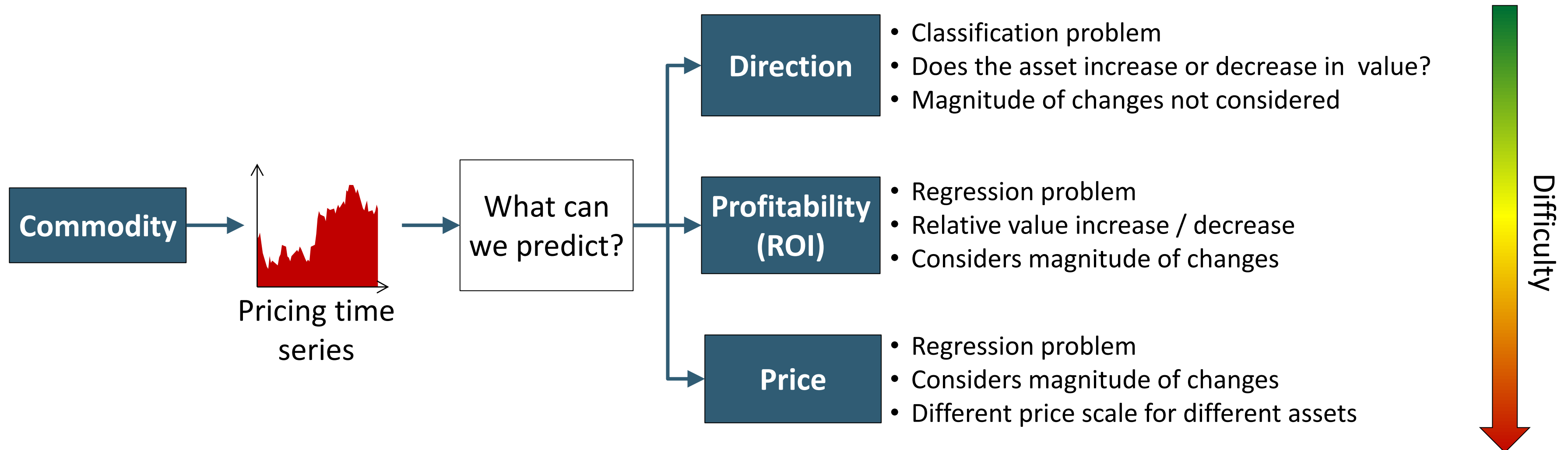


## Overview

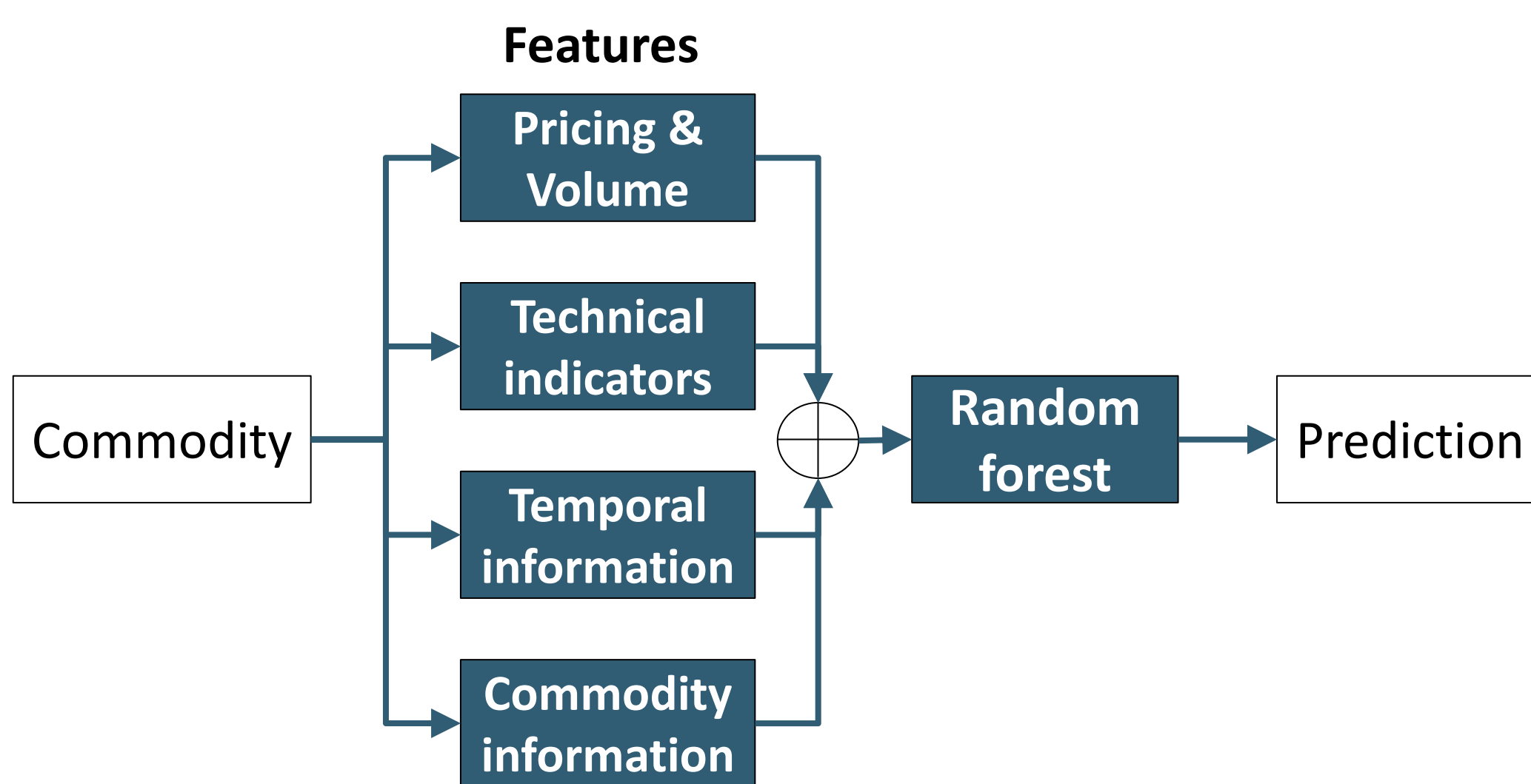
Predicting the future price of financial assets using past information has attracted the attention of machine learning communities. However, there is not consensus on which technique must be used to perform better investments: predict the direction of the price variation, the relative gains (profitability) or the price. In this work, we explore by simulation which of these techniques is more effective for investing on the commodities market.

## 1. Task and Motivation



*Research Question: Which commodity price forecasting strategy is more effective for investing?*

