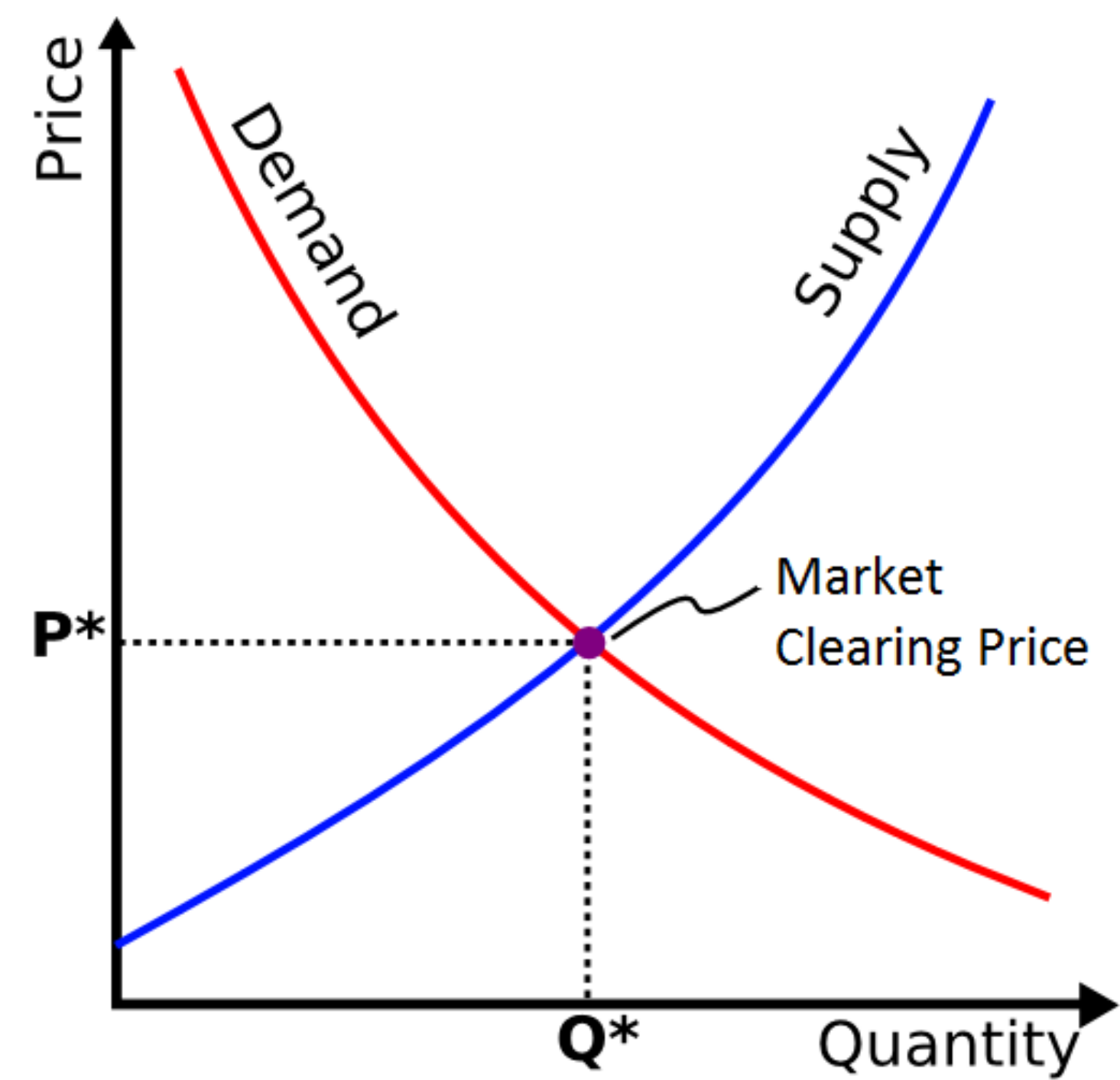
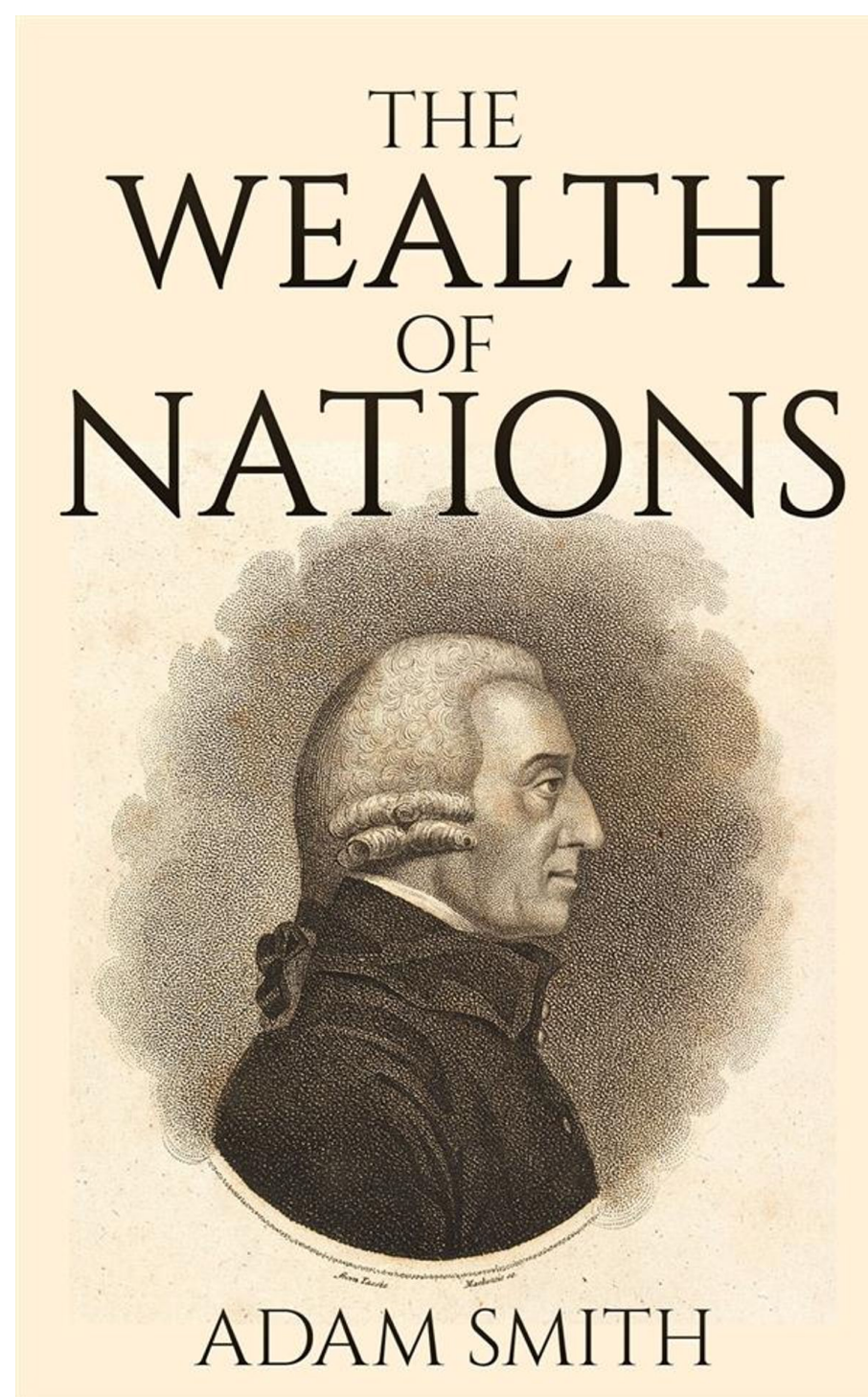


