Pachira Fund

Can Money Grow on Trees?

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Outline

Introduction

Objectives

Define our problem

- Stagnant Pool Problem
- Implicitly addressed by Uniswap v3

Present our Solution

- Liquidity Trees
- Simulation Results

Objective Revisted

- Can Money Grow on Trees?

What are we Solving?

Stagnant Pool Problem

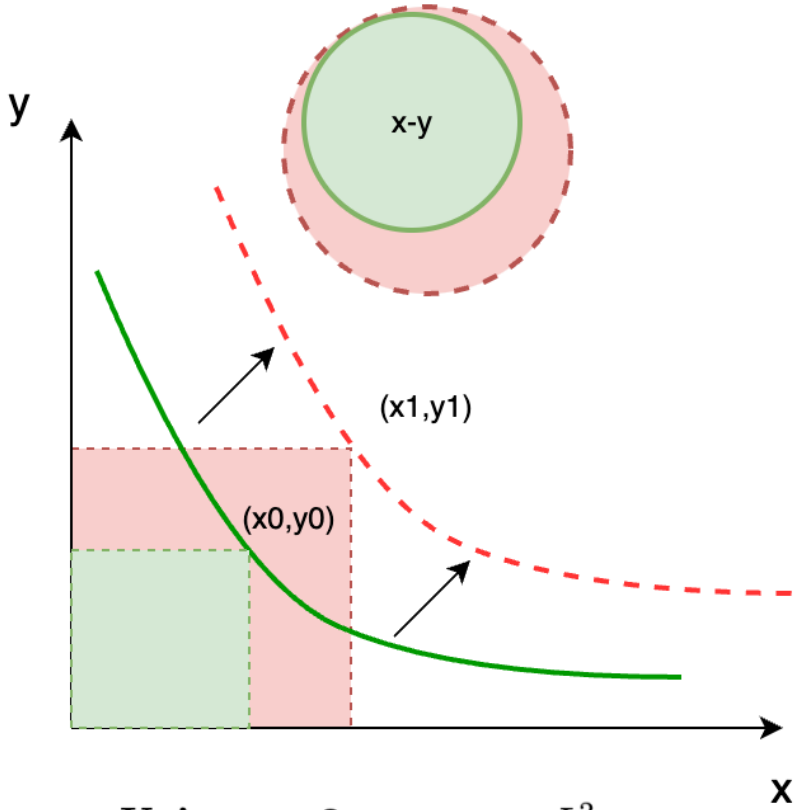
Lay Definition:

- How do we increase ΔV on liquidity over some time interval t?

Uniswap v3 has implicitly addressed this problem:

- Increasing the depth of order book (virtually)
- Makes large trades more efficient
- Hence increasing the *possibility* of more ΔV
- However, does nothing to induce more trading volume

