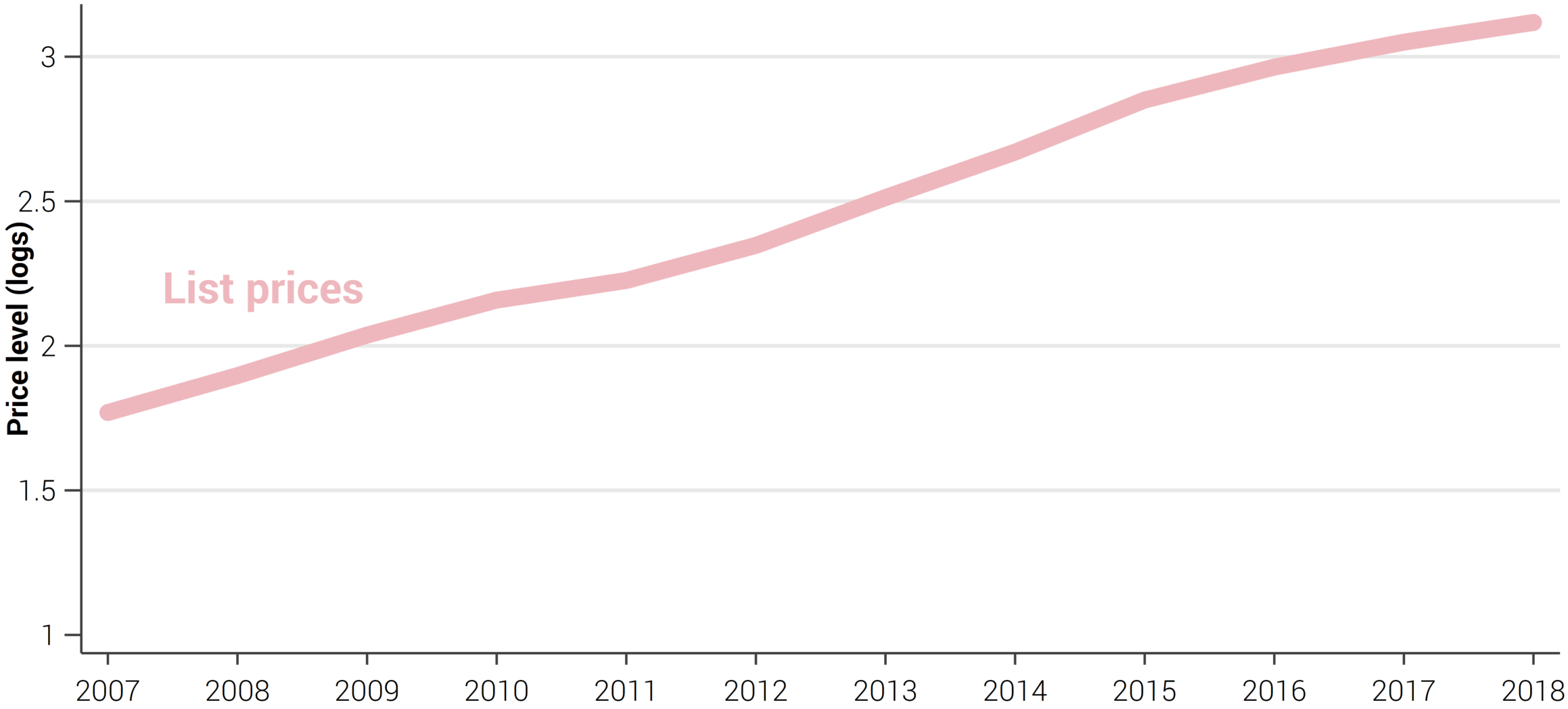
Insurance Design and the Passthrough of Nominal Drug Prices

Josh Feng[1] and Luca Maini[2]