# Explaining the Law and Supply and Demand via Online Learning

Stratis Skoulakis [Aarhus University](#)

**NeurIPS 2025**





$\leq 1\$$



$\leq 1\$$



$\leq 2\$$



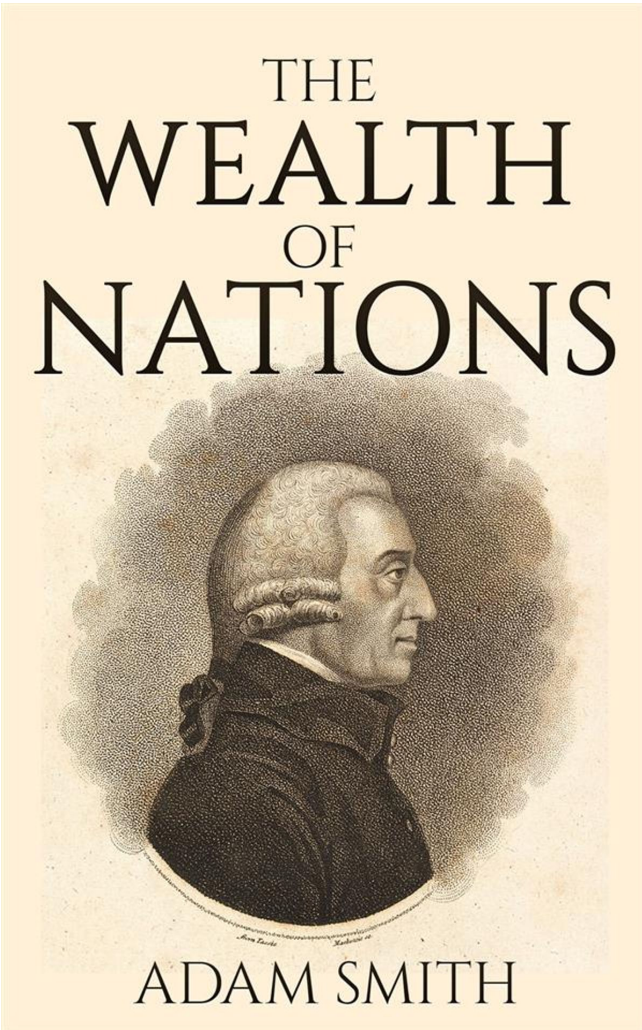
$\leq 3\$$



$\leq 6\$$



$\leq 11\$$



$\geq 1\$$



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$\geq 3\$$



$\geq 4\$$



$\geq 5\$$



$\geq 6\$$





$\leq 1\$$



$\leq 1\$$



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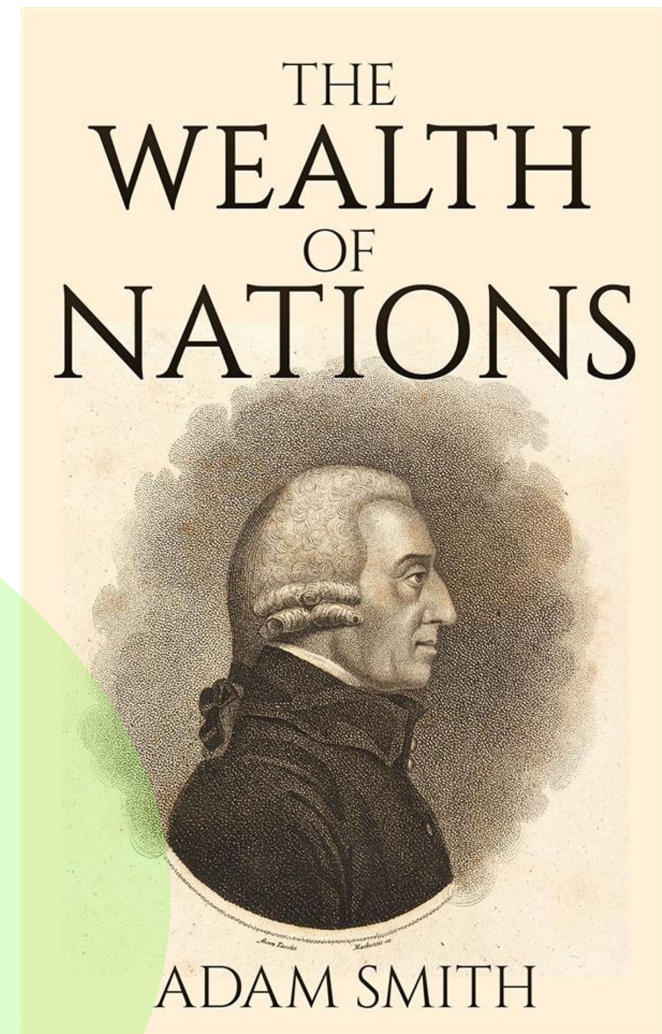
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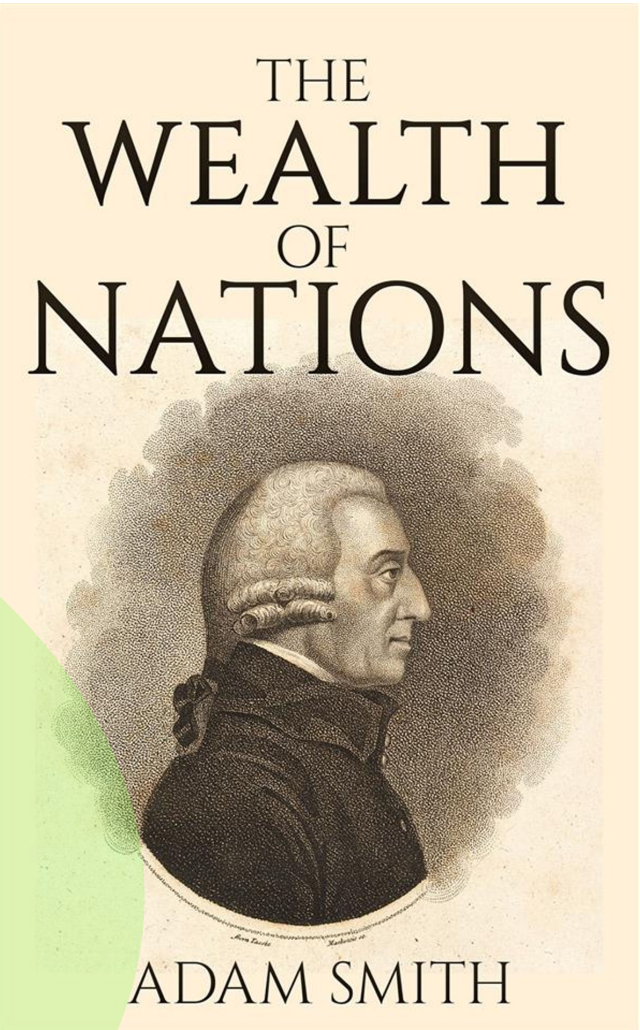
$\geq 4\$$



