TOPIC : What Makes Difference ?

가설 : $\dfrac{\text{Gas Fee}}{\text{Liquidity}}$ 가 작을 수록
$(\approx V(P))$
이론적인 값에 가까울 것이다.

(ETH XXX or XXX ETH only)

Compute Theoretical Numbers.] → Diff.
Compute Historical Numbers.

{ Uni V2, Uni V3, Arb. V2, Arb. V3

↓

filter the Arb-Tx only.

(LVR − Fee − Gas > 0)

↓

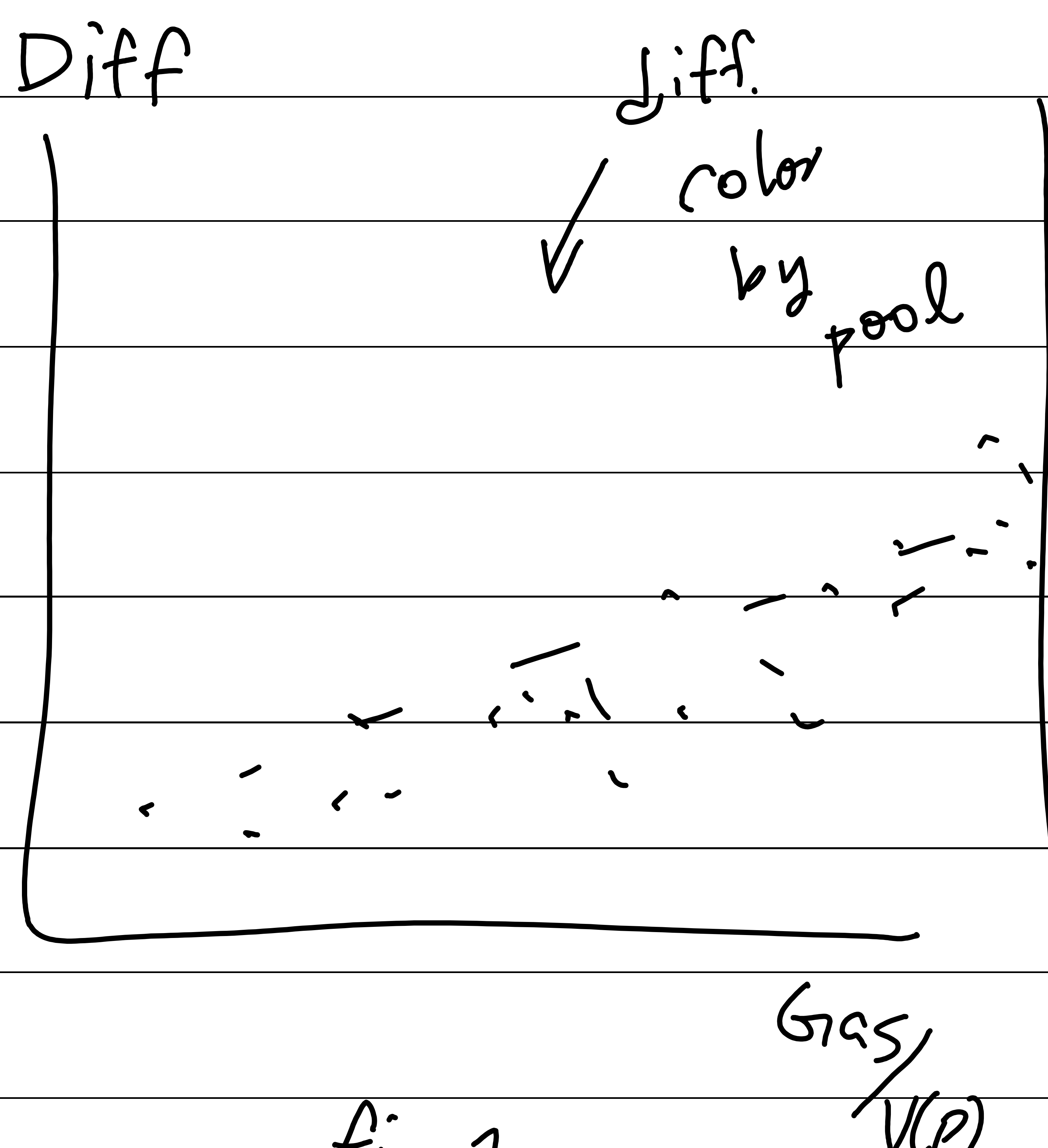


fig 1.