UNISWAP V3



Uniswap v2: $x_0 * y_0 = L_0^2$
Uniswap v3: $x_1 * x_1 = L_1^2$

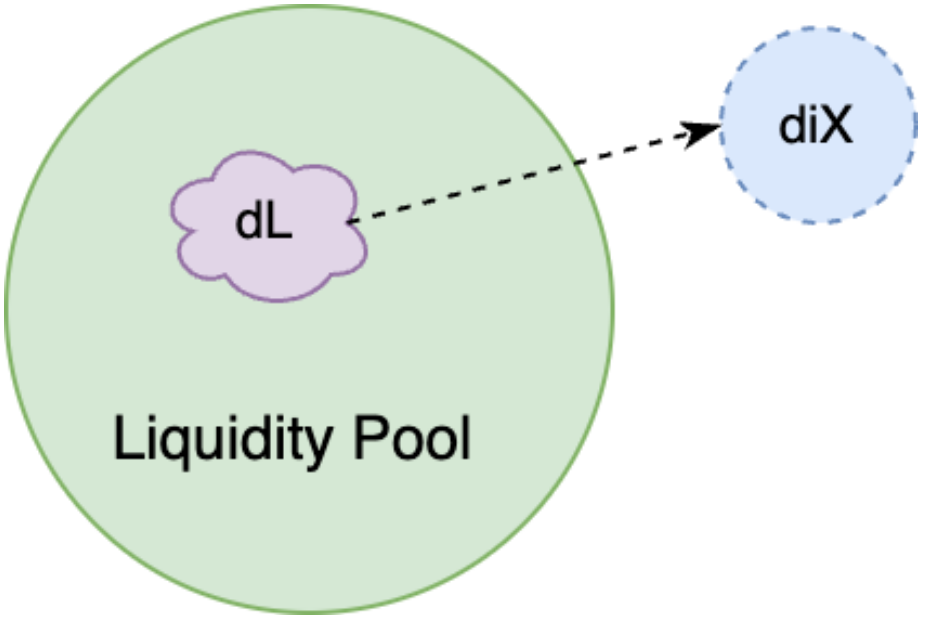
$$L_1 > L_0$$

Figure 1: Graphical illustration on how depth is virtually increased using Uniswap v3

INDEXING PROBLEM: POSED

CPT INDEXING PROBLEM

- Given a position ΔL, what is the indexed value in only one of the two pairing assets (x,y)



Indexing Problem: Solution

This system describes the mathematical operations that are effectively being done in the contract code when performing an *efficient* two-step withdrawal (ie, withdrawal both assets + swap one for the remaining) operation:

$$\Delta x = \frac{\Delta L x}{L} \tag{1}$$

$$\Delta y = \frac{\Delta L y}{L} \tag{2}$$

$$\Delta y_{(i)} = \Delta y + \frac{\gamma \Delta x (y - \Delta y)}{(x - \Delta x) + \gamma \Delta x} \tag{3}$$

LET'S INCLUDE A NEW DIMENSION ...

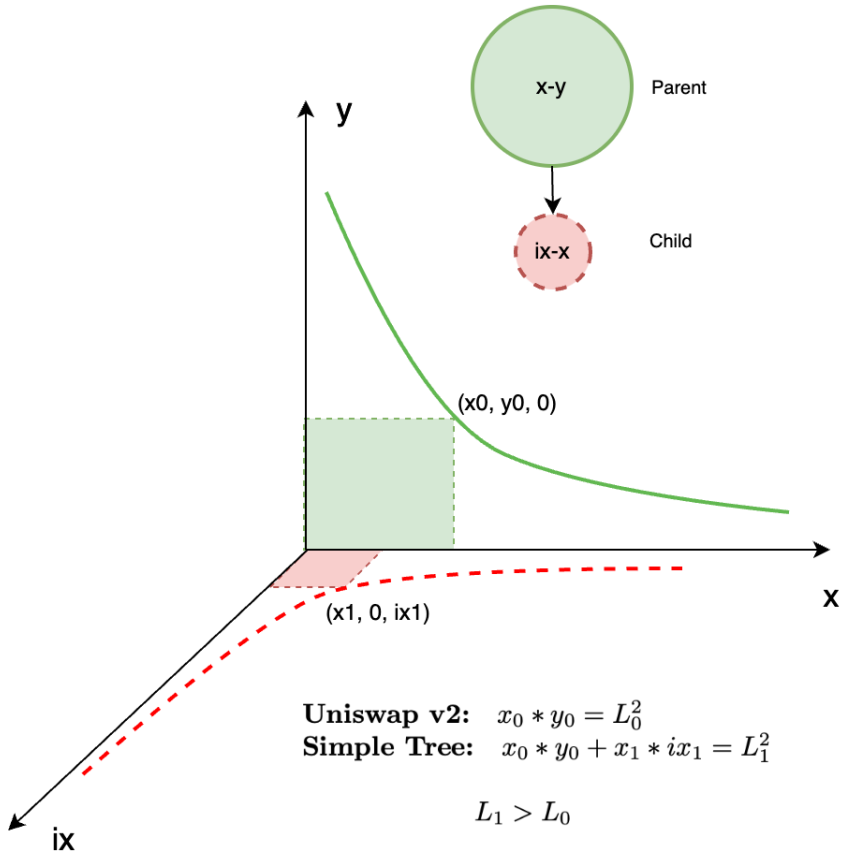


Figure 2: Simple Tree

How does this Work?

