**Economic Market Simulation: A Simple Model**

**Introduction**

This document outlines a basic implementation of an economic market simulation in Python. The simulation demonstrates fundamental economic principles such as supply and demand, price mechanisms, and market equilibrium. The primary goal is to observe how market prices, supply, and demand evolve over time through the interactions between consumers and producers.

**Model Description**

**Agents**

* Producers: Create goods or services, determining quantities and prices based on production costs and market demand.
* Consumers: Purchase goods or services based on preferences, needs, and market prices.

**Environment**

* A virtual marketplace where transactions occur.
* Abstract representation, focusing on price and quantity dynamics.

**Rules**

* Supply and Demand Dynamics: Agents adjust supply and demand based on market price.
* Price Adjustment: Market price changes based on aggregate supply and demand.
* Economic Constraints: Consumers have budgets, and producers have production limits.

**Initial** **Conditions**

* Define initial quantities, prices, budgets, and production capacities for goods and agents.

**Simulation** **Loop**

* At each time step, agents make decisions based on current market conditions.
* Update market price based on total supply and demand.
* Update agent states (inventory and budget) post transactions.

**Data Collection**

* Track changes in market prices, supply, and demand over time.
* Analyze patterns such as market equilibrium, shortages, or surpluses.

**Tools and Libraries**

* Python for implementation.
* NumPy for numerical calculations.
* Matplotlib for visualizing market trends.

**Implementation**

The simulation loop is run for a specified number of agents and months. The results are then visualized using Matplotlib, displaying market price, supply, demand, producer inventory, and consumer budget over time.