testFinRLwithNewsFetch

February 19, 2026

[1]:
```
!pip install stable-baselines3[extra]
!pip install git+https://github.com/AI4Finance-Foundation/FinRL.git
!pip install websockets>=15.0.0 --quiet
!pip install transformers --quiet
!pip install newsapi-python --quiet
```

```
zsh:1: no matches found: stable-baselines3[extra]
Collecting git+https://github.com/AI4Finance-Foundation/FinRL.git
  Cloning https://github.com/AI4Finance-Foundation/FinRL.git to
/private/var/folders/sc/40gcq14x2cng8czg1s_vpkbr0000gn/T/pip-req-build-tzspo8pp
  Running command git clone --filter=blob:none --quiet
https://github.com/AI4Finance-Foundation/FinRL.git
/private/var/folders/sc/40gcq14x2cng8czg1s_vpkbr0000gn/T/pip-req-build-tzspo8pp
  Resolved https://github.com/AI4Finance-Foundation/FinRL.git to commit
f4283de63ca73c915321c5555fa3751698a61eec
  Installing build dependencies … done
  Getting requirements to build wheel … done
  Preparing metadata (pyproject.toml) … done
Requirement already satisfied: alpaca-py<0.38,>=0.37 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (0.37.0)
Requirement already satisfied: alpaca-trade-api<4,>=3 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (3.2.0)
Requirement already satisfied: ccxt<4,>=3 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (3.1.60)
Collecting elegantrl@ git+https://github.com/AI4Finance-Foundation/ElegantRL.git
(from finrl==0.3.8)
  Cloning https://github.com/AI4Finance-Foundation/ElegantRL.git to
/private/var/folders/sc/40gcq14x2cng8czg1s_vpkbr0000gn/T/pip-
install-v4oupadm/elegantrl_73c6e9686fd3422988a958770d68272b
  Running command git clone --filter=blob:none --quiet
https://github.com/AI4Finance-Foundation/ElegantRL.git
/private/var/folders/sc/40gcq14x2cng8czg1s_vpkbr0000gn/T/pip-
install-v4oupadm/elegantrl_73c6e9686fd3422988a958770d68272b
  Resolved https://github.com/AI4Finance-Foundation/ElegantRL.git to commit
95a1a6bbc92e62c8d2ac470b2315d961da343889
  Installing build dependencies … done
  Getting requirements to build wheel … done
  Preparing metadata (pyproject.toml) … done
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Requirement already satisfied: jqdatasdk<2,>=1 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (1.9.8)
Requirement already satisfied: pandas-market-calendars<6,>=5 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (5.3.0)
Requirement already satisfied: pyfolio-reloaded<0.10,>=0.9 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (0.9.9)
Requirement already satisfied: pyportfolioopt<2,>=1 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (1.5.6)
Requirement already satisfied: ray<3,>=2 in /opt/miniconda3/lib/python3.13/site-
packages (from ray[default,tune]<3,>=2->finrl==0.3.8) (2.54.0)
Requirement already satisfied: scikit-learn<2,>=1 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (1.8.0)
Requirement already satisfied: selenium<5,>=4 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (4.32.0)
Requirement already satisfied: stable-baselines3>=2.0.0a5 in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (2.8.0a2)
Requirement already satisfied: stockstats<0.6,>=0.5 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (0.5.4)
Requirement already satisfied: webdriver-manager<5,>=4 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (4.0.2)
Requirement already satisfied: wrds<4,>=3 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (3.5.0)
Requirement already satisfied: yfinance<0.3,>=0.2 in
/opt/miniconda3/lib/python3.13/site-packages (from finrl==0.3.8) (0.2.58)
Requirement already satisfied: th in /opt/miniconda3/lib/python3.13/site-
packages (from elegantrl@ git+https://github.com/AI4Finance-
Foundation/ElegantRL.git->finrl==0.3.8) (0.4.1)
Requirement already satisfied: numpy in /opt/miniconda3/lib/python3.13/site-
packages (from elegantrl@ git+https://github.com/AI4Finance-
Foundation/ElegantRL.git->finrl==0.3.8) (2.4.2)
Requirement already satisfied: gymnasium in /opt/miniconda3/lib/python3.13/site-
packages (from elegantrl@ git+https://github.com/AI4Finance-
Foundation/ElegantRL.git->finrl==0.3.8) (1.2.3)
Requirement already satisfied: matplotlib in
/opt/miniconda3/lib/python3.13/site-packages (from elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(3.10.8)
Requirement already satisfied: msgpack<2.0.0,>=1.0.3 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (1.0.3)
Requirement already satisfied: pandas>=1.5.3 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (2.2.3)
Requirement already satisfied: pydantic<3.0.0,>=2.0.3 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (2.12.4)
Requirement already satisfied: requests<3.0.0,>=2.30.0 in
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/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (2.32.5)
Requirement already satisfied: sseclient-py<2.0.0,>=1.7.2 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (1.9.0)
Requirement already satisfied: websockets>=10.4 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-
py<0.38,>=0.37->finrl==0.3.8) (10.4)
Requirement already satisfied: urllib3<2,>1.24 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-trade-
api<4,>=3->finrl==0.3.8) (1.26.20)
Requirement already satisfied: websocket-client<2,>=0.56.0 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-trade-
api<4,>=3->finrl==0.3.8) (1.9.0)
Requirement already satisfied: aiohttp<4,>=3.8.3 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-trade-
api<4,>=3->finrl==0.3.8) (3.13.3)
Requirement already satisfied: PyYAML==6.0.1 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-trade-
api<4,>=3->finrl==0.3.8) (6.0.1)
Requirement already satisfied: deprecation==2.1.0 in
/opt/miniconda3/lib/python3.13/site-packages (from alpaca-trade-
api<4,>=3->finrl==0.3.8) (2.1.0)
Requirement already satisfied: packaging in /opt/miniconda3/lib/python3.13/site-
packages (from deprecation==2.1.0->alpaca-trade-api<4,>=3->finrl==0.3.8) (25.0)
Requirement already satisfied: aiohappyeyeballs>=2.5.0 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (2.6.1)
Requirement already satisfied: aiosignal>=1.4.0 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (1.4.0)
Requirement already satisfied: attrs>=17.3.0 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (25.4.0)
Requirement already satisfied: frozenlist>=1.1.1 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (1.8.0)
Requirement already satisfied: multidict<7.0,>=4.5 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (6.7.1)
Requirement already satisfied: propcache>=0.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (0.4.1)
Requirement already satisfied: yarl<2.0,>=1.17.0 in
/opt/miniconda3/lib/python3.13/site-packages (from aiohttp<4,>=3.8.3->alpaca-
trade-api<4,>=3->finrl==0.3.8) (1.22.0)
Requirement already satisfied: setuptools>=60.9.0 in
/opt/miniconda3/lib/python3.13/site-packages (from ccxt<4,>=3->finrl==0.3.8)
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(80.9.0)
Requirement already satisfied: certifi>=2018.1.18 in
/opt/miniconda3/lib/python3.13/site-packages (from ccxt<4,>=3->finrl==0.3.8)
(2026.1.4)
Requirement already satisfied: cryptography>=2.6.1 in
/opt/miniconda3/lib/python3.13/site-packages (from ccxt<4,>=3->finrl==0.3.8)
(46.0.3)
Requirement already satisfied: aiodns>=1.1.1 in
/opt/miniconda3/lib/python3.13/site-packages (from ccxt<4,>=3->finrl==0.3.8)
(4.0.0)
Requirement already satisfied: six in /opt/miniconda3/lib/python3.13/site-
packages (from jqdatasdk<2,>=1->finrl==0.3.8) (1.17.0)
Requirement already satisfied: SQLAlchemy>=1.2.8 in
/opt/miniconda3/lib/python3.13/site-packages (from
jqdatasdk<2,>=1->finrl==0.3.8) (2.0.46)
Requirement already satisfied: thriftpy2!=0.5.1,>=0.3.9 in
/opt/miniconda3/lib/python3.13/site-packages (from
jqdatasdk<2,>=1->finrl==0.3.8) (0.6.0)
Requirement already satisfied: pymysql>=0.7.6 in
/opt/miniconda3/lib/python3.13/site-packages (from
jqdatasdk<2,>=1->finrl==0.3.8) (1.1.2)
Requirement already satisfied: exchange-calendars>=3.3 in
/opt/miniconda3/lib/python3.13/site-packages (from pandas-market-
calendars<6,>=5->finrl==0.3.8) (4.13.1)
Requirement already satisfied: annotated-types>=0.6.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
pydantic<3.0.0,>=2.0.3->alpaca-py<0.38,>=0.37->finrl==0.3.8) (0.6.0)
Requirement already satisfied: pydantic-core==2.41.5 in
/opt/miniconda3/lib/python3.13/site-packages (from
pydantic<3.0.0,>=2.0.3->alpaca-py<0.38,>=0.37->finrl==0.3.8) (2.41.5)
Requirement already satisfied: typing-extensions>=4.14.1 in
/opt/miniconda3/lib/python3.13/site-packages (from
pydantic<3.0.0,>=2.0.3->alpaca-py<0.38,>=0.37->finrl==0.3.8) (4.15.0)
Requirement already satisfied: typing-inspection>=0.4.2 in
/opt/miniconda3/lib/python3.13/site-packages (from
pydantic<3.0.0,>=2.0.3->alpaca-py<0.38,>=0.37->finrl==0.3.8) (0.4.2)
Requirement already satisfied: ipython>=3.2.3 in
/opt/miniconda3/lib/python3.13/site-packages (from pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (9.8.0)
Requirement already satisfied: pytz>=2014.10 in
/opt/miniconda3/lib/python3.13/site-packages (from pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (2025.2)
Requirement already satisfied: scipy>=0.14.0 in
/opt/miniconda3/lib/python3.13/site-packages (from pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (1.17.0)
Requirement already satisfied: seaborn>=0.7.1 in
/opt/miniconda3/lib/python3.13/site-packages (from pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.13.2)
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Requirement already satisfied: empyrical-reloaded>=0.5.9 in
/opt/miniconda3/lib/python3.13/site-packages (from pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.5.12)
Requirement already satisfied: python-dateutil>=2.8.2 in
/opt/miniconda3/lib/python3.13/site-packages (from pandas>=1.5.3->alpaca-
py<0.38,>=0.37->finrl==0.3.8) (2.9.0.post0)
Requirement already satisfied: tzdata>=2022.7 in
/opt/miniconda3/lib/python3.13/site-packages (from pandas>=1.5.3->alpaca-
py<0.38,>=0.37->finrl==0.3.8) (2025.3)
Requirement already satisfied: cvxpy>=1.1.19 in
/opt/miniconda3/lib/python3.13/site-packages (from
pyportfolioopt<2,>=1->finrl==0.3.8) (1.8.1)
Requirement already satisfied: ecos<3.0.0,>=2.0.14 in
/opt/miniconda3/lib/python3.13/site-packages (from
pyportfolioopt<2,>=1->finrl==0.3.8) (2.0.14)
Requirement already satisfied: plotly<6.0.0,>=5.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
pyportfolioopt<2,>=1->finrl==0.3.8) (5.24.1)
Requirement already satisfied: tenacity>=6.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
plotly<6.0.0,>=5.0.0->pyportfolioopt<2,>=1->finrl==0.3.8) (9.1.4)
Requirement already satisfied: click>=7.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (8.2.1)
Requirement already satisfied: filelock in /opt/miniconda3/lib/python3.13/site-
packages (from ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (3.24.2)
Requirement already satisfied: jsonschema in
/opt/miniconda3/lib/python3.13/site-packages (from
ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (4.26.0)
Requirement already satisfied: protobuf>=3.20.3 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (6.33.5)
Requirement already satisfied: aiohttp_cors in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (0.8.1)
Requirement already satisfied: colorful in /opt/miniconda3/lib/python3.13/site-
packages (from ray[default,tune]<3,>=2->finrl==0.3.8) (0.5.8)
Requirement already satisfied: py-spy>=0.4.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (0.4.1)
Requirement already satisfied: grpcio>=1.42.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (1.78.0)
Requirement already satisfied: opencensus in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (0.11.4)
Requirement already satisfied: opentelemetry-sdk>=1.30.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
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ray[default,tune]<3,>=2->finrl==0.3.8) (1.39.1)
Requirement already satisfied: opentelemetry-exporter-prometheus in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (0.60b1)
Requirement already satisfied: opentelemetry-proto in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (1.39.1)
Requirement already satisfied: prometheus_client>=0.7.1 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (0.24.1)
Requirement already satisfied: smart_open in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (7.5.0)
Requirement already satisfied: virtualenv!=20.21.1,>=20.0.24 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (20.36.1)
Requirement already satisfied: tensorboardX>=1.9 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (2.6.4)
Requirement already satisfied: pyarrow>=9.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
ray[default,tune]<3,>=2->finrl==0.3.8) (23.0.1)
Requirement already satisfied: fsspec in /opt/miniconda3/lib/python3.13/site-
packages (from ray[default,tune]<3,>=2->finrl==0.3.8) (2026.2.0)
Requirement already satisfied: charset_normalizer<4,>=2 in
/opt/miniconda3/lib/python3.13/site-packages (from
requests<3.0.0,>=2.30.0->alpaca-py<0.38,>=0.37->finrl==0.3.8) (3.4.4)
Requirement already satisfied: idna<4,>=2.5 in
/opt/miniconda3/lib/python3.13/site-packages (from
requests<3.0.0,>=2.30.0->alpaca-py<0.38,>=0.37->finrl==0.3.8) (3.11)
Requirement already satisfied: joblib>=1.3.0 in
/opt/miniconda3/lib/python3.13/site-packages (from scikit-
learn<2,>=1->finrl==0.3.8) (1.5.3)
Requirement already satisfied: threadpoolctl>=3.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from scikit-
learn<2,>=1->finrl==0.3.8) (3.6.0)
Requirement already satisfied: trio~=0.17 in
/opt/miniconda3/lib/python3.13/site-packages (from selenium<5,>=4->finrl==0.3.8)
(0.33.0)
Requirement already satisfied: trio-websocket~=0.9 in
/opt/miniconda3/lib/python3.13/site-packages (from selenium<5,>=4->finrl==0.3.8)
(0.12.2)
Requirement already satisfied: sortedcontainers in
/opt/miniconda3/lib/python3.13/site-packages (from
trio~=0.17->selenium<5,>=4->finrl==0.3.8) (2.4.0)
Requirement already satisfied: outcome in /opt/miniconda3/lib/python3.13/site-
packages (from trio~=0.17->selenium<5,>=4->finrl==0.3.8) (1.3.0.post0)
Requirement already satisfied: sniffio>=1.3.0 in
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/opt/miniconda3/lib/python3.13/site-packages (from
trio~=0.17->selenium<5,>=4->finrl==0.3.8) (1.3.1)
Requirement already satisfied: wsproto>=0.14 in
/opt/miniconda3/lib/python3.13/site-packages (from trio-
websocket~=0.9->selenium<5,>=4->finrl==0.3.8) (1.3.2)
Requirement already satisfied: PySocks!=1.5.7,<2.0,>=1.5.6 in
/opt/miniconda3/lib/python3.13/site-packages (from
urllib3[socks]<3,>=1.26->selenium<5,>=4->finrl==0.3.8) (1.7.1)
Requirement already satisfied: python-dotenv in
/opt/miniconda3/lib/python3.13/site-packages (from webdriver-
manager<5,>=4->finrl==0.3.8) (1.1.0)
Requirement already satisfied: psycopg2-binary<2.10,>=2.9 in
/opt/miniconda3/lib/python3.13/site-packages (from wrds<4,>=3->finrl==0.3.8)
(2.9.11)
Requirement already satisfied: decorator>=4.3.2 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (5.2.1)
Requirement already satisfied: ipython-pygments-lexers>=1.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (1.1.1)
Requirement already satisfied: jedi>=0.18.1 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.19.2)
Requirement already satisfied: matplotlib-inline>=0.1.5 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.2.1)
Requirement already satisfied: pexpect>4.3 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (4.9.0)
Requirement already satisfied: prompt_toolkit<3.1.0,>=3.0.41 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (3.0.52)
Requirement already satisfied: pygments>=2.11.0 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (2.19.2)
Requirement already satisfied: stack_data>=0.6.0 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.6.3)
Requirement already satisfied: traitlets>=5.13.0 in
/opt/miniconda3/lib/python3.13/site-packages (from ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (5.14.3)
Requirement already satisfied: wcwidth in /opt/miniconda3/lib/python3.13/site-
packages (from prompt_toolkit<3.1.0,>=3.0.41->ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.6.0)
Requirement already satisfied: multitasking>=0.0.7 in
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (0.0.12)
Requirement already satisfied: platformdirs>=2.0.0 in
```

```
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (4.5.0)
Requirement already satisfied: frozendict>=2.3.4 in
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (2.4.6)
Requirement already satisfied: peewee>=3.16.2 in
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (3.17.3)
Requirement already satisfied: beautifulsoup4>=4.11.1 in
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (4.14.3)
Requirement already satisfied: curl_cffi>=0.7 in
/opt/miniconda3/lib/python3.13/site-packages (from
yfinance<0.3,>=0.2->finrl==0.3.8) (0.14.0)
Requirement already satisfied: pycares<6,>=5.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
aiodns>=1.1.1->ccxt<4,>=3->finrl==0.3.8) (5.0.1)
Requirement already satisfied: cffi>=1.5.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
pycares<6,>=5.0.0->aiodns>=1.1.1->ccxt<4,>=3->finrl==0.3.8) (2.0.0)
Requirement already satisfied: soupsieve>=1.6.1 in
/opt/miniconda3/lib/python3.13/site-packages (from
beautifulsoup4>=4.11.1->yfinance<0.3,>=0.2->finrl==0.3.8) (2.8.3)
Requirement already satisfied: pycparser in /opt/miniconda3/lib/python3.13/site-
packages (from
cffi>=1.5.0->pycares<6,>=5.0.0->aiodns>=1.1.1->ccxt<4,>=3->finrl==0.3.8) (2.23)
Requirement already satisfied: osqp>=1.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
cvxpy>=1.1.19->pyportfolioopt<2,>=1->finrl==0.3.8) (1.1.1)
Requirement already satisfied: clarabel>=0.5.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
cvxpy>=1.1.19->pyportfolioopt<2,>=1->finrl==0.3.8) (0.11.1)
Requirement already satisfied: scs>=3.2.4.post1 in
/opt/miniconda3/lib/python3.13/site-packages (from
cvxpy>=1.1.19->pyportfolioopt<2,>=1->finrl==0.3.8) (3.2.11)
Requirement already satisfied: highspy>=1.11.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
cvxpy>=1.1.19->pyportfolioopt<2,>=1->finrl==0.3.8) (1.13.1)
Requirement already satisfied: bottleneck>=1.3.0 in
/opt/miniconda3/lib/python3.13/site-packages (from empyrical-
reloaded>=0.5.9->pyfolio-reloaded<0.10,>=0.9->finrl==0.3.8) (1.6.0)
Requirement already satisfied: pyluach>=2.3.0 in
/opt/miniconda3/lib/python3.13/site-packages (from exchange-
calendars>=3.3->pandas-market-calendars<6,>=5->finrl==0.3.8) (2.3.0)
Requirement already satisfied: toolz>=1.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from exchange-
calendars>=3.3->pandas-market-calendars<6,>=5->finrl==0.3.8) (1.1.0)
Requirement already satisfied: korean_lunar_calendar>=0.3.1 in
```

```
/opt/miniconda3/lib/python3.13/site-packages (from exchange-
calendars>=3.3->pandas-market-calendars<6,>=5->finrl==0.3.8) (0.3.1)
Requirement already satisfied: parso<0.9.0,>=0.8.4 in
/opt/miniconda3/lib/python3.13/site-packages (from
jedi>=0.18.1->ipython>=3.2.3->pyfolio-reloaded<0.10,>=0.9->finrl==0.3.8) (0.8.6)
Requirement already satisfied: contourpy>=1.0.1 in
/opt/miniconda3/lib/python3.13/site-packages (from matplotlib->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(1.3.3)
Requirement already satisfied: cycler>=0.10 in
/opt/miniconda3/lib/python3.13/site-packages (from matplotlib->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in
/opt/miniconda3/lib/python3.13/site-packages (from matplotlib->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(4.61.1)
Requirement already satisfied: kiwisolver>=1.3.1 in
/opt/miniconda3/lib/python3.13/site-packages (from matplotlib->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(1.4.9)
Requirement already satisfied: pillow>=8 in /opt/miniconda3/lib/python3.13/site-
packages (from matplotlib->elegantrl@ git+https://github.com/AI4Finance-
Foundation/ElegantRL.git->finrl==0.3.8) (12.1.1)
Requirement already satisfied: pyparsing>=3 in
/opt/miniconda3/lib/python3.13/site-packages (from matplotlib->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(3.3.2)
Requirement already satisfied: opentelemetry-api==1.39.1 in
/opt/miniconda3/lib/python3.13/site-packages (from opentelemetry-
sdk>=1.30.0->ray[default,tune]<3,>=2->finrl==0.3.8) (1.39.1)
Requirement already satisfied: opentelemetry-semantic-conventions==0.60b1 in
/opt/miniconda3/lib/python3.13/site-packages (from opentelemetry-
sdk>=1.30.0->ray[default,tune]<3,>=2->finrl==0.3.8) (0.60b1)
Requirement already satisfied: importlib-metadata<8.8.0,>=6.0 in
/opt/miniconda3/lib/python3.13/site-packages (from opentelemetry-
api==1.39.1->opentelemetry-sdk>=1.30.0->ray[default,tune]<3,>=2->finrl==0.3.8)
(8.7.1)
Requirement already satisfied: zipp>=3.20 in
/opt/miniconda3/lib/python3.13/site-packages (from importlib-
metadata<8.8.0,>=6.0->opentelemetry-api==1.39.1->opentelemetry-
sdk>=1.30.0->ray[default,tune]<3,>=2->finrl==0.3.8) (3.23.0)
Requirement already satisfied: jinja2 in /opt/miniconda3/lib/python3.13/site-
packages (from osqp>=1.0.0->cvxpy>=1.1.19->pyportfolioopt<2,>=1->finrl==0.3.8)
(3.1.6)
Requirement already satisfied: ptyprocess>=0.5 in
/opt/miniconda3/lib/python3.13/site-packages (from
pexpect>4.3->ipython>=3.2.3->pyfolio-reloaded<0.10,>=0.9->finrl==0.3.8) (0.7.0)
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Requirement already satisfied: torch<3.0,>=2.3 in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3>=2.0.0a5->stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (2.10.0)
Requirement already satisfied: cloudpickle in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3>=2.0.0a5->stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (3.1.2)
Requirement already satisfied: farama-notifications>=0.0.1 in
/opt/miniconda3/lib/python3.13/site-packages (from gymnasium->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(0.0.4)
Requirement already satisfied: sympy>=1.13.3 in
/opt/miniconda3/lib/python3.13/site-packages (from torch<3.0,>=2.3->stable-
baselines3>=2.0.0a5->stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (1.14.0)
Requirement already satisfied: networkx>=2.5.1 in
/opt/miniconda3/lib/python3.13/site-packages (from torch<3.0,>=2.3->stable-
baselines3>=2.0.0a5->stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (3.6.1)
Requirement already satisfied: opencv-python in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (4.13.0.92)
Requirement already satisfied: pygame in /opt/miniconda3/lib/python3.13/site-
packages (from stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (2.6.1)
Requirement already satisfied: tensorboard>=2.9.1 in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (2.20.0)
Requirement already satisfied: psutil in /opt/miniconda3/lib/python3.13/site-
packages (from stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (7.2.1)
Requirement already satisfied: tqdm in /opt/miniconda3/lib/python3.13/site-
packages (from stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (4.67.1)
Requirement already satisfied: rich in /opt/miniconda3/lib/python3.13/site-
packages (from stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (14.2.0)
Requirement already satisfied: ale-py>=0.9.0 in
/opt/miniconda3/lib/python3.13/site-packages (from stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (0.11.2)
Requirement already satisfied: executing>=1.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
stack_data>=0.6.0->ipython>=3.2.3->pyfolio-reloaded<0.10,>=0.9->finrl==0.3.8)
(2.2.1)
Requirement already satisfied: asttokens>=2.1.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
stack_data>=0.6.0->ipython>=3.2.3->pyfolio-reloaded<0.10,>=0.9->finrl==0.3.8)
(3.0.1)
Requirement already satisfied: pure_eval in /opt/miniconda3/lib/python3.13/site-
packages (from stack_data>=0.6.0->ipython>=3.2.3->pyfolio-
reloaded<0.10,>=0.9->finrl==0.3.8) (0.2.3)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
sympy>=1.13.3->torch<3.0,>=2.3->stable-baselines3>=2.0.0a5->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (1.3.0)
```

```
Requirement already satisfied: absl-py>=0.4 in
/opt/miniconda3/lib/python3.13/site-packages (from tensorboard>=2.9.1->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (2.4.0)
Requirement already satisfied: markdown>=2.6.8 in
/opt/miniconda3/lib/python3.13/site-packages (from tensorboard>=2.9.1->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (3.10.2)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in
/opt/miniconda3/lib/python3.13/site-packages (from tensorboard>=2.9.1->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (0.7.2)
Requirement already satisfied: werkzeug>=1.0.1 in
/opt/miniconda3/lib/python3.13/site-packages (from tensorboard>=2.9.1->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (3.1.5)
Requirement already satisfied: ply<4.0,>=3.4 in
/opt/miniconda3/lib/python3.13/site-packages (from
thriftpy2!=0.5.1,>=0.3.9->jqdatasdk<2,>=1->finrl==0.3.8) (3.11)
Requirement already satisfied: distlib<1,>=0.3.7 in
/opt/miniconda3/lib/python3.13/site-packages (from
virtualenv!=20.21.1,>=20.0.24->ray[default,tune]<3,>=2->finrl==0.3.8) (0.4.0)
Requirement already satisfied: markupsafe>=2.1.1 in
/opt/miniconda3/lib/python3.13/site-packages (from
werkzeug>=1.0.1->tensorboard>=2.9.1->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (3.0.3)
Requirement already satisfied: h11<1,>=0.16.0 in
/opt/miniconda3/lib/python3.13/site-packages (from wsproto>=0.14->trio-
websocket~=0.9->selenium<5,>=4->finrl==0.3.8) (0.16.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in
/opt/miniconda3/lib/python3.13/site-packages (from
jsonschema->ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (2025.9.1)
Requirement already satisfied: referencing>=0.28.4 in
/opt/miniconda3/lib/python3.13/site-packages (from
jsonschema->ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (0.37.0)
Requirement already satisfied: rpds-py>=0.25.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
jsonschema->ray<3,>=2->ray[default,tune]<3,>=2->finrl==0.3.8) (0.30.0)
Requirement already satisfied: opencensus-context>=0.1.3 in
/opt/miniconda3/lib/python3.13/site-packages (from
opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (0.1.3)
Requirement already satisfied: google-api-core<3.0.0,>=1.0.0 in
/opt/miniconda3/lib/python3.13/site-packages (from
opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (2.30.0)
Requirement already satisfied: googleapis-common-protos<2.0.0,>=1.56.3 in
/opt/miniconda3/lib/python3.13/site-packages (from google-api-
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (1.72.0)
Requirement already satisfied: proto-plus<2.0.0,>=1.22.3 in
/opt/miniconda3/lib/python3.13/site-packages (from google-api-
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (1.27.1)
Requirement already satisfied: google-auth<3.0.0,>=2.14.1 in
/opt/miniconda3/lib/python3.13/site-packages (from google-api-
```

```
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (2.48.0)
Requirement already satisfied: pyasn1-modules>=0.2.1 in
/opt/miniconda3/lib/python3.13/site-packages (from google-
auth<3.0.0,>=2.14.1->google-api-
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (0.4.2)
Requirement already satisfied: rsa<5,>=3.1.4 in
/opt/miniconda3/lib/python3.13/site-packages (from google-
auth<3.0.0,>=2.14.1->google-api-
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (4.9.1)
Requirement already satisfied: pyasn1>=0.1.3 in
/opt/miniconda3/lib/python3.13/site-packages (from rsa<5,>=3.1.4->google-
auth<3.0.0,>=2.14.1->google-api-
core<3.0.0,>=1.0.0->opencensus->ray[default,tune]<3,>=2->finrl==0.3.8) (0.6.2)
Requirement already satisfied: markdown-it-py>=2.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from rich->stable-
baselines3[extra]>=2.0.0a5->finrl==0.3.8) (4.0.0)
Requirement already satisfied: mdurl~=0.1 in
/opt/miniconda3/lib/python3.13/site-packages (from markdown-it-
py>=2.2.0->rich->stable-baselines3[extra]>=2.0.0a5->finrl==0.3.8) (0.1.2)
Requirement already satisfied: wrapt in /opt/miniconda3/lib/python3.13/site-
packages (from smart_open->ray[default,tune]<3,>=2->finrl==0.3.8) (2.1.1)
Requirement already satisfied: niltype<2.0,>=0.3 in
/opt/miniconda3/lib/python3.13/site-packages (from th->elegantrl@
git+https://github.com/AI4Finance-Foundation/ElegantRL.git->finrl==0.3.8)
(1.0.2)
zsh:1: 15.0.0 not found
```