## 2. Method



## 3. Dataset

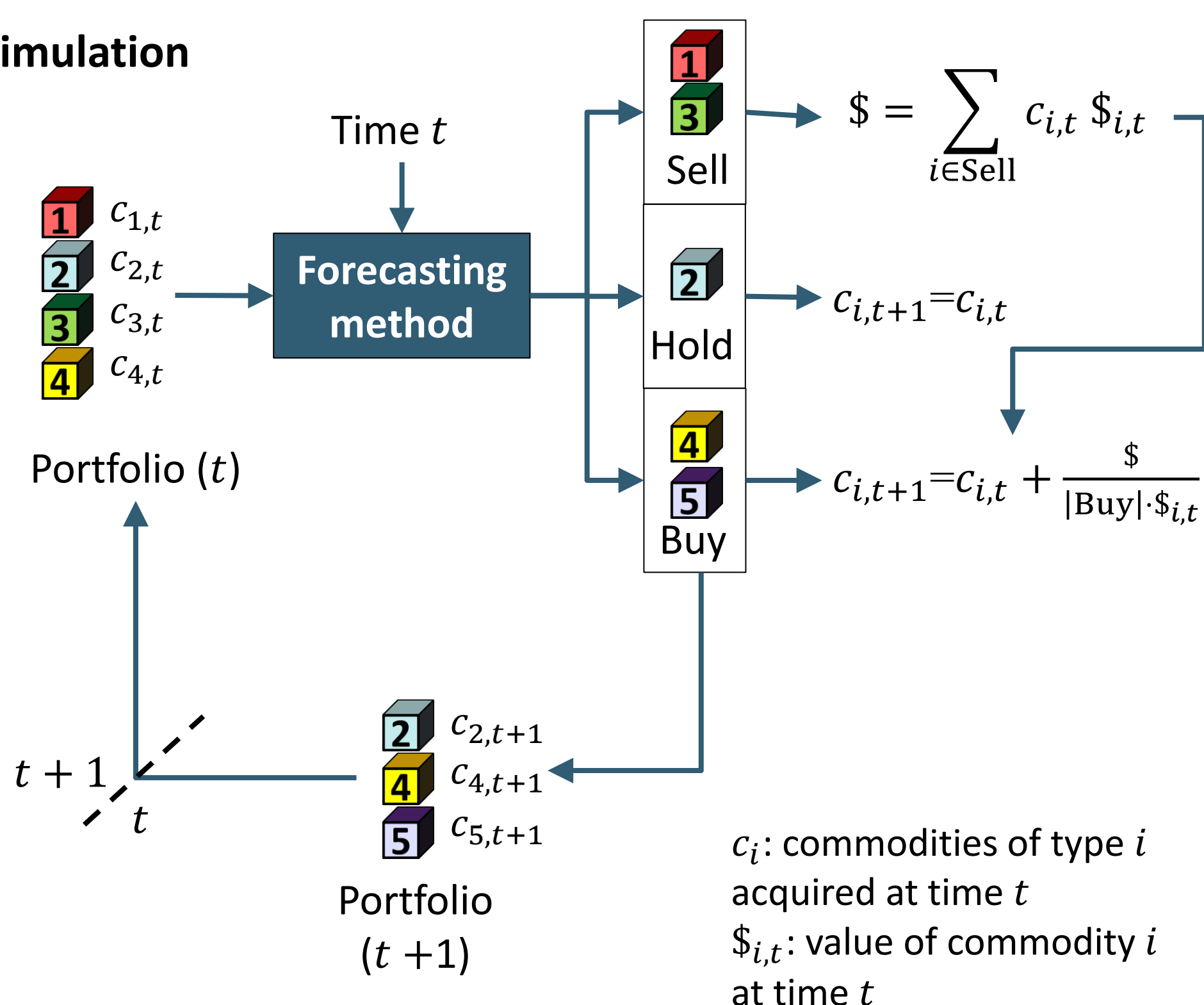
### Dataset

- Commodity pricing data
- 20 commodities
- January 2001 to December 2020
- Training: 2001-2015 / Test: 2016-2021

Sector	Commodities
Energy	Brent Crude, Gasoline, Heating Oil, Natural Gas, West Texas Intermediate (WTI) Crude
Crops	Corn, Coffee, Cocoa, Oats, Wheat, Sugar
Livestock	Feeder Cattle, Lean Hogs, Live Cattle
Metals	Copper, Palladium, Platinum, Gold, Silver
Construction	Lumber

