Speculation of NTD Foreign Exchange

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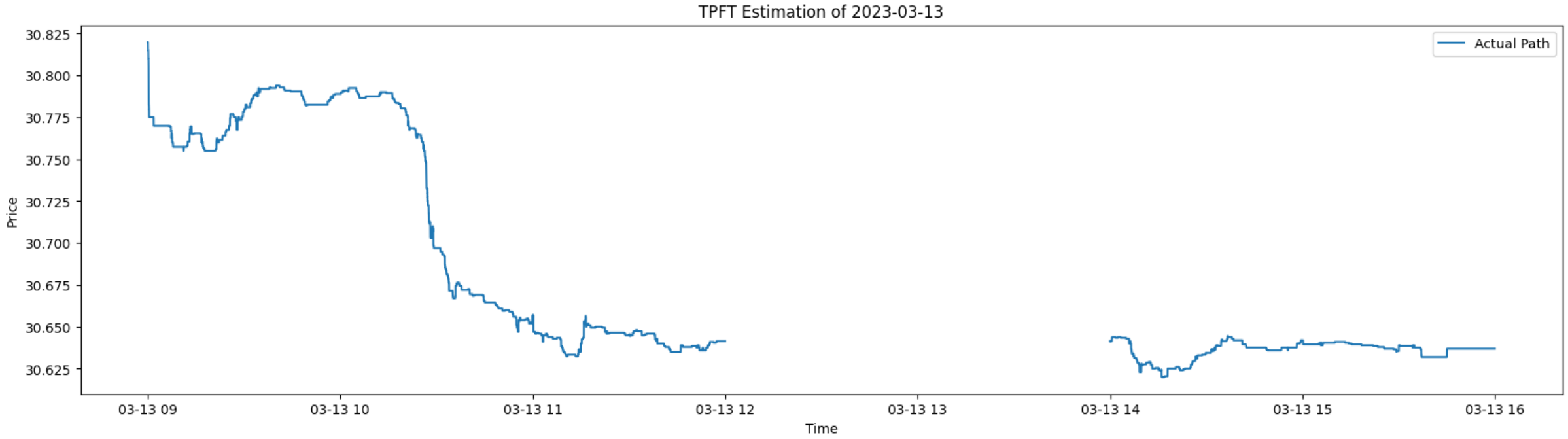
Problem Formulation

Problem Formulation:

- Trading halt between 12:00 to 14:00 at TPFT.



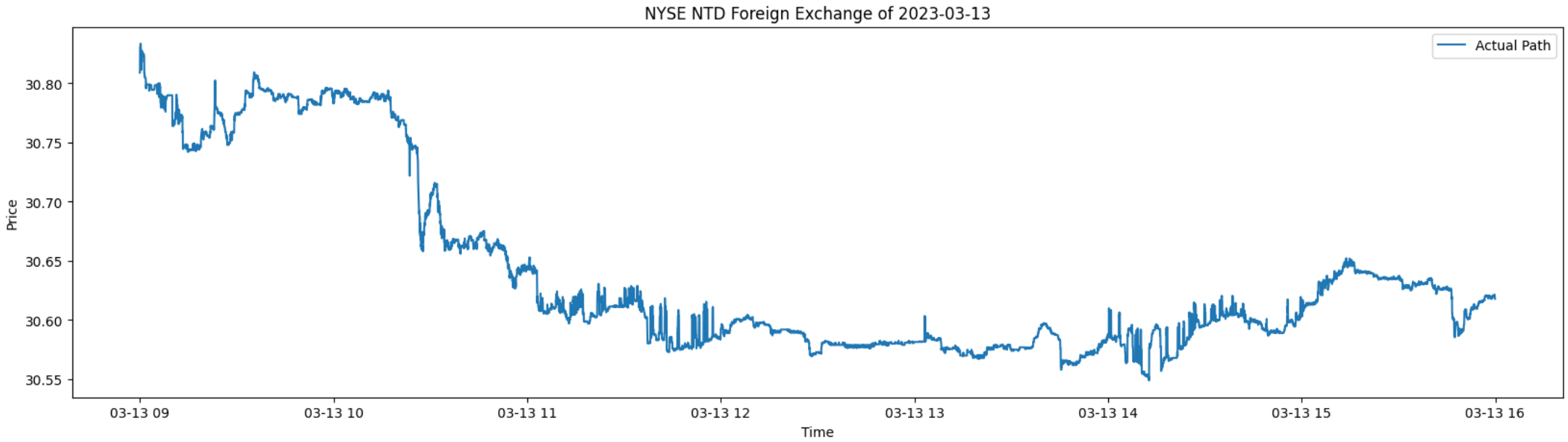
Problem Formulation:

We are aiming to…

- Speculate the price during the halt.
- Estimate the price after 14:00.

Problem Formulation:

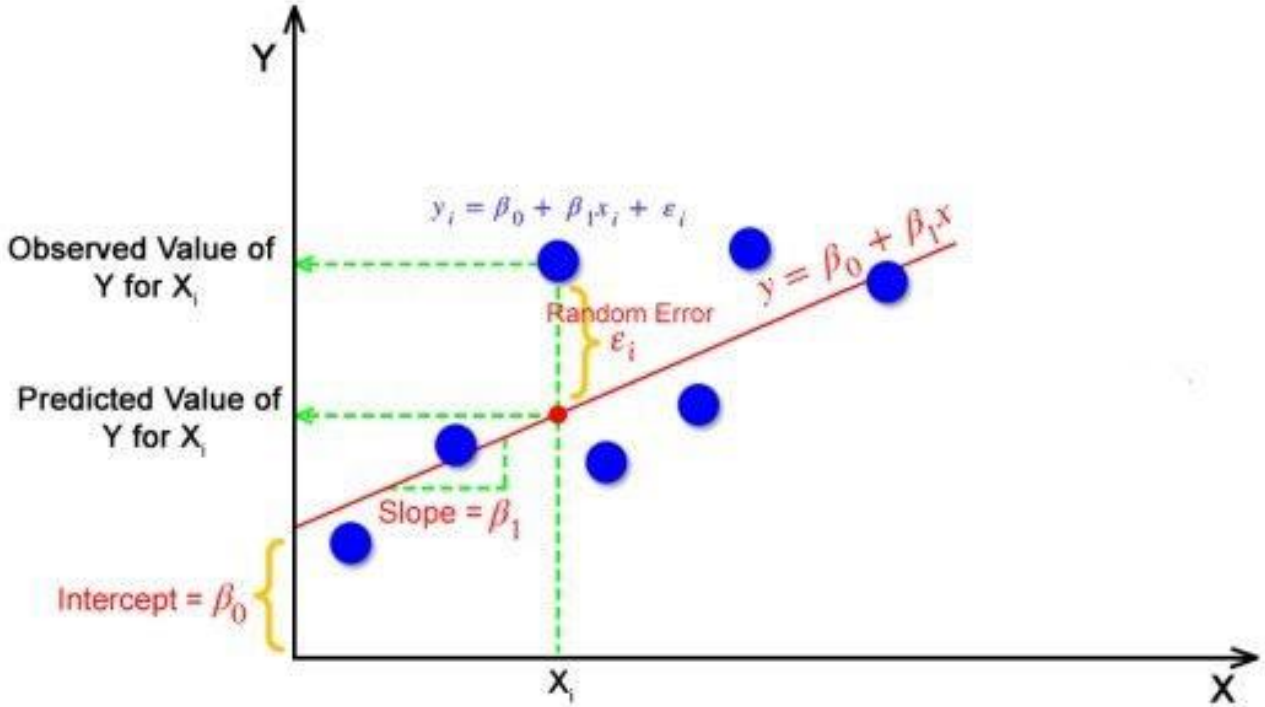
Using the FX at NYSE!!