[2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.dates as mdates
import plotly.graph_objects as go
import pkg_resources
import yfinance as yf
from datetime import timedelta, date
from transformers import BertTokenizer, BertForSequenceClassification
from newsapi import NewsApiClient
import torch as th
import torch.nn as nn

import stable_baselines3
import finrl

from stable_baselines3.common.torch_layers import BaseFeaturesExtractor
from finrl.meta.preprocessor.yahoodownloader import YahooDownloader
from finrl.meta.preprocessor.preprocessors import FeatureEngineer
from finrl.agents.stablebaselines3.models import DRLAgent
```

```
from finrl.meta.env_stock_trading.env_stocktrading import StockTradingEnv
from finrl.config import INDICATORS

%matplotlib inline
plt.close('all')

print(f"SB3 Version:    {stable_baselines3.__version__}")
print(f"FinRL Version:  {pkg_resources.get_distribution('finrl').version}")
print(f"CUDA Available: {th.cuda.is_available()}")

#   Mac GPU (Metal / MPS) detection
if th.backends.mps.is_available():
    DEVICE = th.device('mps')
    print("MPS (Apple Metal GPU) available - using GPU  ")
elif th.cuda.is_available():
    DEVICE = th.device('cuda')
    print(f"CUDA GPU available - using {th.cuda.get_device_name(0)}  ")
else:
    DEVICE = th.device('cpu')
    print("No GPU found - falling back to CPU")

print(f"Active device: {DEVICE}")
```

```
/var/folders/sc/40gcq14x2cng8czg1s_vpkbr0000gn/T/ipykernel_31669/1609060016.py:6
: UserWarning: pkg_resources is deprecated as an API. See
https://setuptools.pypa.io/en/latest/pkg_resources.html. The pkg_resources
package is slated for removal as early as 2025-11-30. Refrain from using this
package or pin to Setuptools<81.
  import pkg_resources
/opt/miniconda3/lib/python3.13/site-packages/tqdm/auto.py:21: TqdmWarning:
IProgress not found. Please update jupyter and ipywidgets. See
https://ipywidgets.readthedocs.io/en/stable/user_install.html
  from .autonotebook import tqdm as notebook_tqdm

SB3 Version:    2.8.0a2
FinRL Version:  0.3.8
CUDA Available: False
MPS (Apple Metal GPU) available - using GPU
Active device: mps
```

[ ]:
```
# ============================================================
# CELL 2b - Load FinBERT & NewsAPI Sentiment Utilities
# ============================================================
import os
import pickle

#   NewsAPI client
NEWSAPI_KEY = "0c5d7e70068a47889cf0b732e276991f"
```

```
newsapi     = NewsApiClient(api_key=NEWSAPI_KEY)

#   FinBERT
SENTIMENT_DEVICE = 'cpu'

print("Loading FinBERT...")
tokenizer = BertTokenizer.from_pretrained('ProsusAI/finbert')
finbert   = BertForSequenceClassification.from_pretrained('ProsusAI/finbert')
finbert   = finbert.to(SENTIMENT_DEVICE)
finbert.eval()
print("FinBERT loaded  ")


def score_headlines(headlines: list[str]) -> float:
    """
    Run a list of headlines through FinBERT.
    Returns a float in [-1, +1]: positive = bullish, negative = bearish.
    """
    if not headlines:
        return 0.0

    scores = []
    for text in headlines:
        inputs = tokenizer(
            text,
            return_tensors='pt',
            truncation=True,
            max_length=128,
            padding=True
        ).to(SENTIMENT_DEVICE)

        with th.no_grad():
            logits = finbert(**inputs).logits
            probs  = th.softmax(logits, dim=1).squeeze()

        # FinBERT labels: 0=positive, 1=negative, 2=neutral
        score = probs[0].item() - probs[1].item()
        scores.append(score)

    return float(np.mean(scores))


def fetch_sentiment_newsapi(ticker: str, start_date: str, end_date: str) -> pd.
 ↪Series:
    """
    Fetch news headlines for a ticker from NewsAPI and score each day.
    """
```

```
    daily_headlines: dict[str, list[str]] = {}

    try:
        response = newsapi.get_everything(
            q=ticker,
            from_param=start_date,
            to=end_date,
            language='en',
            sort_by='publishedAt',
            page_size=100
        )

        for article in response.get('articles', []):
            pub_ts   = pd.Timestamp(article['publishedAt'])
            date_str = pub_ts.strftime('%Y-%m-%d')
            title    = article.get('title', '') or ''
            if title and '[Removed]' not in title:
                daily_headlines.setdefault(date_str, []).append(title)

    except Exception as e:
        print(f"  Warning: NewsAPI error for {ticker}: {e}")

    dated_scores = {
        date_str: score_headlines(headlines)
        for date_str, headlines in daily_headlines.items()
    }

    return pd.Series(dated_scores, name=ticker)


def build_sentiment_df(tickers: list[str], start_date: str, end_date: str) ->␣
 ↪pd.DataFrame:
    """
    Build a (trading_days x n_tickers) DataFrame of daily sentiment scores.
    Missing days are forward-filled then zero-filled (neutral).
    """
    print(f"Fetching NewsAPI sentiment for {len(tickers)} tickers "
          f"({start_date} → {end_date})...")
    series_list = []

    for i, ticker in enumerate(tickers):
        print(f"  [{i+1}/{len(tickers)}] {ticker}", end='\r')
        s = fetch_sentiment_newsapi(ticker, start_date, end_date)
        series_list.append(s)

    df_sent = pd.DataFrame(series_list).T
    df_sent.index.name = 'date'
```

```
    df_sent = df_sent.sort_index().ffill().fillna(0.0)

    print(f"\nDone. Sentiment shape: {df_sent.shape}")
    print(f"Non-zero sentiment entries: {(df_sent != 0).sum().sum()}")
    return df_sent


def build_sentiment_df_cached(
    tickers: list[str],
    start_date: str,
    end_date: str,
    cache_file: str = 'sentiment_cache.pkl'
) -> pd.DataFrame:
    """
    Load sentiment from cache if it exists and was built today,
    otherwise fetch fresh from NewsAPI and save to cache.
    This prevents burning through the 100 requests/day limit
    every time a cell is re-run.
    """
    today_str = date.today().strftime('%Y-%m-%d')

    # Check for valid cache
    if os.path.exists(cache_file):
        with open(cache_file, 'rb') as f:
            cached = pickle.load(f)

        if cached.get('fetch_date') == today_str:
            print(f"  Loaded sentiment from cache: {cache_file} "
                  f"(fetched today, {cached.get('n_requests')} requests used)")
            return cached['df']
        else:
            print(f"Cache found but is from {cached.get('fetch_date')} "
                  f"- fetching fresh data...")
    else:
        print(f"No cache found at {cache_file} - fetching fresh data...")

    # Fetch fresh from NewsAPI
    df_sent = build_sentiment_df(tickers, start_date, end_date)

    # Save to cache with metadata
    cache_data = {
        'fetch_date': today_str,
        'start_date': start_date,
        'end_date':   end_date,
        'n_requests': len(tickers),
        'df':         df_sent
    }
```

```
    with open(cache_file, 'wb') as f:
        pickle.dump(cache_data, f)

    print(f"  Sentiment cached to {cache_file} "
          f"({len(tickers)} requests used today)")
    return df_sent
```

[4]:
```
# ============================================================
# CELL 3 - Download Data
# ============================================================
TICKERS = [
    'AAPL', 'MSFT', 'GOOGL', 'AMZN', 'META', 'TSLA', 'NVDA', 'PYPL', 'ADBE',␣
 ↪'NFLX',
    'INTC', 'CSCO', 'PEP',  'AVGO', 'COST', 'QCOM', 'CMCSA','TMUS', 'TXN', ␣
 ↪'AMGN',
    'HON',  'SBUX', 'INTU', 'MDLZ', 'GILD', 'ISRG', 'ADP',  'BKNG', 'VRTX',␣
 ↪'ADI'
]
NUM_STOCKS = len(TICKERS)  # 30 - use this constant everywhere, no magic numbers

# Download training data
df_raw_train = YahooDownloader(
    start_date='2020-01-01',
    end_date='2024-01-01',
    ticker_list=TICKERS
).fetch_data()

# Download test data (held-out period)
df_raw_test = YahooDownloader(
    start_date='2024-01-01',
    end_date='2025-01-01',
    ticker_list=TICKERS
).fetch_data()

# Add Technical Indicators
fe = FeatureEngineer(
    use_technical_indicator=True,
    tech_indicator_list=INDICATORS,
    use_vix=False,
    use_turbulence=False
)

df_train = fe.preprocess_data(df_raw_train)
df_test  = fe.preprocess_data(df_raw_test)

print(f"Train shape: {df_train.shape}")
print(f"Test shape:  {df_test.shape}")
```

```
YF deprecation warning: set proxy via new config function:
yf.set_config(proxy=proxy)

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Shape of DataFrame:  (30180, 8)

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Shape of DataFrame:  (7560, 8)
Successfully added technical indicators
Successfully added technical indicators
Train shape: (30180, 16)
Test shape:  (7560, 16)
```

[ ]:
```python
# ============================================================
# CELL 2c - Fetch Sentiment Scores (Cached)
# ============================================================
from datetime import date, timedelta

TODAY      = date.today()
DAYS_LIMIT = 29

def safe_newsapi_start(start_date: str) -> str:
    """Clamp start_date to within the past 30 days for NewsAPI."""
    earliest_allowed = (TODAY - timedelta(days=DAYS_LIMIT)).strftime('%Y-%m-%d')
    return max(start_date, earliest_allowed)

TRAIN_START = '2020-01-01'
TRAIN_END   = '2024-01-01'
TEST_START  = '2024-01-01'
TEST_END    = '2025-01-01'

# Each cache file is tied to its date range so they don't overwrite each other
df_sent_train = build_sentiment_df_cached(
    TICKERS,
    safe_newsapi_start(TRAIN_START),
    TRAIN_END,
    cache_file='sentiment_train.pkl'
```

```
)
df_sent_test = build_sentiment_df_cached(
    TICKERS,
    safe_newsapi_start(TEST_START),
    TEST_END,
    cache_file='sentiment_test.pkl'
)

print("\nTrain sentiment (expect mostly zeros):")
print(df_sent_train.tail())
print("\nTest sentiment (expect mostly zeros):")
print(df_sent_test.tail())
```

[7]:
```
# ============================================================
# CELL 4 - Clean, Validate & Merge Sentiment (Corrected)
# ============================================================

# Define here so both Cell 4 and Cell 5 can reference it
INDICATORS_WITH_SENT = INDICATORS + ['sentiment']
INDICATORS_COUNT     = len(INDICATORS_WITH_SENT)

def prepare_df(df, df_sentiment, n_stocks=NUM_STOCKS):
    df = df.rename(columns={'datadate': 'date'})
    df = df.sort_values(['date', 'tic']).reset_index(drop=True)

    ticker_counts = df.groupby('date')['tic'].nunique()
    incomplete    = ticker_counts[ticker_counts != n_stocks].index
    if len(incomplete) > 0:
        print(f"Dropping {len(incomplete)} incomplete date(s)")
        df = df[~df['date'].isin(incomplete)].reset_index(drop=True)

    df_sent_long = df_sentiment.reset_index().melt(
        id_vars='date',
        var_name='tic',
        value_name='sentiment'
    )
    df_sent_long['date'] = df_sent_long['date'].astype(str).str[:10]
    df['date_str']       = df['date'].astype(str).str[:10]

    df = df.merge(
        df_sent_long,
        left_on=['date_str', 'tic'],
        right_on=['date', 'tic'],
        how='left',
        suffixes=('', '_sent')
    ).drop(columns=['date_sent', 'date_str'], errors='ignore')
```

```
    df['sentiment'] = df['sentiment'].fillna(0.0)

    non_zero = (df['sentiment'] != 0).sum()
    print(f"Sentiment merged - non-zero rows: {non_zero} / {len(df)}")

    assert 'sentiment' in df.columns, "sentiment column missing!"

    df.index = df['date'].factorize()[0]
    return df

df_train = prepare_df(df_train, df_sent_train)
df_test  = prepare_df(df_test,  df_sent_test)

# Sanity check - now INDICATORS_WITH_SENT is defined above so this works
print(f"\nAll required indicator columns present in df_train:")
for ind in INDICATORS_WITH_SENT:
    present = ind in df_train.columns
    print(f"  {ind}: {' ' if present else ' MISSING'}")

print(f"\nTrain ready - {df_train['date'].nunique()} trading days")
print(f"Test  ready - {df_test['date'].nunique()} trading days")

# ============================================================
# CELL 5 - Define Model & Train (Sentiment-Aware, Corrected)
# ============================================================
#INDICATORS_WITH_SENT = INDICATORS + ['sentiment']
#INDICATORS_COUNT     = len(INDICATORS_WITH_SENT)
INDICATORS_START_IDX = 1 + NUM_STOCKS + NUM_STOCKS
STATE_SPACE          = INDICATORS_START_IDX + (NUM_STOCKS * INDICATORS_COUNT)

# Sanity check - make sure state space matches what the env will actually see
expected_cols = 1 + NUM_STOCKS + NUM_STOCKS + (NUM_STOCKS * INDICATORS_COUNT)
print(f"Expected state space: {STATE_SPACE}")
print(f"  = 1 cash + {NUM_STOCKS} prices + {NUM_STOCKS} shares "
      f"+ {NUM_STOCKS} stocks x {INDICATORS_COUNT} indicators")
assert STATE_SPACE == expected_cols, \
    f"State space mismatch: {STATE_SPACE} vs {expected_cols}"
print("State space verified ")

class VGG_FinRL_Extractor(BaseFeaturesExtractor):
    def __init__(self, observation_space, features_dim=512,
                 n_stocks=NUM_STOCKS, n_ind=INDICATORS_COUNT):
        super().__init__(observation_space, features_dim)
        self.n_stocks = n_stocks
        self.n_ind    = n_ind

        self.input_norm = nn.BatchNorm2d(1)
```

```
        self.vgg = nn.Sequential(
            nn.Conv2d(1, 32, kernel_size=3, padding=1),
            nn.BatchNorm2d(32), nn.ReLU(),
            nn.Conv2d(32, 64, kernel_size=3, padding=1),
            nn.BatchNorm2d(64), nn.ReLU(),
        )

        with th.no_grad():
            sample    = th.zeros(1, 1, n_stocks, n_ind)
            _norm_cpu = nn.BatchNorm2d(1)
            _vgg_cpu  = nn.Sequential(
                nn.Conv2d(1, 32, kernel_size=3, padding=1),
                nn.BatchNorm2d(32), nn.ReLU(),
                nn.Conv2d(32, 64, kernel_size=3, padding=1),
                nn.BatchNorm2d(64), nn.ReLU(),
            )
            sample    = _norm_cpu(sample)
            n_flatten = _vgg_cpu(sample).numel()

        self.fc = nn.Sequential(
            nn.Linear(n_flatten, features_dim),
            nn.ReLU()
        )

    def forward(self, observations):
        img_data = observations[:, INDICATORS_START_IDX:]
        img_data = img_data.view(-1, 1, self.n_stocks, self.n_ind)
        img_data = self.input_norm(img_data)
        x = self.vgg(img_data)
        x = th.flatten(x, start_dim=1)
        return self.fc(x)

policy_kwargs = dict(
    features_extractor_class=VGG_FinRL_Extractor,
    features_extractor_kwargs=dict(
        features_dim=512,
        n_stocks=NUM_STOCKS,
        n_ind=INDICATORS_COUNT
    ),
)

def make_env(df):
    return StockTradingEnv(
        df=df,
        num_stock_shares=[0] * NUM_STOCKS,
        reward_scaling=1e-4,
```

```
        stock_dim=NUM_STOCKS,
        hmax=100,
        initial_amount=1_000_000,
        buy_cost_pct=[0.001]  * NUM_STOCKS,
        sell_cost_pct=[0.001] * NUM_STOCKS,
        state_space=STATE_SPACE,
        tech_indicator_list=INDICATORS_WITH_SENT,  # sentiment included here
        action_space=NUM_STOCKS
    )

e_train_gym = make_env(df_train)
e_test_gym  = make_env(df_test)

env_train, _ = e_train_gym.get_sb_env()

model_params = {
    "n_steps":       2048,
    "ent_coef":      0.01,
    "learning_rate": 0.0001,
    "batch_size":    64,
    "device":        DEVICE,
}

agent     = DRLAgent(env=env_train)
model_vgg = agent.get_model(
    "ppo",
    policy_kwargs=policy_kwargs,
    model_kwargs=model_params,
    verbose=1
)

print("\nStarting Sentiment-Aware VGG Training...")
trained_vgg = agent.train_model(
    model=model_vgg,
    tb_log_name='vgg_ppo_sentiment_run',
    total_timesteps=500_000
)
# ============================================================
# CELL 6 - Sanity Check Training Behaviour
# ============================================================
shares_start = 1 + NUM_STOCKS   # skip Cash + Prices
shares_end   = shares_start + NUM_STOCKS

final_shares = np.array(e_train_gym.state_memory)[-1][shares_start:shares_end]
print(f"Total shares held across all stocks: {np.sum(final_shares)}")

actions = np.array(e_train_gym.actions_memory)
```

```
print(f"Average absolute action strength: {np.mean(np.abs(actions)):.6f}")
```

```
Sentiment merged - non-zero rows: 0 / 30180
Sentiment merged - non-zero rows: 0 / 7560

All required indicator columns present in df_train:
  macd:
  boll_ub:
  boll_lb:
  rsi_30:
  cci_30:
  dx_30:
  close_30_sma:
  close_60_sma:
  sentiment:

Train ready - 1006 trading days
Test  ready - 252 trading days
Expected state space: 331
  = 1 cash + 30 prices + 30 shares + 30 stocks x 9 indicators
State space verified
{'n_steps': 2048, 'ent_coef': 0.01, 'learning_rate': 0.0001, 'batch_size': 64,
'device': device(type='mps')}
Using mps device

/opt/miniconda3/lib/python3.13/site-
packages/stable_baselines3/common/on_policy_algorithm.py:150: UserWarning: You
are trying to run PPO on the GPU, but it is primarily intended to run on the CPU
when not using a CNN policy (you are using ActorCriticPolicy which should be a
MlpPolicy). See https://github.com/DLR-RM/stable-baselines3/issues/1245 for more
info. You can pass `device='cpu'` or `export CUDA_VISIBLE_DEVICES=` to force
using the CPU.Note: The model will train, but the GPU utilization will be poor
and the training might take longer than on CPU.
  warnings.warn(


Starting Sentiment-Aware VGG Training…
-------------------------------------
| time/              |             |
|    fps             | 276         |
|    iterations      | 1           |
|    time_elapsed    | 7           |
|    total_timesteps | 2048        |
| train/             |             |
|    reward          | -3.1561205  |
|    reward_max      | 7.140023    |
|    reward_mean     | 0.016567688 |
|    reward_min      | -8.425637   |
-------------------------------------
```

```
-------------------------------------
| time/                   |             |
|    fps                  | 215         |
|    iterations           | 2           |
|    time_elapsed         | 18          |
|    total_timesteps      | 4096        |
| train/                  |             |
|    approx_kl            | 0.007790231 |
|    clip_fraction        | 0.0875      |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.6       |
|    explained_variance   | -0.0132     |
|    learning_rate        | 0.0001      |
|    loss                 | 0.768       |
|    n_updates            | 10          |
|    policy_gradient_loss | -0.00945    |
|    reward               | 2.0421958   |
|    reward_max           | 8.257703    |
|    reward_mean          | 0.015451236 |
|    reward_min           | -10.737056  |
|    std                  | 1           |
|    value_loss           | 8.03        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 206         |
|    iterations           | 3           |
|    time_elapsed         | 29          |
|    total_timesteps      | 6144        |
| train/                  |             |
|    approx_kl            | 0.010153657 |
|    clip_fraction        | 0.0971      |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.6       |
|    explained_variance   | 0.67        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.95        |
|    n_updates            | 20          |
|    policy_gradient_loss | -0.0164     |
|    reward               | 0.47012872  |
|    reward_max           | 8.290804    |
|    reward_mean          | 0.054178815 |
|    reward_min           | -9.783268   |
|    std                  | 1           |
|    value_loss           | 4.75        |
-------------------------------------
-------------------------------------
| time/                   |             |
```

```
|    fps                  | 201         |
|    iterations           | 4           |
|    time_elapsed         | 40          |
|    total_timesteps      | 8192        |
| train/                  |             |
|    approx_kl            | 0.011530107 |
|    clip_fraction        | 0.098       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.6       |
|    explained_variance   | 0.782       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.06        |
|    n_updates            | 30          |
|    policy_gradient_loss | -0.0174     |
|    reward               | 0.6307663   |
|    reward_max           | 7.923077    |
|    reward_mean          | 0.050136745 |
|    reward_min           | -10.899241  |
|    std                  | 1           |
|    value_loss           | 5.76        |
-------------------------------------
day: 1005, episode: 10
begin_total_asset: 1000000.00
end_total_asset: 1435182.10
total_reward: 435182.10
total_cost: 272770.59
total_trades: 26477
Sharpe: 0.475
=================================
-------------------------------------
| time/                   |             |
|    fps                  | 198         |
|    iterations           | 5           |
|    time_elapsed         | 51          |
|    total_timesteps      | 10240       |
| train/                  |             |
|    approx_kl            | 0.012118849 |
|    clip_fraction        | 0.113       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.7       |
|    explained_variance   | 0.864       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.98        |
|    n_updates            | 40          |
|    policy_gradient_loss | -0.0164     |
|    reward               | -1.6804281  |
|    reward_max           | 13.128266   |
|    reward_mean          | 0.037009362 |
```

```
|    reward_min           | -9.515338   |
|    std                  | 1           |
|    value_loss           | 5.27        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 197         |
|    iterations           | 6           |
|    time_elapsed         | 62          |
|    total_timesteps      | 12288       |
| train/                  |             |
|    approx_kl            | 0.012341051 |
|    clip_fraction        | 0.134       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.7       |
|    explained_variance   | 0.884       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.09        |
|    n_updates            | 50          |
|    policy_gradient_loss | -0.0182     |
|    reward               | -0.09202063 |
|    reward_max           | 9.15991     |
|    reward_mean          | 0.04787761  |
|    reward_min           | -9.731      |
|    std                  | 1           |
|    value_loss           | 4.94        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 196         |
|    iterations           | 7           |
|    time_elapsed         | 73          |
|    total_timesteps      | 14336       |
| train/                  |             |
|    approx_kl            | 0.015338001 |
|    clip_fraction        | 0.172       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.7       |
|    explained_variance   | 0.909       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.15        |
|    n_updates            | 60          |
|    policy_gradient_loss | -0.0232     |
|    reward               | 0.8142778   |
|    reward_max           | 9.594488    |
|    reward_mean          | 0.08789024  |
|    reward_min           | -9.066261   |
|    std                  | 1.01        |
```

```
|    value_loss           | 3.26        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 195         |
|    iterations           | 8           |
|    time_elapsed         | 83          |
|    total_timesteps      | 16384       |
| train/                  |             |
|    approx_kl            | 0.015057897 |
|    clip_fraction        | 0.152       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.8       |
|    explained_variance   | 0.905       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.23        |
|    n_updates            | 70          |
|    policy_gradient_loss | -0.0207     |
|    reward               | 2.2544668   |
|    reward_max           | 8.325826    |
|    reward_mean          | 0.08444418  |
|    reward_min           | -9.691698   |
|    std                  | 1.01        |
|    value_loss           | 5.29        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 194         |
|    iterations           | 9           |
|    time_elapsed         | 94          |
|    total_timesteps      | 18432       |
| train/                  |             |
|    approx_kl            | 0.014363711 |
|    clip_fraction        | 0.156       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.8       |
|    explained_variance   | 0.928       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.45        |
|    n_updates            | 80          |
|    policy_gradient_loss | -0.0227     |
|    reward               | 1.1261926   |
|    reward_max           | 8.906368    |
|    reward_mean          | 0.068258606 |
|    reward_min           | -9.638256   |
|    std                  | 1.01        |
|    value_loss           | 3.79        |
-----------------------------------------
```

```
day: 1005, episode: 20
begin_total_asset: 1000000.00
end_total_asset: 1395996.23
total_reward: 395996.23
total_cost: 268529.44
total_trades: 26372
Sharpe: 0.452
================================
---------------------------------------
| time/                   |             |
|    fps                  | 194         |
|    iterations           | 10          |
|    time_elapsed         | 105         |
|    total_timesteps      | 20480       |
| train/                  |             |
|    approx_kl            | 0.017868092 |
|    clip_fraction        | 0.193       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.8       |
|    explained_variance   | 0.931       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.19        |
|    n_updates            | 90          |
|    policy_gradient_loss | -0.0238     |
|    reward               | 0.49905276  |
|    reward_max           | 7.6191525   |
|    reward_mean          | 0.05105753  |
|    reward_min           | -8.8393345  |
|    std                  | 1.01        |
|    value_loss           | 3.82        |
---------------------------------------
---------------------------------------
| time/                   |             |
|    fps                  | 193         |
|    iterations           | 11          |
|    time_elapsed         | 116         |
|    total_timesteps      | 22528       |
| train/                  |             |
|    approx_kl            | 0.017650595 |
|    clip_fraction        | 0.211       |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.9       |
|    explained_variance   | 0.944       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.7         |
|    n_updates            | 100         |
|    policy_gradient_loss | -0.0271     |
|    reward               | 1.0676948   |
```

```
|    reward_max           | 8.492397    |
|    reward_mean          | 0.077044785 |
|    reward_min           | -9.233575   |
|    std                  | 1.01        |
|    value_loss           | 2.78        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 193         |
|    iterations           | 12          |
|    time_elapsed         | 127         |
|    total_timesteps      | 24576       |
| train/                  |             |
|    approx_kl            | 0.019844888 |
|    clip_fraction        | 0.25        |
|    clip_range           | 0.2         |
|    entropy_loss         | -42.9       |
|    explained_variance   | 0.946       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.12        |
|    n_updates            | 110         |
|    policy_gradient_loss | -0.0301     |
|    reward               | -2.3637652  |
|    reward_max           | 9.174631    |
|    reward_mean          | 0.06585242  |
|    reward_min           | -10.077222  |
|    std                  | 1.01        |
|    value_loss           | 3.11        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 192         |
|    iterations           | 13          |
|    time_elapsed         | 138         |
|    total_timesteps      | 26624       |
| train/                  |             |
|    approx_kl            | 0.016080018 |
|    clip_fraction        | 0.197       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43         |
|    explained_variance   | 0.955       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.7         |
|    n_updates            | 120         |
|    policy_gradient_loss | -0.0256     |
|    reward               | -1.5132041  |
|    reward_max           | 9.582563    |
|    reward_mean          | 0.14348952  |
```

