ONLINE APPENDIX

The Economics of the Public Option: Evidence from Local Pharmaceutical Markets

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Online Appendix A The determinants of retail drug prices

In the main text, we argue that two conditions that generate price differences between state-owned and private firms are the higher bargaining power of the former in the wholesale market and the exercise of market power of the latter in the retail market. In this section, we present a model that formalizes this intuition.

A.1 Setup

We consider a sequential monopoly model with Nash bargaining. An upstream monopoly produces a drug that is sold to a retail pharmacy that is a downstream monopoly. The model allows for this downstream firm to represent the private pharmacy, the public pharmacy, or some combination between them—we specify how the downstream firm's objective function captures these possibilities below. The marginal cost of the upstream monopoly is c and the wholesale price the retailer pays is t. There are no additional marginal costs downstream.

We start by introducing the objective functions of the upstream firm and the retailer. The upstream monopoly maximizes profits:

$$\Pi_U(t) = (t - c)\bar{q}(t),$$

where $\bar{q}(t) \equiv q(p(t))$ are the sales that result when the downstream retailer chooses the optimal retail price given the wholesale price t.

The downstream firm sets prices by taking into account both profits and consumer surplus, with a weight on consumer surplus equal to λ. Omitting the dependence of prices with respect to the wholesale price, the objective function of the retailer is:

$$V_D(p) = (p - t)\, q\,(p) + \lambda CS\,(p)\,,$$

where $q(p)$ is the demand function, for which we assume $q'(p) < 0$ and $q''(p) \geq 0$. The parameter λ measures the degree of alignment between the retailer and consumers. If $\lambda < 1$, the retailer values profits more than consumer welfare; $\lambda > 1$ implies that the retailer values consumer welfare more than profits; and $\lambda = 1$ means that consumer welfare and profits are valued equally by the retailer and hence that the retailer maximizes total welfare.[1] In terms of the downstream market structure, this specification of the retailer objective is akin to a mixed oligopoly model for the retail market

[1] See also Timmins (2002) and Gowrisankaran et al. (2015) for similar specifications of firm objectives when aligned with consumers.

in which private and state-owned firms compete (see, e.g., Merrill and Schneider 1966; Beato and Mas-Colell 1984; De Fraja and Delbono 1989; Cremer et al. 1991; Duarte et al. 2021).

Bargaining over wholesale price. The upstream and downstream firms bargain over wholesale prices. The wholesale price t maximizes the Nash product of the gains from trade for both firms:

$$V_D\left(p(t)\right)^{\zeta} \times \left(\Pi_U\left(t\right)\right)^{1-\zeta},$$

where ζ is the bargaining power of the retailer.

Optimal pricing upstream and downstream. The first-order condition of the Nash bargaining problem is:

$$(t-c)q'\left(p\right)p'(t) + q = \left(\frac{\zeta}{1-\zeta}\right)\frac{t-c}{(p-t)+\lambda\frac{CS}{q}} \times q, \tag{1}$$

where it is useful to note that this equation simplifies to the standard first order condition of the bilateral monopoly model in the case of $\lambda = 0$, where the retailer places no weight on consumer surplus (Lee et al., 2021).

The optimal retailer price is given by:

$$p = t - \frac{q}{q'} - \lambda\frac{CS'}{q'},$$

which, by using the fact that $CS' = -q(p)$, simplifies to:

$$p = t - (1-\lambda)\frac{q}{q'},$$

which only holds when $\lambda < 1$. When $\lambda \geq 1$, the downstream firm is at a corner solution where it sets prices at marginal cost, namely $p = t$. Overall, the optimal price downstream is given by:

$$p = \begin{cases} t - (1-\lambda)\frac{q}{q'} & \lambda < 1 \\ t & \lambda \geq 1. \end{cases} \tag{2}$$

Market outcomes are jointly determined by equations (1) and (2), and depend on the bargaining power of the retailer and the extent to which the retailer is aligned with consumers and value consumer surplus.

A.2 Comparative Statics

In this section, we deliver the main results of the model. In particular, we show how wholesale and retail prices vary with the retailer's bargaining power and market power, which depend on the parameters ζ and λ, respectively. These are the results that map to the two conditions we discuss in the main text for why public state-owned firms may offer lower prices than private firms in our setting. We start by introducing three assumptions:

Assumption 1 (Decreasing Marginal Revenue)**.** *Marginal revenue $MR(q) = p(q) + qp'(q)$ is decreasing in q, where $p(q)$ is the inverse demand curve.*

Assumption 2. $\frac{qq''}{q'^2}$ *is weakly increasing in p.*

Assumption 3. $\frac{q^2}{-q'} - CS \geq 0$.

These assumptions provide conditions under which the two comparative statics of interest hold. Assumption 1 guarantees the existence of a profit-maximizing price for a monopolist facing a convex cost function and is implied by log-concavity of demand (see e.g., Kang and Vasserman 2022). Assumption 3 is also implied by log-concavity, as shown in Section A.4.1. Log concavity is a commonly-used assumption in industrial organization, and hence it is not particularly restrictive (Bagnoli and Bergstrom, 2006). This property of demand ensures that the first order condition of the monopoly is sufficient for profit maximization.

