Pricing When Customers Care about Fairness but Misinfer Markups

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in many contexts, prices are somewhat rigid

- trade: incomplete exchange-rate passthrough
- IO: incomplete marginal-cost passthrough
- public finance: small VAT passthrough
- macro: money nonneutrality

existing theories do not resonate with price-setters

- Blinder et al [1998]: survey of 200 firms in the US
- ECB: surveys of 10,785 firms in 9 countries
- existing theories from macro and IO are not popular
- most popular theory: "firms tacitly agree to stabilize prices, perhaps out of fairness to customers"

indeed, people intensely dislike price increases

- Shiller [1997]: 600 questionnaires in the US, Germany, and Brazil
- 85% of respondents dislike inflation because "when they go to the store and see that prices are higher, they sometimes feel a little angry at someone"
- "someone": "greedy" "store owners" and "businesses"

this paper: theory of price rigidity based on fairness

- monopoly pricing with 2 psychological assumptions:
  - concerns for the fairness of prices
  - misinference of hidden marginal costs
- several implications:
  - lower markup
  - passthrough of marginal costs into prices < 1
  - in general equilibrium: money nonneutrality
  - in general equilibrium: backward-looking Phillips curve

why do we care about microfoundations?

- models of price rigidity are used for policy analysis
- microfoundations of price rigidity govern effect of policy on welfare: they shape policy recommendations
- Calvo pricing: immensely popular, but no foundations
- success of Calvo pricing $\rightarrow$ tractability is a key constraint

monopoly pricing with fairness concerns

customers

- given price P of consumption, income I, and fairness measure F
- choose money M and consumption Y
- to maximize quasilinear utility

$$\frac{\varepsilon}{\varepsilon - 1} (F \times Y)^{(\varepsilon - 1)/\varepsilon} + M$$

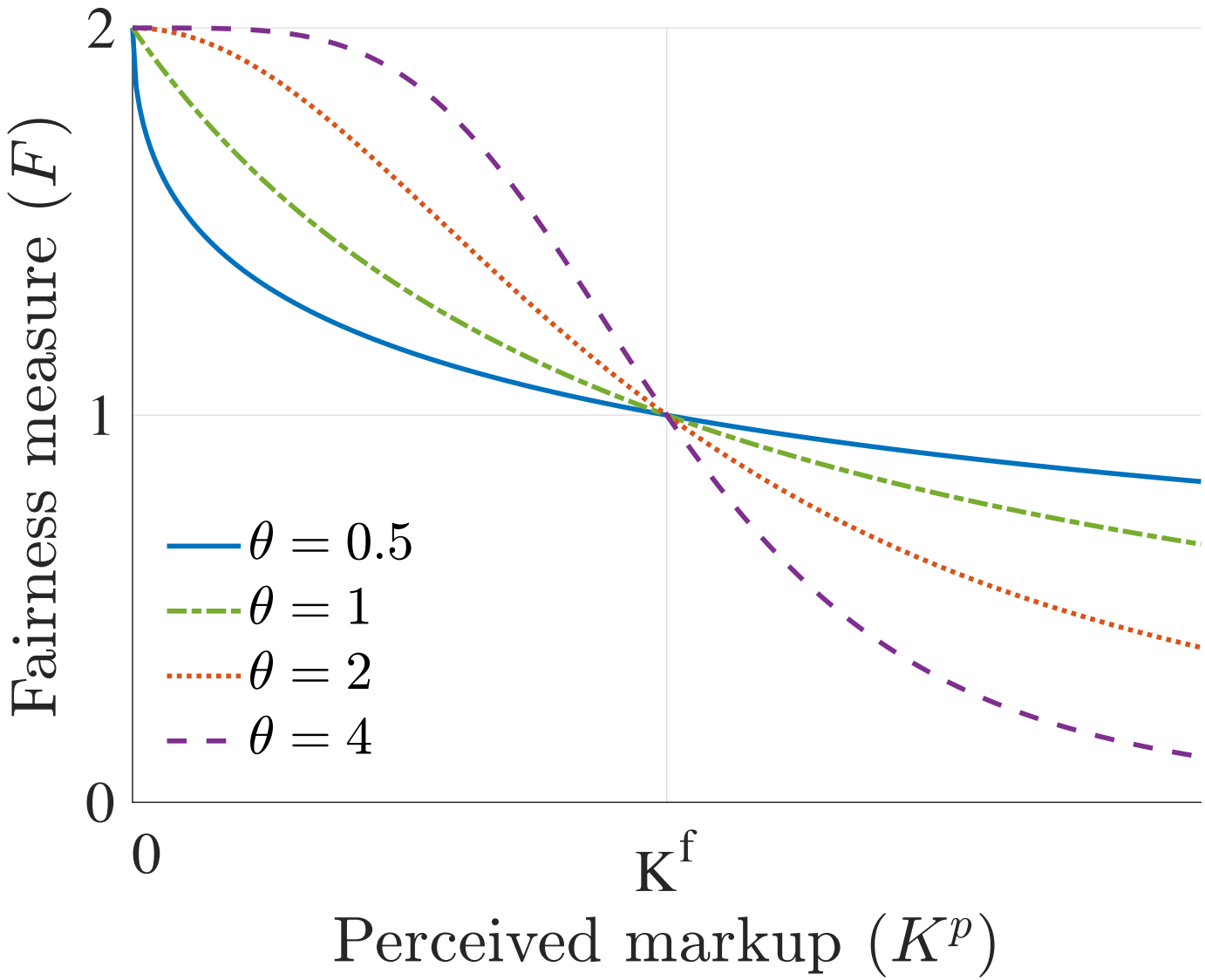
- subject to budget constraint: $M + P \times Y = I$
- different from social-preference approach to fairness