```
|    reward_min           | -10.504288  |
|    std                  | 1.01        |
|    value_loss           | 2.59        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 192         |
|    iterations           | 14          |
|    time_elapsed         | 148         |
|    total_timesteps      | 28672       |
| train/                  |             |
|    approx_kl            | 0.019049913 |
|    clip_fraction        | 0.231       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43         |
|    explained_variance   | 0.944       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.641       |
|    n_updates            | 130         |
|    policy_gradient_loss | -0.0244     |
|    reward               | -0.8973879  |
|    reward_max           | 8.961241    |
|    reward_mean          | 0.08024564  |
|    reward_min           | -11.075682  |
|    std                  | 1.02        |
|    value_loss           | 3.78        |
-----------------------------------------
day: 1005, episode: 30
begin_total_asset: 1000000.00
end_total_asset: 2125320.71
total_reward: 1125320.71
total_cost: 282048.73
total_trades: 26882
Sharpe: 0.910
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 192         |
|    iterations           | 15          |
|    time_elapsed         | 159         |
|    total_timesteps      | 30720       |
| train/                  |             |
|    approx_kl            | 0.017095085 |
|    clip_fraction        | 0.2         |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.1       |
|    explained_variance   | 0.937       |
|    learning_rate        | 0.0001      |
```

```
|    loss                 | 1.43        |
|    n_updates            | 140         |
|    policy_gradient_loss | -0.023      |
|    reward               | -2.0704584  |
|    reward_max           | 9.409456    |
|    reward_mean          | 0.07676023  |
|    reward_min           | -10.103681  |
|    std                  | 1.02        |
|    value_loss           | 5.24        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 191         |
|    iterations           | 16          |
|    time_elapsed         | 170         |
|    total_timesteps      | 32768       |
| train/                  |             |
|    approx_kl            | 0.01779809  |
|    clip_fraction        | 0.225       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.1       |
|    explained_variance   | 0.959       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.711       |
|    n_updates            | 150         |
|    policy_gradient_loss | -0.0245     |
|    reward               | -2.6562974  |
|    reward_max           | 10.771311   |
|    reward_mean          | 0.15957262  |
|    reward_min           | -11.340059  |
|    std                  | 1.02        |
|    value_loss           | 3.44        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 191         |
|    iterations           | 17          |
|    time_elapsed         | 181         |
|    total_timesteps      | 34816       |
| train/                  |             |
|    approx_kl            | 0.016418643 |
|    clip_fraction        | 0.208       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.1       |
|    explained_variance   | 0.935       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.47        |
|    n_updates            | 160         |
```

```
|    policy_gradient_loss | -0.0233     |
|    reward               | 2.0434608   |
|    reward_max           | 11.517307   |
|    reward_mean          | 0.14191797  |
|    reward_min           | -10.927163  |
|    std                  | 1.02        |
|    value_loss           | 6.58        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 191         |
|    iterations           | 18          |
|    time_elapsed         | 192         |
|    total_timesteps      | 36864       |
| train/                  |             |
|    approx_kl            | 0.017946953 |
|    clip_fraction        | 0.212       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.2       |
|    explained_variance   | 0.94        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.37        |
|    n_updates            | 170         |
|    policy_gradient_loss | -0.0243     |
|    reward               | 1.3680279   |
|    reward_max           | 12.7447195  |
|    reward_mean          | 0.14774501  |
|    reward_min           | -10.514643  |
|    std                  | 1.02        |
|    value_loss           | 4.47        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 19          |
|    time_elapsed         | 203         |
|    total_timesteps      | 38912       |
| train/                  |             |
|    approx_kl            | 0.014654177 |
|    clip_fraction        | 0.21        |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.2       |
|    explained_variance   | 0.937       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.17        |
|    n_updates            | 180         |
|    policy_gradient_loss | -0.024      |
|    reward               | -0.45028543 |
```

```
|    reward_max           | 8.690737    |
|    reward_mean          | 0.09116808  |
|    reward_min           | -10.855721  |
|    std                  | 1.02        |
|    value_loss           | 5.15        |
-----------------------------------------
day: 1005, episode: 40
begin_total_asset: 1000000.00
end_total_asset: 2118183.90
total_reward: 1118183.90
total_cost: 251671.34
total_trades: 26072
Sharpe: 0.840
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 20          |
|    time_elapsed         | 214         |
|    total_timesteps      | 40960       |
| train/                  |             |
|    approx_kl            | 0.0200581   |
|    clip_fraction        | 0.234       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.2       |
|    explained_variance   | 0.953       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.593       |
|    n_updates            | 190         |
|    policy_gradient_loss | -0.0289     |
|    reward               | 0.08218607  |
|    reward_max           | 13.238824   |
|    reward_mean          | 0.13945287  |
|    reward_min           | -12.576351  |
|    std                  | 1.02        |
|    value_loss           | 2.91        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 21          |
|    time_elapsed         | 225         |
|    total_timesteps      | 43008       |
| train/                  |             |
|    approx_kl            | 0.018795282 |
|    clip_fraction        | 0.244       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.3       |
```

```
|    explained_variance   | 0.949       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.04        |
|    n_updates            | 200         |
|    policy_gradient_loss | -0.0265     |
|    reward               | -1.1991087  |
|    reward_max           | 8.648861    |
|    reward_mean          | 0.15197761  |
|    reward_min           | -10.852967  |
|    std                  | 1.02        |
|    value_loss           | 3.78        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 22          |
|    time_elapsed         | 236         |
|    total_timesteps      | 45056       |
| train/                  |             |
|    approx_kl            | 0.020217236 |
|    clip_fraction        | 0.232       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.3       |
|    explained_variance   | 0.949       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.73        |
|    n_updates            | 210         |
|    policy_gradient_loss | -0.0262     |
|    reward               | -1.1073569  |
|    reward_max           | 10.886646   |
|    reward_mean          | 0.17366676  |
|    reward_min           | -10.583425  |
|    std                  | 1.02        |
|    value_loss           | 3.46        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 23          |
|    time_elapsed         | 247         |
|    total_timesteps      | 47104       |
| train/                  |             |
|    approx_kl            | 0.021026835 |
|    clip_fraction        | 0.26        |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.3       |
|    explained_variance   | 0.954       |
|    learning_rate        | 0.0001      |
```

```
|    loss                 | 0.874       |
|    n_updates            | 220         |
|    policy_gradient_loss | -0.0315     |
|    reward               | -0.17608956 |
|    reward_max           | 10.670886   |
|    reward_mean          | 0.1537793   |
|    reward_min           | -12.0186    |
|    std                  | 1.03        |
|    value_loss           | 4.02        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 190         |
|    iterations           | 24          |
|    time_elapsed         | 258         |
|    total_timesteps      | 49152       |
| train/                  |             |
|    approx_kl            | 0.018403845 |
|    clip_fraction        | 0.247       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.3       |
|    explained_variance   | 0.944       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.17        |
|    n_updates            | 230         |
|    policy_gradient_loss | -0.0204     |
|    reward               | 2.61895     |
|    reward_max           | 12.18062    |
|    reward_mean          | 0.18460232  |
|    reward_min           | -13.157635  |
|    std                  | 1.03        |
|    value_loss           | 4.62        |
-----------------------------------------
day: 1005, episode: 50
begin_total_asset: 1000000.00
end_total_asset: 3288037.74
total_reward: 2288037.74
total_cost: 281633.14
total_trades: 26712
Sharpe: 1.285
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 189         |
|    iterations           | 25          |
|    time_elapsed         | 269         |
|    total_timesteps      | 51200       |
| train/                  |             |
```

```
|    approx_kl            | 0.01983943  |
|    clip_fraction        | 0.213       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.3       |
|    explained_variance   | 0.926       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.92        |
|    n_updates            | 240         |
|    policy_gradient_loss | -0.0189     |
|    reward               | -3.6131983  |
|    reward_max           | 9.857884    |
|    reward_mean          | 0.16624491  |
|    reward_min           | -10.7484255 |
|    std                  | 1.03        |
|    value_loss           | 10.1        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 189         |
|    iterations           | 26          |
|    time_elapsed         | 280         |
|    total_timesteps      | 53248       |
| train/                  |             |
|    approx_kl            | 0.020641152 |
|    clip_fraction        | 0.264       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.4       |
|    explained_variance   | 0.924       |
|    learning_rate        | 0.0001      |
|    loss                 | 5.39        |
|    n_updates            | 250         |
|    policy_gradient_loss | -0.0247     |
|    reward               | -4.254341   |
|    reward_max           | 12.077997   |
|    reward_mean          | 0.12698069  |
|    reward_min           | -12.490866  |
|    std                  | 1.03        |
|    value_loss           | 7.41        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 27         |
|    time_elapsed         | 291        |
|    total_timesteps      | 55296      |
| train/                  |            |
|    approx_kl            | 0.02237419 |
|    clip_fraction        | 0.28       |
```

```
|    clip_range           | 0.2        |
|    entropy_loss         | -43.4      |
|    explained_variance   | 0.95       |
|    learning_rate        | 0.0001     |
|    loss                 | 3          |
|    n_updates            | 260        |
|    policy_gradient_loss | -0.0262    |
|    reward               | 5.1555824  |
|    reward_max           | 14.488416  |
|    reward_mean          | 0.14715968 |
|    reward_min           | -11.839891 |
|    std                  | 1.03       |
|    value_loss           | 6.53       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 28         |
|    time_elapsed         | 302        |
|    total_timesteps      | 57344      |
| train/                  |            |
|    approx_kl            | 0.023951858 |
|    clip_fraction        | 0.268      |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.5      |
|    explained_variance   | 0.966      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.569      |
|    n_updates            | 270        |
|    policy_gradient_loss | -0.029     |
|    reward               | -0.20800728 |
|    reward_max           | 12.915275  |
|    reward_mean          | 0.19683003 |
|    reward_min           | -10.186772 |
|    std                  | 1.03       |
|    value_loss           | 3.55       |
-----------------------------------------
day: 1005, episode: 60
begin_total_asset: 1000000.00
end_total_asset: 3186006.77
total_reward: 2186006.77
total_cost: 246961.72
total_trades: 25959
Sharpe: 1.148
=================================
-----------------------------------------
| time/                   |            |
|    fps                  | 189        |
```

```
|    iterations           | 29          |
|    time_elapsed         | 313         |
|    total_timesteps      | 59392       |
| train/                  |             |
|    approx_kl            | 0.025115523 |
|    clip_fraction        | 0.276       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.5       |
|    explained_variance   | 0.96        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.47        |
|    n_updates            | 280         |
|    policy_gradient_loss | -0.0297     |
|    reward               | -3.7130628  |
|    reward_max           | 20.129416   |
|    reward_mean          | 0.21194881  |
|    reward_min           | -13.115382  |
|    std                  | 1.03        |
|    value_loss           | 3.39        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 189         |
|    iterations           | 30          |
|    time_elapsed         | 324         |
|    total_timesteps      | 61440       |
| train/                  |             |
|    approx_kl            | 0.019830931 |
|    clip_fraction        | 0.264       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.5       |
|    explained_variance   | 0.944       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.15        |
|    n_updates            | 290         |
|    policy_gradient_loss | -0.0213     |
|    reward               | -1.4469173  |
|    reward_max           | 14.880005   |
|    reward_mean          | 0.17574766  |
|    reward_min           | -15.304574  |
|    std                  | 1.03        |
|    value_loss           | 6.43        |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 31         |
|    time_elapsed         | 335        |
```

```
|    total_timesteps      | 63488      |
| train/                  |            |
|    approx_kl            | 0.01983494 |
|    clip_fraction        | 0.256      |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.5      |
|    explained_variance   | 0.96       |
|    learning_rate        | 0.0001     |
|    loss                 | 1.84       |
|    n_updates            | 300        |
|    policy_gradient_loss | -0.0234    |
|    reward               | 0.42989913 |
|    reward_max           | 11.299261  |
|    reward_mean          | 0.1770696  |
|    reward_min           | -11.525704 |
|    std                  | 1.03       |
|    value_loss           | 5.95       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 32         |
|    time_elapsed         | 346        |
|    total_timesteps      | 65536      |
| train/                  |            |
|    approx_kl            | 0.025164966 |
|    clip_fraction        | 0.28       |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.6      |
|    explained_variance   | 0.964      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.15       |
|    n_updates            | 310        |
|    policy_gradient_loss | -0.0349    |
|    reward               | 0.2603721  |
|    reward_max           | 13.569678  |
|    reward_mean          | 0.1869917  |
|    reward_min           | -10.850238 |
|    std                  | 1.03       |
|    value_loss           | 4.74       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 33         |
|    time_elapsed         | 357        |
|    total_timesteps      | 67584      |
| train/                  |            |
```

```
|    approx_kl            | 0.021963801 |
|    clip_fraction        | 0.292       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.6       |
|    explained_variance   | 0.965       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.04        |
|    n_updates            | 320         |
|    policy_gradient_loss | -0.0277     |
|    reward               | 0.9299837   |
|    reward_max           | 18.405817   |
|    reward_mean          | 0.24482355  |
|    reward_min           | -19.94826   |
|    std                  | 1.04        |
|    value_loss           | 4.95        |
-----------------------------------------
day: 1005, episode: 70
begin_total_asset: 1000000.00
end_total_asset: 3417840.48
total_reward: 2417840.48
total_cost: 271627.11
total_trades: 26039
Sharpe: 1.232
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 189         |
|    iterations           | 34          |
|    time_elapsed         | 368         |
|    total_timesteps      | 69632       |
| train/                  |             |
|    approx_kl            | 0.027661562 |
|    clip_fraction        | 0.278       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.6       |
|    explained_variance   | 0.919       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.27        |
|    n_updates            | 330         |
|    policy_gradient_loss | -0.0202     |
|    reward               | 2.5408168   |
|    reward_max           | 17.860605   |
|    reward_mean          | 0.23879834  |
|    reward_min           | -13.003088  |
|    std                  | 1.04        |
|    value_loss           | 7.85        |
-----------------------------------------
-----------------------------------------
```

```
| time/                   |             |
|    fps                  | 189         |
|    iterations           | 35          |
|    time_elapsed         | 379         |
|    total_timesteps      | 71680       |
| train/                  |             |
|    approx_kl            | 0.021861594 |
|    clip_fraction        | 0.256       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.7       |
|    explained_variance   | 0.945       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.55        |
|    n_updates            | 340         |
|    policy_gradient_loss | -0.0215     |
|    reward               | 0.10066073  |
|    reward_max           | 18.22406    |
|    reward_mean          | 0.2537736   |
|    reward_min           | -20.271093  |
|    std                  | 1.04        |
|    value_loss           | 7.29        |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 189        |
|    iterations           | 36         |
|    time_elapsed         | 389        |
|    total_timesteps      | 73728      |
| train/                  |            |
|    approx_kl            | 0.02248187 |
|    clip_fraction        | 0.244      |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.8      |
|    explained_variance   | 0.951      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.28       |
|    n_updates            | 350        |
|    policy_gradient_loss | -0.0261    |
|    reward               | 0.94473016 |
|    reward_max           | 17.030386  |
|    reward_mean          | 0.24667244 |
|    reward_min           | -11.195622 |
|    std                  | 1.04       |
|    value_loss           | 9.99       |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 189         |
```

```
|    iterations           | 37          |
|    time_elapsed         | 400         |
|    total_timesteps      | 75776       |
| train/                  |             |
|    approx_kl            | 0.023791917 |
|    clip_fraction        | 0.268       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.8       |
|    explained_variance   | 0.951       |
|    learning_rate        | 0.0001      |
|    loss                 | 5.04        |
|    n_updates            | 360         |
|    policy_gradient_loss | -0.0249     |
|    reward               | 0.4783657   |
|    reward_max           | 16.571829   |
|    reward_mean          | 0.22113334  |
|    reward_min           | -12.189618  |
|    std                  | 1.04        |
|    value_loss           | 9.25        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 38          |
|    time_elapsed         | 411         |
|    total_timesteps      | 77824       |
| train/                  |             |
|    approx_kl            | 0.024898104 |
|    clip_fraction        | 0.259       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.8       |
|    explained_variance   | 0.943       |
|    learning_rate        | 0.0001      |
|    loss                 | 8.54        |
|    n_updates            | 370         |
|    policy_gradient_loss | -0.0266     |
|    reward               | 1.3907661   |
|    reward_max           | 15.504005   |
|    reward_mean          | 0.28684312  |
|    reward_min           | -17.519665  |
|    std                  | 1.04        |
|    value_loss           | 7.62        |
-------------------------------------
day: 1005, episode: 80
begin_total_asset: 1000000.00
end_total_asset: 4029172.84
total_reward: 3029172.84
total_cost: 219323.87
```

```
total_trades: 25029
Sharpe: 1.325
---------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 39          |
|    time_elapsed         | 422         |
|    total_timesteps      | 79872       |
| train/                  |             |
|    approx_kl            | 0.022575133 |
|    clip_fraction        | 0.269       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.8       |
|    explained_variance   | 0.947       |
|    learning_rate        | 0.0001      |
|    loss                 | 5.34        |
|    n_updates            | 380         |
|    policy_gradient_loss | -0.024      |
|    reward               | -0.82939744 |
|    reward_max           | 22.69911    |
|    reward_mean          | 0.28933832  |
|    reward_min           | -15.059075  |
|    std                  | 1.04        |
|    value_loss           | 10.7        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 40          |
|    time_elapsed         | 433         |
|    total_timesteps      | 81920       |
| train/                  |             |
|    approx_kl            | 0.022039574 |
|    clip_fraction        | 0.27        |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.9       |
|    explained_variance   | 0.957       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.83        |
|    n_updates            | 390         |
|    policy_gradient_loss | -0.0252     |
|    reward               | 3.2352936   |
|    reward_max           | 18.223104   |
|    reward_mean          | 0.2938062   |
|    reward_min           | -12.699653  |
|    std                  | 1.04        |
|    value_loss           | 9.1         |
```

```
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 41          |
|    time_elapsed         | 444         |
|    total_timesteps      | 83968       |
| train/                  |             |
|    approx_kl            | 0.023556601 |
|    clip_fraction        | 0.269       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.9       |
|    explained_variance   | 0.961       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.64        |
|    n_updates            | 400         |
|    policy_gradient_loss | -0.0252     |
|    reward               | 0.2607473   |
|    reward_max           | 18.693851   |
|    reward_mean          | 0.30677107  |
|    reward_min           | -13.127766  |
|    std                  | 1.05        |
|    value_loss           | 9.18        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 42          |
|    time_elapsed         | 455         |
|    total_timesteps      | 86016       |
| train/                  |             |
|    approx_kl            | 0.021903906 |
|    clip_fraction        | 0.263       |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.9       |
|    explained_variance   | 0.959       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.85        |
|    n_updates            | 410         |
|    policy_gradient_loss | -0.0247     |
|    reward               | -3.6645868  |
|    reward_max           | 21.149523   |
|    reward_mean          | 0.29779992  |
|    reward_min           | -14.719602  |
|    std                  | 1.05        |
|    value_loss           | 11          |
-----------------------------------------
-----------------------------------------
```

```
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 43         |
|    time_elapsed         | 466        |
|    total_timesteps      | 88064      |
| train/                  |            |
|    approx_kl            | 0.02337766 |
|    clip_fraction        | 0.266      |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.9      |
|    explained_variance   | 0.971      |
|    learning_rate        | 0.0001     |
|    loss                 | 5.76       |
|    n_updates            | 420        |
|    policy_gradient_loss | -0.0319    |
|    reward               | 0.62076825 |
|    reward_max           | 22.255695  |
|    reward_mean          | 0.319449   |
|    reward_min           | -13.315053 |
|    std                  | 1.05       |
|    value_loss           | 9.31       |
-------------------------------------
day: 1005, episode: 90
begin_total_asset: 1000000.00
end_total_asset: 4064961.75
total_reward: 3064961.75
total_cost: 184760.44
total_trades: 24360
Sharpe: 1.395
=================================
-------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 44         |
|    time_elapsed         | 477        |
|    total_timesteps      | 90112      |
| train/                  |            |
|    approx_kl            | 0.020109965 |
|    clip_fraction        | 0.244      |
|    clip_range           | 0.2        |
|    entropy_loss         | -43.9      |
|    explained_variance   | 0.975      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.85       |
|    n_updates            | 430        |
|    policy_gradient_loss | -0.0272    |
|    reward               | 3.979075   |
|    reward_max           | 20.048115  |
```

```
|    reward_mean          | 0.33699125  |
|    reward_min           | -13.637577  |
|    std                  | 1.05        |
|    value_loss           | 8.37        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 45          |
|    time_elapsed         | 487         |
|    total_timesteps      | 92160       |
| train/                  |             |
|    approx_kl            | 0.022464648 |
|    clip_fraction        | 0.26        |
|    clip_range           | 0.2         |
|    entropy_loss         | -43.9       |
|    explained_variance   | 0.967       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.61        |
|    n_updates            | 440         |
|    policy_gradient_loss | -0.025      |
|    reward               | -9.350004   |
|    reward_max           | 21.499537   |
|    reward_mean          | 0.34950122  |
|    reward_min           | -13.976372  |
|    std                  | 1.05        |
|    value_loss           | 10.6        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 46          |
|    time_elapsed         | 498         |
|    total_timesteps      | 94208       |
| train/                  |             |
|    approx_kl            | 0.02412486  |
|    clip_fraction        | 0.275       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44         |
|    explained_variance   | 0.977       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.33        |
|    n_updates            | 450         |
|    policy_gradient_loss | -0.0276     |
|    reward               | -0.08908631 |
|    reward_max           | 23.236355   |
|    reward_mean          | 0.314337    |
|    reward_min           | -15.552337  |
```

```
|    std                  | 1.05        |
|    value_loss           | 6.71        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 47          |
|    time_elapsed         | 509         |
|    total_timesteps      | 96256       |
| train/                  |             |
|    approx_kl            | 0.024594884 |
|    clip_fraction        | 0.254       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44         |
|    explained_variance   | 0.969       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.45        |
|    n_updates            | 460         |
|    policy_gradient_loss | -0.0292     |
|    reward               | -1.7459617  |
|    reward_max           | 21.47535    |
|    reward_mean          | 0.28471386  |
|    reward_min           | -19.5721    |
|    std                  | 1.05        |
|    value_loss           | 10.1        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 48          |
|    time_elapsed         | 520         |
|    total_timesteps      | 98304       |
| train/                  |             |
|    approx_kl            | 0.021349577 |
|    clip_fraction        | 0.25        |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.1       |
|    explained_variance   | 0.968       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.98        |
|    n_updates            | 470         |
|    policy_gradient_loss | -0.0289     |
|    reward               | 4.4657464   |
|    reward_max           | 17.908098   |
|    reward_mean          | 0.29546076  |
|    reward_min           | -14.111347  |
|    std                  | 1.05        |
|    value_loss           | 11.1        |
```

```
---------------------------------------
day: 1005, episode: 100
begin_total_asset: 1000000.00
end_total_asset: 4057601.16
total_reward: 3057601.16
total_cost: 205612.19
total_trades: 24548
Sharpe: 1.235
=================================
---------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 49          |
|    time_elapsed         | 531         |
|    total_timesteps      | 100352      |
| train/                  |             |
|    approx_kl            | 0.025261309 |
|    clip_fraction        | 0.257       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.1       |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.991       |
|    n_updates            | 480         |
|    policy_gradient_loss | -0.0273     |
|    reward               | 1.3897405   |
|    reward_max           | 19.254436   |
|    reward_mean          | 0.31385496  |
|    reward_min           | -16.160803  |
|    std                  | 1.05        |
|    value_loss           | 4.38        |
---------------------------------------
---------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 50          |
|    time_elapsed         | 542         |
|    total_timesteps      | 102400      |
| train/                  |             |
|    approx_kl            | 0.022980552 |
|    clip_fraction        | 0.252       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.2       |
|    explained_variance   | 0.979       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.56        |
|    n_updates            | 490         |
|    policy_gradient_loss | -0.0289     |
```

```
|    reward               | -0.34364837 |
|    reward_max           | 19.977743   |
|    reward_mean          | 0.34528214  |
|    reward_min           | -18.963558  |
|    std                  | 1.06        |
|    value_loss           | 5.69        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 51          |
|    time_elapsed         | 553         |
|    total_timesteps      | 104448      |
| train/                  |             |
|    approx_kl            | 0.02563347  |
|    clip_fraction        | 0.279       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.2       |
|    explained_variance   | 0.975       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.13        |
|    n_updates            | 500         |
|    policy_gradient_loss | -0.0303     |
|    reward               | -3.8274827  |
|    reward_max           | 20.713623   |
|    reward_mean          | 0.3568252   |
|    reward_min           | -17.343088  |
|    std                  | 1.06        |
|    value_loss           | 7.58        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 52          |
|    time_elapsed         | 564         |
|    total_timesteps      | 106496      |
| train/                  |             |
|    approx_kl            | 0.02255489  |
|    clip_fraction        | 0.256       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.2       |
|    explained_variance   | 0.964       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.84        |
|    n_updates            | 510         |
|    policy_gradient_loss | -0.0247     |
|    reward               | 10.060777   |
|    reward_max           | 25.108248   |
```

```
|    reward_mean          | 0.38602883 |
|    reward_min           | -27.624071 |
|    std                  | 1.06       |
|    value_loss           | 11.5       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 53         |
|    time_elapsed         | 575        |
|    total_timesteps      | 108544     |
| train/                  |            |
|    approx_kl            | 0.023614176 |
|    clip_fraction        | 0.291      |
|    clip_range           | 0.2        |
|    entropy_loss         | -44.3      |
|    explained_variance   | 0.963      |
|    learning_rate        | 0.0001     |
|    loss                 | 5.02       |
|    n_updates            | 520        |
|    policy_gradient_loss | -0.0213    |
|    reward               | -1.117305  |
|    reward_max           | 19.760632  |
|    reward_mean          | 0.3328256  |
|    reward_min           | -17.607477 |
|    std                  | 1.06       |
|    value_loss           | 13.4       |
-----------------------------------------
day: 1005, episode: 110
begin_total_asset: 1000000.00
end_total_asset: 4349725.07
total_reward: 3349725.07
total_cost: 200206.90
total_trades: 24298
Sharpe: 1.295
=================================
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 54         |
|    time_elapsed         | 586        |
|    total_timesteps      | 110592     |
| train/                  |            |
|    approx_kl            | 0.026052956 |
|    clip_fraction        | 0.275      |
|    clip_range           | 0.2        |
|    entropy_loss         | -44.3      |
|    explained_variance   | 0.977      |
```

```
|    learning_rate        | 0.0001      |
|    loss                 | 2.54        |
|    n_updates            | 530         |
|    policy_gradient_loss | -0.0323     |
|    reward               | 0.47923374  |
|    reward_max           | 19.76836    |
|    reward_mean          | 0.3453923   |
|    reward_min           | -18.772812  |
|    std                  | 1.06        |
|    value_loss           | 8.72        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 55          |
|    time_elapsed         | 597         |
|    total_timesteps      | 112640      |
| train/                  |             |
|    approx_kl            | 0.025745053 |
|    clip_fraction        | 0.299       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.3       |
|    explained_variance   | 0.983       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.05        |
|    n_updates            | 540         |
|    policy_gradient_loss | -0.0296     |
|    reward               | 11.589195   |
|    reward_max           | 20.176832   |
|    reward_mean          | 0.31581163  |
|    reward_min           | -16.60358   |
|    std                  | 1.06        |
|    value_loss           | 6.96        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 56          |
|    time_elapsed         | 608         |
|    total_timesteps      | 114688      |
| train/                  |             |
|    approx_kl            | 0.026225608 |
|    clip_fraction        | 0.293       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.3       |
|    explained_variance   | 0.965       |
|    learning_rate        | 0.0001      |
|    loss                 | 5.21        |
```