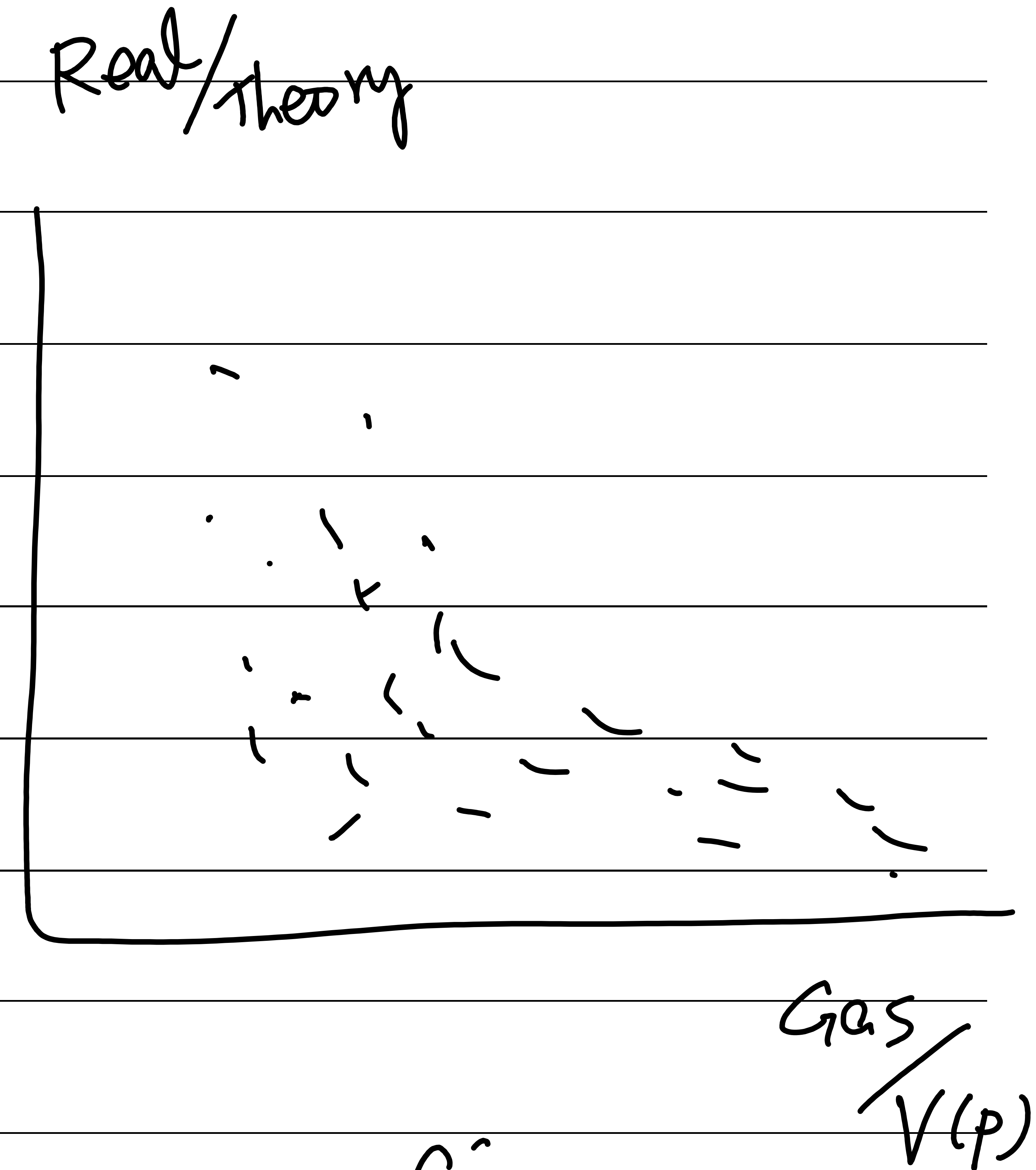


fig 2.

TOPIC: Profitability of Passive LP-ing

$$\int \frac{LVR}{V(p)}\,dt.$$

$$\int \frac{Fee}{V(p)}\,dt.$$

가설: Loss in V3 > Loss in V2

Why?: JIT & Active Liquidity

결론: 리테일은 메인넷 V2가 낫다.

