

Leveraging causal recourse for promoting fairness



Time-Aware CAR

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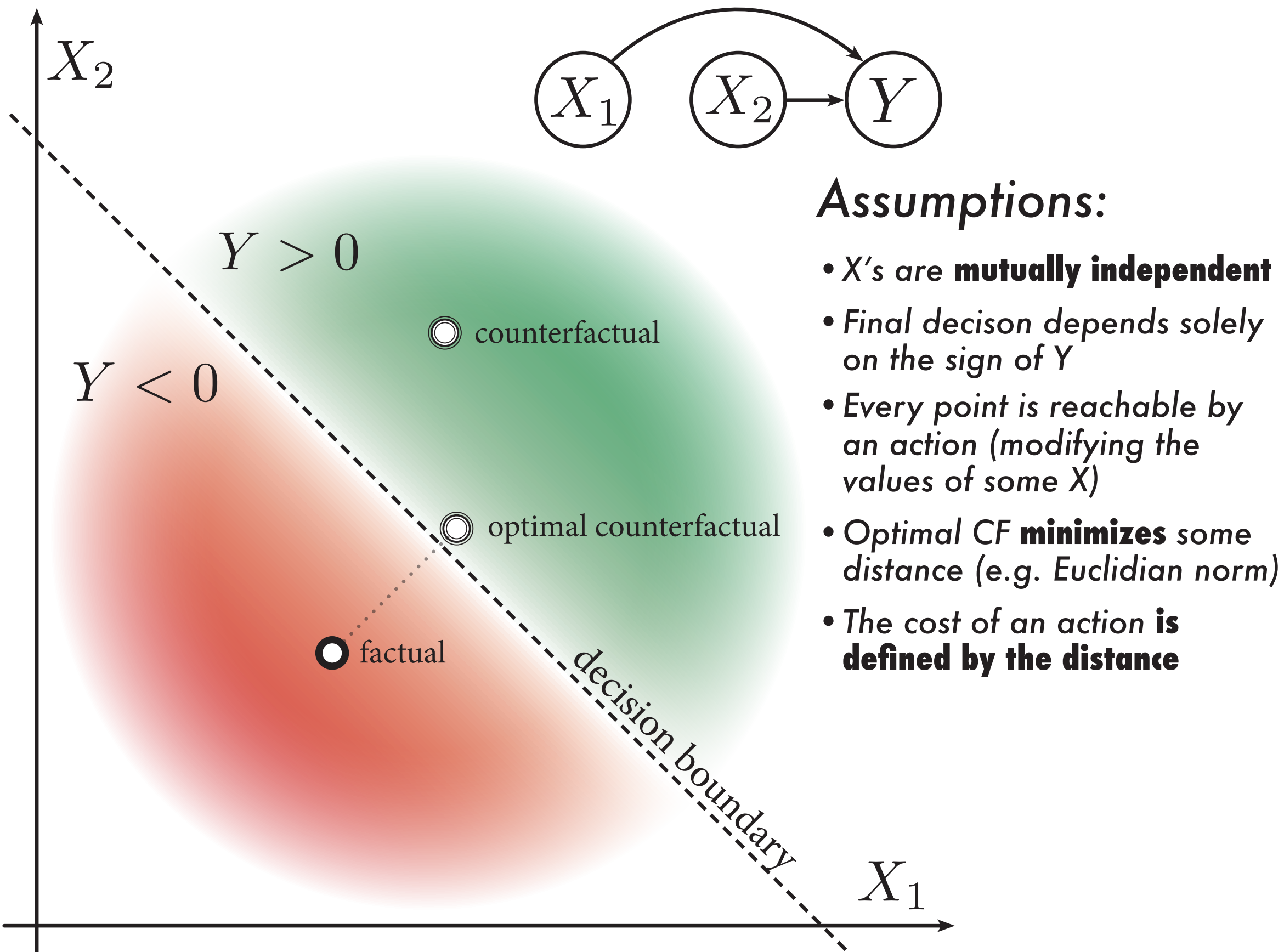
Discovery Science, October 14-16 2024