```
|    n_updates            | 550         |
|    policy_gradient_loss | -0.0234     |
|    reward               | 0.3452577   |
|    reward_max           | 21.192572   |
|    reward_mean          | 0.42192775  |
|    reward_min           | -19.253426  |
|    std                  | 1.06        |
|    value_loss           | 11.2        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 57          |
|    time_elapsed         | 619         |
|    total_timesteps      | 116736      |
| train/                  |             |
|    approx_kl            | 0.025815962 |
|    clip_fraction        | 0.296       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.4       |
|    explained_variance   | 0.974       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.67        |
|    n_updates            | 560         |
|    policy_gradient_loss | -0.0287     |
|    reward               | 5.730628    |
|    reward_max           | 18.915678   |
|    reward_mean          | 0.39666155  |
|    reward_min           | -16.19405   |
|    std                  | 1.06        |
|    value_loss           | 9.08        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 58          |
|    time_elapsed         | 630         |
|    total_timesteps      | 118784      |
| train/                  |             |
|    approx_kl            | 0.026828151 |
|    clip_fraction        | 0.306       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.4       |
|    explained_variance   | 0.98        |
|    learning_rate        | 0.0001      |
|    loss                 | 0.819       |
|    n_updates            | 570         |
|    policy_gradient_loss | -0.0336     |
```

```
|    reward               | 3.0882843   |
|    reward_max           | 19.973871   |
|    reward_mean          | 0.3936194   |
|    reward_min           | -18.538328  |
|    std                  | 1.07        |
|    value_loss           | 7.67        |
-----------------------------------------
day: 1005, episode: 120
begin_total_asset: 1000000.00
end_total_asset: 5593677.15
total_reward: 4593677.15
total_cost: 196665.49
total_trades: 24007
Sharpe: 1.553
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 59          |
|    time_elapsed         | 641         |
|    total_timesteps      | 120832      |
| train/                  |             |
|    approx_kl            | 0.025546279 |
|    clip_fraction        | 0.298       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.5       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.48        |
|    n_updates            | 580         |
|    policy_gradient_loss | -0.0331     |
|    reward               | 1.5932955   |
|    reward_max           | 20.94481    |
|    reward_mean          | 0.4649406   |
|    reward_min           | -20.048594  |
|    std                  | 1.07        |
|    value_loss           | 5.91        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 60          |
|    time_elapsed         | 652         |
|    total_timesteps      | 122880      |
| train/                  |             |
|    approx_kl            | 0.028029075 |
|    clip_fraction        | 0.286       |
|    clip_range           | 0.2         |
```

```
|    entropy_loss         | -44.5       |
|    explained_variance   | 0.975       |
|    learning_rate        | 0.0001      |
|    loss                 | 11.3        |
|    n_updates            | 590         |
|    policy_gradient_loss | -0.0287     |
|    reward               | 0.3105909   |
|    reward_max           | 17.475964   |
|    reward_mean          | 0.38993573  |
|    reward_min           | -16.616516  |
|    std                  | 1.07        |
|    value_loss           | 10.7        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 61          |
|    time_elapsed         | 662         |
|    total_timesteps      | 124928      |
| train/                  |             |
|    approx_kl            | 0.026941013 |
|    clip_fraction        | 0.305       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.5       |
|    explained_variance   | 0.975       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.39        |
|    n_updates            | 600         |
|    policy_gradient_loss | -0.0307     |
|    reward               | 1.5524199   |
|    reward_max           | 23.253231   |
|    reward_mean          | 0.40304884  |
|    reward_min           | -24.631147  |
|    std                  | 1.07        |
|    value_loss           | 8.34        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 62          |
|    time_elapsed         | 673         |
|    total_timesteps      | 126976      |
| train/                  |             |
|    approx_kl            | 0.022626624 |
|    clip_fraction        | 0.287       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.6       |
|    explained_variance   | 0.974       |
```

```
|    learning_rate        | 0.0001      |
|    loss                 | 4.95        |
|    n_updates            | 610         |
|    policy_gradient_loss | -0.0237     |
|    reward               | 1.2778133   |
|    reward_max           | 23.450813   |
|    reward_mean          | 0.4391761   |
|    reward_min           | -24.276438  |
|    std                  | 1.07        |
|    value_loss           | 9.09        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 63          |
|    time_elapsed         | 685         |
|    total_timesteps      | 129024      |
| train/                  |             |
|    approx_kl            | 0.023516856 |
|    clip_fraction        | 0.264       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.6       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.31        |
|    n_updates            | 620         |
|    policy_gradient_loss | -0.0305     |
|    reward               | 9.464125    |
|    reward_max           | 21.400385   |
|    reward_mean          | 0.459784    |
|    reward_min           | -21.379763  |
|    std                  | 1.07        |
|    value_loss           | 8.41        |
-----------------------------------------
day: 1005, episode: 130
begin_total_asset: 1000000.00
end_total_asset: 4888710.96
total_reward: 3888710.96
total_cost: 190358.24
total_trades: 23724
Sharpe: 1.456
=================================
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 64         |
|    time_elapsed         | 697        |
|    total_timesteps      | 131072     |
```

```
| train/                  |            |
|    approx_kl            | 0.02775554 |
|    clip_fraction        | 0.305      |
|    clip_range           | 0.2        |
|    entropy_loss         | -44.7      |
|    explained_variance   | 0.98       |
|    learning_rate        | 0.0001     |
|    loss                 | 4.92       |
|    n_updates            | 630        |
|    policy_gradient_loss | -0.0316    |
|    reward               | -6.9188757 |
|    reward_max           | 24.741856  |
|    reward_mean          | 0.39901245 |
|    reward_min           | -27.572683 |
|    std                  | 1.07       |
|    value_loss           | 10.4       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 65         |
|    time_elapsed         | 708        |
|    total_timesteps      | 133120     |
| train/                  |            |
|    approx_kl            | 0.027089752 |
|    clip_fraction        | 0.305      |
|    clip_range           | 0.2        |
|    entropy_loss         | -44.7      |
|    explained_variance   | 0.982      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.19       |
|    n_updates            | 640        |
|    policy_gradient_loss | -0.0342    |
|    reward               | -5.015077  |
|    reward_max           | 22.695148  |
|    reward_mean          | 0.4022821  |
|    reward_min           | -22.841688 |
|    std                  | 1.08       |
|    value_loss           | 6.7        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 66         |
|    time_elapsed         | 718        |
|    total_timesteps      | 135168     |
| train/                  |            |
|    approx_kl            | 0.027402876 |
```

```
|    clip_fraction        | 0.308       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.7       |
|    explained_variance   | 0.983       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.79        |
|    n_updates            | 650         |
|    policy_gradient_loss | -0.0334     |
|    reward               | 2.2464652   |
|    reward_max           | 32.77882    |
|    reward_mean          | 0.42059398  |
|    reward_min           | -37.933743  |
|    std                  | 1.08        |
|    value_loss           | 6.99        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 67          |
|    time_elapsed         | 729         |
|    total_timesteps      | 137216      |
| train/                  |             |
|    approx_kl            | 0.029143529 |
|    clip_fraction        | 0.355       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.8       |
|    explained_variance   | 0.958       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.53        |
|    n_updates            | 660         |
|    policy_gradient_loss | -0.0196     |
|    reward               | 0.90449536  |
|    reward_max           | 25.64336    |
|    reward_mean          | 0.36348802  |
|    reward_min           | -28.917751  |
|    std                  | 1.08        |
|    value_loss           | 10.7        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 68          |
|    time_elapsed         | 740         |
|    total_timesteps      | 139264      |
| train/                  |             |
|    approx_kl            | 0.027227689 |
|    clip_fraction        | 0.327       |
|    clip_range           | 0.2         |
```

```
|    entropy_loss         | -44.8       |
|    explained_variance   | 0.979       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.03        |
|    n_updates            | 670         |
|    policy_gradient_loss | -0.0287     |
|    reward               | 3.3583314   |
|    reward_max           | 35.566097   |
|    reward_mean          | 0.40697095  |
|    reward_min           | -35.950943  |
|    std                  | 1.08        |
|    value_loss           | 6.04        |
-----------------------------------------
day: 1005, episode: 140
begin_total_asset: 1000000.00
end_total_asset: 4709840.80
total_reward: 3709840.80
total_cost: 191469.26
total_trades: 24054
Sharpe: 1.391
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 69          |
|    time_elapsed         | 751         |
|    total_timesteps      | 141312      |
| train/                  |             |
|    approx_kl            | 0.025772607 |
|    clip_fraction        | 0.291       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.9       |
|    explained_variance   | 0.974       |
|    learning_rate        | 0.0001      |
|    loss                 | 7.47        |
|    n_updates            | 680         |
|    policy_gradient_loss | -0.027      |
|    reward               | -4.5543146  |
|    reward_max           | 28.242207   |
|    reward_mean          | 0.41979742  |
|    reward_min           | -32.04901   |
|    std                  | 1.08        |
|    value_loss           | 11.2        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 70          |
```

```
|    time_elapsed         | 762         |
|    total_timesteps      | 143360      |
| train/                  |             |
|    approx_kl            | 0.024460565 |
|    clip_fraction        | 0.277       |
|    clip_range           | 0.2         |
|    entropy_loss         | -44.9       |
|    explained_variance   | 0.973       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.61        |
|    n_updates            | 690         |
|    policy_gradient_loss | -0.0255     |
|    reward               | -3.8101077  |
|    reward_max           | 27.320707   |
|    reward_mean          | 0.41521937  |
|    reward_min           | -24.16353   |
|    std                  | 1.08        |
|    value_loss           | 13.7        |
-------------------------------------
-------------------------------------
| time/                   |           |
|    fps                  | 188       |
|    iterations           | 71        |
|    time_elapsed         | 773       |
|    total_timesteps      | 145408    |
| train/                  |           |
|    approx_kl            | 0.03466608 |
|    clip_fraction        | 0.364     |
|    clip_range           | 0.2       |
|    entropy_loss         | -45       |
|    explained_variance   | 0.98      |
|    learning_rate        | 0.0001    |
|    loss                 | 2.78      |
|    n_updates            | 700       |
|    policy_gradient_loss | -0.0345   |
|    reward               | -1.9739374 |
|    reward_max           | 27.448322  |
|    reward_mean          | 0.40451407 |
|    reward_min           | -31.296486 |
|    std                  | 1.08      |
|    value_loss           | 6.73      |
-------------------------------------
-------------------------------------
| time/                   |           |
|    fps                  | 188       |
|    iterations           | 72        |
|    time_elapsed         | 784       |
|    total_timesteps      | 147456    |
```

```
| train/                  |             |
|    approx_kl            | 0.033677466 |
|    clip_fraction        | 0.36        |
|    clip_range           | 0.2         |
|    entropy_loss         | -45         |
|    explained_variance   | 0.981       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.967       |
|    n_updates            | 710         |
|    policy_gradient_loss | -0.0286     |
|    reward               | 0.4699393   |
|    reward_max           | 25.03032    |
|    reward_mean          | 0.46326172  |
|    reward_min           | -28.140425  |
|    std                  | 1.09        |
|    value_loss           | 4.32        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 73          |
|    time_elapsed         | 795         |
|    total_timesteps      | 149504      |
| train/                  |             |
|    approx_kl            | 0.027262177 |
|    clip_fraction        | 0.326       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45         |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.19        |
|    n_updates            | 720         |
|    policy_gradient_loss | -0.0286     |
|    reward               | -8.809403   |
|    reward_max           | 19.61633    |
|    reward_mean          | 0.38088885  |
|    reward_min           | -16.03385   |
|    std                  | 1.09        |
|    value_loss           | 5.02        |
-------------------------------------
day: 1005, episode: 150
begin_total_asset: 1000000.00
end_total_asset: 5434964.46
total_reward: 4434964.46
total_cost: 176724.86
total_trades: 23663
Sharpe: 1.618
=================================
```

```
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 74          |
|    time_elapsed         | 805         |
|    total_timesteps      | 151552      |
| train/                  |             |
|    approx_kl            | 0.028428271 |
|    clip_fraction        | 0.342       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45         |
|    explained_variance   | 0.966       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.98        |
|    n_updates            | 730         |
|    policy_gradient_loss | -0.0227     |
|    reward               | -0.024988705 |
|    reward_max           | 23.385101   |
|    reward_mean          | 0.44259483  |
|    reward_min           | -24.809343  |
|    std                  | 1.09        |
|    value_loss           | 5.11        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 75          |
|    time_elapsed         | 817         |
|    total_timesteps      | 153600      |
| train/                  |             |
|    approx_kl            | 0.030717278 |
|    clip_fraction        | 0.344       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.1       |
|    explained_variance   | 0.978       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.01        |
|    n_updates            | 740         |
|    policy_gradient_loss | -0.0269     |
|    reward               | -2.9491637  |
|    reward_max           | 21.180235   |
|    reward_mean          | 0.43196508  |
|    reward_min           | -21.9559    |
|    std                  | 1.09        |
|    value_loss           | 4.84        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
```

```
|    fps                  | 187         |
|    iterations           | 76          |
|    time_elapsed         | 828         |
|    total_timesteps      | 155648      |
| train/                  |             |
|    approx_kl            | 0.02947245 |
|    clip_fraction        | 0.342       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.1       |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.22        |
|    n_updates            | 750         |
|    policy_gradient_loss | -0.0329     |
|    reward               | 1.8532262   |
|    reward_max           | 26.900848   |
|    reward_mean          | 0.4191161   |
|    reward_min           | -28.368807 |
|    std                  | 1.09        |
|    value_loss           | 5.73        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 77          |
|    time_elapsed         | 838         |
|    total_timesteps      | 157696      |
| train/                  |             |
|    approx_kl            | 0.031355727 |
|    clip_fraction        | 0.349       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.2       |
|    explained_variance   | 0.972       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.37        |
|    n_updates            | 760         |
|    policy_gradient_loss | -0.0213     |
|    reward               | -1.8422098  |
|    reward_max           | 23.430143   |
|    reward_mean          | 0.37302637  |
|    reward_min           | -24.696856  |
|    std                  | 1.09        |
|    value_loss           | 7.27        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 78          |
```

```
|    time_elapsed         | 849         |
|    total_timesteps      | 159744      |
| train/                  |             |
|    approx_kl            | 0.027869074 |
|    clip_fraction        | 0.301       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.2       |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.86        |
|    n_updates            | 770         |
|    policy_gradient_loss | -0.0322     |
|    reward               | 0.6322424   |
|    reward_max           | 23.63331    |
|    reward_mean          | 0.4288771   |
|    reward_min           | -22.48937   |
|    std                  | 1.09        |
|    value_loss           | 5.87        |
-----------------------------------------
day: 1005, episode: 160
begin_total_asset: 1000000.00
end_total_asset: 5059534.82
total_reward: 4059534.82
total_cost: 191521.50
total_trades: 24084
Sharpe: 1.433
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 79          |
|    time_elapsed         | 860         |
|    total_timesteps      | 161792      |
| train/                  |             |
|    approx_kl            | 0.028161254 |
|    clip_fraction        | 0.316       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.3       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.991       |
|    n_updates            | 780         |
|    policy_gradient_loss | -0.0355     |
|    reward               | -1.1365829  |
|    reward_max           | 26.421345   |
|    reward_mean          | 0.44705743  |
|    reward_min           | -26.300613  |
|    std                  | 1.1         |
```

```
|    value_loss           | 4.08        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 80          |
|    time_elapsed         | 871         |
|    total_timesteps      | 163840      |
| train/                  |             |
|    approx_kl            | 0.029412575 |
|    clip_fraction        | 0.311       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.3       |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.05        |
|    n_updates            | 790         |
|    policy_gradient_loss | -0.0343     |
|    reward               | -0.10946985 |
|    reward_max           | 20.687637   |
|    reward_mean          | 0.43241808  |
|    reward_min           | -21.028872  |
|    std                  | 1.1         |
|    value_loss           | 5.82        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 81          |
|    time_elapsed         | 882         |
|    total_timesteps      | 165888      |
| train/                  |             |
|    approx_kl            | 0.030360788 |
|    clip_fraction        | 0.32        |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.4       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.57        |
|    n_updates            | 800         |
|    policy_gradient_loss | -0.0335     |
|    reward               | 6.4791985   |
|    reward_max           | 21.227339   |
|    reward_mean          | 0.40673697  |
|    reward_min           | -22.672535  |
|    std                  | 1.1         |
|    value_loss           | 4.35        |
-----------------------------------------
```

```
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 82          |
|    time_elapsed         | 892         |
|    total_timesteps      | 167936      |
| train/                  |             |
|    approx_kl            | 0.028195877 |
|    clip_fraction        | 0.31        |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.4       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.43        |
|    n_updates            | 810         |
|    policy_gradient_loss | -0.036      |
|    reward               | 1.0149295   |
|    reward_max           | 26.930225   |
|    reward_mean          | 0.3969031   |
|    reward_min           | -29.975012  |
|    std                  | 1.1         |
|    value_loss           | 3.12        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 83          |
|    time_elapsed         | 903         |
|    total_timesteps      | 169984      |
| train/                  |             |
|    approx_kl            | 0.026955638 |
|    clip_fraction        | 0.299       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.4       |
|    explained_variance   | 0.987       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.05        |
|    n_updates            | 820         |
|    policy_gradient_loss | -0.0329     |
|    reward               | 0.9982886   |
|    reward_max           | 26.188927   |
|    reward_mean          | 0.4273596   |
|    reward_min           | -29.073545  |
|    std                  | 1.1         |
|    value_loss           | 3.03        |
-------------------------------------
day: 1005, episode: 170
begin_total_asset: 1000000.00
```

```
end_total_asset: 4938668.34
total_reward: 3938668.34
total_cost: 178932.79
total_trades: 23326
Sharpe: 1.386
================================
----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 84         |
|    time_elapsed         | 914        |
|    total_timesteps      | 172032     |
| train/                  |            |
|    approx_kl            | 0.030325301 |
|    clip_fraction        | 0.323      |
|    clip_range           | 0.2        |
|    entropy_loss         | -45.4      |
|    explained_variance   | 0.982      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.06       |
|    n_updates            | 830        |
|    policy_gradient_loss | -0.0317    |
|    reward               | -0.06820026 |
|    reward_max           | 25.67746   |
|    reward_mean          | 0.4632582  |
|    reward_min           | -20.286318 |
|    std                  | 1.1        |
|    value_loss           | 4.93       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 85         |
|    time_elapsed         | 925        |
|    total_timesteps      | 174080     |
| train/                  |            |
|    approx_kl            | 0.030899428 |
|    clip_fraction        | 0.343      |
|    clip_range           | 0.2        |
|    entropy_loss         | -45.4      |
|    explained_variance   | 0.967      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.56       |
|    n_updates            | 840        |
|    policy_gradient_loss | -0.0303    |
|    reward               | 5.6288605  |
|    reward_max           | 23.499138  |
|    reward_mean          | 0.37486336 |
```

```
|    reward_min           | -23.451765  |
|    std                  | 1.1         |
|    value_loss           | 5.56        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 86          |
|    time_elapsed         | 936         |
|    total_timesteps      | 176128      |
| train/                  |             |
|    approx_kl            | 0.027111376 |
|    clip_fraction        | 0.296       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.5       |
|    explained_variance   | 0.973       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.54        |
|    n_updates            | 850         |
|    policy_gradient_loss | -0.0289     |
|    reward               | 1.2532393   |
|    reward_max           | 21.99776    |
|    reward_mean          | 0.38704947  |
|    reward_min           | -25.423565  |
|    std                  | 1.1         |
|    value_loss           | 6.06        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 87          |
|    time_elapsed         | 947         |
|    total_timesteps      | 178176      |
| train/                  |             |
|    approx_kl            | 0.03002029  |
|    clip_fraction        | 0.331       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.5       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.896       |
|    n_updates            | 860         |
|    policy_gradient_loss | -0.036      |
|    reward               | 1.5558507   |
|    reward_max           | 20.680296   |
|    reward_mean          | 0.3959017   |
|    reward_min           | -20.399988  |
|    std                  | 1.1         |
```

```
|    value_loss           | 2.85       |
-------------------------------------
day: 1005, episode: 180
begin_total_asset: 1000000.00
end_total_asset: 4951226.05
total_reward: 3951226.05
total_cost: 192503.28
total_trades: 23753
Sharpe: 1.499
=================================
---------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 88          |
|    time_elapsed         | 957         |
|    total_timesteps      | 180224      |
| train/                  |             |
|    approx_kl            | 0.028492715 |
|    clip_fraction        | 0.327       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.5       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.701       |
|    n_updates            | 870         |
|    policy_gradient_loss | -0.0364     |
|    reward               | 1.0036426   |
|    reward_max           | 26.11532    |
|    reward_mean          | 0.43504593  |
|    reward_min           | -21.463226  |
|    std                  | 1.11        |
|    value_loss           | 2.86        |
---------------------------------------
---------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 89         |
|    time_elapsed         | 968        |
|    total_timesteps      | 182272     |
| train/                  |            |
|    approx_kl            | 0.03162855 |
|    clip_fraction        | 0.339      |
|    clip_range           | 0.2        |
|    entropy_loss         | -45.6      |
|    explained_variance   | 0.983      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.668      |
|    n_updates            | 880        |
```

```
|    policy_gradient_loss | -0.036     |
|    reward               | 3.356541   |
|    reward_max           | 27.833275  |
|    reward_mean          | 0.36223185 |
|    reward_min           | -22.930079 |
|    std                  | 1.11       |
|    value_loss           | 3.22       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 90         |
|    time_elapsed         | 979        |
|    total_timesteps      | 184320     |
| train/                  |            |
|    approx_kl            | 0.028071322 |
|    clip_fraction        | 0.318      |
|    clip_range           | 0.2        |
|    entropy_loss         | -45.6      |
|    explained_variance   | 0.971      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.64       |
|    n_updates            | 890        |
|    policy_gradient_loss | -0.0323    |
|    reward               | 4.9648757  |
|    reward_max           | 22.845337  |
|    reward_mean          | 0.42986152 |
|    reward_min           | -20.286913 |
|    std                  | 1.11       |
|    value_loss           | 6.29       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 91         |
|    time_elapsed         | 990        |
|    total_timesteps      | 186368     |
| train/                  |            |
|    approx_kl            | 0.032821536 |
|    clip_fraction        | 0.354      |
|    clip_range           | 0.2        |
|    entropy_loss         | -45.7      |
|    explained_variance   | 0.975      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.548      |
|    n_updates            | 900        |
|    policy_gradient_loss | -0.0328    |
|    reward               | -12.2603245 |
```

```
|    reward_max           | 27.671785   |
|    reward_mean          | 0.45067102  |
|    reward_min           | -31.483938  |
|    std                  | 1.11        |
|    value_loss           | 4           |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 92          |
|    time_elapsed         | 1000        |
|    total_timesteps      | 188416      |
| train/                  |             |
|    approx_kl            | 0.027127689 |
|    clip_fraction        | 0.313       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.7       |
|    explained_variance   | 0.966       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.13        |
|    n_updates            | 910         |
|    policy_gradient_loss | -0.0243     |
|    reward               | -5.63274    |
|    reward_max           | 25.475546   |
|    reward_mean          | 0.41992015  |
|    reward_min           | -29.900166  |
|    std                  | 1.11        |
|    value_loss           | 6.01        |
-----------------------------------------
day: 1005, episode: 190
begin_total_asset: 1000000.00
end_total_asset: 6391901.27
total_reward: 5391901.27
total_cost: 194442.03
total_trades: 23578
Sharpe: 1.647
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 93          |
|    time_elapsed         | 1011        |
|    total_timesteps      | 190464      |
| train/                  |             |
|    approx_kl            | 0.031414054 |
|    clip_fraction        | 0.331       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.8       |
```

```
|    explained_variance   | 0.975       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.76        |
|    n_updates            | 920         |
|    policy_gradient_loss | -0.0282     |
|    reward               | 2.0838766   |
|    reward_max           | 24.505919   |
|    reward_mean          | 0.50682956  |
|    reward_min           | -26.670221  |
|    std                  | 1.12        |
|    value_loss           | 5.74        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 94          |
|    time_elapsed         | 1022        |
|    total_timesteps      | 192512      |
| train/                  |             |
|    approx_kl            | 0.029213045 |
|    clip_fraction        | 0.316       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.8       |
|    explained_variance   | 0.977       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.2         |
|    n_updates            | 930         |
|    policy_gradient_loss | -0.0345     |
|    reward               | 0.54259574  |
|    reward_max           | 26.347452   |
|    reward_mean          | 0.4349777   |
|    reward_min           | -30.461157  |
|    std                  | 1.12        |
|    value_loss           | 7           |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 95          |
|    time_elapsed         | 1033        |
|    total_timesteps      | 194560      |
| train/                  |             |
|    approx_kl            | 0.029178943 |
|    clip_fraction        | 0.333       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.9       |
|    explained_variance   | 0.982       |
|    learning_rate        | 0.0001      |
```

```
|    loss                 | 0.833       |
|    n_updates            | 940         |
|    policy_gradient_loss | -0.0359     |
|    reward               | -3.3367367  |
|    reward_max           | 25.769545   |
|    reward_mean          | 0.45373535  |
|    reward_min           | -22.290901  |
|    std                  | 1.12        |
|    value_loss           | 3.66        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 96          |
|    time_elapsed         | 1044        |
|    total_timesteps      | 196608      |
| train/                  |             |
|    approx_kl            | 0.034106676 |
|    clip_fraction        | 0.359       |
|    clip_range           | 0.2         |
|    entropy_loss         | -45.9       |
|    explained_variance   | 0.98        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.81        |
|    n_updates            | 950         |
|    policy_gradient_loss | -0.0348     |
|    reward               | -5.52483    |
|    reward_max           | 26.925385   |
|    reward_mean          | 0.45671344  |
|    reward_min           | -27.928158  |
|    std                  | 1.12        |
|    value_loss           | 3.83        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 97          |
|    time_elapsed         | 1055        |
|    total_timesteps      | 198656      |
| train/                  |             |
|    approx_kl            | 0.028524738 |
|    clip_fraction        | 0.297       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46         |
|    explained_variance   | 0.987       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.8         |
|    n_updates            | 960         |
```

```
|    policy_gradient_loss | -0.0398     |
|    reward               | 2.6384246   |
|    reward_max           | 28.6407     |
|    reward_mean          | 0.4844857   |
|    reward_min           | -32.789867  |
|    std                  | 1.13        |
|    value_loss           | 4.32        |
-----------------------------------------
day: 1005, episode: 200
begin_total_asset: 1000000.00
end_total_asset: 6323455.05
total_reward: 5323455.05
total_cost: 197694.37
total_trades: 23259
Sharpe: 1.645
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 98          |
|    time_elapsed         | 1065        |
|    total_timesteps      | 200704      |
| train/                  |             |
|    approx_kl            | 0.031171378 |
|    clip_fraction        | 0.343       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.1       |
|    explained_variance   | 0.969       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.34        |
|    n_updates            | 970         |
|    policy_gradient_loss | -0.0242     |
|    reward               | 4.352842    |
|    reward_max           | 27.089346   |
|    reward_mean          | 0.50959736  |
|    reward_min           | -28.085564  |
|    std                  | 1.13        |
|    value_loss           | 8.63        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 99          |
|    time_elapsed         | 1076        |
|    total_timesteps      | 202752      |
| train/                  |             |
|    approx_kl            | 0.03689237  |
|    clip_fraction        | 0.365       |
```