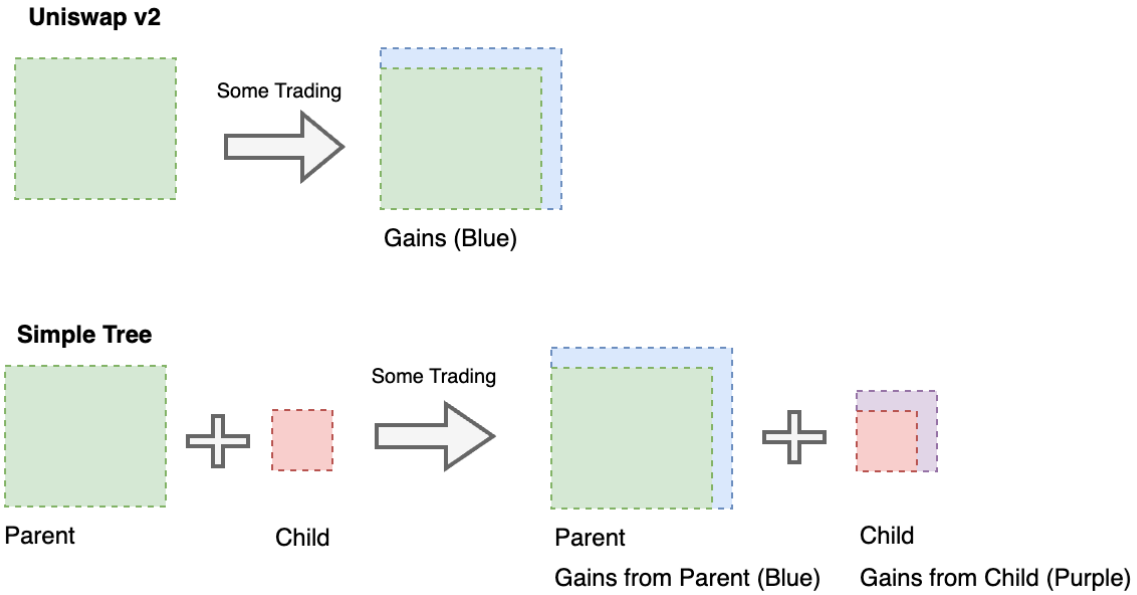


Figure 3: Boxes represent liquidity under CPT curve; creating a new market out of indexed liquidity indexed liquidity is a way to address the stagnant pool problem; in short we've leveraged some of the green, got red and made some extra purple

Liquidity Trees

Full Tree

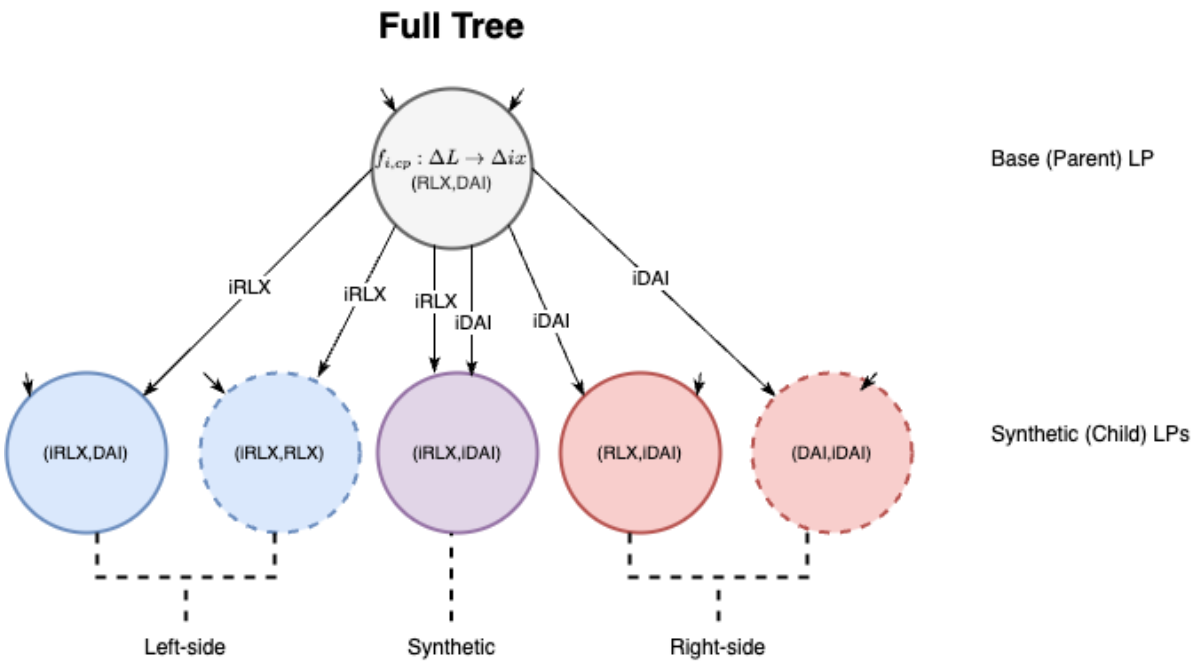


Figure 4: Full CPT liquidity tree represented as a computational tree structure comprised of left-sided, right-sided and synthetic pools