Methods Review

Linear Regression

$$min \sum (\hat{y} - y)^2$$



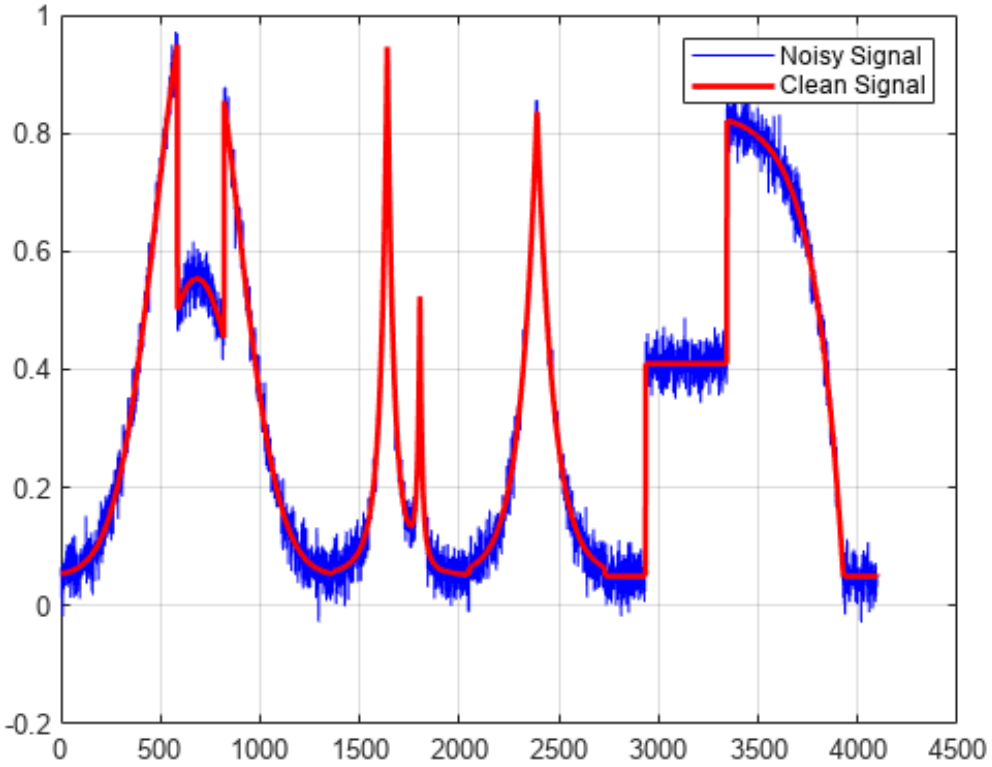
Exponential Smoothing

$$EMA_t = Actual_t \times \alpha + EMA_{t-1} \times (1 - \alpha)$$

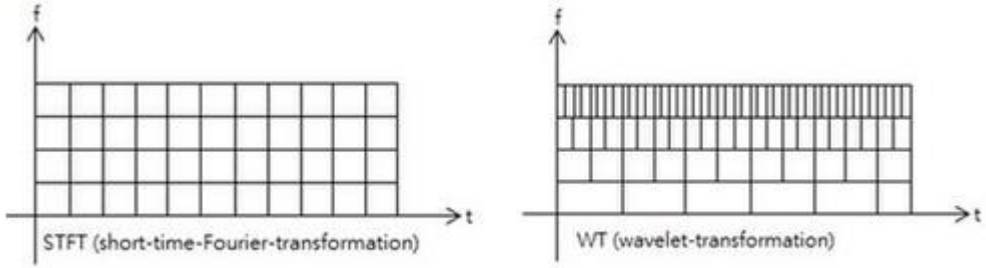
P.S. α is normally calculated by $\frac{2}{N+1}$, whereas N = the span of window.