```
|    clip_range           | 0.2         |
|    entropy_loss         | -46.2       |
|    explained_variance   | 0.978       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.56        |
|    n_updates            | 980         |
|    policy_gradient_loss | -0.0284     |
|    reward               | -0.96978396 |
|    reward_max           | 27.465475   |
|    reward_mean          | 0.4704733   |
|    reward_min           | -27.995922  |
|    std                  | 1.13        |
|    value_loss           | 4.57        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 100         |
|    time_elapsed         | 1087        |
|    total_timesteps      | 204800      |
| train/                  |             |
|    approx_kl            | 0.032406684 |
|    clip_fraction        | 0.337       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.2       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.92        |
|    n_updates            | 990         |
|    policy_gradient_loss | -0.0368     |
|    reward               | 2.3652592   |
|    reward_max           | 28.250114   |
|    reward_mean          | 0.49781582  |
|    reward_min           | -26.534859  |
|    std                  | 1.13        |
|    value_loss           | 4.58        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 101         |
|    time_elapsed         | 1098        |
|    total_timesteps      | 206848      |
| train/                  |             |
|    approx_kl            | 0.036573008 |
|    clip_fraction        | 0.357       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.3       |
```

```
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.343       |
|    n_updates            | 1000        |
|    policy_gradient_loss | -0.0463     |
|    reward               | 4.640543    |
|    reward_max           | 29.02814    |
|    reward_mean          | 0.48711175  |
|    reward_min           | -33.574448  |
|    std                  | 1.14        |
|    value_loss           | 3.27        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 102         |
|    time_elapsed         | 1109        |
|    total_timesteps      | 208896      |
| train/                  |             |
|    approx_kl            | 0.025144652 |
|    clip_fraction        | 0.284       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.4       |
|    explained_variance   | 0.986       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.21        |
|    n_updates            | 1010        |
|    policy_gradient_loss | -0.0352     |
|    reward               | 4.5368814   |
|    reward_max           | 31.835514   |
|    reward_mean          | 0.5189906   |
|    reward_min           | -35.806267  |
|    std                  | 1.14        |
|    value_loss           | 5.07        |
-----------------------------------------
day: 1005, episode: 210
begin_total_asset: 1000000.00
end_total_asset: 5845040.81
total_reward: 4845040.81
total_cost: 179471.47
total_trades: 22575
Sharpe: 1.610
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 103         |
|    time_elapsed         | 1120        |
```

```
|    total_timesteps      | 210944      |
| train/                  |             |
|    approx_kl            | 0.025645787 |
|    clip_fraction        | 0.308       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.5       |
|    explained_variance   | 0.98        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.1         |
|    n_updates            | 1020        |
|    policy_gradient_loss | -0.0331     |
|    reward               | 7.33089     |
|    reward_max           | 25.282772   |
|    reward_mean          | 0.4614565   |
|    reward_min           | -22.384893  |
|    std                  | 1.14        |
|    value_loss           | 6.03        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 104         |
|    time_elapsed         | 1131        |
|    total_timesteps      | 212992      |
| train/                  |             |
|    approx_kl            | 0.037337653 |
|    clip_fraction        | 0.395       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.5       |
|    explained_variance   | 0.954       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.85        |
|    n_updates            | 1030        |
|    policy_gradient_loss | -0.0168     |
|    reward               | 3.3640223   |
|    reward_max           | 28.469778   |
|    reward_mean          | 0.5194971   |
|    reward_min           | -21.62125   |
|    std                  | 1.14        |
|    value_loss           | 5.28        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 105         |
|    time_elapsed         | 1142        |
|    total_timesteps      | 215040      |
| train/                  |             |
```

```
|    approx_kl            | 0.033808507 |
|    clip_fraction        | 0.342       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.5       |
|    explained_variance   | 0.977       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.99        |
|    n_updates            | 1040        |
|    policy_gradient_loss | -0.0366     |
|    reward               | 2.3131604   |
|    reward_max           | 27.403133   |
|    reward_mean          | 0.520584    |
|    reward_min           | -23.99441   |
|    std                  | 1.14        |
|    value_loss           | 4.7         |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 106         |
|    time_elapsed         | 1152        |
|    total_timesteps      | 217088      |
| train/                  |             |
|    approx_kl            | 0.030026028 |
|    clip_fraction        | 0.357       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.5       |
|    explained_variance   | 0.977       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.21        |
|    n_updates            | 1050        |
|    policy_gradient_loss | -0.0327     |
|    reward               | 1.2580585   |
|    reward_max           | 30.493284   |
|    reward_mean          | 0.53330886  |
|    reward_min           | -26.058367  |
|    std                  | 1.14        |
|    value_loss           | 5.36        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 107         |
|    time_elapsed         | 1163        |
|    total_timesteps      | 219136      |
| train/                  |             |
|    approx_kl            | 0.031969376 |
|    clip_fraction        | 0.308       |
```

```
|    clip_range           | 0.2         |
|    entropy_loss         | -46.6       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.27        |
|    n_updates            | 1060        |
|    policy_gradient_loss | -0.0373     |
|    reward               | -8.732451   |
|    reward_max           | 28.887861   |
|    reward_mean          | 0.5584799   |
|    reward_min           | -27.168854  |
|    std                  | 1.15        |
|    value_loss           | 5.94        |
-------------------------------------
day: 1005, episode: 220
begin_total_asset: 1000000.00
end_total_asset: 6201519.12
total_reward: 5201519.12
total_cost: 178377.39
total_trades: 22480
Sharpe: 1.540
=================================
-------------------------------------
| time/                   |           |
|    fps                  | 188       |
|    iterations           | 108       |
|    time_elapsed         | 1174      |
|    total_timesteps      | 221184    |
| train/                  |           |
|    approx_kl            | 0.03628671 |
|    clip_fraction        | 0.358     |
|    clip_range           | 0.2       |
|    entropy_loss         | -46.6     |
|    explained_variance   | 0.985     |
|    learning_rate        | 0.0001    |
|    loss                 | 0.533     |
|    n_updates            | 1070      |
|    policy_gradient_loss | -0.0327   |
|    reward               | -0.7704411 |
|    reward_max           | 30.61611  |
|    reward_mean          | 0.5331959 |
|    reward_min           | -28.885094 |
|    std                  | 1.15      |
|    value_loss           | 4.01      |
-------------------------------------
-------------------------------------
| time/                   |           |
|    fps                  | 188       |
```

```
|    iterations           | 109         |
|    time_elapsed         | 1185        |
|    total_timesteps      | 223232      |
| train/                  |             |
|    approx_kl            | 0.037436076 |
|    clip_fraction        | 0.354       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.7       |
|    explained_variance   | 0.98        |
|    learning_rate        | 0.0001      |
|    loss                 | 2.92        |
|    n_updates            | 1080        |
|    policy_gradient_loss | -0.0279     |
|    reward               | -3.1946857  |
|    reward_max           | 30.127697   |
|    reward_mean          | 0.5213416   |
|    reward_min           | -22.973131  |
|    std                  | 1.15        |
|    value_loss           | 5.66        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 110         |
|    time_elapsed         | 1196        |
|    total_timesteps      | 225280      |
| train/                  |             |
|    approx_kl            | 0.026834104 |
|    clip_fraction        | 0.332       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.7       |
|    explained_variance   | 0.974       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.35        |
|    n_updates            | 1090        |
|    policy_gradient_loss | -0.0263     |
|    reward               | -3.1466808  |
|    reward_max           | 29.384935   |
|    reward_mean          | 0.526476    |
|    reward_min           | -28.115194  |
|    std                  | 1.15        |
|    value_loss           | 5.53        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 111         |
|    time_elapsed         | 1206        |
```

```
|    total_timesteps      | 227328      |
| train/                  |             |
|    approx_kl            | 0.034139894 |
|    clip_fraction        | 0.354       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.8       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.5         |
|    n_updates            | 1100        |
|    policy_gradient_loss | -0.0395     |
|    reward               | 7.2158575   |
|    reward_max           | 33.755363   |
|    reward_mean          | 0.56363565  |
|    reward_min           | -30.056551  |
|    std                  | 1.15        |
|    value_loss           | 3.15        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 112         |
|    time_elapsed         | 1217        |
|    total_timesteps      | 229376      |
| train/                  |             |
|    approx_kl            | 0.029529745 |
|    clip_fraction        | 0.297       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.8       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.92        |
|    n_updates            | 1110        |
|    policy_gradient_loss | -0.0358     |
|    reward               | 0.18371917  |
|    reward_max           | 32.484436   |
|    reward_mean          | 0.57670367  |
|    reward_min           | -36.45493   |
|    std                  | 1.15        |
|    value_loss           | 6.39        |
-------------------------------------
day: 1005, episode: 230
begin_total_asset: 1000000.00
end_total_asset: 6539754.00
total_reward: 5539754.00
total_cost: 193549.73
total_trades: 22949
Sharpe: 1.709
```

```
================================
----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 113        |
|    time_elapsed         | 1228       |
|    total_timesteps      | 231424     |
| train/                  |            |
|    approx_kl            | 0.034203935 |
|    clip_fraction        | 0.321      |
|    clip_range           | 0.2        |
|    entropy_loss         | -46.8      |
|    explained_variance   | 0.979      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.64       |
|    n_updates            | 1120       |
|    policy_gradient_loss | -0.0343    |
|    reward               | -1.3492917 |
|    reward_max           | 36.462414  |
|    reward_mean          | 0.5391711  |
|    reward_min           | -25.58874  |
|    std                  | 1.15       |
|    value_loss           | 8.11       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 114        |
|    time_elapsed         | 1239       |
|    total_timesteps      | 233472     |
| train/                  |            |
|    approx_kl            | 0.038798165 |
|    clip_fraction        | 0.386      |
|    clip_range           | 0.2        |
|    entropy_loss         | -46.8      |
|    explained_variance   | 0.98       |
|    learning_rate        | 0.0001     |
|    loss                 | 1.05       |
|    n_updates            | 1130       |
|    policy_gradient_loss | -0.0366    |
|    reward               | -2.98712   |
|    reward_max           | 32.870373  |
|    reward_mean          | 0.574749   |
|    reward_min           | -24.767775 |
|    std                  | 1.16       |
|    value_loss           | 3.4        |
----------------------------------------
----------------------------------------
```

```
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 115         |
|    time_elapsed         | 1250        |
|    total_timesteps      | 235520      |
| train/                  |             |
|    approx_kl            | 0.030534428 |
|    clip_fraction        | 0.368       |
|    clip_range           | 0.2         |
|    entropy_loss         | -46.9       |
|    explained_variance   | 0.983       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.46        |
|    n_updates            | 1140        |
|    policy_gradient_loss | -0.0316     |
|    reward               | 0.18902095  |
|    reward_max           | 42.000374   |
|    reward_mean          | 0.5607351   |
|    reward_min           | -36.775375  |
|    std                  | 1.16        |
|    value_loss           | 4.76        |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 116        |
|    time_elapsed         | 1261       |
|    total_timesteps      | 237568     |
| train/                  |            |
|    approx_kl            | 0.02485531 |
|    clip_fraction        | 0.3        |
|    clip_range           | 0.2        |
|    entropy_loss         | -46.9      |
|    explained_variance   | 0.972      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.49       |
|    n_updates            | 1150       |
|    policy_gradient_loss | -0.0307    |
|    reward               | -1.3437297 |
|    reward_max           | 42.10953   |
|    reward_mean          | 0.53066796 |
|    reward_min           | -32.311874 |
|    std                  | 1.16       |
|    value_loss           | 11         |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
```

```
|    iterations           | 117         |
|    time_elapsed         | 1271        |
|    total_timesteps      | 239616      |
| train/                  |             |
|    approx_kl            | 0.036965456 |
|    clip_fraction        | 0.341       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47         |
|    explained_variance   | 0.983       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.89        |
|    n_updates            | 1160        |
|    policy_gradient_loss | -0.0377     |
|    reward               | 2.4706988   |
|    reward_max           | 40.186695   |
|    reward_mean          | 0.58834904  |
|    reward_min           | -27.082315  |
|    std                  | 1.16        |
|    value_loss           | 4.73        |
-----------------------------------------
day: 1005, episode: 240
begin_total_asset: 1000000.00
end_total_asset: 6663096.71
total_reward: 5663096.71
total_cost: 177501.39
total_trades: 22606
Sharpe: 1.660
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 118         |
|    time_elapsed         | 1282        |
|    total_timesteps      | 241664      |
| train/                  |             |
|    approx_kl            | 0.032648407 |
|    clip_fraction        | 0.338       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.1       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.63        |
|    n_updates            | 1170        |
|    policy_gradient_loss | -0.0385     |
|    reward               | 3.4551127   |
|    reward_max           | 47.47024    |
|    reward_mean          | 0.57172126  |
|    reward_min           | -26.999296  |
```

```
|    std                  | 1.16        |
|    value_loss           | 4.52        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 119         |
|    time_elapsed         | 1293        |
|    total_timesteps      | 243712      |
| train/                  |             |
|    approx_kl            | 0.03729541  |
|    clip_fraction        | 0.333       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.1       |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.914       |
|    n_updates            | 1180        |
|    policy_gradient_loss | -0.0507     |
|    reward               | 1.0223553   |
|    reward_max           | 44.063103   |
|    reward_mean          | 0.5950198   |
|    reward_min           | -26.050377  |
|    std                  | 1.17        |
|    value_loss           | 2.92        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 120         |
|    time_elapsed         | 1304        |
|    total_timesteps      | 245760      |
| train/                  |             |
|    approx_kl            | 0.030589534 |
|    clip_fraction        | 0.325       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.2       |
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.469       |
|    n_updates            | 1190        |
|    policy_gradient_loss | -0.0446     |
|    reward               | -9.714517   |
|    reward_max           | 38.59437    |
|    reward_mean          | 0.5158875   |
|    reward_min           | -28.225214  |
|    std                  | 1.17        |
|    value_loss           | 2.9         |
```

```
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 121         |
|    time_elapsed         | 1315        |
|    total_timesteps      | 247808      |
| train/                  |             |
|    approx_kl            | 0.029175574 |
|    clip_fraction        | 0.319       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.2       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.31        |
|    n_updates            | 1200        |
|    policy_gradient_loss | -0.0415     |
|    reward               | -1.9420149  |
|    reward_max           | 45.092804   |
|    reward_mean          | 0.5793225   |
|    reward_min           | -31.21694   |
|    std                  | 1.17        |
|    value_loss           | 6.69        |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 122         |
|    time_elapsed         | 1326        |
|    total_timesteps      | 249856      |
| train/                  |             |
|    approx_kl            | 0.030865509 |
|    clip_fraction        | 0.337       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.3       |
|    explained_variance   | 0.987       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.27        |
|    n_updates            | 1210        |
|    policy_gradient_loss | -0.0368     |
|    reward               | -0.43565497 |
|    reward_max           | 39.7044     |
|    reward_mean          | 0.5666296   |
|    reward_min           | -28.859478  |
|    std                  | 1.17        |
|    value_loss           | 3.72        |
-------------------------------------
day: 1005, episode: 250
```

```
begin_total_asset: 1000000.00
end_total_asset: 7257340.19
total_reward: 6257340.19
total_cost: 176738.40
total_trades: 22567
Sharpe: 1.803
================================
----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 123         |
|    time_elapsed         | 1336        |
|    total_timesteps      | 251904      |
| train/                  |             |
|    approx_kl            | 0.034874275 |
|    clip_fraction        | 0.343       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.3       |
|    explained_variance   | 0.981       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.79        |
|    n_updates            | 1220        |
|    policy_gradient_loss | -0.0405     |
|    reward               | -1.6478039  |
|    reward_max           | 48.193607   |
|    reward_mean          | 0.6246584   |
|    reward_min           | -31.022907  |
|    std                  | 1.17        |
|    value_loss           | 6.22        |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 124        |
|    time_elapsed         | 1347       |
|    total_timesteps      | 253952     |
| train/                  |            |
|    approx_kl            | 0.03157596 |
|    clip_fraction        | 0.351      |
|    clip_range           | 0.2        |
|    entropy_loss         | -47.4      |
|    explained_variance   | 0.978      |
|    learning_rate        | 0.0001     |
|    loss                 | 4.08       |
|    n_updates            | 1230       |
|    policy_gradient_loss | -0.0346    |
|    reward               | -2.6261277 |
|    reward_max           | 40.19806   |
```

```
|    reward_mean          | 0.57804143 |
|    reward_min           | -30.693182 |
|    std                  | 1.18       |
|    value_loss           | 7.55       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 125        |
|    time_elapsed         | 1358       |
|    total_timesteps      | 256000     |
| train/                  |            |
|    approx_kl            | 0.033621043 |
|    clip_fraction        | 0.327      |
|    clip_range           | 0.2        |
|    entropy_loss         | -47.4      |
|    explained_variance   | 0.985      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.22       |
|    n_updates            | 1240       |
|    policy_gradient_loss | -0.0389    |
|    reward               | 9.436515   |
|    reward_max           | 37.731297  |
|    reward_mean          | 0.6116515  |
|    reward_min           | -33.72497  |
|    std                  | 1.18       |
|    value_loss           | 5.68       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 126        |
|    time_elapsed         | 1369       |
|    total_timesteps      | 258048     |
| train/                  |            |
|    approx_kl            | 0.028177815 |
|    clip_fraction        | 0.313      |
|    clip_range           | 0.2        |
|    entropy_loss         | -47.5      |
|    explained_variance   | 0.984      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.71       |
|    n_updates            | 1250       |
|    policy_gradient_loss | -0.0358    |
|    reward               | 3.274262   |
|    reward_max           | 42.7666    |
|    reward_mean          | 0.5675474  |
|    reward_min           | -27.067862 |
```

```
|    std                  | 1.18        |
|    value_loss           | 6.13        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 127         |
|    time_elapsed         | 1380        |
|    total_timesteps      | 260096      |
| train/                  |             |
|    approx_kl            | 0.028166108 |
|    clip_fraction        | 0.346       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.5       |
|    explained_variance   | 0.987       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.89        |
|    n_updates            | 1260        |
|    policy_gradient_loss | -0.0336     |
|    reward               | -5.206097   |
|    reward_max           | 34.173786   |
|    reward_mean          | 0.57677186  |
|    reward_min           | -28.50481   |
|    std                  | 1.18        |
|    value_loss           | 4.51        |
-----------------------------------------
day: 1005, episode: 260
begin_total_asset: 1000000.00
end_total_asset: 6596353.66
total_reward: 5596353.66
total_cost: 183778.06
total_trades: 22408
Sharpe: 1.664
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 128         |
|    time_elapsed         | 1391        |
|    total_timesteps      | 262144      |
| train/                  |             |
|    approx_kl            | 0.033127695 |
|    clip_fraction        | 0.342       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.6       |
|    explained_variance   | 0.983       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.18        |
```

```
|    n_updates            | 1270        |
|    policy_gradient_loss | -0.0405     |
|    reward               | -0.7948502  |
|    reward_max           | 33.688347   |
|    reward_mean          | 0.6154366   |
|    reward_min           | -33.454197  |
|    std                  | 1.18        |
|    value_loss           | 4.57        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 129         |
|    time_elapsed         | 1402        |
|    total_timesteps      | 264192      |
| train/                  |             |
|    approx_kl            | 0.029609721 |
|    clip_fraction        | 0.331       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.6       |
|    explained_variance   | 0.987       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.885       |
|    n_updates            | 1280        |
|    policy_gradient_loss | -0.0377     |
|    reward               | 13.023849   |
|    reward_max           | 41.356262   |
|    reward_mean          | 0.54976565  |
|    reward_min           | -35.109127  |
|    std                  | 1.19        |
|    value_loss           | 4.34        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 130         |
|    time_elapsed         | 1412        |
|    total_timesteps      | 266240      |
| train/                  |             |
|    approx_kl            | 0.03438638  |
|    clip_fraction        | 0.364       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.7       |
|    explained_variance   | 0.981       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.671       |
|    n_updates            | 1290        |
|    policy_gradient_loss | -0.036      |
```

```
|    reward               | 0.5196179  |
|    reward_max           | 30.75072   |
|    reward_mean          | 0.6232432  |
|    reward_min           | -29.529888 |
|    std                  | 1.19       |
|    value_loss           | 3.57       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 131        |
|    time_elapsed         | 1423       |
|    total_timesteps      | 268288     |
| train/                  |            |
|    approx_kl            | 0.035716623 |
|    clip_fraction        | 0.355      |
|    clip_range           | 0.2        |
|    entropy_loss         | -47.8      |
|    explained_variance   | 0.985      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.31       |
|    n_updates            | 1300       |
|    policy_gradient_loss | -0.0349    |
|    reward               | -5.3460126 |
|    reward_max           | 35.77469   |
|    reward_mean          | 0.6054341  |
|    reward_min           | -40.200787 |
|    std                  | 1.19       |
|    value_loss           | 4.09       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 188        |
|    iterations           | 132        |
|    time_elapsed         | 1434       |
|    total_timesteps      | 270336     |
| train/                  |            |
|    approx_kl            | 0.027482318 |
|    clip_fraction        | 0.314      |
|    clip_range           | 0.2        |
|    entropy_loss         | -47.8      |
|    explained_variance   | 0.984      |
|    learning_rate        | 0.0001     |
|    loss                 | 4.71       |
|    n_updates            | 1310       |
|    policy_gradient_loss | -0.0301    |
|    reward               | 1.4666573  |
|    reward_max           | 40.45018   |
```

```
|    reward_mean          | 0.64445657  |
|    reward_min           | -37.32447   |
|    std                  | 1.19        |
|    value_loss           | 8.87        |
-----------------------------------------
day: 1005, episode: 270
begin_total_asset: 1000000.00
end_total_asset: 7155276.38
total_reward: 6155276.38
total_cost: 195756.04
total_trades: 22700
Sharpe: 1.576
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 133         |
|    time_elapsed         | 1445        |
|    total_timesteps      | 272384      |
| train/                  |             |
|    approx_kl            | 0.027940195 |
|    clip_fraction        | 0.312       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.9       |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.28        |
|    n_updates            | 1320        |
|    policy_gradient_loss | -0.0401     |
|    reward               | 6.90877     |
|    reward_max           | 34.566936   |
|    reward_mean          | 0.5937672   |
|    reward_min           | -30.274696  |
|    std                  | 1.2         |
|    value_loss           | 4.95        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 134         |
|    time_elapsed         | 1456        |
|    total_timesteps      | 274432      |
| train/                  |             |
|    approx_kl            | 0.029865049 |
|    clip_fraction        | 0.313       |
|    clip_range           | 0.2         |
|    entropy_loss         | -47.9       |
|    explained_variance   | 0.99        |
```

```
|    learning_rate        | 0.0001      |
|    loss                 | 0.911       |
|    n_updates            | 1330        |
|    policy_gradient_loss | -0.0391     |
|    reward               | -0.8579647  |
|    reward_max           | 39.023003   |
|    reward_mean          | 0.58089066  |
|    reward_min           | -28.57903   |
|    std                  | 1.2         |
|    value_loss           | 4.25        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 188         |
|    iterations           | 135         |
|    time_elapsed         | 1467        |
|    total_timesteps      | 276480      |
| train/                  |             |
|    approx_kl            | 0.02716415 |
|    clip_fraction        | 0.316       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48         |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.44        |
|    n_updates            | 1340        |
|    policy_gradient_loss | -0.0389     |
|    reward               | 5.414645    |
|    reward_max           | 42.622467   |
|    reward_mean          | 0.63178456 |
|    reward_min           | -38.90715   |
|    std                  | 1.2         |
|    value_loss           | 5.39        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 136         |
|    time_elapsed         | 1487        |
|    total_timesteps      | 278528      |
| train/                  |             |
|    approx_kl            | 0.03224801 |
|    clip_fraction        | 0.34        |
|    clip_range           | 0.2         |
|    entropy_loss         | -48         |
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.55        |
```

```
|    n_updates            | 1350       |
|    policy_gradient_loss | -0.0372    |
|    reward               | -6.484335  |
|    reward_max           | 31.046848  |
|    reward_mean          | 0.6076374  |
|    reward_min           | -27.954048 |
|    std                  | 1.2        |
|    value_loss           | 4.47       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 137        |
|    time_elapsed         | 1497       |
|    total_timesteps      | 280576     |
| train/                  |            |
|    approx_kl            | 0.030423494 |
|    clip_fraction        | 0.351      |
|    clip_range           | 0.2        |
|    entropy_loss         | -48.1      |
|    explained_variance   | 0.981      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.21       |
|    n_updates            | 1360       |
|    policy_gradient_loss | -0.0349    |
|    reward               | -3.51466   |
|    reward_max           | 30.535357  |
|    reward_mean          | 0.6698603  |
|    reward_min           | -31.87786  |
|    std                  | 1.2        |
|    value_loss           | 5.41       |
-----------------------------------------
day: 1005, episode: 280
begin_total_asset: 1000000.00
end_total_asset: 7558949.74
total_reward: 6558949.74
total_cost: 200684.57
total_trades: 22474
Sharpe: 1.731
=================================
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 138        |
|    time_elapsed         | 1508       |
|    total_timesteps      | 282624     |
| train/                  |            |
|    approx_kl            | 0.029652558 |
```

```
|    clip_fraction        | 0.333       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.1       |
|    explained_variance   | 0.986       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.08        |
|    n_updates            | 1370        |
|    policy_gradient_loss | -0.0357     |
|    reward               | -10.660854  |
|    reward_max           | 34.17046    |
|    reward_mean          | 0.5991417   |
|    reward_min           | -36.656616  |
|    std                  | 1.21        |
|    value_loss           | 4.53        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 139         |
|    time_elapsed         | 1519        |
|    total_timesteps      | 284672      |
| train/                  |             |
|    approx_kl            | 0.029029502 |
|    clip_fraction        | 0.326       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.1       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.43        |
|    n_updates            | 1380        |
|    policy_gradient_loss | -0.044      |
|    reward               | -0.0013601608 |
|    reward_max           | 31.534626   |
|    reward_mean          | 0.6401167   |
|    reward_min           | -29.476103  |
|    std                  | 1.21        |
|    value_loss           | 6.57        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 140         |
|    time_elapsed         | 1530        |
|    total_timesteps      | 286720      |
| train/                  |             |
|    approx_kl            | 0.032444198 |
|    clip_fraction        | 0.317       |
|    clip_range           | 0.2         |
```

```
|    entropy_loss         | -48.2       |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.49        |
|    n_updates            | 1390        |
|    policy_gradient_loss | -0.0438     |
|    reward               | 0.14289072  |
|    reward_max           | 32.381744   |
|    reward_mean          | 0.62531865  |
|    reward_min           | -28.558765  |
|    std                  | 1.21        |
|    value_loss           | 3.63        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 141         |
|    time_elapsed         | 1541        |
|    total_timesteps      | 288768      |
| train/                  |             |
|    approx_kl            | 0.027719777 |
|    clip_fraction        | 0.318       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.2       |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.316       |
|    n_updates            | 1400        |
|    policy_gradient_loss | -0.0457     |
|    reward               | 4.5399847   |
|    reward_max           | 31.466005   |
|    reward_mean          | 0.62005603  |
|    reward_min           | -30.23218   |
|    std                  | 1.21        |
|    value_loss           | 3.21        |
-----------------------------------------
day: 1005, episode: 290
begin_total_asset: 1000000.00
end_total_asset: 7362697.21
total_reward: 6362697.21
total_cost: 199401.29
total_trades: 22615
Sharpe: 1.716
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 142         |
```