Sub Trees

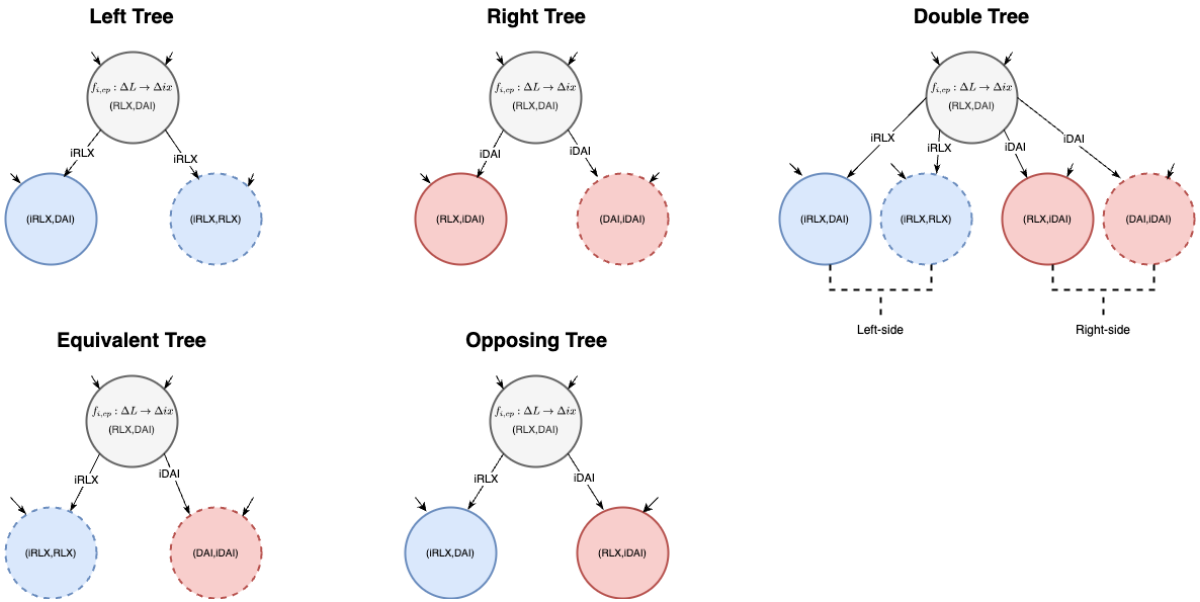


Figure 5: Sub-trees comprised of: (TOP LEFT) left tree; (TOP CENTER) right tree; (TOP RIGHT) double tree; (BOTTOM LEFT) equivalent tree; (BOTTOM CENTER) opposing Tree