[1]University of Utah, Eccles School of Business, [2]Harvard Medical School

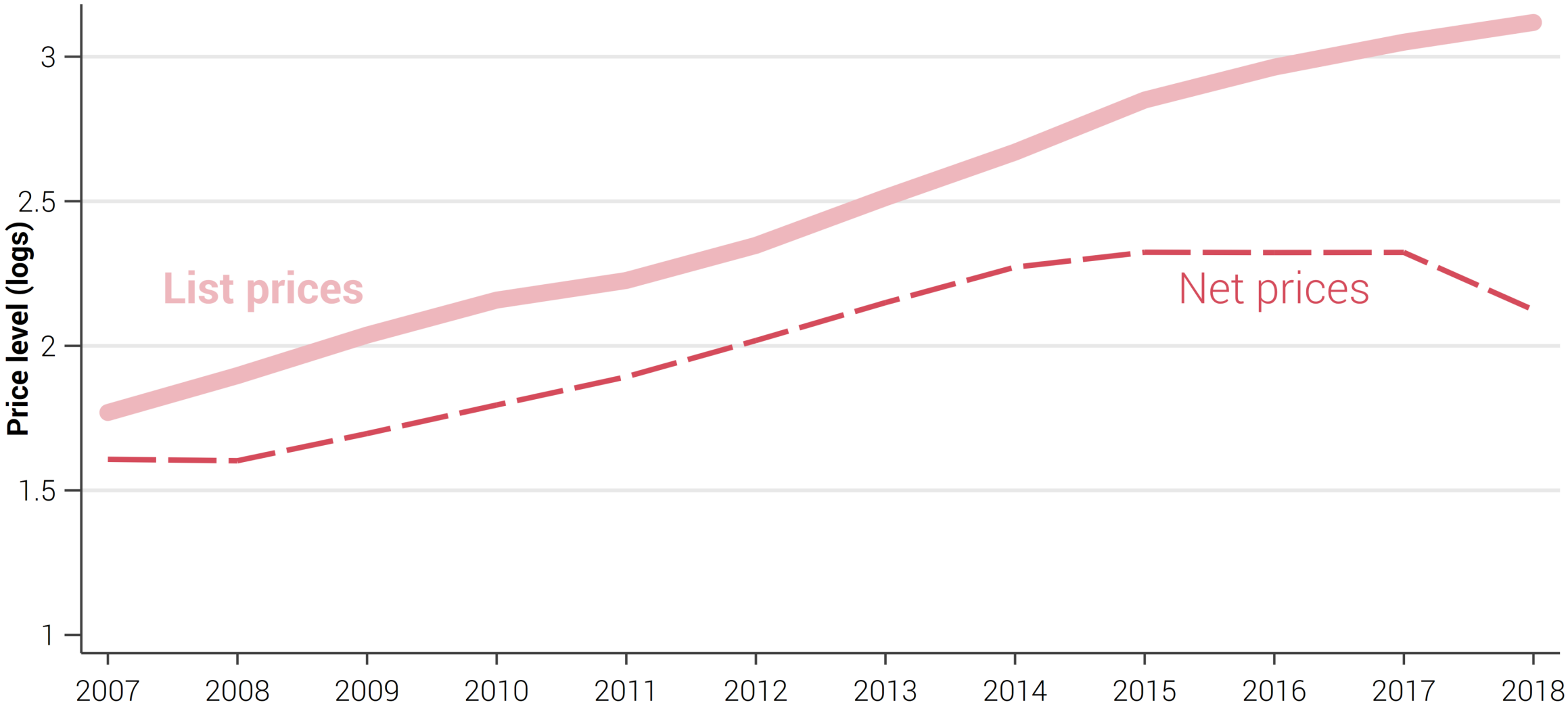
June 16, 2026

Common complaint: drug prices are high & growing



Notes: estimated prices for a sample of branded, pre-LOE, retail prescription drugs, using SSR Health data

Usual industry answer: you're looking at the wrong prices



Notes: estimated prices for a sample of branded, pre-LOE, retail prescription drugs, using SSR Health data

If that’s true, then why do list prices exist?

If that's true, then why do list prices exist?

- Broad consensus: list prices drive patients' out-of-pocket costs

Manufacturers have steadily increased the list price of their drugs, leading to artificially inflated list prices […]. Yet, ***many patients' out-of-pocket expenses are directly or indirectly tied to these inflated prices****. […] insured patients with high deductibles or co-insurance face costs based on these inflated list prices.*

FTC complaint against PBMs (2024)

- Potential answer: **list prices are used to increase OOP costs**

If that's true, then why do list prices exist?

- Broad consensus: list prices drive patients' out-of-pocket costs

Manufacturers have steadily increased the list price of their drugs, leading to artificially inflated list prices […]. Yet, many patients' out-of-pocket expenses are directly or indirectly tied to these inflated prices. […] insured patients with high deductibles or co-insurance face costs based on these inflated list prices.