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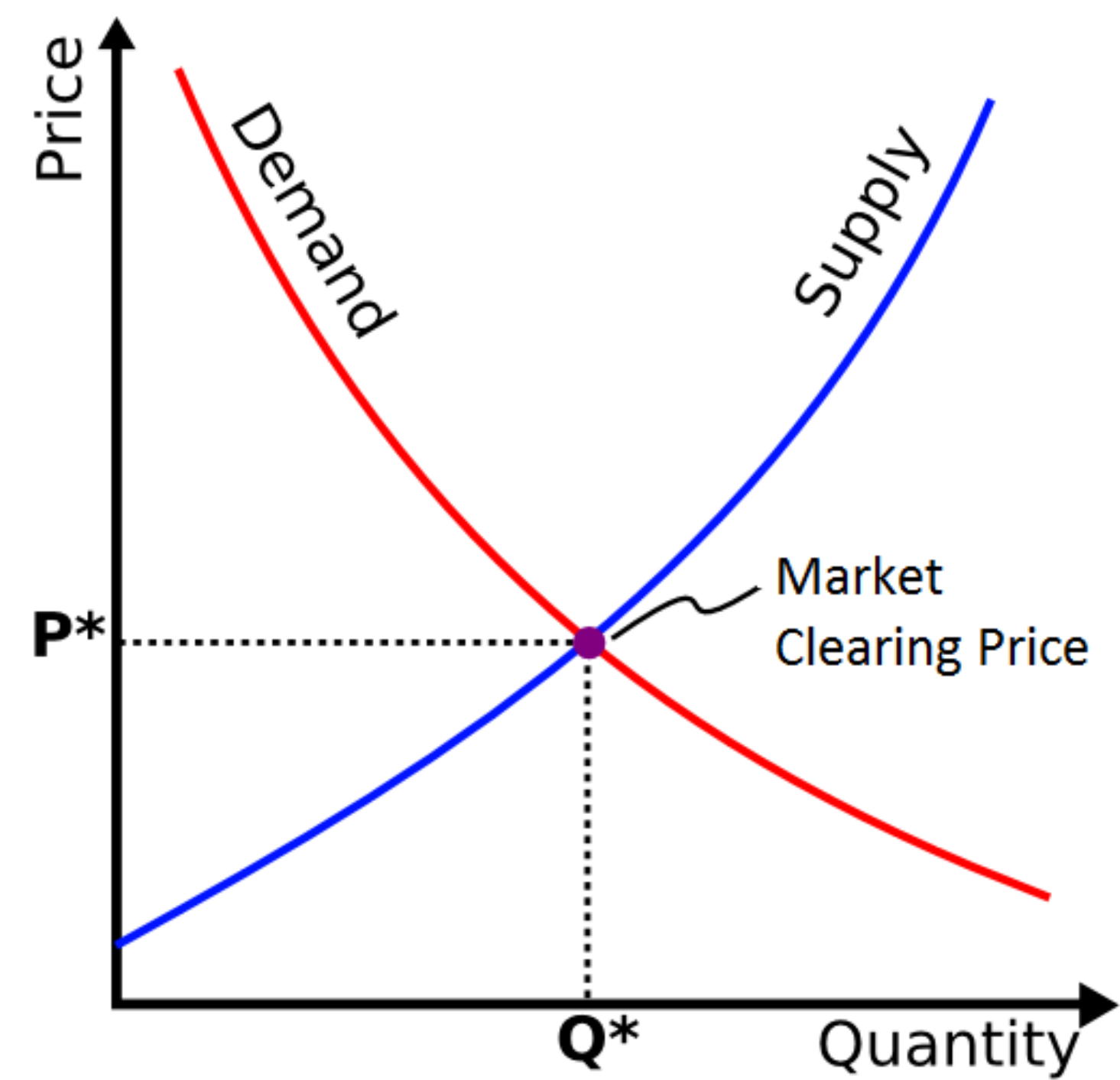
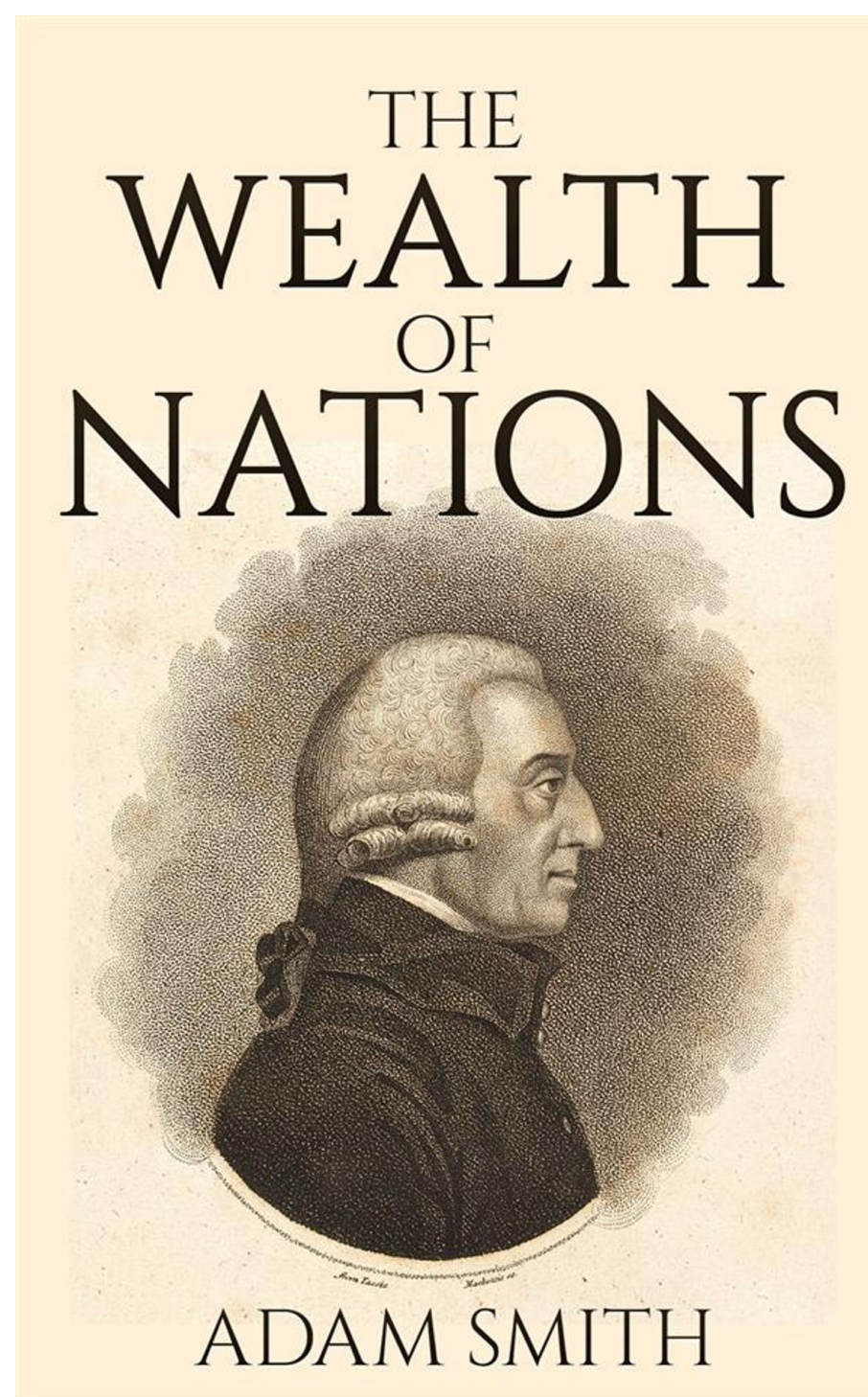