Simulation Results

Left Tree

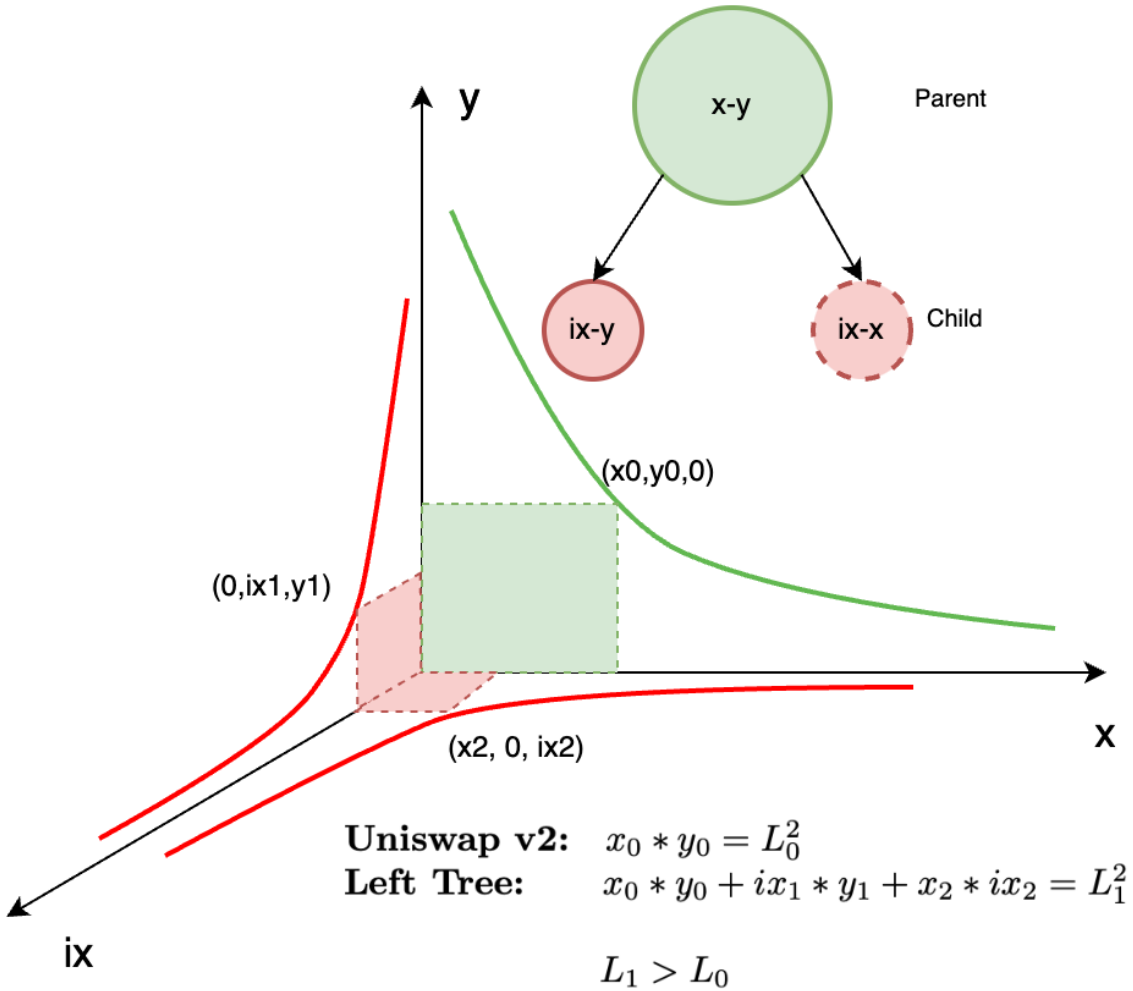
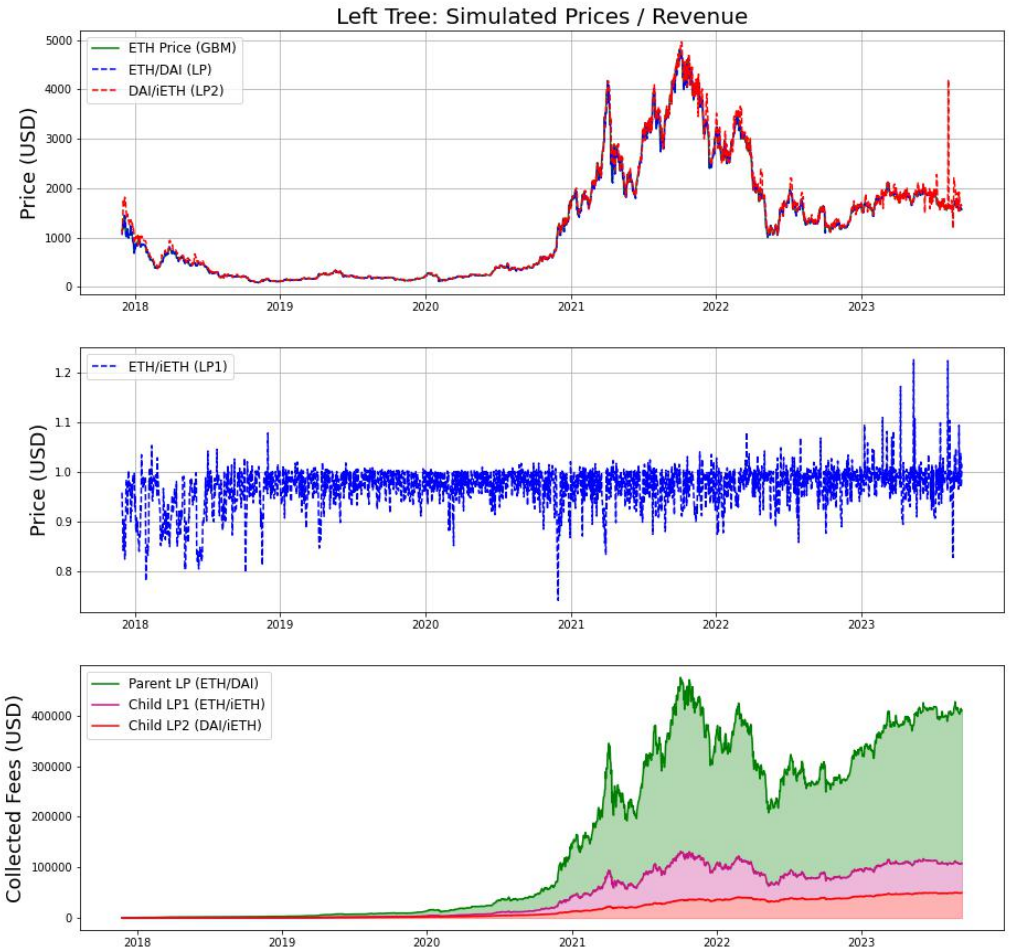