FTC complaint against PBMs (2024)

- Potential answer: list prices are used to increase OOP costs
- **But why tie OOP to a price that doesn't reflect acquisition cost?**
  - No classic model of insurance would imply this is optimal
  - If insurers really want to increase OOP, why do they need to rely on list price?

We develop and test a theory of how and when insurers tie out-of-pocket costs to list prices

1. Argue **insurers use list prices to bypass benefit design restrictions**
   - Key implication → **list price should only affect OOP in "restricted" plans**

We develop and test a theory of how and when insurers tie out-of-pocket costs to list prices

1. Argue insurers use list prices to bypass benefit design restrictions
   - Key implication → list price should only affect OOP in "restricted" plans

2. **Show that higher list prices do pass through to OOP**
   - Argue existing evidence suffers from endogeneity and measurement issues
   - Use an IV approach to show **list price affects OOP—but only in "restricted" plans**

A Model of Insurance with List Prices and Rebates

We start from a simplified version of Rothschild-Stiglitz

Model (binary insurance loss setup)

- Risk-averse patients, defined by likelihood of getting sick $\theta \sim F(\theta)$
- Sick patients receive shock $-h$, can consume a unit of drug to reverse it
- Drug's net cost is $p < h$ (no moral hazard)
- Manufacturer sets list price w, pays discount $d = w - p$ to health plan
- Patients can purchase insurance, defined as a pair $(\alpha w, r)$
  - α is the coinsurance rate (so αw is the effective OOP)
  - r is the premium, which is set by a no-profit condition
- Utility of type θ patient is given by

$$U(\theta) = (1-\theta) \times u(W - r) + \theta \times u(W - \kappa r - \alpha w)$$

Theoretical results: when do list prices matter?

Proposition 1. (Irrelevance of list price) *Any solution concept depending only on plans' strategy spaces and payoff functions yields identical predictions about* $(\alpha w, r)$ *outcomes across all list prices* $w \geq p$.

- P1 formalizes that, absent constraints, list prices are an **accounting tool**
- They don't affect the equilibrium bc. they don't affect payoffs or strategies

Theoretical results: list prices matter under caps

Assume α is capped at $\bar{\alpha}$ (e.g., by gov't regulation)

- Under these conditions, the equilibrium unravels **(Hendren, 2014)**

Lemma 2. (Unraveling under caps) *The unique Nash equilibrium has every active plan offering coinsurance $\alpha = \bar{\alpha}$ at a common break-even premium $r^{\star}$.*

Theoretical results: list prices matter under caps

Assume α is capped at $\bar{\alpha}$ (e.g., by gov't regulation)

- Under these conditions, the equilibrium unravels **(Hendren, 2014)**

Lemma 2. (Unraveling under caps) *The unique Nash equilibrium has every active plan offering coinsurance $\alpha = \bar{\alpha}$ at a common break-even premium $r^{\star}$.*

- In turn, this implies that between two identical drugs A and B, health plans prefer the one with the highest list price

Proposition 2. (Dominance of high-list price drug) *The two-drug game with $w_B - w_A > 0$ and sufficiently small, has a unique Nash equilibrium with all active plans covering drug B.*

Model takeaways

- The key condition is that **plan generosity is constrained**
  - In models where α is set optimally, list price does not affect the equilibrium (because plans can already set any OOP)

- Empirical settings where this model applies most closely:
  - Medicare Part D (standard benefit design based on a fixed set of coinsurances)
  - High-deductible Health Plans (coinsurance cannot be >100%)

Empirical Evidence of the Relationship Between List Prices and Out-of-Pocket Costs

Empirical approach

- Compare **changes** in OOP & list price (Wholesale Acquisition Cost = WAC):

$$\Delta \ln(y_{jt}) = \alpha_t + \gamma \times \Delta \ln(\mathrm{WAC_{jt}}) + \varepsilon_{jt}$$