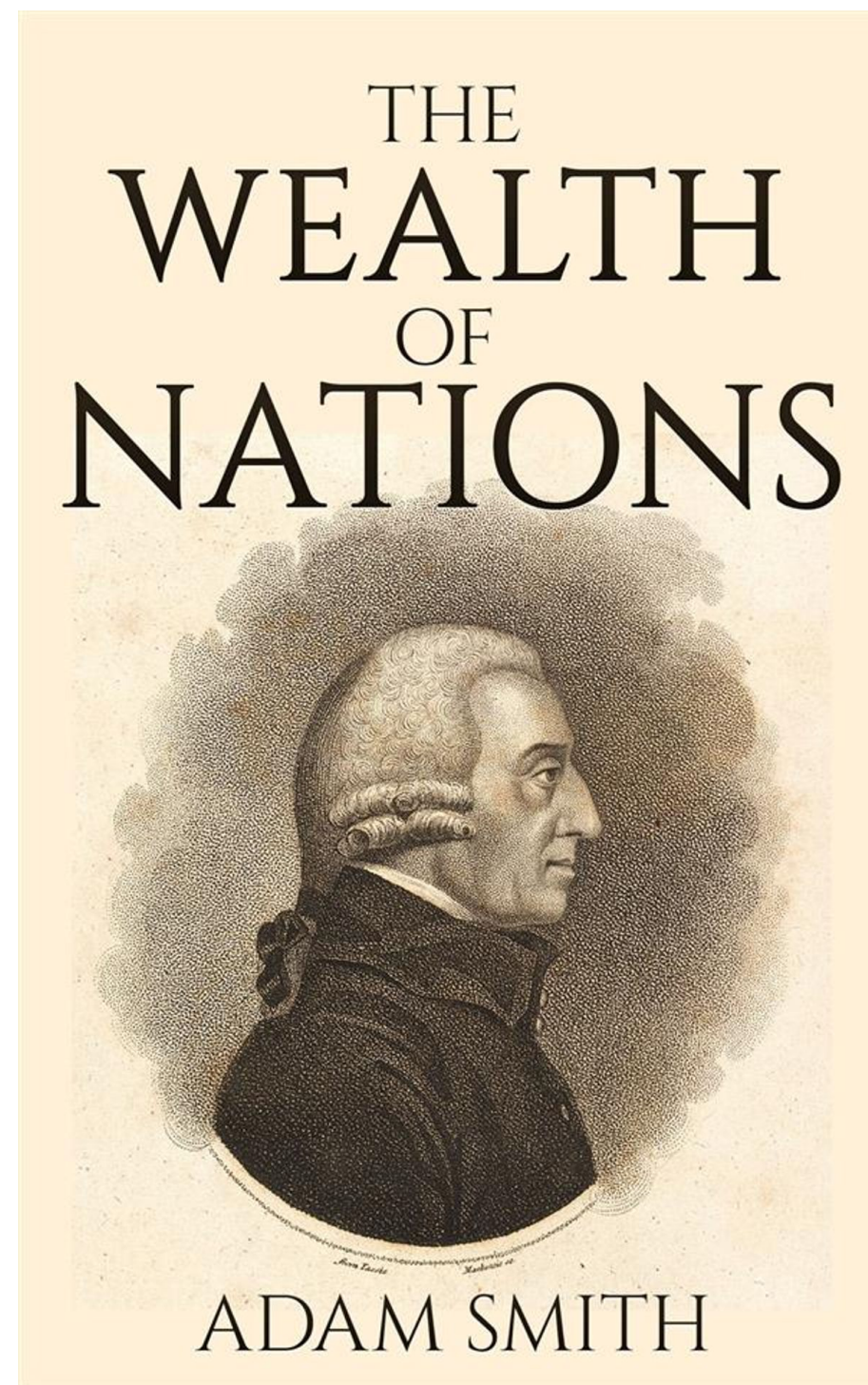
$\geq 5\$$