Figure 6: Left Tree

LEFT TREE: SIMULATED PRICE / REVENUE (1)



LEFT TREE: SIMULATED PRICE / REVENUE (2)

Metric	Totals
Revenue (LP) / LP Liquidity	19.4%
Revenue (LP+LP1+LP2) / LP Liquidity	26.3%
Revenue Boost (Indexed Liquidity)	35.61%
Percentage Indexed	7.51%

	Sub-totals		
	LP (ETH-DAI)	**LP1 (iETH-ETH)**	**LP2 (iETH-DAI)**
Liquidity	$1,559,145	$71,961	$162,118
Revenue	$302,140	$57,927	$49,673
Revenue / Liquidity	19.4%	80.5%	30.64%

Table 1: Metrics harvested from Left-tree simulation using ETH & DAI (Jan 2018 to Oct 2023)

Revist our Objective

In Summary

Stagnant Pool Problem

- Shown how stagnant pool problem can be addressed

Liquidity Trees: A new DeFi Primitive

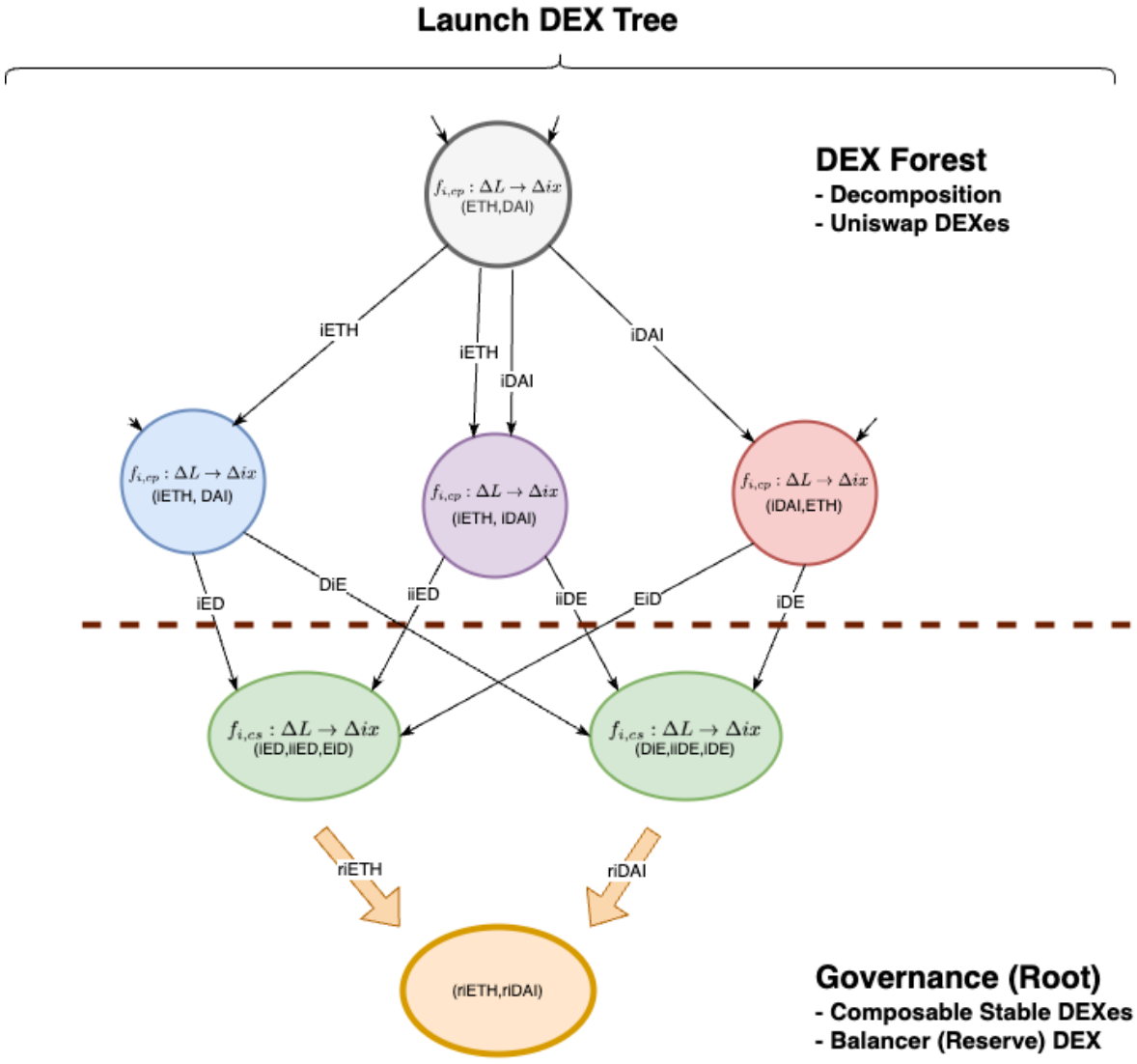
- New DeFi Primitive, which we call Liquidity Trees
- Utilizes fully collateralized liquidity, and can be represented as undirected graphs or algebraically in $\mathbb{R}^n$

Pachira Token Launch

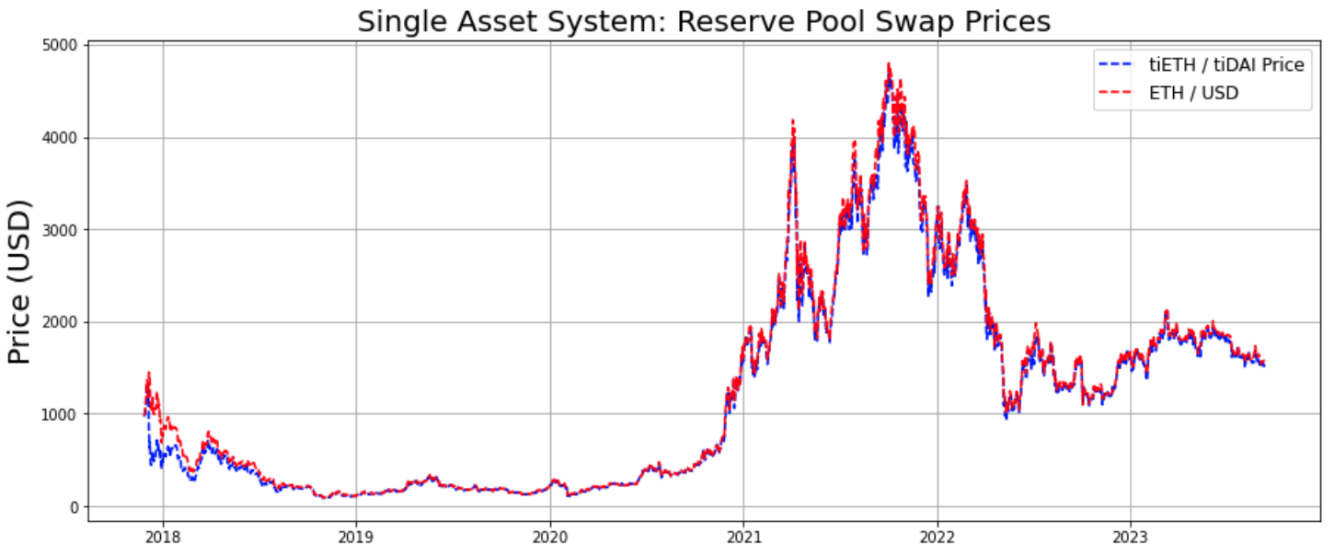
- Combining thes Liquidity Trees with a Governance system for Pachira Fund token launch

Thank you!