## 4. Evaluation procedure

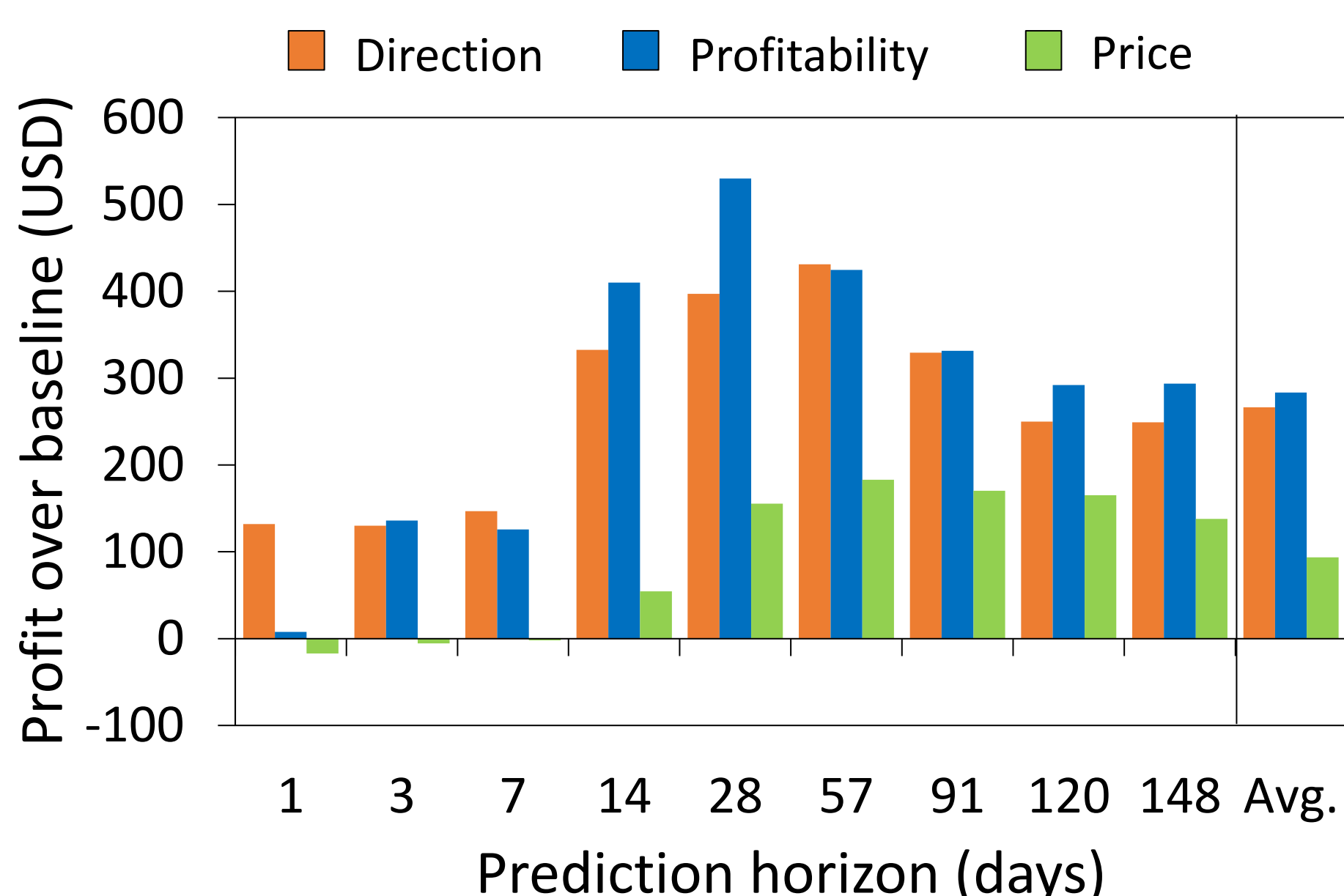
### Simulation



### Configuration

- Initial portfolio
- Invest on every commodity
- Same amount of money on each commodity
- **Start investment:** 10,000 USD
- **Outcome:** money when portfolio is sold at the end of the simulation
- When to buy / sell / hold?
  - Buy:  $>1\%$  predicted price variation
  - Hold:  $-1\% < \text{predicted price variation} < 1\%$
  - Sell:  $< -1\%$  predicted price variation
- Modify portfolio daily
- **Simulation length:** 28 days
- Test this over 20 different time periods
  - Test set: starting dates from January 2016 to December 2019
  - Train set: time series from 2016 to start of test period

## 5. Results & Conclusions



- **Baseline:** invest same amount of money on each commodity
- **RQ1:** Which strategy is more effective for investing?
  - Profitability prediction
  - Direction prediction
  - Price prediction
- **RQ2:** Which prediction horizon should we set our methods to?
  - Performance is maximized when looking at 20-40 days into the future.
  - This is particularly notorious on profitability prediction ( $> 500$  USD over the baseline)
- **Conclusion:** Profitability prediction represents the most effective strategy for investing on the commodities market.