the fairness measure

$$F(K^p) = \frac{2}{1 + (K^p / K^f)^{\theta}}$$

- $K^p \equiv P/MC^p$: perceived markup
  - P: observed price
  - MC^p: perception of hidden marginal cost
- $\theta \geq 0$: importance of fairness concerns
  - $\theta = 0$: fairness does not matter, $F = 1$ for all K^p
  - $\theta > 0$: fairness matters, F is decreasing in K^p

shape of the fairness measure



demand curve faced by the monopoly

$$Y^d(P) = P^{-\varepsilon} \times F\left(K^p(P)\right)^{\varepsilon-1}$$

- $P^{-\varepsilon}$: traditional effect of P on demand
  - $P \rightarrow$ customers' budget sets $\rightarrow$ demand
- $F\left(K^p(P)\right)^{\varepsilon-1}$: effect of P on demand through fairness
  - $P \rightarrow$ perceived markup $\rightarrow$ perceived fairness of transaction

    $\rightarrow$ marginal utility of consumption $\rightarrow$ demand

God cares about markups

- Talmudic law: maximum markup allowable in trade $= 20\%$
- legal texts also regulate markups
  - price of bread in France from 1700 to 1970
  - price of public utilities in the US

a higher price caused by a higher markup is unfair

- Kahneman, Knetsch & Thaler [1986]
- "A hardware store has been selling snow shovels for \$15. The morning after a large snowstorm, the store raises the price to \$20."
  - acceptable: 18%
  - unfair: 82%

a higher price with the same markup is fair

- "Due to a transportation mixup, the wholesale price of lettuce has increased. A grocer has bought lettuce at a price that is 30 cents per head higher than normal. The grocer raises the price of lettuce to customers by 30 cents per head."
  - acceptable: 79%
  - unfair: 21%

firms understand the norms of fairness

- Okun [1975]: "empirically, the standard of fairness involves cost-oriented pricing with a markup"
- most firms in Blinder et al [1998] say that "customers do not tolerate price increases after increases in demand" but "customers do tolerate price increases after increases in cost"

the monopoly

- produces and sells Y units of good
- subject to contant marginal cost of production MC
- faces demand $Y^d(P)$
- sets price P to maximize profits $\Pi = Y^d(P) \times (P - MC)$
- optimal markup over marginal cost: $K = E/(E-1)$
- $E \equiv -d\ln(Y^d)/d\ln(P)$: price elasticity of demand

inference of marginal cost

the perceived marginal cost

$$MC^p(P) = (MC^b)^{\chi} \times \left(\frac{P}{K^b}\right)^{1-\chi}$$

- MC^b: prior belief of monopoly's marginal cost
- P/K^b: marginal cost proportional to price
- $\chi \in [0,1]$: amount of inference
  - $\chi = 0$: proportional or rational inference
  - $\chi = 1$: no inference at all
  - $\chi \in (0,1)$: underinference

the perceived markup

$$K^p(P) = \left(K^b\right)^{1-\chi} \left(\frac{P}{MC^b}\right)^{\chi}$$

- proportional / rational inference ($\chi = 0$): constant K^p
- underinference ($\chi > 0$): K^p is increasing in price
  - form of money illusion