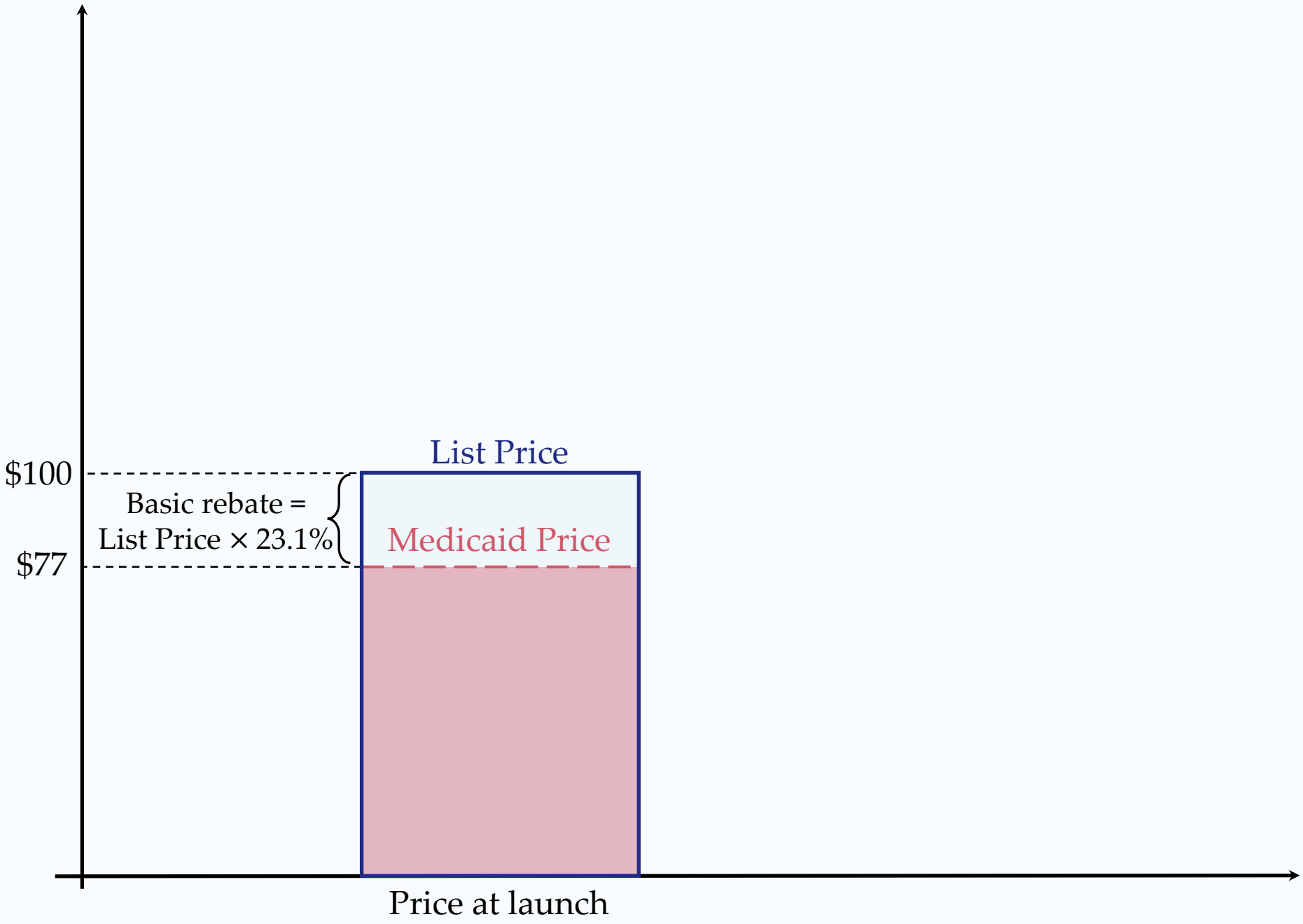
  where
  - j indexes drugs, t years
  - y_{jt} measures OOP costs