Wavelet Signal Denoiser (Cumulative)

$$CWT_x(a,b) = \frac{1}{\sqrt{|a|}} \int_{-\infty}^{+\infty} x(t)\psi\left(\frac{t-b}{a}\right) dt$$

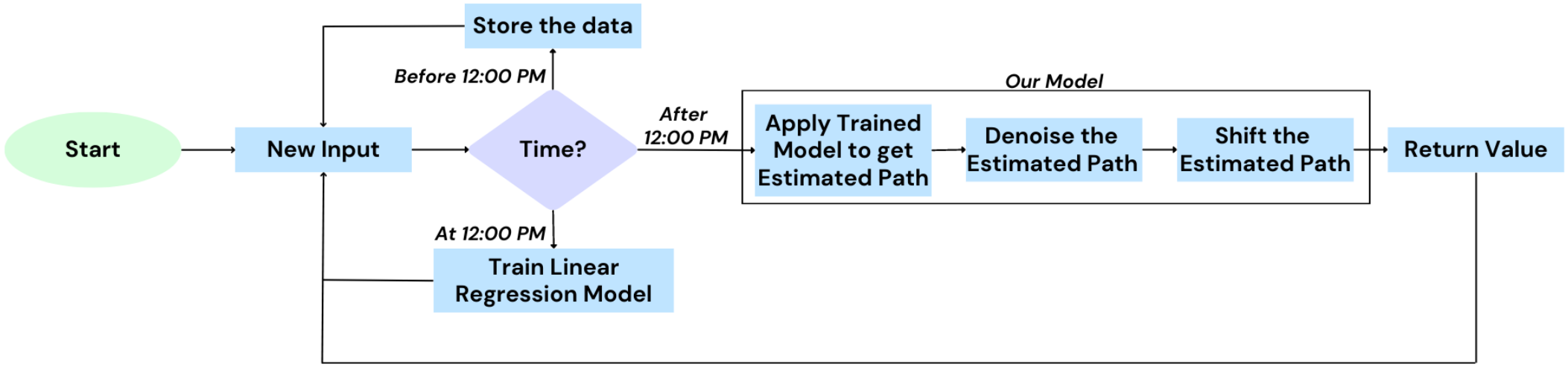


vs *Fourier Transform:*
Ability to handle the ***High-Frequency*** *data.*



Experiment

Design of Experiment



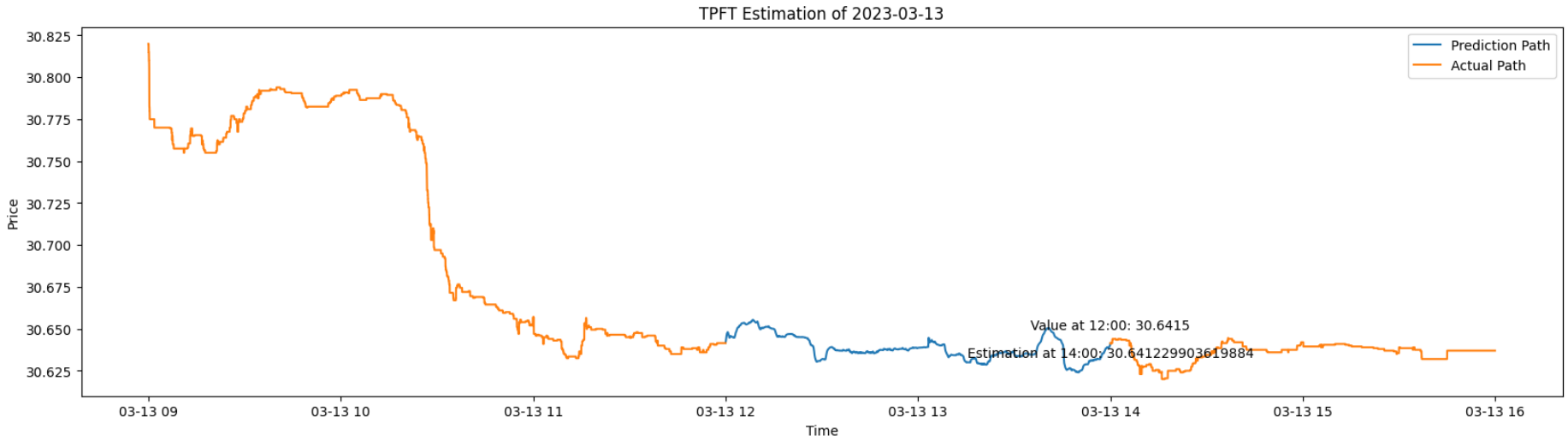
Replicate the volatility of CMPN !!