```
|    time_elapsed         | 1551        |
|    total_timesteps      | 290816      |
| train/                  |             |
|    approx_kl            | 0.02902067  |
|    clip_fraction        | 0.308       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.3       |
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.55        |
|    n_updates            | 1410        |
|    policy_gradient_loss | -0.0372     |
|    reward               | -0.46667254 |
|    reward_max           | 32.37171    |
|    reward_mean          | 0.6255673   |
|    reward_min           | -26.55996   |
|    std                  | 1.21        |
|    value_loss           | 5.63        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 143         |
|    time_elapsed         | 1562        |
|    total_timesteps      | 292864      |
| train/                  |             |
|    approx_kl            | 0.03139107  |
|    clip_fraction        | 0.319       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.3       |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.05        |
|    n_updates            | 1420        |
|    policy_gradient_loss | -0.0416     |
|    reward               | 0.7873832   |
|    reward_max           | 36.47426    |
|    reward_mean          | 0.61241555  |
|    reward_min           | -26.802507  |
|    std                  | 1.21        |
|    value_loss           | 3.8         |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 144         |
|    time_elapsed         | 1573        |
|    total_timesteps      | 294912      |
```

```
| train/                  |            |
|    approx_kl            | 0.02755319 |
|    clip_fraction        | 0.308      |
|    clip_range           | 0.2        |
|    entropy_loss         | -48.4      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.722      |
|    n_updates            | 1430       |
|    policy_gradient_loss | -0.0456    |
|    reward               | 7.5868096  |
|    reward_max           | 38.70514   |
|    reward_mean          | 0.64840585 |
|    reward_min           | -24.534182 |
|    std                  | 1.22       |
|    value_loss           | 2.81       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 145        |
|    time_elapsed         | 1584       |
|    total_timesteps      | 296960     |
| train/                  |            |
|    approx_kl            | 0.03143223 |
|    clip_fraction        | 0.324      |
|    clip_range           | 0.2        |
|    entropy_loss         | -48.4      |
|    explained_variance   | 0.99       |
|    learning_rate        | 0.0001     |
|    loss                 | 2.05       |
|    n_updates            | 1440       |
|    policy_gradient_loss | -0.0425    |
|    reward               | -8.819332  |
|    reward_max           | 35.574356  |
|    reward_mean          | 0.66578835 |
|    reward_min           | -31.56932  |
|    std                  | 1.22       |
|    value_loss           | 3.19       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 146        |
|    time_elapsed         | 1595       |
|    total_timesteps      | 299008     |
| train/                  |            |
|    approx_kl            | 0.032776557 |
```

```
|    clip_fraction        | 0.36        |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.5       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.74        |
|    n_updates            | 1450        |
|    policy_gradient_loss | -0.0387     |
|    reward               | 7.1488566   |
|    reward_max           | 35.058083   |
|    reward_mean          | 0.60586387  |
|    reward_min           | -29.379532  |
|    std                  | 1.22        |
|    value_loss           | 4.26        |
-----------------------------------------
day: 1005, episode: 300
begin_total_asset: 1000000.00
end_total_asset: 7427945.74
total_reward: 6427945.74
total_cost: 208041.43
total_trades: 23131
Sharpe: 1.753
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 147         |
|    time_elapsed         | 1605        |
|    total_timesteps      | 301056      |
| train/                  |             |
|    approx_kl            | 0.031686284 |
|    clip_fraction        | 0.34        |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.5       |
|    explained_variance   | 0.99        |
|    learning_rate        | 0.0001      |
|    loss                 | 0.699       |
|    n_updates            | 1460        |
|    policy_gradient_loss | -0.0398     |
|    reward               | -4.886653   |
|    reward_max           | 33.070843   |
|    reward_mean          | 0.6669844   |
|    reward_min           | -24.925264  |
|    std                  | 1.22        |
|    value_loss           | 3.01        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
```

```
|    fps                  | 187         |
|    iterations           | 148         |
|    time_elapsed         | 1616        |
|    total_timesteps      | 303104      |
| train/                  |             |
|    approx_kl            | 0.033623148 |
|    clip_fraction        | 0.338       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.6       |
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.96        |
|    n_updates            | 1470        |
|    policy_gradient_loss | -0.0375     |
|    reward               | -1.0963086  |
|    reward_max           | 33.675686   |
|    reward_mean          | 0.6480876   |
|    reward_min           | -35.305363  |
|    std                  | 1.22        |
|    value_loss           | 4.44        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 149         |
|    time_elapsed         | 1627        |
|    total_timesteps      | 305152      |
| train/                  |             |
|    approx_kl            | 0.029578537 |
|    clip_fraction        | 0.326       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.6       |
|    explained_variance   | 0.985       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.23        |
|    n_updates            | 1480        |
|    policy_gradient_loss | -0.0385     |
|    reward               | 4.4685974   |
|    reward_max           | 36.244728   |
|    reward_mean          | 0.61672056  |
|    reward_min           | -26.804777  |
|    std                  | 1.22        |
|    value_loss           | 6.37        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 150         |
```

```
|    time_elapsed         | 1638        |
|    total_timesteps      | 307200      |
| train/                  |             |
|    approx_kl            | 0.035076663 |
|    clip_fraction        | 0.357       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.6       |
|    explained_variance   | 0.981       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.99        |
|    n_updates            | 1490        |
|    policy_gradient_loss | -0.0371     |
|    reward               | 1.3692604   |
|    reward_max           | 32.931423   |
|    reward_mean          | 0.64462227  |
|    reward_min           | -36.688747  |
|    std                  | 1.23        |
|    value_loss           | 5.03        |
-------------------------------------
-------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 151       |
|    time_elapsed         | 1649      |
|    total_timesteps      | 309248    |
| train/                  |           |
|    approx_kl            | 0.0366086 |
|    clip_fraction        | 0.376     |
|    clip_range           | 0.2       |
|    entropy_loss         | -48.7     |
|    explained_variance   | 0.982     |
|    learning_rate        | 0.0001    |
|    loss                 | 2.62      |
|    n_updates            | 1500      |
|    policy_gradient_loss | -0.0371   |
|    reward               | 4.9770875 |
|    reward_max           | 32.19079  |
|    reward_mean          | 0.62535995|
|    reward_min           | -36.038635|
|    std                  | 1.23      |
|    value_loss           | 4.46      |
-------------------------------------
day: 1005, episode: 310
begin_total_asset: 1000000.00
end_total_asset: 7483935.88
total_reward: 6483935.88
total_cost: 192895.94
total_trades: 22598
```

```
Sharpe: 1.679
==================================
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 152        |
|    time_elapsed         | 1659       |
|    total_timesteps      | 311296     |
| train/                  |            |
|    approx_kl            | 0.032232355 |
|    clip_fraction        | 0.349      |
|    clip_range           | 0.2        |
|    entropy_loss         | -48.7      |
|    explained_variance   | 0.987      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.791      |
|    n_updates            | 1510       |
|    policy_gradient_loss | -0.0392    |
|    reward               | -1.8415272 |
|    reward_max           | 31.076977  |
|    reward_mean          | 0.62144214 |
|    reward_min           | -32.539333 |
|    std                  | 1.23       |
|    value_loss           | 4.32       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 153        |
|    time_elapsed         | 1670       |
|    total_timesteps      | 313344     |
| train/                  |            |
|    approx_kl            | 0.029407883 |
|    clip_fraction        | 0.315      |
|    clip_range           | 0.2        |
|    entropy_loss         | -48.8      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.442      |
|    n_updates            | 1520       |
|    policy_gradient_loss | -0.0437    |
|    reward               | -8.347812  |
|    reward_max           | 32.187443  |
|    reward_mean          | 0.6763946  |
|    reward_min           | -31.681387 |
|    std                  | 1.23       |
|    value_loss           | 2.94       |
----------------------------------------
```

```
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 154         |
|    time_elapsed         | 1681        |
|    total_timesteps      | 315392      |
| train/                  |             |
|    approx_kl            | 0.036463305 |
|    clip_fraction        | 0.349       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.8       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.747       |
|    n_updates            | 1530        |
|    policy_gradient_loss | -0.0407     |
|    reward               | 5.3501177   |
|    reward_max           | 32.80864    |
|    reward_mean          | 0.6673083   |
|    reward_min           | -33.4939    |
|    std                  | 1.23        |
|    value_loss           | 3.59        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 155         |
|    time_elapsed         | 1692        |
|    total_timesteps      | 317440      |
| train/                  |             |
|    approx_kl            | 0.032177392 |
|    clip_fraction        | 0.311       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.9       |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.62        |
|    n_updates            | 1540        |
|    policy_gradient_loss | -0.0411     |
|    reward               | 5.186892    |
|    reward_max           | 32.52624    |
|    reward_mean          | 0.6390543   |
|    reward_min           | -36.008366  |
|    std                  | 1.24        |
|    value_loss           | 5.54        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
```

```
|    fps                  | 187         |
|    iterations           | 156         |
|    time_elapsed         | 1703        |
|    total_timesteps      | 319488      |
| train/                  |             |
|    approx_kl            | 0.030278686 |
|    clip_fraction        | 0.324       |
|    clip_range           | 0.2         |
|    entropy_loss         | -48.9       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.568       |
|    n_updates            | 1550        |
|    policy_gradient_loss | -0.0455     |
|    reward               | -1.691538   |
|    reward_max           | 35.43506    |
|    reward_mean          | 0.6769296   |
|    reward_min           | -35.39022   |
|    std                  | 1.24        |
|    value_loss           | 2.93        |
-------------------------------------
day: 1005, episode: 320
begin_total_asset: 1000000.00
end_total_asset: 7755181.52
total_reward: 6755181.52
total_cost: 195015.23
total_trades: 22545
Sharpe: 1.674
=================================
-------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 157       |
|    time_elapsed         | 1714      |
|    total_timesteps      | 321536    |
| train/                  |           |
|    approx_kl            | 0.03162303 |
|    clip_fraction        | 0.323     |
|    clip_range           | 0.2       |
|    entropy_loss         | -49       |
|    explained_variance   | 0.993     |
|    learning_rate        | 0.0001    |
|    loss                 | 0.29      |
|    n_updates            | 1560      |
|    policy_gradient_loss | -0.0418   |
|    reward               | 2.6766846 |
|    reward_max           | 35.56297  |
|    reward_mean          | 0.6631989 |
```

```
|    reward_min           | -39.990044 |
|    std                  | 1.24       |
|    value_loss           | 2.88       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 158        |
|    time_elapsed         | 1724       |
|    total_timesteps      | 323584     |
| train/                  |            |
|    approx_kl            | 0.029726295 |
|    clip_fraction        | 0.323      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49        |
|    explained_variance   | 0.991      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.744      |
|    n_updates            | 1570       |
|    policy_gradient_loss | -0.0447    |
|    reward               | 3.3403103  |
|    reward_max           | 33.787086  |
|    reward_mean          | 0.7041364  |
|    reward_min           | -35.847134 |
|    std                  | 1.24       |
|    value_loss           | 2.93       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 159        |
|    time_elapsed         | 1736       |
|    total_timesteps      | 325632     |
| train/                  |            |
|    approx_kl            | 0.02875293 |
|    clip_fraction        | 0.309      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.1      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.306      |
|    n_updates            | 1580       |
|    policy_gradient_loss | -0.0428    |
|    reward               | 5.224401   |
|    reward_max           | 35.623314  |
|    reward_mean          | 0.6573079  |
|    reward_min           | -34.17977  |
|    std                  | 1.25       |
```

```
|    value_loss           | 3.05       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 160        |
|    time_elapsed         | 1746       |
|    total_timesteps      | 327680     |
| train/                  |            |
|    approx_kl            | 0.029087711 |
|    clip_fraction        | 0.305      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.1      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.3        |
|    n_updates            | 1590       |
|    policy_gradient_loss | -0.0447    |
|    reward               | -4.465303  |
|    reward_max           | 32.59519   |
|    reward_mean          | 0.6889461  |
|    reward_min           | -35.627422 |
|    std                  | 1.25       |
|    value_loss           | 4.03       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 161        |
|    time_elapsed         | 1757       |
|    total_timesteps      | 329728     |
| train/                  |            |
|    approx_kl            | 0.030444661 |
|    clip_fraction        | 0.312      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.2      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.91       |
|    n_updates            | 1600       |
|    policy_gradient_loss | -0.0448    |
|    reward               | -6.2292123 |
|    reward_max           | 33.527626  |
|    reward_mean          | 0.6813402  |
|    reward_min           | -34.21035  |
|    std                  | 1.25       |
|    value_loss           | 4.33       |
----------------------------------------
```

```
day: 1005, episode: 330
begin_total_asset: 1000000.00
end_total_asset: 7959038.21
total_reward: 6959038.21
total_cost: 183064.55
total_trades: 22292
Sharpe: 1.662
================================
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 162        |
|    time_elapsed         | 1768       |
|    total_timesteps      | 331776     |
| train/                  |            |
|    approx_kl            | 0.030024394 |
|    clip_fraction        | 0.316      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.2      |
|    explained_variance   | 0.995      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.931      |
|    n_updates            | 1610       |
|    policy_gradient_loss | -0.0453    |
|    reward               | -3.2038264 |
|    reward_max           | 38.50003   |
|    reward_mean          | 0.68153214 |
|    reward_min           | -42.156826 |
|    std                  | 1.25       |
|    value_loss           | 3.25       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 163        |
|    time_elapsed         | 1779       |
|    total_timesteps      | 333824     |
| train/                  |            |
|    approx_kl            | 0.028847374 |
|    clip_fraction        | 0.311      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.3      |
|    explained_variance   | 0.99       |
|    learning_rate        | 0.0001     |
|    loss                 | 1.6        |
|    n_updates            | 1620       |
|    policy_gradient_loss | -0.0399    |
|    reward               | 1.1856049  |
```

```
|    reward_max           | 35.243725   |
|    reward_mean          | 0.7365817   |
|    reward_min           | -39.76659   |
|    std                  | 1.25        |
|    value_loss           | 4.98        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 164         |
|    time_elapsed         | 1789        |
|    total_timesteps      | 335872      |
| train/                  |             |
|    approx_kl            | 0.035701856 |
|    clip_fraction        | 0.355       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.3       |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.0282      |
|    n_updates            | 1630        |
|    policy_gradient_loss | -0.0468     |
|    reward               | -4.0748925  |
|    reward_max           | 36.421665   |
|    reward_mean          | 0.712523    |
|    reward_min           | -40.650505  |
|    std                  | 1.25        |
|    value_loss           | 2.75        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 165         |
|    time_elapsed         | 1800        |
|    total_timesteps      | 337920      |
| train/                  |             |
|    approx_kl            | 0.030319285 |
|    clip_fraction        | 0.314       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.3       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.508       |
|    n_updates            | 1640        |
|    policy_gradient_loss | -0.0477     |
|    reward               | -4.9378223  |
|    reward_max           | 37.690746   |
|    reward_mean          | 0.7457556   |
```

```
|    reward_min           | -42.598312  |
|    std                  | 1.26        |
|    value_loss           | 2.66        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 166         |
|    time_elapsed         | 1811        |
|    total_timesteps      | 339968      |
| train/                  |             |
|    approx_kl            | 0.026438415 |
|    clip_fraction        | 0.282       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.4       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.02        |
|    n_updates            | 1650        |
|    policy_gradient_loss | -0.0446     |
|    reward               | -2.9756145  |
|    reward_max           | 44.137966   |
|    reward_mean          | 0.739016    |
|    reward_min           | -44.368523  |
|    std                  | 1.26        |
|    value_loss           | 4.47        |
-----------------------------------------
day: 1005, episode: 340
begin_total_asset: 1000000.00
end_total_asset: 8130330.93
total_reward: 7130330.93
total_cost: 196203.41
total_trades: 22089
Sharpe: 1.669
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 167         |
|    time_elapsed         | 1822        |
|    total_timesteps      | 342016      |
| train/                  |             |
|    approx_kl            | 0.024091236 |
|    clip_fraction        | 0.268       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.4       |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
```

```
|    loss                 | 4.03        |
|    n_updates            | 1660        |
|    policy_gradient_loss | -0.0379     |
|    reward               | -0.39557078 |
|    reward_max           | 45.62287    |
|    reward_mean          | 0.73477256  |
|    reward_min           | -34.11663   |
|    std                  | 1.26        |
|    value_loss           | 6.43        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 168         |
|    time_elapsed         | 1833        |
|    total_timesteps      | 344064      |
| train/                  |             |
|    approx_kl            | 0.032619957 |
|    clip_fraction        | 0.35        |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.4       |
|    explained_variance   | 0.984       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.2         |
|    n_updates            | 1670        |
|    policy_gradient_loss | -0.0361     |
|    reward               | 0.5808016   |
|    reward_max           | 39.01199    |
|    reward_mean          | 0.76313496  |
|    reward_min           | -44.651928  |
|    std                  | 1.26        |
|    value_loss           | 5.89        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 169         |
|    time_elapsed         | 1844        |
|    total_timesteps      | 346112      |
| train/                  |             |
|    approx_kl            | 0.033665005 |
|    clip_fraction        | 0.339       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.5       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.19        |
|    n_updates            | 1680        |
```

```
|    policy_gradient_loss | -0.0376     |
|    reward               | -7.6396065  |
|    reward_max           | 42.502083   |
|    reward_mean          | 0.74109894  |
|    reward_min           | -48.954205  |
|    std                  | 1.26        |
|    value_loss           | 6.51        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 170         |
|    time_elapsed         | 1854        |
|    total_timesteps      | 348160      |
| train/                  |             |
|    approx_kl            | 0.03372314  |
|    clip_fraction        | 0.337       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.5       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.685       |
|    n_updates            | 1690        |
|    policy_gradient_loss | -0.0479     |
|    reward               | 1.4000448   |
|    reward_max           | 45.20608    |
|    reward_mean          | 0.7808129   |
|    reward_min           | -45.507153  |
|    std                  | 1.26        |
|    value_loss           | 3.25        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 171         |
|    time_elapsed         | 1865        |
|    total_timesteps      | 350208      |
| train/                  |             |
|    approx_kl            | 0.03146931  |
|    clip_fraction        | 0.33        |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.6       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.79        |
|    n_updates            | 1700        |
|    policy_gradient_loss | -0.0451     |
|    reward               | -4.997994   |
```

```
|    reward_max           | 45.68573   |
|    reward_mean          | 0.761569   |
|    reward_min           | -53.18054  |
|    std                  | 1.27       |
|    value_loss           | 4.14       |
-----------------------------------------
day: 1005, episode: 350
begin_total_asset: 1000000.00
end_total_asset: 8499166.07
total_reward: 7499166.07
total_cost: 187803.71
total_trades: 21884
Sharpe: 1.585
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 172         |
|    time_elapsed         | 1876        |
|    total_timesteps      | 352256      |
| train/                  |             |
|    approx_kl            | 0.026662474 |
|    clip_fraction        | 0.302       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.6       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 4.86        |
|    n_updates            | 1710        |
|    policy_gradient_loss | -0.0423     |
|    reward               | 1.2556407   |
|    reward_max           | 46.196354   |
|    reward_mean          | 0.7419431   |
|    reward_min           | -47.796062  |
|    std                  | 1.27        |
|    value_loss           | 5.28        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 173        |
|    time_elapsed         | 1887       |
|    total_timesteps      | 354304     |
| train/                  |            |
|    approx_kl            | 0.0320966  |
|    clip_fraction        | 0.342      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.7      |
```

```
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.73       |
|    n_updates            | 1720       |
|    policy_gradient_loss | -0.0434    |
|    reward               | -5.0623136 |
|    reward_max           | 43.619507  |
|    reward_mean          | 0.74990994 |
|    reward_min           | -49.406216 |
|    std                  | 1.27       |
|    value_loss           | 3.32       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 174        |
|    time_elapsed         | 1898       |
|    total_timesteps      | 356352     |
| train/                  |            |
|    approx_kl            | 0.027276328 |
|    clip_fraction        | 0.302      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.7      |
|    explained_variance   | 0.99       |
|    learning_rate        | 0.0001     |
|    loss                 | 4.02       |
|    n_updates            | 1730       |
|    policy_gradient_loss | -0.0357    |
|    reward               | 7.5335217  |
|    reward_max           | 42.509026  |
|    reward_mean          | 0.7632634  |
|    reward_min           | -44.07732  |
|    std                  | 1.27       |
|    value_loss           | 7.94       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 175        |
|    time_elapsed         | 1909       |
|    total_timesteps      | 358400     |
| train/                  |            |
|    approx_kl            | 0.030532345 |
|    clip_fraction        | 0.303      |
|    clip_range           | 0.2        |
|    entropy_loss         | -49.8      |
|    explained_variance   | 0.995      |
|    learning_rate        | 0.0001     |
```

```
|    loss                 | 0.79        |
|    n_updates            | 1740        |
|    policy_gradient_loss | -0.0492     |
|    reward               | 3.1691542   |
|    reward_max           | 40.37147    |
|    reward_mean          | 0.75723284  |
|    reward_min           | -45.551968  |
|    std                  | 1.27        |
|    value_loss           | 3.67        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 176         |
|    time_elapsed         | 1919        |
|    total_timesteps      | 360448      |
| train/                  |             |
|    approx_kl            | 0.03110925  |
|    clip_fraction        | 0.32        |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.8       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.31        |
|    n_updates            | 1750        |
|    policy_gradient_loss | -0.0461     |
|    reward               | -2.6219778  |
|    reward_max           | 40.68162    |
|    reward_mean          | 0.71206975  |
|    reward_min           | -40.48845   |
|    std                  | 1.28        |
|    value_loss           | 3.36        |
-----------------------------------------
day: 1005, episode: 360
begin_total_asset: 1000000.00
end_total_asset: 9007789.12
total_reward: 8007789.12
total_cost: 200513.06
total_trades: 21904
Sharpe: 1.663
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 177         |
|    time_elapsed         | 1930        |
|    total_timesteps      | 362496      |
| train/                  |             |
```

```
|    approx_kl            | 0.033034243 |
|    clip_fraction        | 0.319       |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.8       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.56        |
|    n_updates            | 1760        |
|    policy_gradient_loss | -0.0438     |
|    reward               | -5.7035737  |
|    reward_max           | 40.610474   |
|    reward_mean          | 0.73744726  |
|    reward_min           | -46.132187  |
|    std                  | 1.28        |
|    value_loss           | 4.47        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 178         |
|    time_elapsed         | 1941        |
|    total_timesteps      | 364544      |
| train/                  |             |
|    approx_kl            | 0.028314132 |
|    clip_fraction        | 0.31        |
|    clip_range           | 0.2         |
|    entropy_loss         | -49.9       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.63        |
|    n_updates            | 1770        |
|    policy_gradient_loss | -0.0454     |
|    reward               | 6.8103538   |
|    reward_max           | 43.90147    |
|    reward_mean          | 0.7386155   |
|    reward_min           | -35.224823  |
|    std                  | 1.28        |
|    value_loss           | 4.07        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 179         |
|    time_elapsed         | 1952        |
|    total_timesteps      | 366592      |
| train/                  |             |
|    approx_kl            | 0.039701894 |
|    clip_fraction        | 0.371       |
```

```
|    clip_range           | 0.2         |
|    entropy_loss         | -49.9       |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.414       |
|    n_updates            | 1780        |
|    policy_gradient_loss | -0.0476     |
|    reward               | -9.600713   |
|    reward_max           | 43.52773    |
|    reward_mean          | 0.7673003   |
|    reward_min           | -37.60273   |
|    std                  | 1.28        |
|    value_loss           | 3.01        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 180         |
|    time_elapsed         | 1963        |
|    total_timesteps      | 368640      |
| train/                  |             |
|    approx_kl            | 0.03692667  |
|    clip_fraction        | 0.358       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50         |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.148       |
|    n_updates            | 1790        |
|    policy_gradient_loss | -0.054      |
|    reward               | 1.2627428   |
|    reward_max           | 39.86852    |
|    reward_mean          | 0.7425533   |
|    reward_min           | -40.64687   |
|    std                  | 1.28        |
|    value_loss           | 1.88        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 181         |
|    time_elapsed         | 1974        |
|    total_timesteps      | 370688      |
| train/                  |             |
|    approx_kl            | 0.034587562 |
|    clip_fraction        | 0.351       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50         |
```

```
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.494       |
|    n_updates            | 1800        |
|    policy_gradient_loss | -0.0438     |
|    reward               | -13.678078  |
|    reward_max           | 38.554466   |
|    reward_mean          | 0.7297249   |
|    reward_min           | -40.54226   |
|    std                  | 1.29        |
|    value_loss           | 3.84        |
-----------------------------------------
day: 1005, episode: 370
begin_total_asset: 1000000.00
end_total_asset: 8583375.85
total_reward: 7583375.85
total_cost: 186472.99
total_trades: 21815
Sharpe: 1.715
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 182         |
|    time_elapsed         | 1985        |
|    total_timesteps      | 372736      |
| train/                  |             |
|    approx_kl            | 0.030495401 |
|    clip_fraction        | 0.304       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.1       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.06        |
|    n_updates            | 1810        |
|    policy_gradient_loss | -0.0365     |
|    reward               | -6.4912167  |
|    reward_max           | 37.97021    |
|    reward_mean          | 0.7132709   |
|    reward_min           | -35.6604    |
|    std                  | 1.29        |
|    value_loss           | 6.51        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 183         |
|    time_elapsed         | 1996        |
```

```
|    total_timesteps      | 374784      |
| train/                  |             |
|    approx_kl            | 0.032040652 |
|    clip_fraction        | 0.351       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.1       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.27        |
|    n_updates            | 1820        |
|    policy_gradient_loss | -0.0456     |
|    reward               | -8.727062   |
|    reward_max           | 38.786358   |
|    reward_mean          | 0.73796946  |
|    reward_min           | -39.210182  |
|    std                  | 1.29        |
|    value_loss           | 3.17        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 184         |
|    time_elapsed         | 2007        |
|    total_timesteps      | 376832      |
| train/                  |             |
|    approx_kl            | 0.034759782 |
|    clip_fraction        | 0.356       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.2       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.753       |
|    n_updates            | 1830        |
|    policy_gradient_loss | -0.047      |
|    reward               | 7.3819327   |
|    reward_max           | 39.309284   |
|    reward_mean          | 0.8185866   |
|    reward_min           | -40.473988  |
|    std                  | 1.29        |
|    value_loss           | 2.47        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 185         |
|    time_elapsed         | 2018        |
|    total_timesteps      | 378880      |
| train/                  |             |
```

```
|    approx_kl            | 0.034178495 |
|    clip_fraction        | 0.329       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.2       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.119       |
|    n_updates            | 1840        |
|    policy_gradient_loss | -0.0462     |
|    reward               | 12.798223   |
|    reward_max           | 39.736557   |
|    reward_mean          | 0.78486675  |
|    reward_min           | -40.857708  |
|    std                  | 1.3         |
|    value_loss           | 2.78        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 186         |
|    time_elapsed         | 2029        |
|    total_timesteps      | 380928      |
| train/                  |             |
|    approx_kl            | 0.030994076 |
|    clip_fraction        | 0.304       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.3       |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.18        |
|    n_updates            | 1850        |
|    policy_gradient_loss | -0.0489     |
|    reward               | -2.0084236  |
|    reward_max           | 40.363194   |
|    reward_mean          | 0.77519685  |
|    reward_min           | -32.968327  |
|    std                  | 1.3         |
|    value_loss           | 3.98        |
-----------------------------------------
day: 1005, episode: 380
begin_total_asset: 1000000.00
end_total_asset: 8917709.84
total_reward: 7917709.84
total_cost: 204383.83
total_trades: 21923
Sharpe: 1.863
=================================
-----------------------------------------
```