(Order Cost ↑)

Pools (Pool Value Filter: 10k↑)

Mainnet

Uni V2

WETH
- ~~USDC~~
- ~~USDT~~
- ~~DAI~~

~~WETH-WBTC~~

SUSHI

WETH
- ~~USDC~~
- ~~USDT~~
- ~~DAI~~

WETH ~~-WBTC~~

UniV3

WETH	USDC	USDT	DAI
0.05	✓	✓	✓
0.3	✓	✓	✓
1	✓	✓	✓

WETH
- ~~0.05~~
- ~~0.3~~
- ~~1~~

WBTC

ARBITRUM.

UniV3

WETH

	USDC	USDCe	DAI	USDT
0.05	✓	✓	✓	✓
0.3	✓	✓	✓	✓
1	✓	✓	✓	✓

WETH – WBTC
- 0.05 ✓
- 0.3 ✓
- 1 ✓

Camelot

WETH
- USDC
- USDCe
- USDT
- DAI

WETH – WBTC

FRI

SUSHI

WETH
- USDC ✓
- USDCe ✓
- USDT ✓
- DAI ✓

WETH – WBTC ✓

FuGaZi

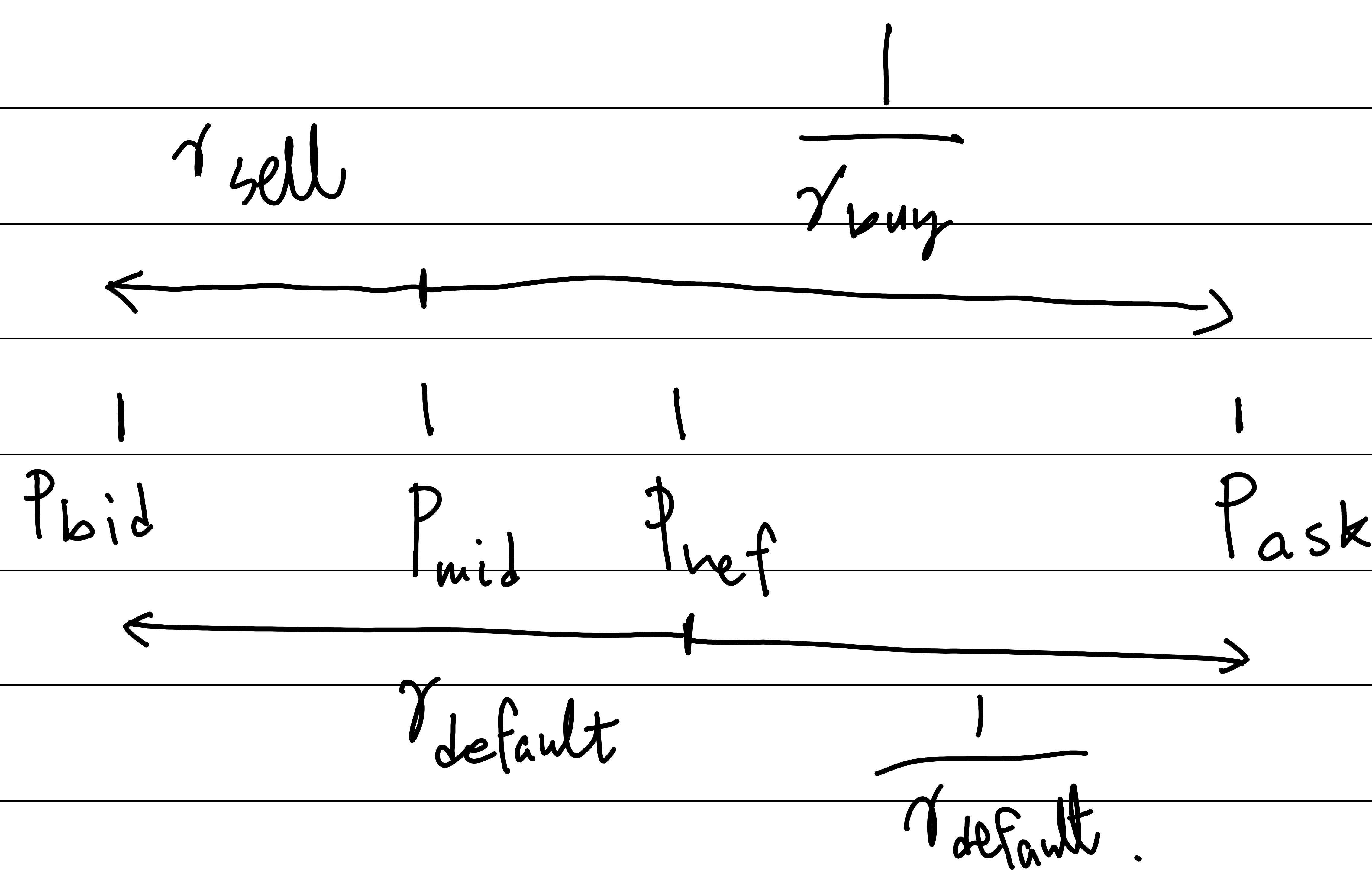
Optimal input routing:

$$\delta_i = \frac{L_i}{\sqrt{r_i}} \cdot \frac{\Delta + \sum \frac{X_j}{r_j}}{\sum \frac{L_j}{\sqrt{r_j}}} - \frac{X_i}{r_i}$$

Optimal output routing:

$$\delta_i = Y_i - \frac{L_i}{\sqrt{r_i}} \cdot \frac{\sum Y_j - \Delta}{\sum \frac{L_j}{\sqrt{r_j}}}$$

Dynamic Fee (γ_{buy}, γ_{sell})



Leave-Or-Take-It Offer.

$$\text{Fee} = \underset{x}{\operatorname{argmax}}\ \mathbb{P}(LVR \geq x) \cdot x$$

$$LVR = L\sqrt{p}\left(\sqrt{\frac{p_t}{p}} - 1\right)^2.$$

$$\begin{aligned}
&\mathbb{P}(LVR \geq x) \\
&= \mathbb{P}\left(\left(\sqrt{\frac{p_t}{p}} - 1\right)^2 \geq \frac{x}{L\sqrt{p}} \right) \\
&= 1 - \mathbb{P}\left(-\sqrt{\frac{x}{L\sqrt{p}}} \leq \sqrt{\frac{p_t}{p}} - 1 \leq \sqrt{\frac{x}{L\sqrt{p}}} \right) \\
&= 1 - \mathbb{P}\left(1 - \sqrt{\frac{x}{L\sqrt{p}}} \leq \sqrt{\frac{p_t}{p}} \leq 1 + \sqrt{\frac{x}{L\sqrt{p}}} \right) \\
&= 1 - \mathbb{P}\left(2\log\left(1 - \sqrt{\frac{x}{L\sqrt{p}}}\right) \leq \log\frac{p_t}{p} \leq 2\log\left(1 + \sqrt{\frac{x}{L\sqrt{p}}}\right) \right) \\
&= 1 - \int_{2\log\left(1 - \sqrt{\frac{x}{L\sqrt{p}}}\right)}^{2\log\left(1 + \sqrt{\frac{x}{L\sqrt{p}}}\right)} f_{\log p_t}(s)\, ds. \quad \cdots (*)
\end{aligned}$$

$$dP = p \cdot \mu \, dt + p \cdot \sigma \, dW$$

$$\Rightarrow (*) \approx 1 - 4\sqrt{\frac{x}{L\sqrt{p}}} \cdot \frac{1}{\sigma\sqrt{2\pi}}$$

$$\therefore \mathbb{P}(LVR \geq x) \cdot x$$

$$= \left(1 - 4\sqrt{\frac{x}{L\sqrt{p}}} \cdot \frac{1}{\sigma\sqrt{2\pi}}\right) x$$

$$\frac{d}{dx}\left(\mathbb{P}(LVR \geq x) \cdot x\right)$$

$$= \left(1 - 4\sqrt{\frac{x}{L\sqrt{p}}} \cdot \frac{1}{\sigma\sqrt{2\pi}}\right)$$

$$+ x \cdot (-4) \cdot \frac{1}{2}\left(\frac{x}{L\sqrt{p}}\right)^{-\frac{1}{2}} \cdot \frac{1}{L\sqrt{p}} \cdot \frac{1}{\sigma\sqrt{2\pi}}$$

local maximum $\Longleftrightarrow$ $1 - 6\sqrt{\frac{x}{L\sqrt{p}}} \cdot \frac{1}{\sigma\sqrt{2\pi}} = 0$.

$$\frac{\sigma^2 \cdot \cancel{2}\pi}{36} = \frac{x}{\cancel{2}L\sqrt{p}} = \frac{x}{V(p)}$$

$$x = V(p) \cdot \frac{\sigma^2\pi}{36}.$$ (Optimal Reserve Price)