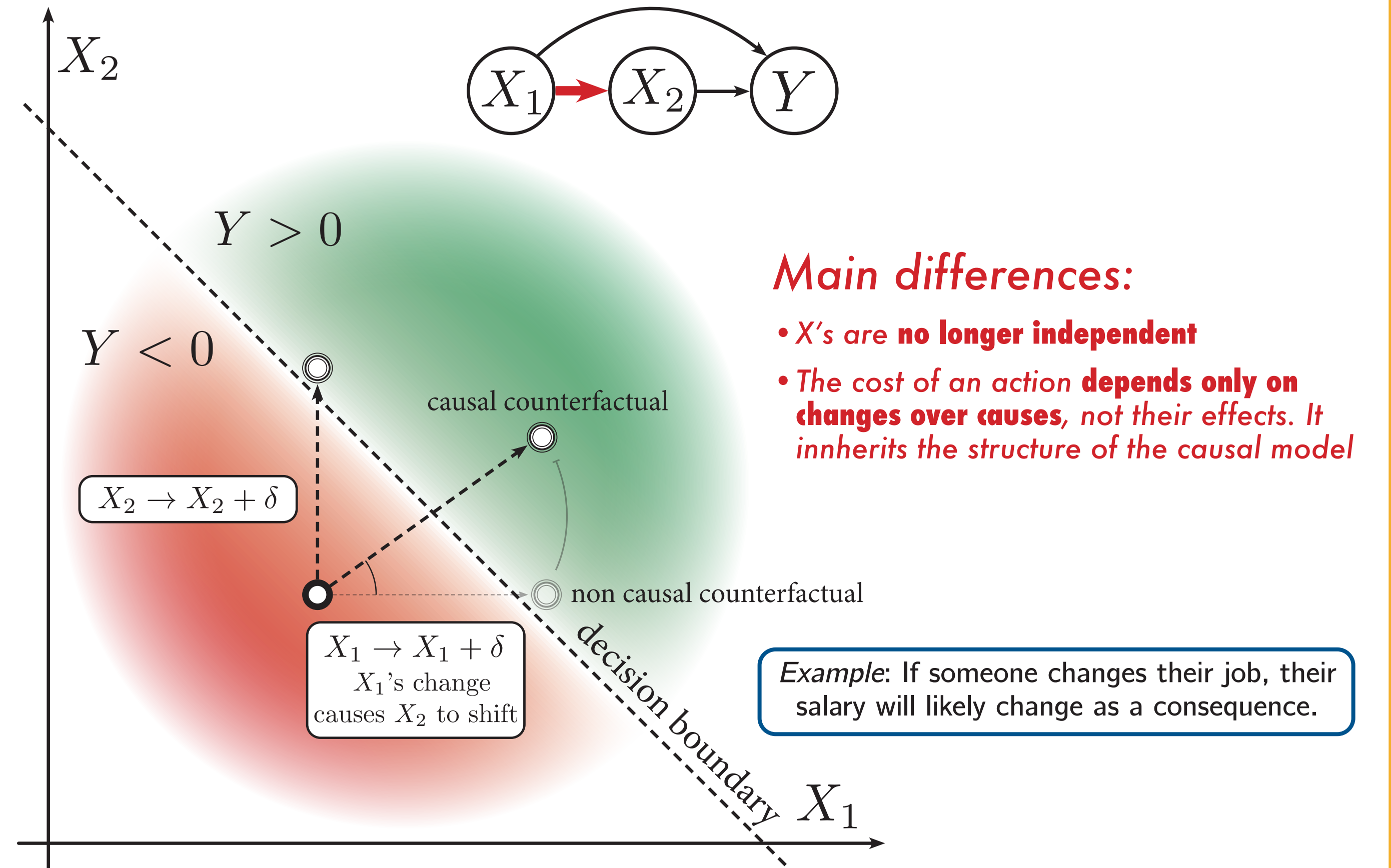
Abstract

ALGORITHMIC RECOURSE

Counterfactual Explanation