evidence of underinference

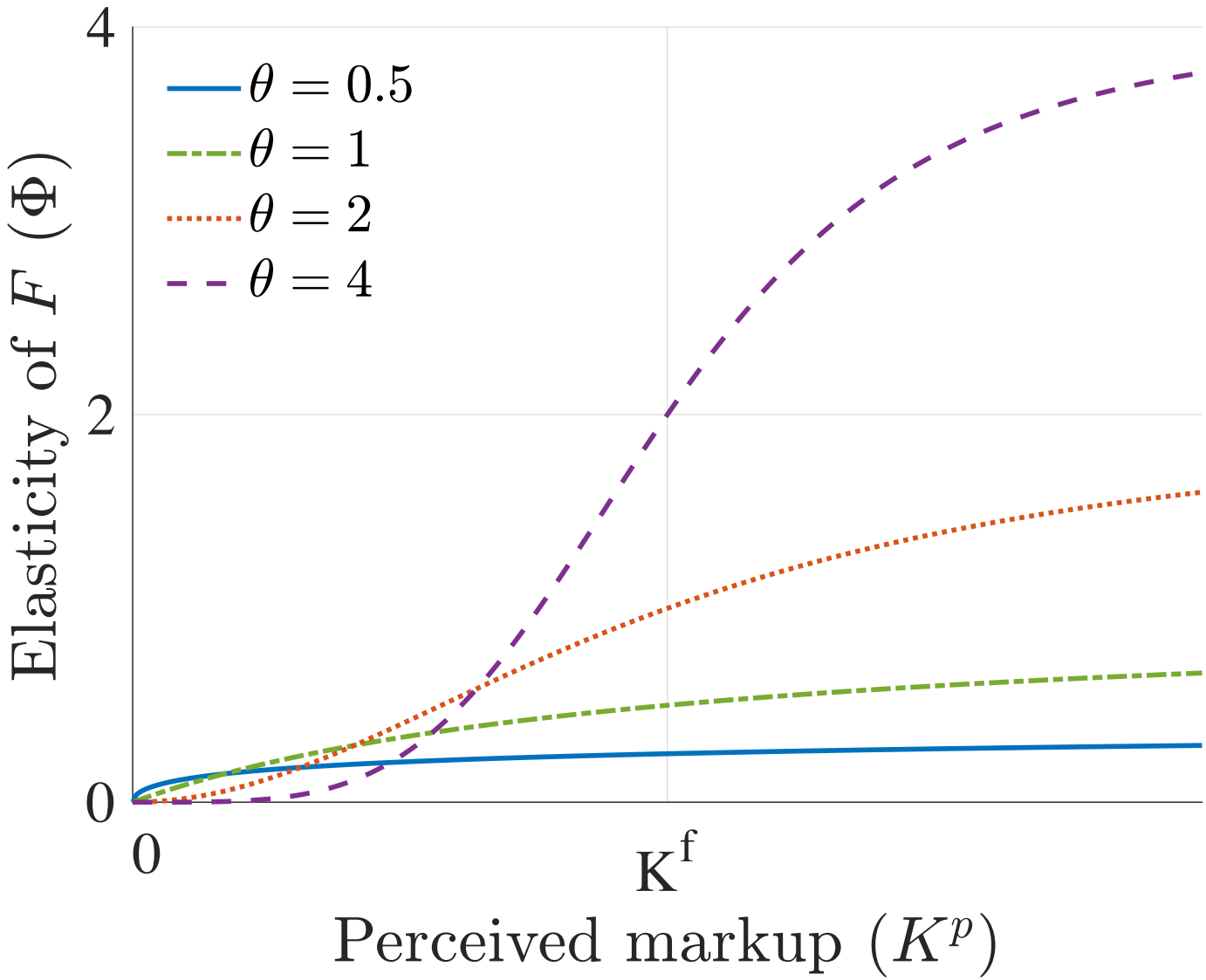
- people underinfer others' private information from their action
  - in bargaining
  - in auctions (winner's curse)
  - in social learning
- underinference is related to various other behaviors
  - "anchoring heuristic": less-than-Bayesian updating
  - "availability heuristic": higher prices suggest greed
  - cognitive error / inattention

the price elasticity of demand

$$E(P) = \varepsilon + (\varepsilon - 1) \times \chi \times \Phi(K^p(P))$$

- recall that $Y^d(P) = P^{-\varepsilon} \times F(K^p(P))^{\varepsilon - 1}$
- χ: elasticity of perceived markup wrt price
- $\Phi(K^p)$: elasticity of fairness measure wrt perceived markup

shape of elasticity of fairness measure



various equilibria

no fairness

$$E(P) = \varepsilon + (\varepsilon - 1) \times \chi \times \underbrace{\Phi(K^p(P))}_{=0}$$