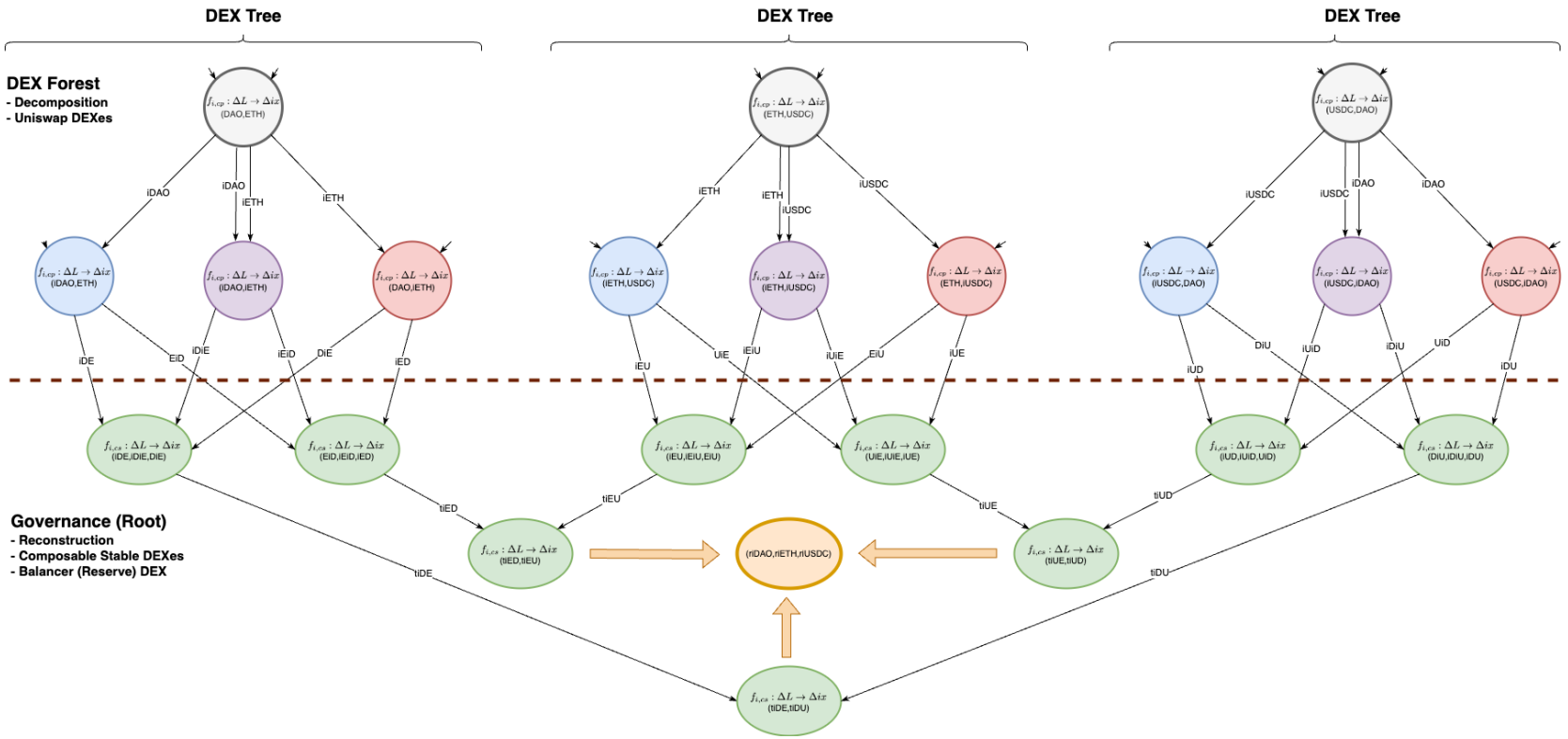
APPENDIX 1: PACHIRA TOKEN LAUNCH



APPENDIX 2: RESERVE SWAP PRICES



APPENDIX 3: PACHIRA TOKEN LAUNCH



APPENDIX 4: RESERVE SWAP PRICES