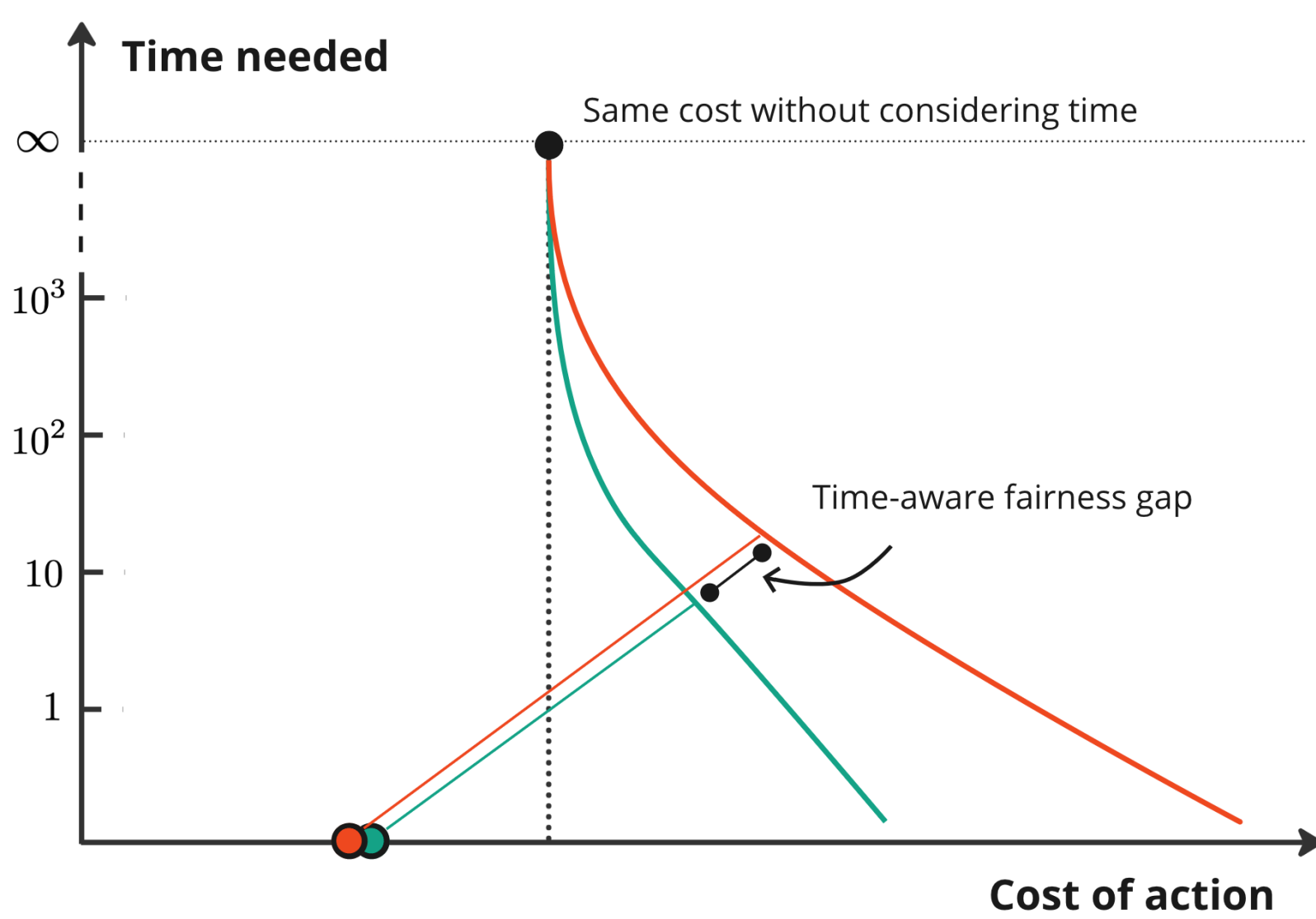
Causal Framework



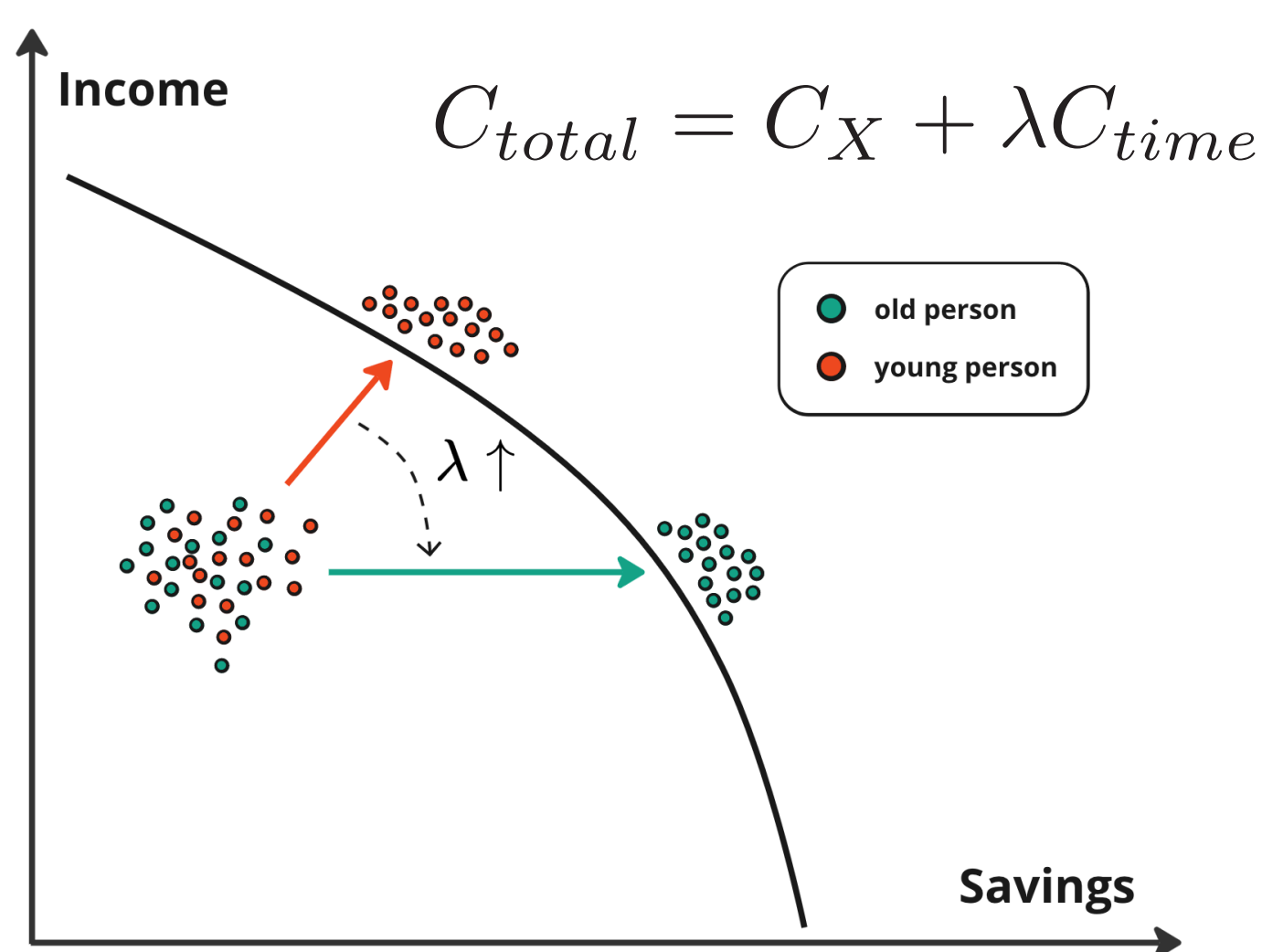
WHY TIME MATTERS

In real-world scenarios, actions require time to produce any change, and time has its own cost.