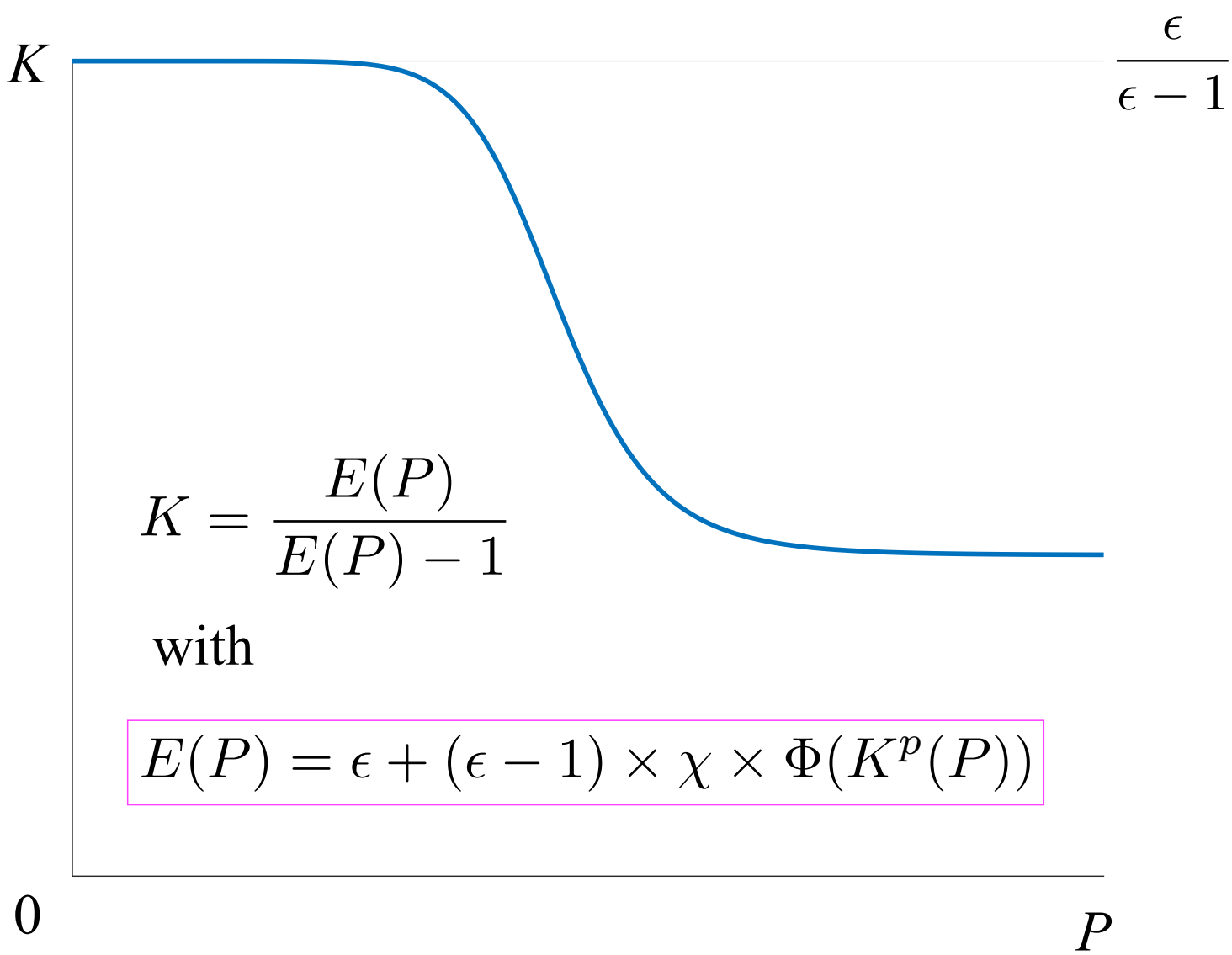
- standard markup: $K = \varepsilon/(\varepsilon - 1)$
- markup independent of $MC \rightarrow$ marginal-cost passthrough $= 1$
- prices are flexible