```
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 187         |
|    time_elapsed         | 2040        |
|    total_timesteps      | 382976      |
| train/                  |             |
|    approx_kl            | 0.028512422 |
|    clip_fraction        | 0.322       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.3       |
|    explained_variance   | 0.988       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.14        |
|    n_updates            | 1860        |
|    policy_gradient_loss | -0.0356     |
|    reward               | -5.992505   |
|    reward_max           | 39.570927   |
|    reward_mean          | 0.77641684  |
|    reward_min           | -38.73531   |
|    std                  | 1.3         |
|    value_loss           | 5.54        |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 188        |
|    time_elapsed         | 2050       |
|    total_timesteps      | 385024     |
| train/                  |            |
|    approx_kl            | 0.03680237 |
|    clip_fraction        | 0.361      |
|    clip_range           | 0.2        |
|    entropy_loss         | -50.4      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.622      |
|    n_updates            | 1870       |
|    policy_gradient_loss | -0.0512    |
|    reward               | 2.1720026  |
|    reward_max           | 38.126858  |
|    reward_mean          | 0.83158326 |
|    reward_min           | -36.596905 |
|    std                  | 1.3        |
|    value_loss           | 3          |
-------------------------------------
-------------------------------------
| time/                   |             |
|    fps                  | 187         |
```

```
|    iterations           | 189         |
|    time_elapsed         | 2061        |
|    total_timesteps      | 387072      |
| train/                  |             |
|    approx_kl            | 0.032091618 |
|    clip_fraction        | 0.323       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.5       |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.64        |
|    n_updates            | 1880        |
|    policy_gradient_loss | -0.0524     |
|    reward               | 5.2369533   |
|    reward_max           | 38.56319    |
|    reward_mean          | 0.8328068   |
|    reward_min           | -44.33658   |
|    std                  | 1.31        |
|    value_loss           | 3.29        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 190         |
|    time_elapsed         | 2072        |
|    total_timesteps      | 389120      |
| train/                  |             |
|    approx_kl            | 0.027838733 |
|    clip_fraction        | 0.303       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.6       |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.29        |
|    n_updates            | 1890        |
|    policy_gradient_loss | -0.0411     |
|    reward               | 5.55361     |
|    reward_max           | 43.69212    |
|    reward_mean          | 0.7942861   |
|    reward_min           | -39.5328    |
|    std                  | 1.31        |
|    value_loss           | 8.14        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 191         |
|    time_elapsed         | 2083        |
```

```
|    total_timesteps      | 391168      |
| train/                  |             |
|    approx_kl            | 0.029481556 |
|    clip_fraction        | 0.319       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.6       |
|    explained_variance   | 0.99        |
|    learning_rate        | 0.0001      |
|    loss                 | 1.82        |
|    n_updates            | 1900        |
|    policy_gradient_loss | -0.0353     |
|    reward               | -6.633036   |
|    reward_max           | 36.643555   |
|    reward_mean          | 0.84096235  |
|    reward_min           | -36.722122  |
|    std                  | 1.31        |
|    value_loss           | 7           |
-------------------------------------
day: 1005, episode: 390
begin_total_asset: 1000000.00
end_total_asset: 9473552.43
total_reward: 8473552.43
total_cost: 220212.75
total_trades: 22346
Sharpe: 1.821
=================================
-------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 192         |
|    time_elapsed         | 2094        |
|    total_timesteps      | 393216      |
| train/                  |             |
|    approx_kl            | 0.030186798 |
|    clip_fraction        | 0.319       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.7       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.33        |
|    n_updates            | 1910        |
|    policy_gradient_loss | -0.0441     |
|    reward               | 13.287063   |
|    reward_max           | 36.56138    |
|    reward_mean          | 0.83590007  |
|    reward_min           | -37.457584  |
|    std                  | 1.31        |
|    value_loss           | 4.83        |
```

```
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 193         |
|    time_elapsed         | 2105        |
|    total_timesteps      | 395264      |
| train/                  |             |
|    approx_kl            | 0.031301413 |
|    clip_fraction        | 0.311       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.7       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.725       |
|    n_updates            | 1920        |
|    policy_gradient_loss | -0.0453     |
|    reward               | -15.529768  |
|    reward_max           | 44.564777   |
|    reward_mean          | 0.8715761   |
|    reward_min           | -37.761967  |
|    std                  | 1.32        |
|    value_loss           | 4.7         |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 194         |
|    time_elapsed         | 2117        |
|    total_timesteps      | 397312      |
| train/                  |             |
|    approx_kl            | 0.028929774 |
|    clip_fraction        | 0.316       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.8       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.897       |
|    n_updates            | 1930        |
|    policy_gradient_loss | -0.0454     |
|    reward               | 0.605745    |
|    reward_max           | 37.23915    |
|    reward_mean          | 0.8279009   |
|    reward_min           | -36.48724   |
|    std                  | 1.32        |
|    value_loss           | 5.44        |
-----------------------------------------
-----------------------------------------
```

```
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 195         |
|    time_elapsed         | 2129        |
|    total_timesteps      | 399360      |
| train/                  |             |
|    approx_kl            | 0.033817247 |
|    clip_fraction        | 0.332       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.9       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.78        |
|    n_updates            | 1940        |
|    policy_gradient_loss | -0.0493     |
|    reward               | -0.82175446 |
|    reward_max           | 37.820858   |
|    reward_mean          | 0.79426116  |
|    reward_min           | -33.33434   |
|    std                  | 1.32        |
|    value_loss           | 4.62        |
-------------------------------------
day: 1005, episode: 400
begin_total_asset: 1000000.00
end_total_asset: 9132553.33
total_reward: 8132553.33
total_cost: 208863.03
total_trades: 21941
Sharpe: 1.899
=================================
-------------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 196         |
|    time_elapsed         | 2139        |
|    total_timesteps      | 401408      |
| train/                  |             |
|    approx_kl            | 0.03215582  |
|    clip_fraction        | 0.323       |
|    clip_range           | 0.2         |
|    entropy_loss         | -50.9       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.0645      |
|    n_updates            | 1950        |
|    policy_gradient_loss | -0.0485     |
|    reward               | -0.047179043 |
|    reward_max           | 37.523373   |
```

```
|    reward_mean          | 0.81322414   |
|    reward_min           | -30.441456   |
|    std                  | 1.32         |
|    value_loss           | 2.83         |
-----------------------------------------
-----------------------------------------
| time/                   |              |
|    fps                  | 187          |
|    iterations           | 197          |
|    time_elapsed         | 2150         |
|    total_timesteps      | 403456       |
| train/                  |              |
|    approx_kl            | 0.033384643  |
|    clip_fraction        | 0.32         |
|    clip_range           | 0.2          |
|    entropy_loss         | -51          |
|    explained_variance   | 0.991        |
|    learning_rate        | 0.0001       |
|    loss                 | 1.39         |
|    n_updates            | 1960         |
|    policy_gradient_loss | -0.0429      |
|    reward               | -9.318516    |
|    reward_max           | 48.7864      |
|    reward_mean          | 0.80718136   |
|    reward_min           | -34.345016   |
|    std                  | 1.33         |
|    value_loss           | 4.65         |
-----------------------------------------
-----------------------------------------
| time/                   |              |
|    fps                  | 187          |
|    iterations           | 198          |
|    time_elapsed         | 2161         |
|    total_timesteps      | 405504       |
| train/                  |              |
|    approx_kl            | 0.033705436  |
|    clip_fraction        | 0.338        |
|    clip_range           | 0.2          |
|    entropy_loss         | -51          |
|    explained_variance   | 0.992        |
|    learning_rate        | 0.0001       |
|    loss                 | 1.64         |
|    n_updates            | 1970         |
|    policy_gradient_loss | -0.0423      |
|    reward               | -0.03723786  |
|    reward_max           | 49.794834    |
|    reward_mean          | 0.782897     |
|    reward_min           | -32.292915   |
```

```
|    std                  | 1.33        |
|    value_loss           | 3.59        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 199         |
|    time_elapsed         | 2172        |
|    total_timesteps      | 407552      |
| train/                  |             |
|    approx_kl            | 0.025222957 |
|    clip_fraction        | 0.278       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51         |
|    explained_variance   | 0.991       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.16        |
|    n_updates            | 1980        |
|    policy_gradient_loss | -0.0402     |
|    reward               | -3.4157333  |
|    reward_max           | 46.620552   |
|    reward_mean          | 0.80629075  |
|    reward_min           | -37.307716  |
|    std                  | 1.33        |
|    value_loss           | 5.91        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 200         |
|    time_elapsed         | 2182        |
|    total_timesteps      | 409600      |
| train/                  |             |
|    approx_kl            | 0.03717687  |
|    clip_fraction        | 0.332       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51         |
|    explained_variance   | 0.992       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.69        |
|    n_updates            | 1990        |
|    policy_gradient_loss | -0.041      |
|    reward               | 1.9215666   |
|    reward_max           | 47.901047   |
|    reward_mean          | 0.81526005  |
|    reward_min           | -32.956238  |
|    std                  | 1.33        |
|    value_loss           | 5.31        |
```

```
---------------------------------------
day: 1005, episode: 410
begin_total_asset: 1000000.00
end_total_asset: 9096025.28
total_reward: 8096025.28
total_cost: 215106.32
total_trades: 22047
Sharpe: 1.873
=================================
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 201        |
|    time_elapsed         | 2193       |
|    total_timesteps      | 411648     |
| train/                  |            |
|    approx_kl            | 0.034080114 |
|    clip_fraction        | 0.326      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.1      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.7        |
|    n_updates            | 2000       |
|    policy_gradient_loss | -0.0464    |
|    reward               | -0.1258622 |
|    reward_max           | 45.015045  |
|    reward_mean          | 0.7681736  |
|    reward_min           | -31.187252 |
|    std                  | 1.33       |
|    value_loss           | 4.01       |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 202        |
|    time_elapsed         | 2204       |
|    total_timesteps      | 413696     |
| train/                  |            |
|    approx_kl            | 0.03104239 |
|    clip_fraction        | 0.328      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.2      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.47       |
|    n_updates            | 2010       |
|    policy_gradient_loss | -0.0463    |
```

```
|    reward               | -3.958765  |
|    reward_max           | 38.775776  |
|    reward_mean          | 0.7724737  |
|    reward_min           | -26.344658 |
|    std                  | 1.33       |
|    value_loss           | 4.21       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 203        |
|    time_elapsed         | 2215       |
|    total_timesteps      | 415744     |
| train/                  |            |
|    approx_kl            | 0.03406111 |
|    clip_fraction        | 0.349      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.2      |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.408      |
|    n_updates            | 2020       |
|    policy_gradient_loss | -0.0502    |
|    reward               | 0.8393146  |
|    reward_max           | 44.02536   |
|    reward_mean          | 0.8028685  |
|    reward_min           | -27.53348  |
|    std                  | 1.34       |
|    value_loss           | 2.9        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 204        |
|    time_elapsed         | 2226       |
|    total_timesteps      | 417792     |
| train/                  |            |
|    approx_kl            | 0.032503   |
|    clip_fraction        | 0.32       |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.2      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.548      |
|    n_updates            | 2030       |
|    policy_gradient_loss | -0.0485    |
|    reward               | -6.0480876 |
|    reward_max           | 40.895927  |
```

```
|    reward_mean          | 0.7655492  |
|    reward_min           | -31.080732 |
|    std                  | 1.34       |
|    value_loss           | 3.35       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 205        |
|    time_elapsed         | 2237       |
|    total_timesteps      | 419840     |
| train/                  |            |
|    approx_kl            | 0.032421984 |
|    clip_fraction        | 0.329      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.3      |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.88       |
|    n_updates            | 2040       |
|    policy_gradient_loss | -0.0425    |
|    reward               | 2.2218292  |
|    reward_max           | 39.464596  |
|    reward_mean          | 0.8321641  |
|    reward_min           | -29.978989 |
|    std                  | 1.34       |
|    value_loss           | 4.63       |
-----------------------------------------
day: 1005, episode: 420
begin_total_asset: 1000000.00
end_total_asset: 9600109.95
total_reward: 8600109.95
total_cost: 227269.08
total_trades: 22322
Sharpe: 1.911
=================================
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 206        |
|    time_elapsed         | 2248       |
|    total_timesteps      | 421888     |
| train/                  |            |
|    approx_kl            | 0.031876802 |
|    clip_fraction        | 0.34       |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.3      |
|    explained_variance   | 0.994      |
```

```
|    learning_rate        | 0.0001      |
|    loss                 | 1.73        |
|    n_updates            | 2050        |
|    policy_gradient_loss | -0.05       |
|    reward               | 4.598779    |
|    reward_max           | 47.54228    |
|    reward_mean          | 0.85082024  |
|    reward_min           | -33.810707  |
|    std                  | 1.34        |
|    value_loss           | 3.86        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 207         |
|    time_elapsed         | 2258        |
|    total_timesteps      | 423936      |
| train/                  |             |
|    approx_kl            | 0.031337645 |
|    clip_fraction        | 0.314       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.3       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.65        |
|    n_updates            | 2060        |
|    policy_gradient_loss | -0.0479     |
|    reward               | 1.4736645   |
|    reward_max           | 38.074722   |
|    reward_mean          | 0.8174984   |
|    reward_min           | -27.99851   |
|    std                  | 1.34        |
|    value_loss           | 4.89        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 208         |
|    time_elapsed         | 2269        |
|    total_timesteps      | 425984      |
| train/                  |             |
|    approx_kl            | 0.03466188  |
|    clip_fraction        | 0.343       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.4       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.7         |
```

```
|    n_updates            | 2070       |
|    policy_gradient_loss | -0.0444    |
|    reward               | -2.419347  |
|    reward_max           | 42.662155  |
|    reward_mean          | 0.80728555 |
|    reward_min           | -26.319248 |
|    std                  | 1.34       |
|    value_loss           | 4.18       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 209        |
|    time_elapsed         | 2280       |
|    total_timesteps      | 428032     |
| train/                  |            |
|    approx_kl            | 0.03126337 |
|    clip_fraction        | 0.33       |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.4      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.95       |
|    n_updates            | 2080       |
|    policy_gradient_loss | -0.0495    |
|    reward               | -1.8369185 |
|    reward_max           | 49.260174  |
|    reward_mean          | 0.8689558  |
|    reward_min           | -29.449108 |
|    std                  | 1.35       |
|    value_loss           | 3.36       |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 210         |
|    time_elapsed         | 2291        |
|    total_timesteps      | 430080      |
| train/                  |             |
|    approx_kl            | 0.025352381 |
|    clip_fraction        | 0.288       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.5       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.98        |
|    n_updates            | 2090        |
|    policy_gradient_loss | -0.0405     |
```

```
|    reward               | -6.258496   |
|    reward_max           | 44.51642    |
|    reward_mean          | 0.80415535  |
|    reward_min           | -28.718645  |
|    std                  | 1.35        |
|    value_loss           | 6.56        |
-----------------------------------------
day: 1005, episode: 430
begin_total_asset: 1000000.00
end_total_asset: 9490455.19
total_reward: 8490455.19
total_cost: 214457.44
total_trades: 21888
Sharpe: 2.029
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 211         |
|    time_elapsed         | 2302        |
|    total_timesteps      | 432128      |
| train/                  |             |
|    approx_kl            | 0.03761345  |
|    clip_fraction        | 0.382       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.5       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.754       |
|    n_updates            | 2100        |
|    policy_gradient_loss | -0.0488     |
|    reward               | 10.171905   |
|    reward_max           | 44.709137   |
|    reward_mean          | 0.84506196  |
|    reward_min           | -26.220413  |
|    std                  | 1.35        |
|    value_loss           | 2.31        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 212         |
|    time_elapsed         | 2312        |
|    total_timesteps      | 434176      |
| train/                  |             |
|    approx_kl            | 0.032281272 |
|    clip_fraction        | 0.34        |
|    clip_range           | 0.2         |
```

```
|    entropy_loss         | -51.5       |
|    explained_variance   | 0.989       |
|    learning_rate        | 0.0001      |
|    loss                 | 3.86        |
|    n_updates            | 2110        |
|    policy_gradient_loss | -0.0347     |
|    reward               | -11.602069  |
|    reward_max           | 44.200893   |
|    reward_mean          | 0.86689156  |
|    reward_min           | -38.840828  |
|    std                  | 1.35        |
|    value_loss           | 7.98        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 213         |
|    time_elapsed         | 2323        |
|    total_timesteps      | 436224      |
| train/                  |             |
|    approx_kl            | 0.037778504 |
|    clip_fraction        | 0.384       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.6       |
|    explained_variance   | 0.986       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.45        |
|    n_updates            | 2120        |
|    policy_gradient_loss | -0.0371     |
|    reward               | -13.670757  |
|    reward_max           | 46.081154   |
|    reward_mean          | 0.8522275   |
|    reward_min           | -30.743383  |
|    std                  | 1.35        |
|    value_loss           | 7.05        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 214         |
|    time_elapsed         | 2334        |
|    total_timesteps      | 438272      |
| train/                  |             |
|    approx_kl            | 0.03336268  |
|    clip_fraction        | 0.344       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.6       |
|    explained_variance   | 0.993       |
```

```
|    learning_rate        | 0.0001     |
|    loss                 | 1.72       |
|    n_updates            | 2130       |
|    policy_gradient_loss | -0.0454    |
|    reward               | -5.3482203 |
|    reward_max           | 48.589066  |
|    reward_mean          | 0.8229315  |
|    reward_min           | -30.27697  |
|    std                  | 1.36       |
|    value_loss           | 5.3        |
----------------------------------------
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 215        |
|    time_elapsed         | 2345       |
|    total_timesteps      | 440320     |
| train/                  |            |
|    approx_kl            | 0.03777656 |
|    clip_fraction        | 0.37       |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.7      |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.531      |
|    n_updates            | 2140       |
|    policy_gradient_loss | -0.0457    |
|    reward               | 0.80687547 |
|    reward_max           | 42.344555  |
|    reward_mean          | 0.8492787  |
|    reward_min           | -29.31158  |
|    std                  | 1.36       |
|    value_loss           | 3.91       |
----------------------------------------
day: 1005, episode: 440
begin_total_asset: 1000000.00
end_total_asset: 8986401.16
total_reward: 7986401.16
total_cost: 208024.64
total_trades: 22026
Sharpe: 1.893
================================
----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 216        |
|    time_elapsed         | 2356       |
|    total_timesteps      | 442368     |
```

```
| train/                  |             |
|    approx_kl            | 0.033441186 |
|    clip_fraction        | 0.332       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.7       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 2.42        |
|    n_updates            | 2150        |
|    policy_gradient_loss | -0.0448     |
|    reward               | 6.4566956   |
|    reward_max           | 36.16181    |
|    reward_mean          | 0.8224909   |
|    reward_min           | -28.712273  |
|    std                  | 1.36        |
|    value_loss           | 5.64        |
-------------------------------------------
-------------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 217         |
|    time_elapsed         | 2366        |
|    total_timesteps      | 444416      |
| train/                  |             |
|    approx_kl            | 0.028177124 |
|    clip_fraction        | 0.338       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.7       |
|    explained_variance   | 0.99        |
|    learning_rate        | 0.0001      |
|    loss                 | 0.984       |
|    n_updates            | 2160        |
|    policy_gradient_loss | -0.036      |
|    reward               | 0.6023033   |
|    reward_max           | 41.790466   |
|    reward_mean          | 0.83064437  |
|    reward_min           | -35.078613  |
|    std                  | 1.36        |
|    value_loss           | 5.94        |
-------------------------------------------
-------------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 218         |
|    time_elapsed         | 2377        |
|    total_timesteps      | 446464      |
| train/                  |             |
|    approx_kl            | 0.03246963  |
```

```
|    clip_fraction        | 0.341      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.8      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.05       |
|    n_updates            | 2170       |
|    policy_gradient_loss | -0.0439    |
|    reward               | 8.2569685  |
|    reward_max           | 39.703106  |
|    reward_mean          | 0.8492614  |
|    reward_min           | -38.86943  |
|    std                  | 1.36       |
|    value_loss           | 3.99       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 219        |
|    time_elapsed         | 2388       |
|    total_timesteps      | 448512     |
| train/                  |            |
|    approx_kl            | 0.028922956 |
|    clip_fraction        | 0.305      |
|    clip_range           | 0.2        |
|    entropy_loss         | -51.8      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 2.16       |
|    n_updates            | 2180       |
|    policy_gradient_loss | -0.0458    |
|    reward               | 0.23279431 |
|    reward_max           | 40.693233  |
|    reward_mean          | 0.87033004 |
|    reward_min           | -38.826214 |
|    std                  | 1.36       |
|    value_loss           | 6.32       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 220        |
|    time_elapsed         | 2399       |
|    total_timesteps      | 450560     |
| train/                  |            |
|    approx_kl            | 0.031749584 |
|    clip_fraction        | 0.318      |
|    clip_range           | 0.2        |
```

```
|    entropy_loss         | -51.9       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.57        |
|    n_updates            | 2190        |
|    policy_gradient_loss | -0.0493     |
|    reward               | -3.128804   |
|    reward_max           | 42.360203   |
|    reward_mean          | 0.92845553  |
|    reward_min           | -47.784622  |
|    std                  | 1.37        |
|    value_loss           | 4.47        |
-----------------------------------------
day: 1005, episode: 450
begin_total_asset: 1000000.00
end_total_asset: 9531338.46
total_reward: 8531338.46
total_cost: 215038.61
total_trades: 22051
Sharpe: 1.903
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 221         |
|    time_elapsed         | 2410        |
|    total_timesteps      | 452608      |
| train/                  |             |
|    approx_kl            | 0.037746757 |
|    clip_fraction        | 0.341       |
|    clip_range           | 0.2         |
|    entropy_loss         | -51.9       |
|    explained_variance   | 0.99        |
|    learning_rate        | 0.0001      |
|    loss                 | 3.18        |
|    n_updates            | 2200        |
|    policy_gradient_loss | -0.0392     |
|    reward               | 2.5139625   |
|    reward_max           | 45.210575   |
|    reward_mean          | 0.8616248   |
|    reward_min           | -34.8034    |
|    std                  | 1.37        |
|    value_loss           | 6.51        |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 222        |
```

```
|    time_elapsed         | 2420       |
|    total_timesteps      | 454656     |
| train/                  |            |
|    approx_kl            | 0.03778275 |
|    clip_fraction        | 0.381      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52        |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.18       |
|    n_updates            | 2210       |
|    policy_gradient_loss | -0.044     |
|    reward               | 7.0357785  |
|    reward_max           | 40.616615  |
|    reward_mean          | 0.8481828  |
|    reward_min           | -32.919495 |
|    std                  | 1.37       |
|    value_loss           | 3.1        |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 223        |
|    time_elapsed         | 2431       |
|    total_timesteps      | 456704     |
| train/                  |            |
|    approx_kl            | 0.0395713  |
|    clip_fraction        | 0.358      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.1      |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 1          |
|    n_updates            | 2220       |
|    policy_gradient_loss | -0.0426    |
|    reward               | 3.8205392  |
|    reward_max           | 37.557693  |
|    reward_mean          | 0.8743636  |
|    reward_min           | -36.242165 |
|    std                  | 1.38       |
|    value_loss           | 3.48       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 224        |
|    time_elapsed         | 2442       |
|    total_timesteps      | 458752     |
```

```
| train/                  |            |
|    approx_kl            | 0.03370946 |
|    clip_fraction        | 0.341      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.1      |
|    explained_variance   | 0.993      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.508      |
|    n_updates            | 2230       |
|    policy_gradient_loss | -0.0408    |
|    reward               | -1.4342415 |
|    reward_max           | 40.670757  |
|    reward_mean          | 0.87790215 |
|    reward_min           | -46.09656  |
|    std                  | 1.38       |
|    value_loss           | 4.67       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 225        |
|    time_elapsed         | 2453       |
|    total_timesteps      | 460800     |
| train/                  |            |
|    approx_kl            | 0.025982162 |
|    clip_fraction        | 0.299      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.2      |
|    explained_variance   | 0.992      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.74       |
|    n_updates            | 2240       |
|    policy_gradient_loss | -0.0393    |
|    reward               | -0.1423172 |
|    reward_max           | 36.113853  |
|    reward_mean          | 0.83564776 |
|    reward_min           | -38.986076 |
|    std                  | 1.38       |
|    value_loss           | 8.24       |
-------------------------------------
day: 1005, episode: 460
begin_total_asset: 1000000.00
end_total_asset: 9490831.06
total_reward: 8490831.06
total_cost: 197125.28
total_trades: 21637
Sharpe: 1.811
=================================
```

```
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 226         |
|    time_elapsed         | 2464        |
|    total_timesteps      | 462848      |
| train/                  |             |
|    approx_kl            | 0.036657937 |
|    clip_fraction        | 0.351       |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.3       |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.213       |
|    n_updates            | 2250        |
|    policy_gradient_loss | -0.0508     |
|    reward               | 1.235785    |
|    reward_max           | 40.608055   |
|    reward_mean          | 0.8390918   |
|    reward_min           | -42.743145  |
|    std                  | 1.39        |
|    value_loss           | 2.3         |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 227        |
|    time_elapsed         | 2474       |
|    total_timesteps      | 464896     |
| train/                  |            |
|    approx_kl            | 0.03108546 |
|    clip_fraction        | 0.319      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.3      |
|    explained_variance   | 0.996      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.624      |
|    n_updates            | 2260       |
|    policy_gradient_loss | -0.0497    |
|    reward               | 4.9155474  |
|    reward_max           | 40.536316  |
|    reward_mean          | 0.88309723 |
|    reward_min           | -43.79913  |
|    std                  | 1.39       |
|    value_loss           | 3.28       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
```

```
|    fps                  | 187        |
|    iterations           | 228        |
|    time_elapsed         | 2485       |
|    total_timesteps      | 466944     |
| train/                  |            |
|    approx_kl            | 0.03041688 |
|    clip_fraction        | 0.286      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.4      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 5.78       |
|    n_updates            | 2270       |
|    policy_gradient_loss | -0.0449    |
|    reward               | 8.061623   |
|    reward_max           | 41.741756  |
|    reward_mean          | 0.852409   |
|    reward_min           | -47.461727 |
|    std                  | 1.39       |
|    value_loss           | 7.75       |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 229        |
|    time_elapsed         | 2496       |
|    total_timesteps      | 468992     |
| train/                  |            |
|    approx_kl            | 0.024440065 |
|    clip_fraction        | 0.282      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.4      |
|    explained_variance   | 0.989      |
|    learning_rate        | 0.0001     |
|    loss                 | 5.05       |
|    n_updates            | 2280       |
|    policy_gradient_loss | -0.0386    |
|    reward               | 5.5679016  |
|    reward_max           | 35.885574  |
|    reward_mean          | 0.85760343 |
|    reward_min           | -40.146637 |
|    std                  | 1.39       |
|    value_loss           | 12         |
-------------------------------------
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 230        |
```

```
|    time_elapsed         | 2507       |
|    total_timesteps      | 471040     |
| train/                  |            |
|    approx_kl            | 0.03285526 |
|    clip_fraction        | 0.345      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.5      |
|    explained_variance   | 0.996      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.443      |
|    n_updates            | 2290       |
|    policy_gradient_loss | -0.0511    |
|    reward               | -5.1127014 |
|    reward_max           | 43.64156   |
|    reward_mean          | 0.8782619  |
|    reward_min           | -40.299217 |
|    std                  | 1.4        |
|    value_loss           | 3.28       |
-------------------------------------
day: 1005, episode: 470
begin_total_asset: 1000000.00
end_total_asset: 9691006.12
total_reward: 8691006.12
total_cost: 207628.12
total_trades: 21916
Sharpe: 1.883
=================================
-------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 231        |
|    time_elapsed         | 2518       |
|    total_timesteps      | 473088     |
| train/                  |            |
|    approx_kl            | 0.032992873 |
|    clip_fraction        | 0.321      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.5      |
|    explained_variance   | 0.997      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.75       |
|    n_updates            | 2300       |
|    policy_gradient_loss | -0.0533    |
|    reward               | 1.2078894  |
|    reward_max           | 40.51038   |
|    reward_mean          | 0.8799924  |
|    reward_min           | -39.14934  |
|    std                  | 1.4        |
```