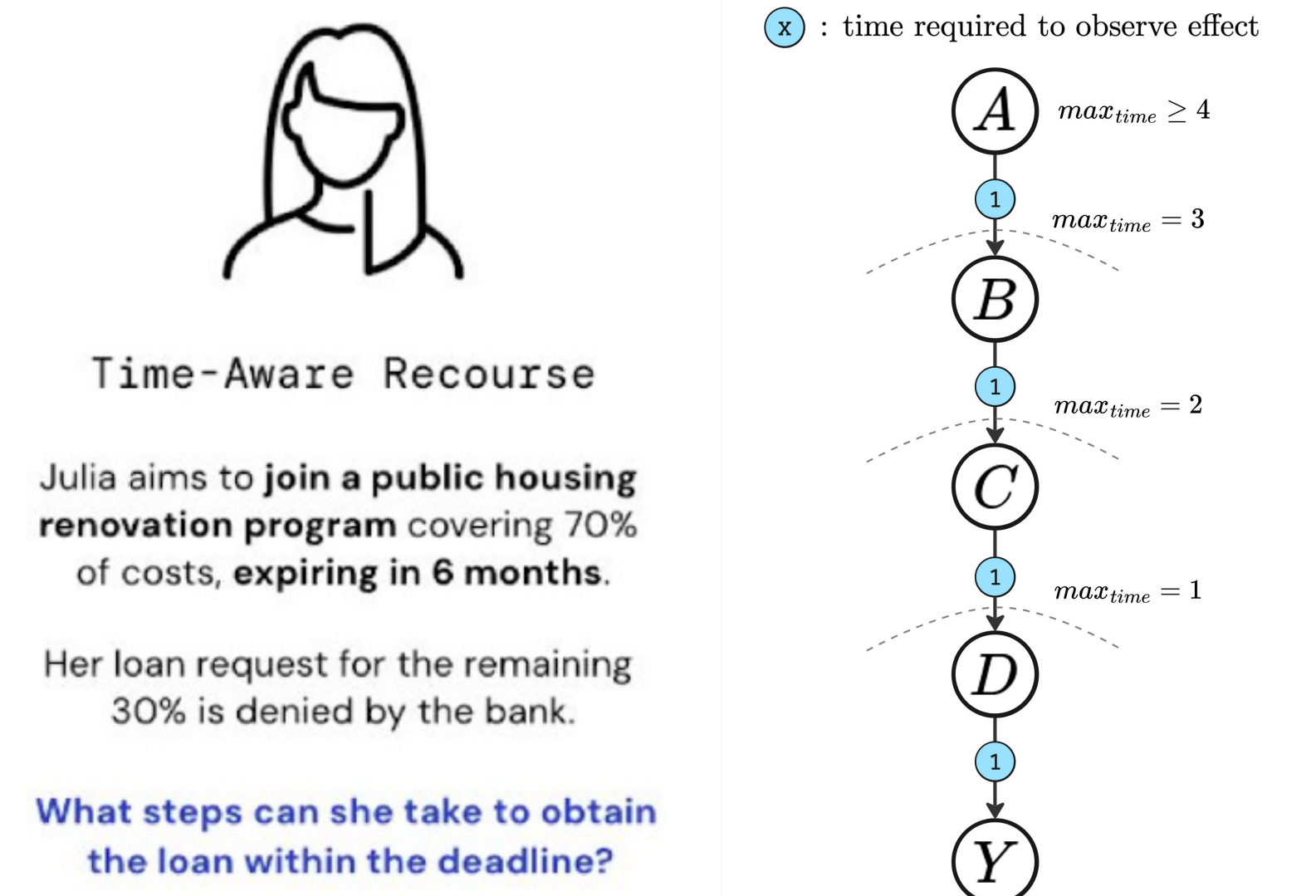
Problem 1: Not accounting for time could **introduce hidden biases** in recommendation algorithms.



Problem 2: The **cost of time** could be **differently perceived** by individuals (e.g. age groups).