fairness and proportional /rational inference

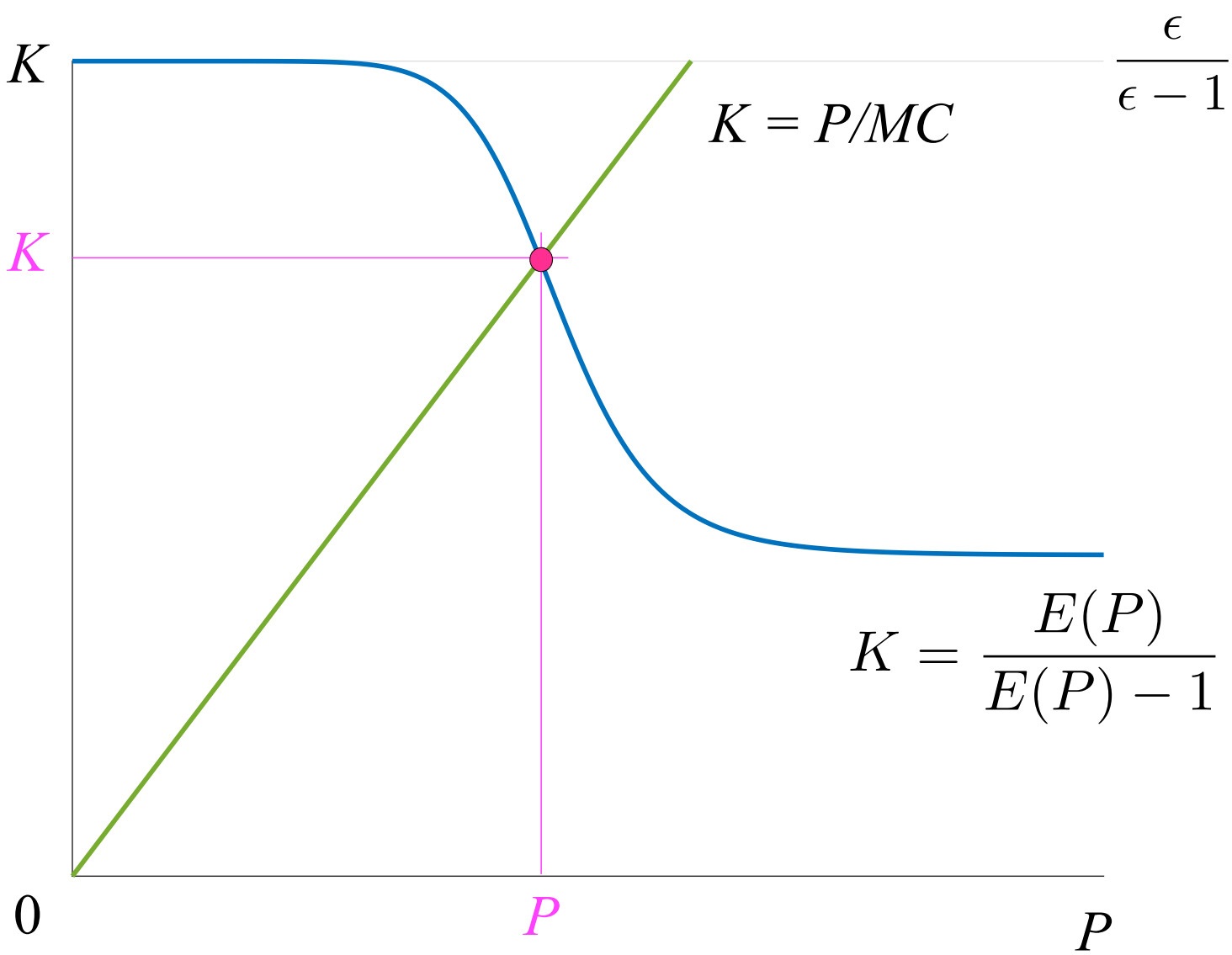
$$E(P) = \varepsilon + (\varepsilon - 1) \times \underbrace{\chi}_{=0} \times \Phi(K^p(P))$$

- standard markup: $K = \varepsilon/(\varepsilon - 1)$
- as without fairness: prices are flexible

fairness and underinference: monopoly's markup



fairness and underinference: more competition



fairness and underinference: price rigidity