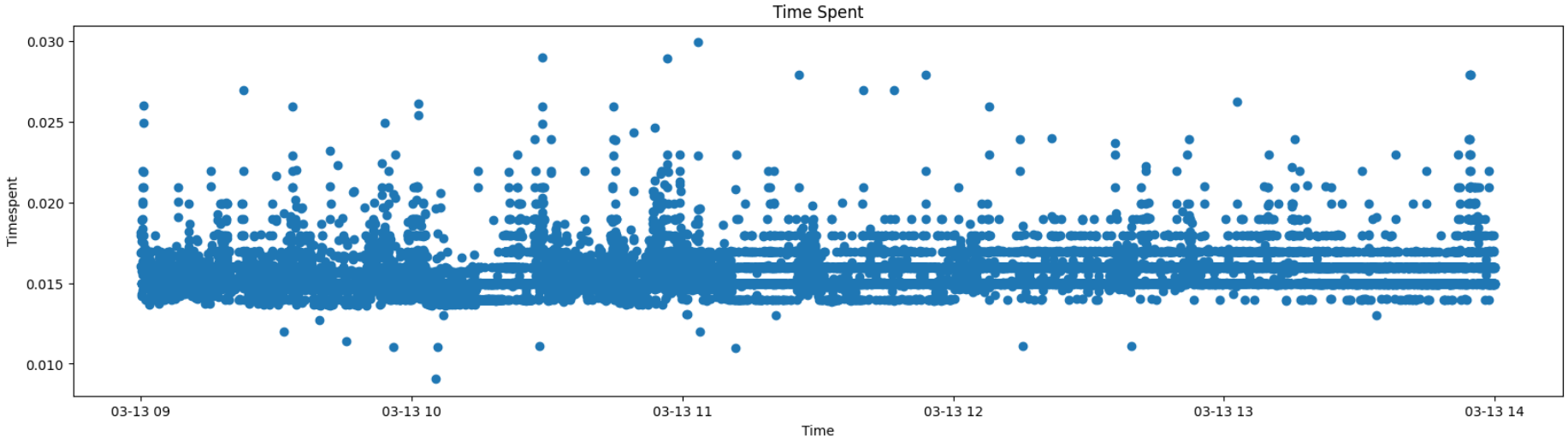
※Selection of α: *Volume of CMPN ÷ Volume of TPFT*