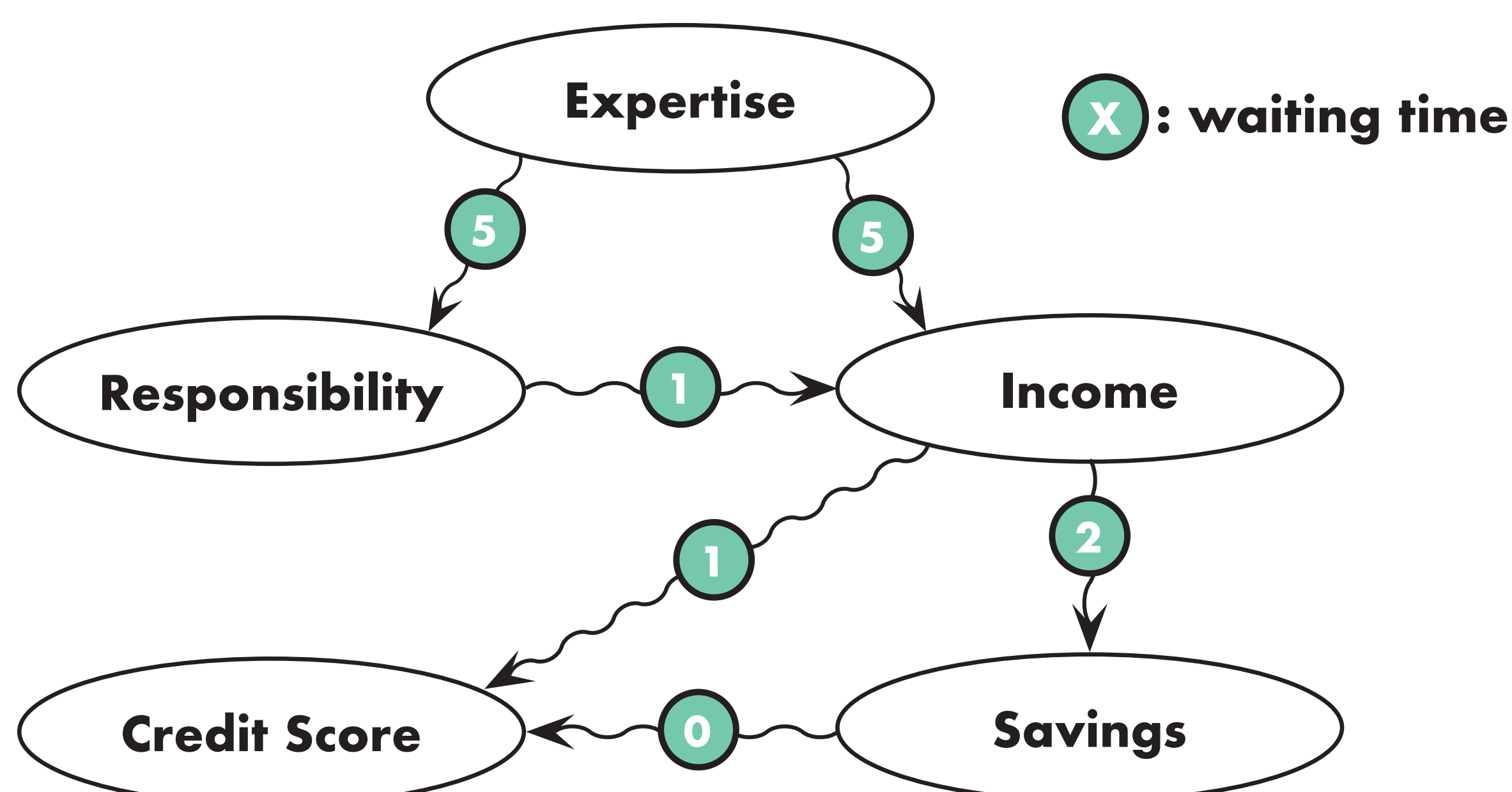


Problem 3: If an action takes **too much time**, it might be considered **non-actionable**.



POSSIBLE SOLUTIONS

Time-weighted Graph



We integrate the temporal dimension by **equipping an additional graph** that considers the **required timeframe** for the action to have an effect.

[Beretta I., Cinquini M., *The importance of Time in Causal Algorithmic Recourse*, 2023]

Dynamical Systems