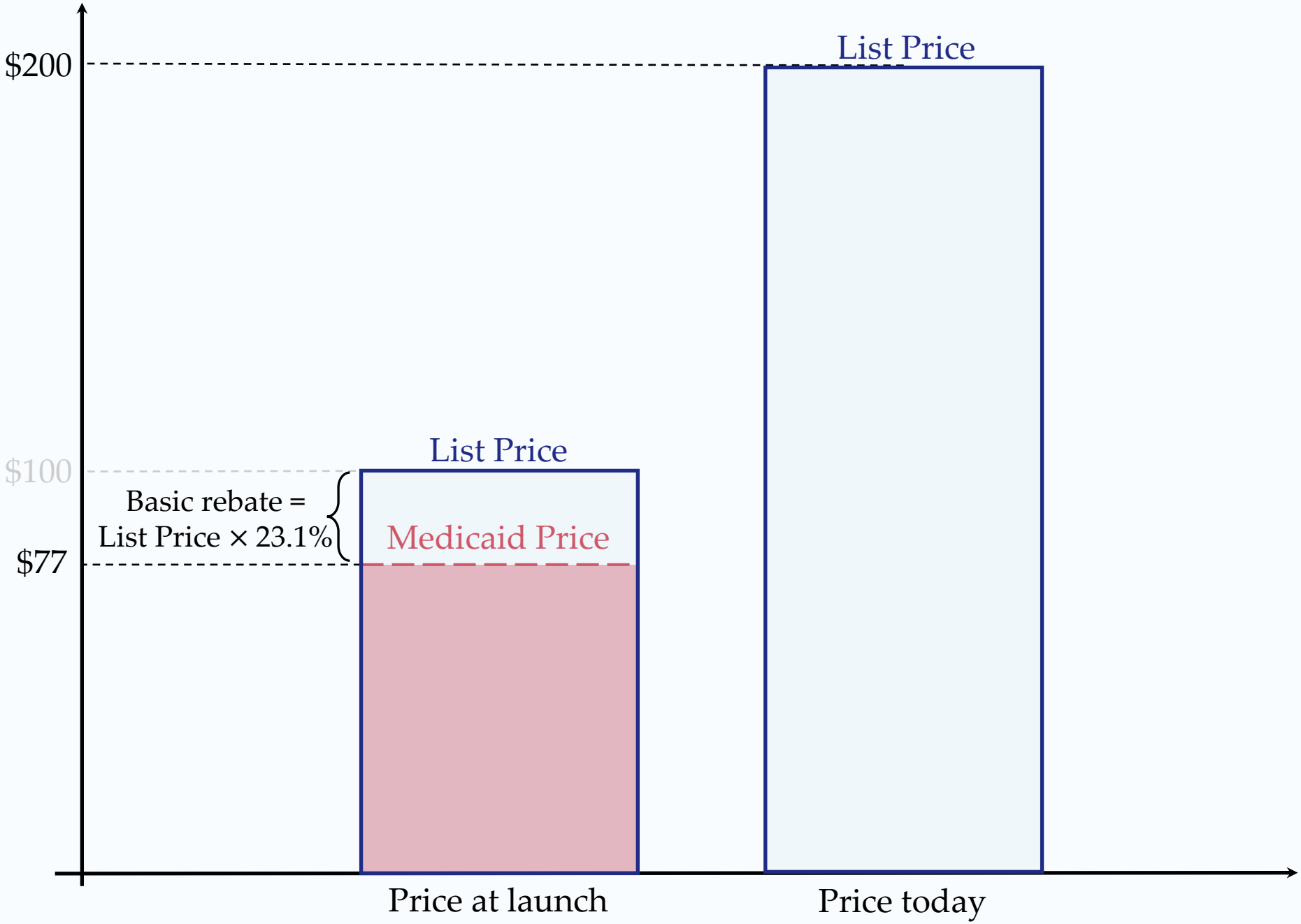
- Issues:
  - List price increases could be tied to changes in quality (e.g., new indications)
  - Patient OOP depends on **allowed amount** (price negotiated btw. pharmacy & PBM)
- Papers examining this relationship find weak/no relationship **(Yang et al., 2020; Rome et al., 2021; Lalani et al., 2024)**