Data Overview

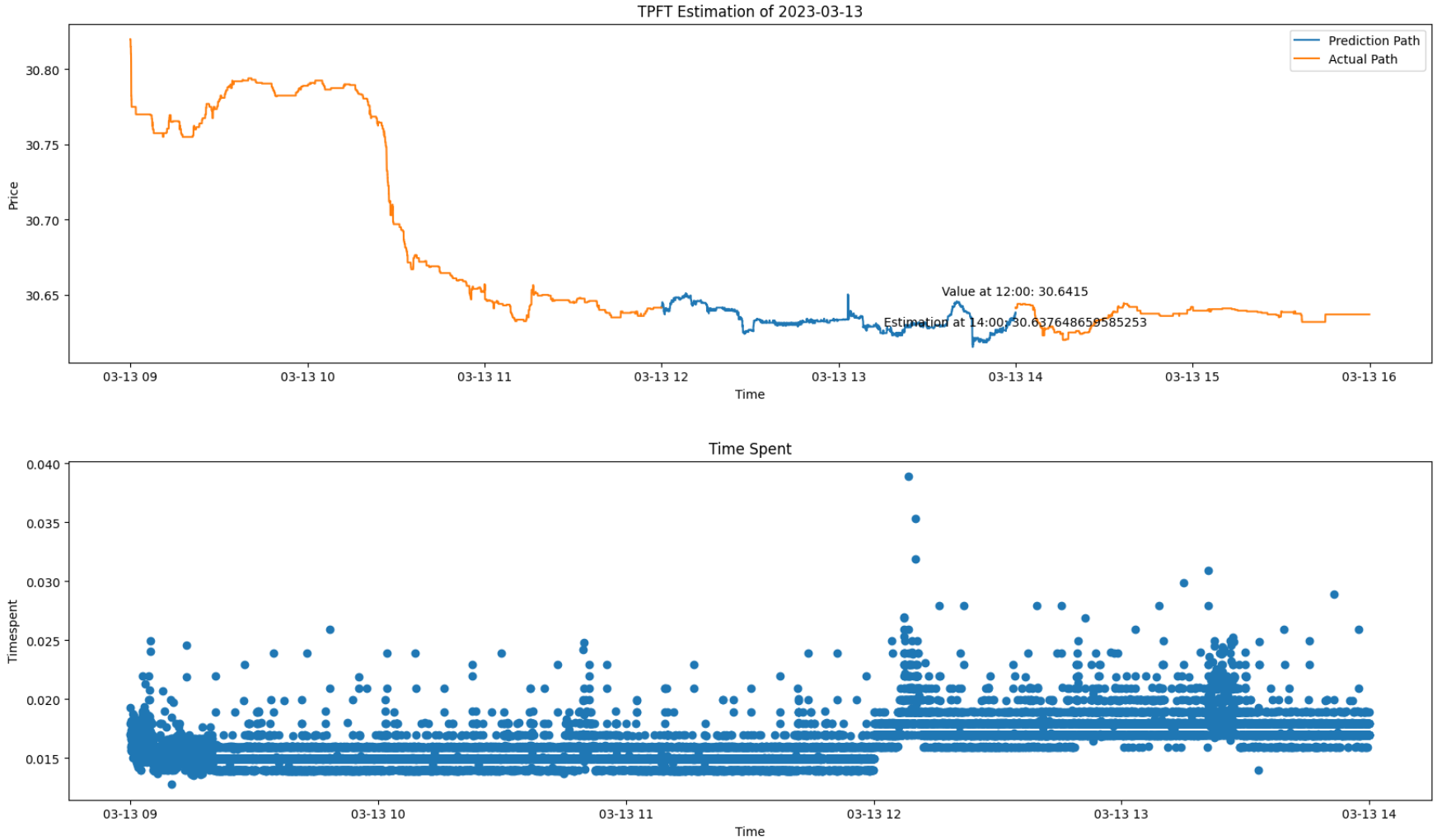
- Time Interval: Second Interval
- Linear Regression: TPFT and CMPN data before 12:00:00
- First value of Denoiser: TPFT data at 12:00:00
- Shifting: based on TPFT price at 12:00:00

Model 1: *Linear Regression → EMA → Shifting*





Model 2: *Linear Regression → Wavelet → Shifting*



Numerical Results

Numerical Results (MSE)

(in comparison with 15:00 price)

Time	Linear Regr., EMA and Shift	Linear Regr., Wavelet Denoiser and Shift	EMA Smoothing
12:15	0.015785	0.017466	0.017060
12:30	0.016061	0.017492	0.017721
12:45	0.015523	0.016999	0.017410
13:00	0.015296	0.017000	0.017457
13:15	0.014977	0.016760	0.017297
13:30	0.015118	0.016599	0.017819
13:45	0.015109	0.016712	0.017319