```
|    value_loss           | 2.88        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 232         |
|    time_elapsed         | 2528        |
|    total_timesteps      | 475136      |
| train/                  |             |
|    approx_kl            | 0.03553114  |
|    clip_fraction        | 0.352       |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.6       |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.95        |
|    n_updates            | 2310        |
|    policy_gradient_loss | -0.0517     |
|    reward               | -14.178512  |
|    reward_max           | 43.343937   |
|    reward_mean          | 0.80957806  |
|    reward_min           | -36.391327  |
|    std                  | 1.4         |
|    value_loss           | 2.71        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 233         |
|    time_elapsed         | 2539        |
|    total_timesteps      | 477184      |
| train/                  |             |
|    approx_kl            | 0.034280356 |
|    clip_fraction        | 0.331       |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.6       |
|    explained_variance   | 0.996       |
|    learning_rate        | 0.0001      |
|    loss                 | -0.0784     |
|    n_updates            | 2320        |
|    policy_gradient_loss | -0.0526     |
|    reward               | -12.143533  |
|    reward_max           | 44.351154   |
|    reward_mean          | 0.8462476   |
|    reward_min           | -34.621635  |
|    std                  | 1.4         |
|    value_loss           | 1.77        |
-----------------------------------------
```

```
-------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 234       |
|    time_elapsed         | 2550      |
|    total_timesteps      | 479232    |
| train/                  |           |
|    approx_kl            | 0.03059518 |
|    clip_fraction        | 0.308     |
|    clip_range           | 0.2       |
|    entropy_loss         | -52.7     |
|    explained_variance   | 0.997     |
|    learning_rate        | 0.0001    |
|    loss                 | 1.82      |
|    n_updates            | 2330      |
|    policy_gradient_loss | -0.0514   |
|    reward               | -0.9842517 |
|    reward_max           | 39.425014 |
|    reward_mean          | 0.82195705 |
|    reward_min           | -35.31285 |
|    std                  | 1.41      |
|    value_loss           | 2.47      |
-------------------------------------
-------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 235       |
|    time_elapsed         | 2561      |
|    total_timesteps      | 481280    |
| train/                  |           |
|    approx_kl            | 0.033294786 |
|    clip_fraction        | 0.331     |
|    clip_range           | 0.2       |
|    entropy_loss         | -52.7     |
|    explained_variance   | 0.995     |
|    learning_rate        | 0.0001    |
|    loss                 | 0.652     |
|    n_updates            | 2340      |
|    policy_gradient_loss | -0.0485   |
|    reward               | 3.5431921 |
|    reward_max           | 39.50718  |
|    reward_mean          | 0.8894598 |
|    reward_min           | -34.22837 |
|    std                  | 1.41      |
|    value_loss           | 3.63      |
-------------------------------------
day: 1005, episode: 480
begin_total_asset: 1000000.00
```

```
end_total_asset: 10162820.85
total_reward: 9162820.85
total_cost: 219492.96
total_trades: 22264
Sharpe: 1.985
=================================
---------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 236       |
|    time_elapsed         | 2572      |
|    total_timesteps      | 483328    |
| train/                  |           |
|    approx_kl            | 0.03245984 |
|    clip_fraction        | 0.323     |
|    clip_range           | 0.2       |
|    entropy_loss         | -52.8     |
|    explained_variance   | 0.994     |
|    learning_rate        | 0.0001    |
|    loss                 | 1.15      |
|    n_updates            | 2350      |
|    policy_gradient_loss | -0.0444   |
|    reward               | 1.7765758  |
|    reward_max           | 36.40181   |
|    reward_mean          | 0.88566923 |
|    reward_min           | -32.968616 |
|    std                  | 1.41      |
|    value_loss           | 3.91      |
---------------------------------------
---------------------------------------
| time/                   |           |
|    fps                  | 187       |
|    iterations           | 237       |
|    time_elapsed         | 2582      |
|    total_timesteps      | 485376    |
| train/                  |           |
|    approx_kl            | 0.03414254 |
|    clip_fraction        | 0.347     |
|    clip_range           | 0.2       |
|    entropy_loss         | -52.8     |
|    explained_variance   | 0.996     |
|    learning_rate        | 0.0001    |
|    loss                 | 0.623     |
|    n_updates            | 2360      |
|    policy_gradient_loss | -0.052    |
|    reward               | -1.8611718 |
|    reward_max           | 40.895027  |
|    reward_mean          | 0.8824321  |
```

```
|    reward_min           | -37.754665 |
|    std                  | 1.41       |
|    value_loss           | 2.91       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 238        |
|    time_elapsed         | 2593       |
|    total_timesteps      | 487424     |
| train/                  |            |
|    approx_kl            | 0.02917993 |
|    clip_fraction        | 0.304      |
|    clip_range           | 0.2        |
|    entropy_loss         | -52.8      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 3.04       |
|    n_updates            | 2370       |
|    policy_gradient_loss | -0.045     |
|    reward               | -6.55292   |
|    reward_max           | 36.46787   |
|    reward_mean          | 0.86205924 |
|    reward_min           | -37.299564 |
|    std                  | 1.41       |
|    value_loss           | 6.09       |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 239         |
|    time_elapsed         | 2604        |
|    total_timesteps      | 489472      |
| train/                  |             |
|    approx_kl            | 0.032867007 |
|    clip_fraction        | 0.33        |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.9       |
|    explained_variance   | 0.994       |
|    learning_rate        | 0.0001      |
|    loss                 | 1.87        |
|    n_updates            | 2380        |
|    policy_gradient_loss | -0.0443     |
|    reward               | 4.9044166   |
|    reward_max           | 44.825436   |
|    reward_mean          | 0.8901326   |
|    reward_min           | -33.99394   |
|    std                  | 1.41        |
```

```
|    value_loss           | 3.43        |
-----------------------------------------
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 240         |
|    time_elapsed         | 2615        |
|    total_timesteps      | 491520      |
| train/                  |             |
|    approx_kl            | 0.033565484 |
|    clip_fraction        | 0.363       |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.9       |
|    explained_variance   | 0.993       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.717       |
|    n_updates            | 2390        |
|    policy_gradient_loss | -0.0472     |
|    reward               | -17.383331  |
|    reward_max           | 49.211643   |
|    reward_mean          | 0.85785     |
|    reward_min           | -30.793205  |
|    std                  | 1.42        |
|    value_loss           | 3.8         |
-----------------------------------------
day: 1005, episode: 490
begin_total_asset: 1000000.00
end_total_asset: 10231420.42
total_reward: 9231420.42
total_cost: 224802.04
total_trades: 22345
Sharpe: 2.005
=================================
-----------------------------------------
| time/                   |             |
|    fps                  | 187         |
|    iterations           | 241         |
|    time_elapsed         | 2626        |
|    total_timesteps      | 493568      |
| train/                  |             |
|    approx_kl            | 0.03359857  |
|    clip_fraction        | 0.339       |
|    clip_range           | 0.2         |
|    entropy_loss         | -52.9       |
|    explained_variance   | 0.995       |
|    learning_rate        | 0.0001      |
|    loss                 | 0.46        |
|    n_updates            | 2400        |
```

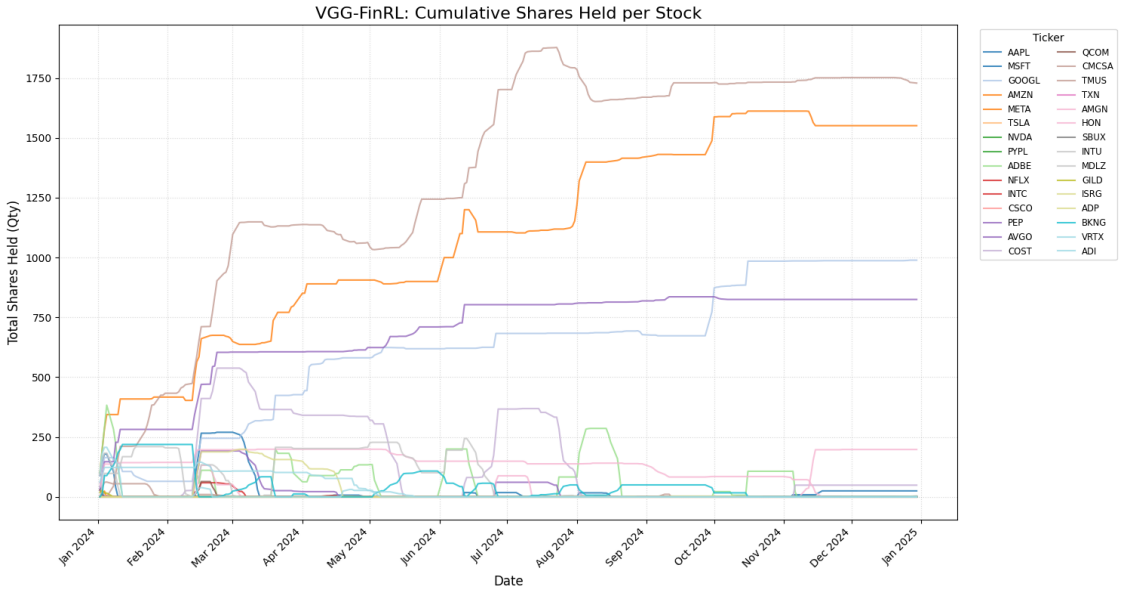
```
|    policy_gradient_loss | -0.0461    |
|    reward               | -0.6183505 |
|    reward_max           | 49.625275  |
|    reward_mean          | 0.91817373 |
|    reward_min           | -31.296543 |
|    std                  | 1.42       |
|    value_loss           | 3.02       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 242        |
|    time_elapsed         | 2636       |
|    total_timesteps      | 495616     |
| train/                  |            |
|    approx_kl            | 0.03215483 |
|    clip_fraction        | 0.32       |
|    clip_range           | 0.2        |
|    entropy_loss         | -53        |
|    explained_variance   | 0.996      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.93       |
|    n_updates            | 2410       |
|    policy_gradient_loss | -0.0444    |
|    reward               | -9.160574  |
|    reward_max           | 47.605915  |
|    reward_mean          | 0.88655657 |
|    reward_min           | -27.212488 |
|    std                  | 1.42       |
|    value_loss           | 2.97       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 243        |
|    time_elapsed         | 2647       |
|    total_timesteps      | 497664     |
| train/                  |            |
|    approx_kl            | 0.03109573 |
|    clip_fraction        | 0.326      |
|    clip_range           | 0.2        |
|    entropy_loss         | -53        |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 0.397      |
|    n_updates            | 2420       |
|    policy_gradient_loss | -0.0491    |
|    reward               | -5.699345  |
```

```
|    reward_max           | 38.609478  |
|    reward_mean          | 0.86408573 |
|    reward_min           | -28.664022 |
|    std                  | 1.42       |
|    value_loss           | 3.84       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 244        |
|    time_elapsed         | 2658       |
|    total_timesteps      | 499712     |
| train/                  |            |
|    approx_kl            | 0.03791733 |
|    clip_fraction        | 0.344      |
|    clip_range           | 0.2        |
|    entropy_loss         | -53.1      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.15       |
|    n_updates            | 2430       |
|    policy_gradient_loss | -0.0488    |
|    reward               | 1.8092315  |
|    reward_max           | 39.325874  |
|    reward_mean          | 0.90269077 |
|    reward_min           | -29.117664 |
|    std                  | 1.43       |
|    value_loss           | 2.73       |
-----------------------------------------
-----------------------------------------
| time/                   |            |
|    fps                  | 187        |
|    iterations           | 245        |
|    time_elapsed         | 2669       |
|    total_timesteps      | 501760     |
| train/                  |            |
|    approx_kl            | 0.029811092 |
|    clip_fraction        | 0.316      |
|    clip_range           | 0.2        |
|    entropy_loss         | -53.2      |
|    explained_variance   | 0.994      |
|    learning_rate        | 0.0001     |
|    loss                 | 1.21       |
|    n_updates            | 2440       |
|    policy_gradient_loss | -0.0464    |
|    reward               | 9.136097   |
|    reward_max           | 36.295486  |
|    reward_mean          | 0.8993227  |
```

```
|    reward_min           | -28.897524  |
|    std                  | 1.43        |
|    value_loss           | 3.02        |
-----------------------------------------
Total shares held across all stocks: 12628.0
Average absolute action strength: 30.230829
```

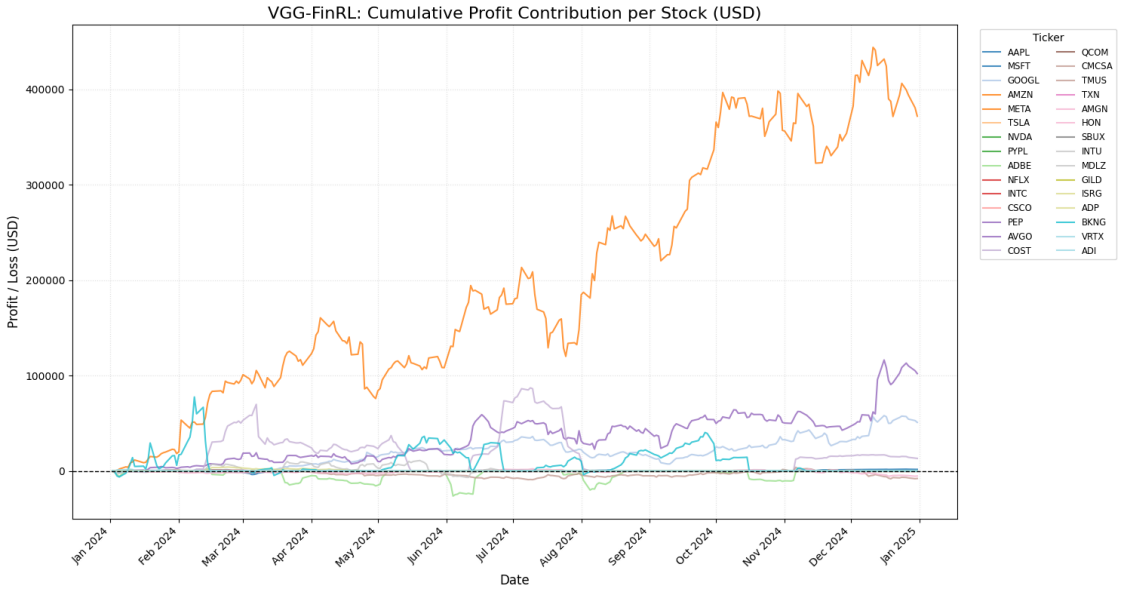
[8]:
```
# ============================================================
# CELL 7 - Run Prediction & Plot Cumulative Shares Held
# ============================================================
import matplotlib.dates as mdates
df_account_value, df_actions = DRLAgent.DRL_prediction(
    model=trained_vgg,
    environment=e_test_gym
)

# Parse dates as proper datetime
df_shares_held = df_actions.cumsum()
dates_all      = pd.to_datetime(df_account_value['date'].values)

min_len     = min(len(dates_all), len(df_shares_held))
dates_plot  = dates_all[:min_len]
shares_plot = df_shares_held.iloc[:min_len]

fig, ax = plt.subplots(figsize=(15, 8))
colormap = plt.get_cmap('tab20', len(TICKERS))

for i, ticker in enumerate(TICKERS):
    if ticker in shares_plot.columns:
        ax.plot(dates_plot, shares_plot[ticker], label=ticker,
                color=colormap(i), linewidth=1.5, alpha=0.8)

# Format x-axis as proper dates
ax.xaxis.set_major_locator(mdates.MonthLocator(interval=1))
ax.xaxis.set_major_formatter(mdates.DateFormatter('%b %Y'))
plt.setp(ax.get_xticklabels(), rotation=45, ha='right')

ax.set_title('VGG-FinRL: Cumulative Shares Held per Stock', fontsize=16)
ax.set_xlabel('Date', fontsize=12)
ax.set_ylabel('Total Shares Held (Qty)', fontsize=12)
ax.legend(bbox_to_anchor=(1.02, 1), loc='upper left', ncol=2, fontsize='small',␣
 ↪title='Ticker')
ax.grid(True, linestyle=':', alpha=0.5)
fig.tight_layout()
plt.show()
```

```
hit end!
```



[9]:
```
# ============================================================
# CELL 8 - Plot Profit Contribution per Stock
# ============================================================
# Pivot prices and join on date index so alignment is guaranteed
df_prices_pivot = (
    e_test_gym.df
    .sort_values(['date', 'tic'])
    .pivot(index='date', columns='tic', values='close')
)

df_shares_held = df_actions.cumsum()
df_shares_held.index = dates_all[:len(df_shares_held)]  # align by date␣
 ↪(already datetime)

# Cast price index to datetime, then reindex and forward-fill
price_dates           = pd.to_datetime(df_prices_pivot.index)
df_prices_pivot.index = price_dates
df_shares_aligned     = df_shares_held.reindex(price_dates).ffill().fillna(0)

profit_df = pd.DataFrame(index=price_dates)
for ticker in TICKERS:
    if ticker in df_prices_pivot.columns and ticker in df_shares_aligned.
 ↪columns:
        prices        = df_prices_pivot[ticker]
        initial_price = prices.iloc[0]
        profit_df[ticker] = (prices - initial_price) * df_shares_aligned[ticker]
```

```
fig, ax = plt.subplots(figsize=(15, 8))
colormap = plt.get_cmap('tab20', len(TICKERS))

for i, ticker in enumerate(TICKERS):
    if ticker in profit_df.columns:
        ax.plot(profit_df.index, profit_df[ticker], label=ticker,
                color=colormap(i), linewidth=1.5, alpha=0.8)

ax.axhline(0, color='black', lw=1, linestyle='--')

# Format x-axis as proper dates
ax.xaxis.set_major_locator(mdates.MonthLocator(interval=1))
ax.xaxis.set_major_formatter(mdates.DateFormatter('%b %Y'))
plt.setp(ax.get_xticklabels(), rotation=45, ha='right')

ax.set_title('VGG-FinRL: Cumulative Profit Contribution per Stock (USD)',␣
 ↪fontsize=16)
ax.set_xlabel('Date', fontsize=12)
ax.set_ylabel('Profit / Loss (USD)', fontsize=12)
ax.legend(bbox_to_anchor=(1.02, 1), loc='upper left', ncol=2, fontsize='small',␣
 ↪title='Ticker')
ax.grid(True, linestyle=':', alpha=0.4)
fig.tight_layout()
plt.show()
```



[10]:
```
# ============================================================
# CELL 9 - Compute True P&L (Current Holding Value)
```

```
# ============================================================
true_pnl_df = (df_prices_pivot * df_shares_aligned).fillna(0)
true_pnl_df = true_pnl_df.reset_index().rename(columns={'date': 'Date'})
```

[11]:
```
!pip install --upgrade nbformat
```

```
Requirement already satisfied: nbformat in /opt/miniconda3/lib/python3.13/site-
packages (5.10.4)
Requirement already satisfied: fastjsonschema>=2.15 in
/opt/miniconda3/lib/python3.13/site-packages (from nbformat) (2.21.2)
Requirement already satisfied: jsonschema>=2.6 in
/opt/miniconda3/lib/python3.13/site-packages (from nbformat) (4.26.0)
Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in
/opt/miniconda3/lib/python3.13/site-packages (from nbformat) (5.9.1)
Requirement already satisfied: traitlets>=5.1 in
/opt/miniconda3/lib/python3.13/site-packages (from nbformat) (5.14.3)
Requirement already satisfied: attrs>=22.2.0 in
/opt/miniconda3/lib/python3.13/site-packages (from jsonschema>=2.6->nbformat)
(25.4.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in
/opt/miniconda3/lib/python3.13/site-packages (from jsonschema>=2.6->nbformat)
(2025.9.1)
Requirement already satisfied: referencing>=0.28.4 in
/opt/miniconda3/lib/python3.13/site-packages (from jsonschema>=2.6->nbformat)
(0.37.0)
Requirement already satisfied: rpds-py>=0.25.0 in
/opt/miniconda3/lib/python3.13/site-packages (from jsonschema>=2.6->nbformat)
(0.30.0)
Requirement already satisfied: platformdirs>=2.5 in
/opt/miniconda3/lib/python3.13/site-packages (from jupyter-
core!=5.0.*,>=4.12->nbformat) (4.5.0)
```

[12]:
```
# ============================================================
# CELL 10 - Interactive Plotly P&L Chart
# ============================================================
final_pnl   = true_pnl_df[TICKERS].iloc[-1]
top_5       = final_pnl.nlargest(5).index.tolist()
bottom_5    = final_pnl.nsmallest(5).index.tolist()
key_tickers = set(top_5 + bottom_5)

fig = go.Figure()

for ticker in TICKERS:
    if ticker not in true_pnl_df.columns:
        continue
    fig.add_trace(go.Scatter(
        x=true_pnl_df['Date'],
        y=true_pnl_df[ticker],
```

```
        name=ticker,
        mode='lines',
        visible=True if ticker in key_tickers else 'legendonly',
        hovertemplate=f"<b>{ticker}</b><br>PnL: %{{y:$.2f}}<br>Date:␣
↪%{{x}}<extra></extra>"
    ))

fig.update_layout(
    title='VGG-FinRL: Individual Stock P&L (Hover over lines to see details)',
    template='plotly_dark',
    hovermode='closest',
    hoverlabel=dict(bgcolor='black', font_size=13),
    xaxis_title='Date',
    yaxis_title='Profit / Loss (USD)',
    legend=dict(groupclick='toggleitem', traceorder='grouped')
)
fig.update_xaxes(rangeslider_visible=True)
#fig.write_html("pnl_chart.html")
#print("Open pnl_chart.html in your browser")
fig.show()
```

[ ]:
```
# ============================================================
# CELL 11 - Future Prediction with Live NewsAPI Sentiment (Cached)
# ============================================================
from datetime import date

FUTURE_START = (TODAY - timedelta(days=DAYS_LIMIT)).strftime('%Y-%m-%d')
FUTURE_END   = TODAY.strftime('%Y-%m-%d')

print(f"Future window: {FUTURE_START} → {FUTURE_END}")

# Download price data
df_raw_future = YahooDownloader(
    start_date=FUTURE_START,
    end_date=FUTURE_END,
    ticker_list=TICKERS
).fetch_data()

df_future_raw = fe.preprocess_data(df_raw_future)

# Fetch live sentiment - cached so re-running this cell
# won't burn extra API requests
print("Fetching live NewsAPI sentiment...")
df_sent_future = build_sentiment_df_cached(
    TICKERS,
    FUTURE_START,
    FUTURE_END,
```

```
    cache_file='sentiment_future.pkl'
)

print(f"\nLive sentiment coverage:")
print(f"  Days with at least one non-zero score: "
      f"{(df_sent_future != 0).any(axis=1).sum()} / {len(df_sent_future)}")
print(f"  Tickers with at least one score: "
      f"{(df_sent_future != 0).any(axis=0).sum()} / {len(TICKERS)}")

df_future = prepare_df(df_future_raw, df_sent_future)
print(f"\nFuture ready - {df_future['date'].nunique()} trading days")

e_future_gym = make_env(df_future)

df_future_account, df_future_actions = DRLAgent.DRL_prediction(
    model=trained_vgg,
    environment=e_future_gym
)

#   Plot: Portfolio Value
future_dates = pd.to_datetime(df_future_account['date'].values)

fig, ax = plt.subplots(figsize=(15, 5))
ax.plot(future_dates, df_future_account['account_value'],
        color='cyan', linewidth=2, label='Portfolio value')
ax.axhline(1_000_000, color='white', linestyle='--',
           linewidth=1, label='Starting capital')
ax.fill_between(future_dates, 1_000_000, df_future_account['account_value'],
                where=df_future_account['account_value'] >= 1_000_000,
                alpha=0.2, color='green', label='Above baseline')
ax.fill_between(future_dates, 1_000_000, df_future_account['account_value'],
                where=df_future_account['account_value'] < 1_000_000,
                alpha=0.2, color='red', label='Below baseline')

ax.xaxis.set_major_locator(mdates.DayLocator(interval=3))
ax.xaxis.set_major_formatter(mdates.DateFormatter('%d %b %Y'))
plt.setp(ax.get_xticklabels(), rotation=45, ha='right')
ax.set_title('VGG-FinRL: Sentiment-Aware Portfolio Value (Live)', fontsize=16)
ax.set_xlabel('Date', fontsize=12)
ax.set_ylabel('Portfolio Value (USD)', fontsize=12)
ax.legend(fontsize='small')
ax.grid(True, linestyle=':', alpha=0.5)
fig.tight_layout()
plt.show()

#   Plot: Live Sentiment Heatmap
fig, ax = plt.subplots(figsize=(15, 8))
```

```
sent_plot = df_sent_future[TICKERS].T

im = ax.imshow(sent_plot.values, aspect='auto', cmap='RdYlGn',
               vmin=-1, vmax=1, interpolation='nearest')

ax.set_yticks(range(len(TICKERS)))
ax.set_yticklabels(TICKERS, fontsize=8)

n_cols   = sent_plot.shape[1]
tick_idx = np.linspace(0, n_cols - 1, min(12, n_cols)).astype(int)
ax.set_xticks(tick_idx)
ax.set_xticklabels(
    [sent_plot.columns[i] for i in tick_idx],
    rotation=45, ha='right', fontsize=8
)

plt.colorbar(im, ax=ax, label='Sentiment Score (-1=Bearish, +1=Bullish)')
ax.set_title('Live News Sentiment Heatmap by Stock', fontsize=16)
ax.set_xlabel('Date', fontsize=12)
ax.set_ylabel('Ticker', fontsize=12)
fig.tight_layout()
plt.show()

#   Interactive Plotly: Future P&L
df_future_prices = (
    e_future_gym.df
    .sort_values(['date', 'tic'])
    .pivot(index='date', columns='tic', values='close')
)

future_price_dates      = pd.to_datetime(df_future_prices.index)
df_future_prices.index  = future_price_dates
future_shares           = df_future_actions.cumsum()
future_shares_aligned   = future_shares.reindex(future_price_dates).ffill().
 ↪fillna(0)

future_pnl_df = pd.DataFrame(index=future_price_dates)
for ticker in TICKERS:
    if ticker in df_future_prices.columns and ticker in future_shares_aligned.
 ↪columns:
        prices        = df_future_prices[ticker]
        initial_price = prices.iloc[0]
        future_pnl_df[ticker] = (prices - initial_price) *␣
 ↪future_shares_aligned[ticker]

future_pnl_df = future_pnl_df.reset_index().rename(columns={'date': 'Date'})
```

```
final_future_pnl = future_pnl_df[TICKERS].iloc[-1]
top_5            = final_future_pnl.nlargest(5).index.tolist()
bottom_5         = final_future_pnl.nsmallest(5).index.tolist()
key_tickers      = set(top_5 + bottom_5)

fig = go.Figure()
for ticker in TICKERS:
    if ticker not in future_pnl_df.columns:
        continue
    fig.add_trace(go.Scatter(
        x=future_pnl_df['Date'],
        y=future_pnl_df[ticker],
        name=ticker,
        mode='lines',
        visible=True if ticker in key_tickers else 'legendonly',
        hovertemplate=f"<b>{ticker}</b><br>PnL: %{{y:$.2f}}<br>Date:␣
 ↪%{{x}}<extra></extra>"
    ))

fig.update_layout(
    title='VGG-FinRL: Sentiment-Aware Individual Stock P&L (Live)',
    template='plotly_dark',
    hovermode='closest',
    hoverlabel=dict(bgcolor='black', font_size=13),
    xaxis_title='Date',
    yaxis_title='Profit / Loss (USD)',
    legend=dict(groupclick='toggleitem', traceorder='grouped')
)
fig.update_xaxes(rangeslider_visible=True)
fig.write_html("live_sentiment_pnl.html")
print("Chart saved to live_sentiment_pnl.html")
```