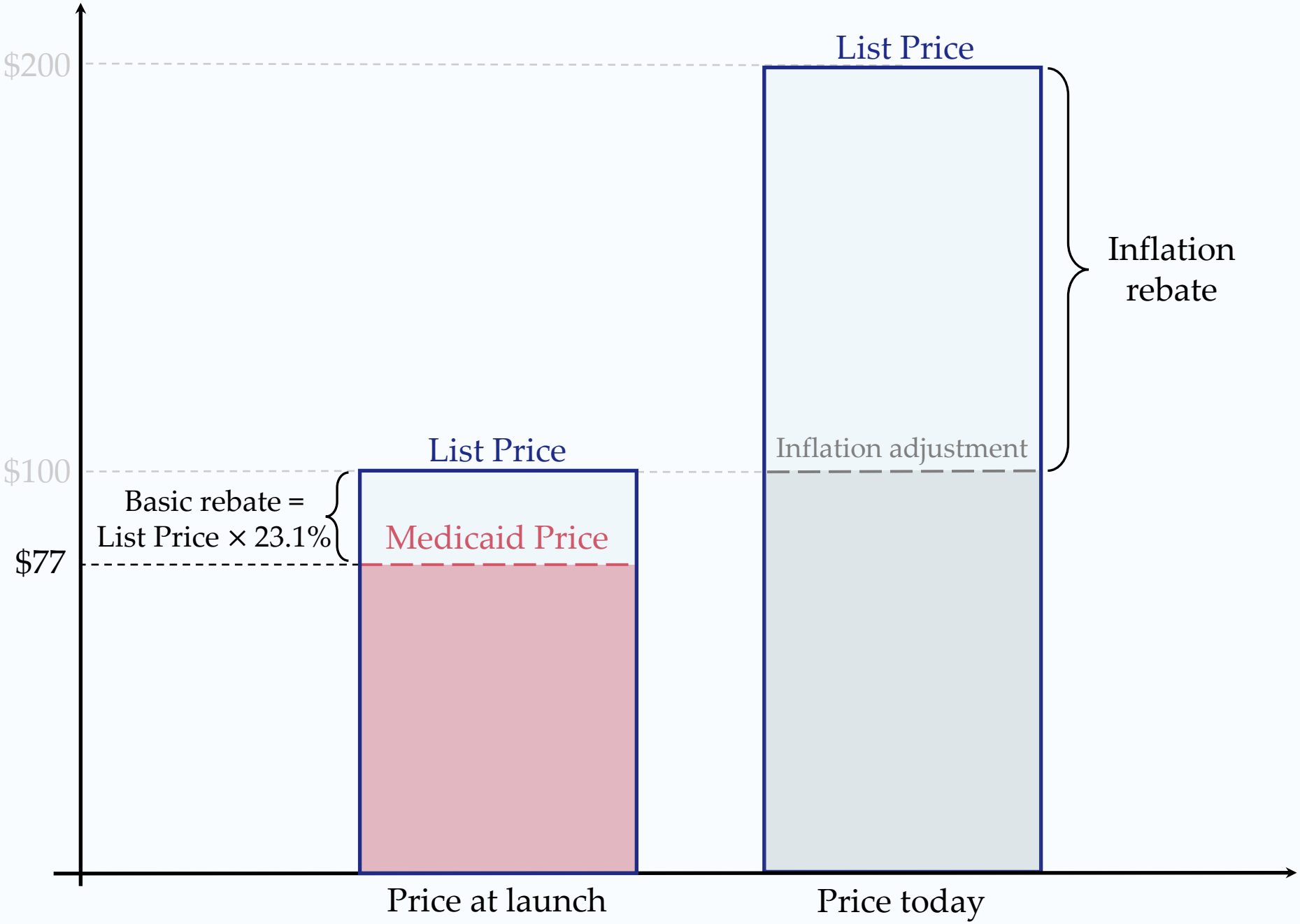
Solution → Medicaid exposure as an IV for list price growth