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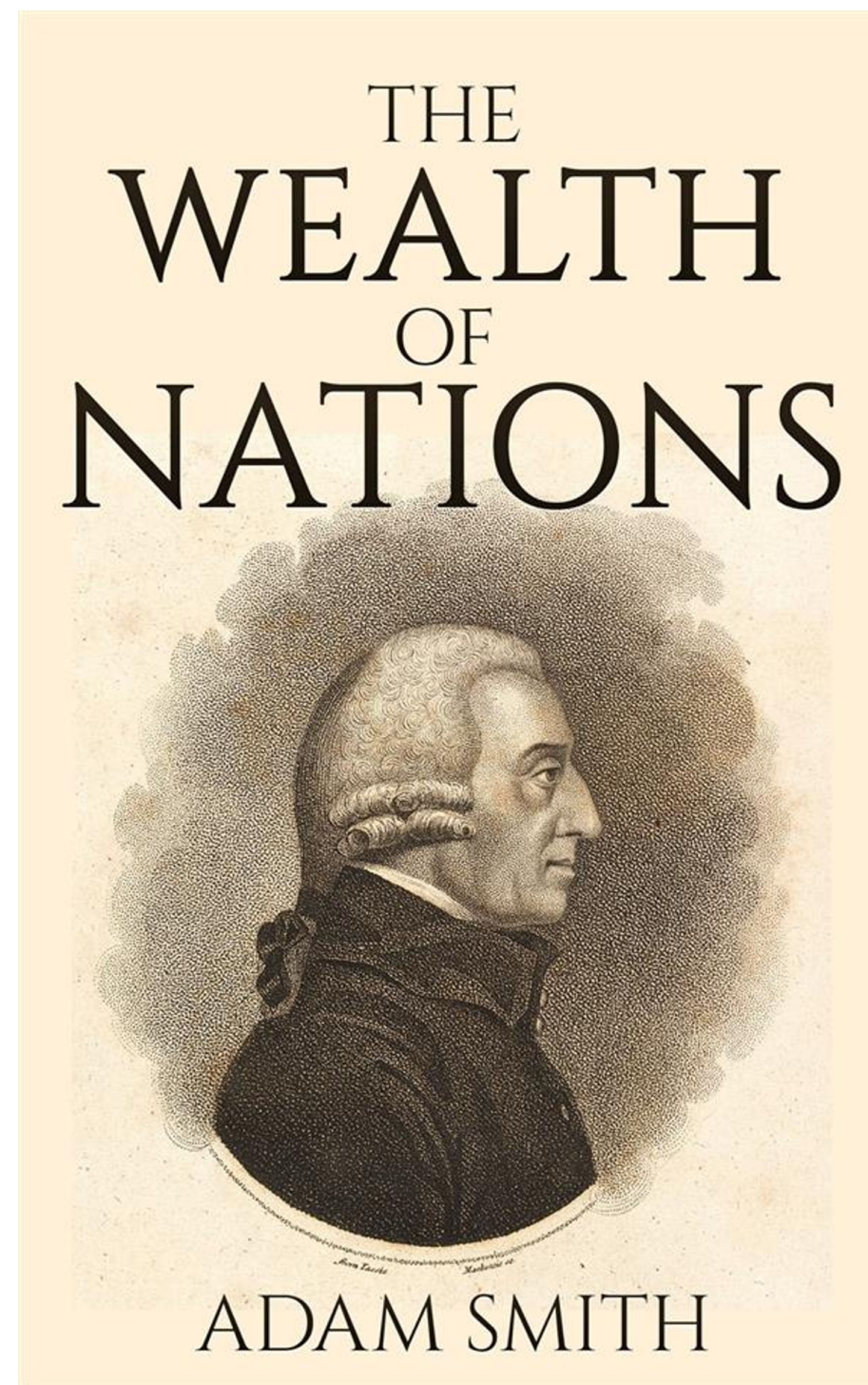