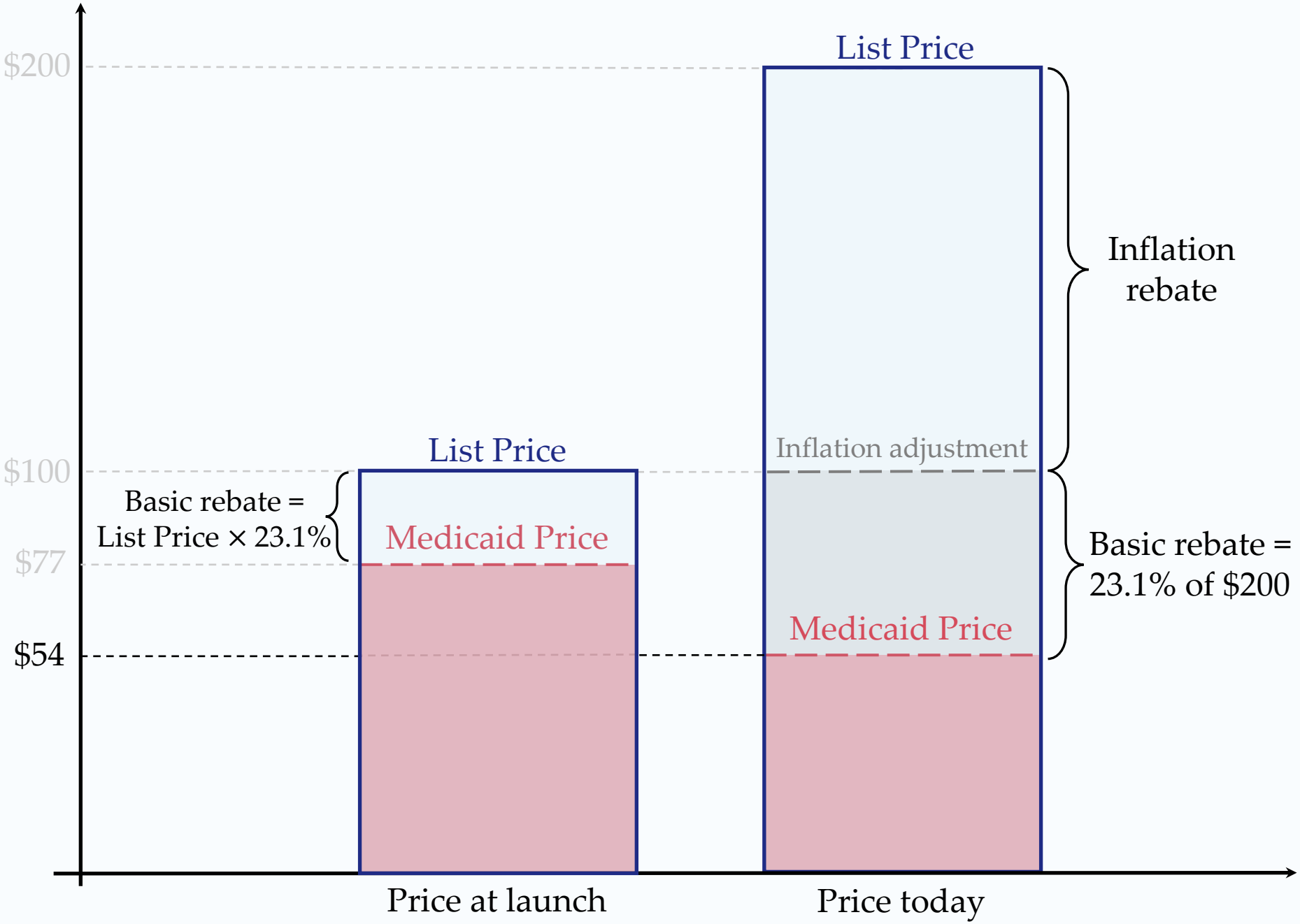
Feng, Hwang and Maini (2023)

- Medicaid reimburses for prescription drugs at list price levels, but then receives a per-unit rebate from manufacturers
- The rebate has two components:
  - A **basic rebate** equal to the largest of 23.1% or the best private payer discount
  - An **inflation rebate** equal to difference btw. current list price and list price at launch
- Because the basic rebate is anchored to the *current* list price, Medicaid rules disincentivize list price *growth*


List Price
$100
Basic rebate =
List Price × 23.1%
Medicaid Price
$77
Price at launch


$200
List Price
$100
List Price
Basic rebate =
List Price × 23.1%
Medicaid Price
$77
Price at launch
Price today


$200
$100
$77
List Price
List Price
Inflation adjustment
Inflation rebate
Basic rebate = List Price × 23.1%
Medicaid Price
Price at launch
Price today


$200
$100
$77
$54
List Price
List Price
Inflation adjustment
Basic rebate =
List Price × 23.1%
Medicaid Price
Medicaid Price
Inflation
rebate
Basic rebate =
23.1% of $200
Price at launch
Price today

Data

- 2007—2018 list prices and sales for ~300 on-patent branded drugs primarily sold through retail pharmacies (SSR Health)
- Medicaid sales from publicly available CMS files
- Prescription drug claims
  - Commercial market: MarketScan (47 million patients 2007–2018)
  - Medicare: CMS 20% random Part D sample (90 million patients 2007–2018)
  - To measure OOP we take the drug-year average across claims

First stage: a SD increase in MMS (~10pp) lowers yearly list price growth by 1.6pp

$$\Delta \ln(WAC_{jt}) = \delta_t + \beta \times MMS_{jt} + \omega_{jt}$$

	(1)	(2)
MMS	**-0.161**	**-0.158**
	(0.034)	**(0.034)**
Year FE		X
N	1,671	1,671
R^2	0.008	0.040
F-stat	22.88	9.008

The effect of list price on OOP

Dependent variable: average per-claim OOP at the drug-year level

	Commercial Plans			
	All Plans	**PPO**	**HMO**	**HDHP**
Panel A. OLS Estimates				
$\Delta \ln(WAC)$				
Panel B. Instrumental Variable Estimates				
$\Delta \ln(WAC)$				
Year FE				
N				