- Each **seller**  $i \in [n]$  selects a selling price  $p_i \geq s_i$ .
- Each **buyer**  $j \in [n]$  buys from the cheapest available seller with  $p_i \leq b_j$ .
- Each **seller**  $i \in [n]$  that sells its good gets utility  $U_i(p_i, p_{-i}) = p_i - s_i$  and **0** for any seller that does not sell its good.

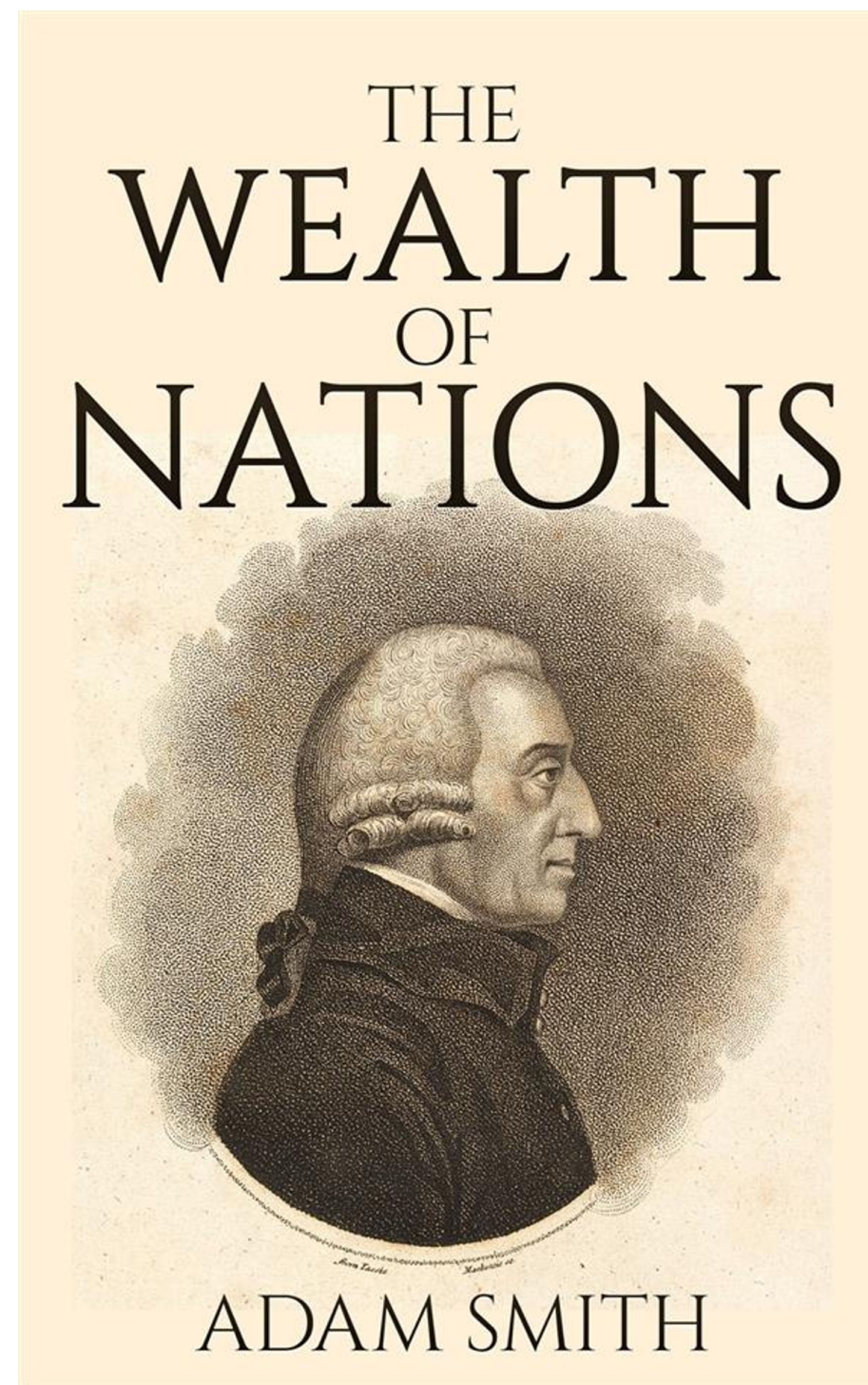




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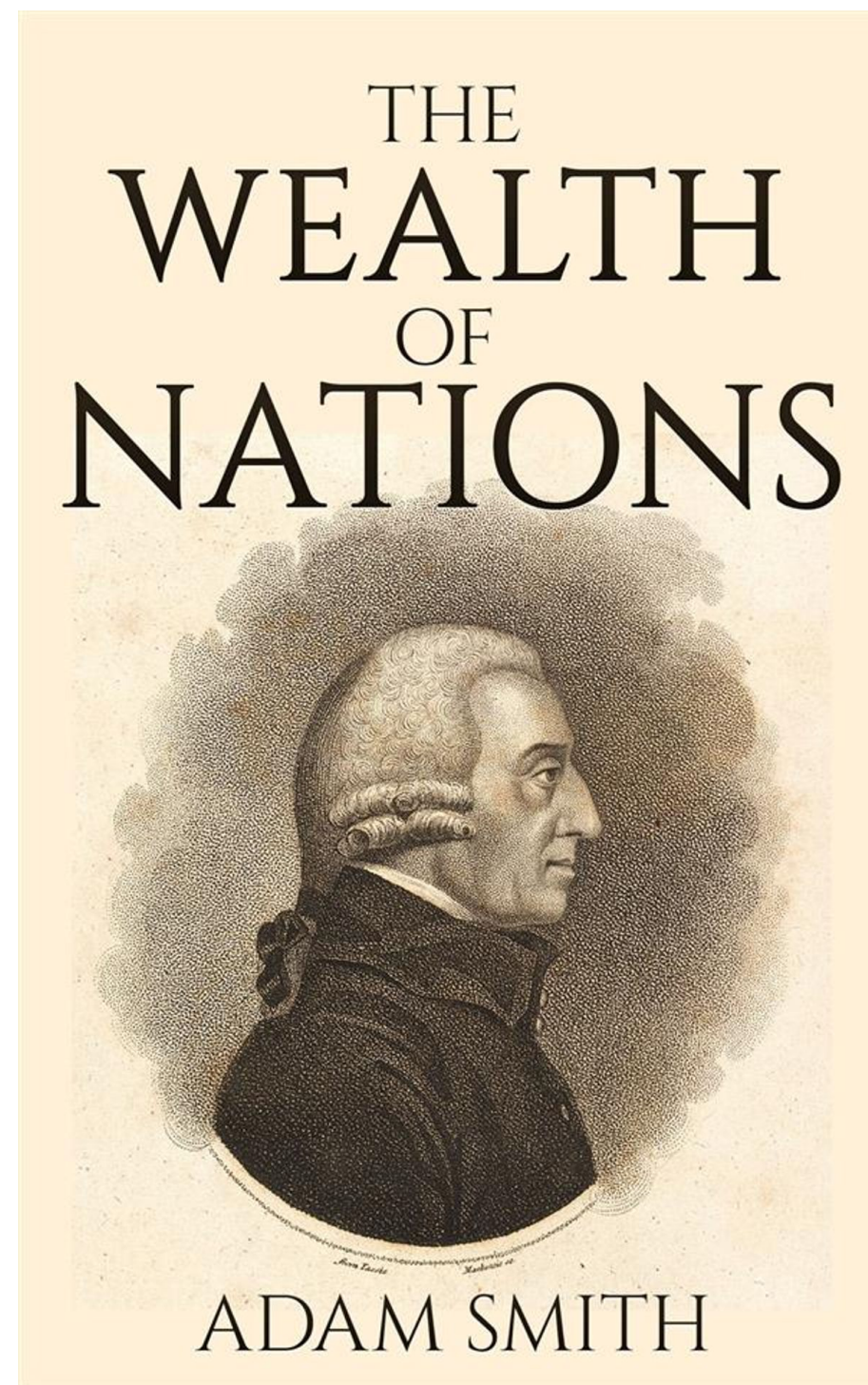
***Market Clearing Price is the Nash Equilibrium!***





- Each **seller**  $i \in [n]$  selects a selling price  $p_i \geq s_i$ .
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***Do prices actually converge?***



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- Each **seller**  $i \in [n]$  that sells its good gets utility  $U_i(p_i, p_{-i}) = p_i - s_i$  and 0 for any seller that does not sell its good.

**Thm:** *If all sellers use a no-swap regret algorithm to select their prices, the overall dynamics converge to the Market Clearing Price .*