The effect of list price on OOP

Dependent variable: average per-claim OOP at the drug-year level

	Commercial Plans			
	All Plans	**PPO**	**HMO**	**HDHP**
Panel A. OLS Estimates				
$\Delta \ln(WAC)$	**0.115**	**0.13**	**0.023**	**0.118**
	(0.050)	**(0.054)**	**(0.041)**	**(0.068)**
Panel B. Instrumental Variable Estimates				
$\Delta \ln(WAC)$				
Year FE	X	X	X	X
N	1,651	1,649	1,620	1,619

The effect of list price on OOP

Dependent variable: average per-claim OOP at the drug-year level

	Commercial Plans			
	All Plans	**PPO**	**HMO**	**HDHP**
Panel A. OLS Estimates				
$\Delta \ln(WAC)$	0.115	0.13	0.023	0.118
	(0.050)	(0.054)	(0.041)	(0.068)
Panel B. Instrumental Variable Estimates				
$\Delta \ln(WAC)$	**-0.067**	**-0.085**	**0.216**	**1.026**
	(0.325)	**(0.338)**	**(0.402)**	**(0.353)**
Year FE	X	X	X	X
N	1,651	1,649	1,620	1,619

The effect of list price on OOP

Dependent variable: average per-claim OOP at the drug-year level

	Commercial Plans				Medicare Plans		
	All Plans	**PPO**	**HMO**	**HDHP**	**All Plans**	**Basic Plans**	**Enhanced Plans**
Panel A. OLS Estimates							
$\Delta \ln(WAC)$	0.115	0.13	0.023	0.118	**0.193**	**0.196**	**0.142**
	(0.050)	(0.054)	(0.041)	(0.068)	**(0.078)**	**(0.065)**	**(0.077)**
Panel B. Instrumental Variable Estimates							
$\Delta \ln(WAC)$	-0.067	-0.085	0.216	1.026			
	(0.325)	(0.338)	(0.402)	(0.353)			
Year FE	X	X	X	X	X	X	X
N	1,651	1,649	1,620	1,619	1,473	1,409	1,444

The effect of list price on OOP

Dependent variable: average per-claim OOP at the drug-year level

	Commercial Plans				Medicare Plans		
	All Plans	**PPO**	**HMO**	**HDHP**	**All Plans**	**Basic Plans**	**Enhanced Plans**
Panel A. OLS Estimates							
$\Delta \ln(WAC)$	0.115	0.13	0.023	0.118	0.193	0.196	0.142
	(0.050)	(0.054)	(0.041)	(0.068)	(0.078)	(0.065)	(0.077)
Panel B. Instrumental Variable Estimates							
$\Delta \ln(WAC)$	-0.067	-0.085	0.216	1.026	**0.908**	**1.045**	**0.525**
	(0.325)	(0.338)	(0.402)	(0.353)	**(0.205)**	**(0.346)**	**(0.200)**
Year FE	X	X	X	X	X	X	X
N	1,651	1,649	1,620	1,619	1,473	1,409	1,444

Discussion

Our results support claims often made by policymakers and regulators, but with some added nuance

- Our model argues that PBMs and payers benefit from higher list prices…
  - → **but only when plan design is constrained**
  - In these instances, **list price + rebate schemes can undo coverage requirements**

Our results support claims often made by policymakers and regulators, but with some added nuance

- Our model argues that PBMs and payers benefit from higher list prices…
  - → **but only when plan design is constrained**
  - In these instances, **list price + rebate schemes can undo coverage requirements**
- The results substantiate FTC allegations against PBMs, with two caveats
  - Passthrough to OOP weakest in commercial plans (focus of the complaint)
  - Plan sponsors and PBM incentives are aligned (complaint singles out PBMs)

Our results support claims often made by policymakers and regulators, but with some added nuance

- Our model argues that PBMs and payers benefit from higher list prices…
  - → **but only when plan design is constrained**
  - In these instances, **list price + rebate schemes can undo coverage requirements**
- The results substantiate FTC allegations against PBMs, with two caveats
  - Passthrough to OOP weakest in commercial plans (focus of the complaint)
  - Plan sponsors and PBM incentives are aligned (complaint singles out PBMs)
- Importantly, plans do not do this to "trick" patients, but because **cheaper, less generous plans are what patients prefer**