We start by establishing general results for how market outcomes vary with the degree of bargaining power downstream, ζ. Lemma 1 shows that under Assumption 1 and Assumption 2, wholesale prices and downstream prices are decreasing on the retailer's bargaining power ζ.

Lemma 1. *Wholesale prices and retail prices are decreasing in the bargaining power of the retailer. For $\lambda \geq 1$ and if Assumption 1 holds, then $\partial t/\partial\zeta < 0$ and $\partial p/\partial\zeta < 0$. For $\lambda < 1$ and if Assumption 1 and 2 hold, then $\partial t/\partial\zeta < 0$ and $\partial p/\partial\zeta < 0$.*

Proof. See Section A.4.3 □

We now establish general results for how market outcomes vary with the extent of alignment between the retailer and consumers, λ. When $\lambda \geq 1$, the retailer sets its price to be equal to the wholesale price, $p = t$. Lemma 2 shows that in this case, the wholesale price and the retail price are independent of λ. When $\lambda < 1$, the wholesale price is not always decreasing with λ. The intuition is as follows: as λ goes up, the retailer would like to give away profits to increase output. In some cases, this allows the upstream firm to set a higher wholesale price. Regardless, Lemma 2 shows that retail prices are decreasing with λ under Assumptions 1, 2 and 3, which is the result of main interest in our context.

Lemma 2. *The retail price is weakly decreasing in the weight given to consumer surplus, λ. In particular, for $\lambda \geq 1$ we show that $\partial p/\partial\lambda = 0$ and $\partial t/\partial\lambda = 0$. For $\lambda < 1$ and if Assumptions 1, 2, and 3 hold, then $\frac{\partial p}{\partial\lambda} < 0$.*

Proof. See Section A.4.4. □

A.3 Parametric Examples

Lemmas 1 and 2 provide general conditions under which retail prices are lower when retailers have more bargaining power, and when retailers are more aligned with consumers. These conditions hold for multiple families of demand that satisfy combinations of Assumptions 1, 2, and 3. To provide examples for these results, Lemmas 3-7 show that retail prices are weakly decreasing with ζ and λ for commonly used families of demand functions.

Lemma 3 (CES demand)**.** *Consider the CES demand function of the form $q = p^{\alpha}$, with $\alpha < -1$. With CES demand, wholesale and retail prices are weakly decreasing in the bargaining power downstream and in the weight given to consumer surplus. For $\lambda < 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} < 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} = 0$. For $\lambda \geq 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} = 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} = 0$.*

Proof. See Section A.4.5. □

Lemma 4 (Constant marginal revenue)**.** *Consider a demand function that features a constant marginal revenue curve $q = \frac{1}{p-a}$ (CMR demand). With CMR demand, wholesale prices and retail prices are weakly decreasing in the bargaining power downstream and in the weight given to consumer surplus. For $\lambda < 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} < 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} < 0$. For $\lambda \geq 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} = 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} = 0$.*

Proof. See Section A.4.6. □

Lemma 5 (Logit demand)**.** *Consider a logit demand function $q = \frac{e^{-\beta p}}{1+e^{-\beta p}}$. With logit demand, retailer prices are weakly decreasing in the retailer's bargaining power and in the weight given to consumer surplus. For $\lambda < 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} < 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$. For $\lambda \geq 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} = 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} = 0$.*

Proof. See Section A.4.7. □

Lemma 6 (Exponential demand)**.** *Consider an exponential demand function $q = e^{-\beta p}$. With exponential demand, retail prices are weakly decreasing in the retailer's bargaining power and in the weight given to consumer surplus. For $\lambda < 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} < 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$. For $\lambda \geq 1$, $\frac{\partial p}{\partial\zeta} < 0$ and $\frac{\partial p}{\partial\lambda} = 0$, and in addition $\frac{\partial t}{\partial\zeta} < 0$ and $\frac{\partial t}{\partial\lambda} = 0$.*

Proof. See Section A.4.8. □

Lemma 7 (ρ-linear demand)**.** *Consider a ρ-linear demand function $q = (a - bp)^{1/\rho}$. With $\rho-linear$ demand, retail prices are weakly decreasing in the retailer's bargaining power and in the weight given to consumer surplus. For $\lambda < 1$, $\frac{\partial p}{\partial \zeta} < 0$ and $\frac{\partial p}{\partial \lambda} < 0$, and in addition $\frac{\partial t}{\partial \zeta} < 0$. For $\lambda \geq 1$, $\frac{\partial p}{\partial \zeta} < 0$ and $\frac{\partial p}{\partial \lambda} = 0$, and in addition $\frac{\partial t}{\partial \zeta} < 0$ and $\frac{\partial t}{\partial \lambda} = 0$.*

Proof. See Section A.4.9. □

A.4 Additional Lemmas and Proofs

A.4.1 Assumption 3 and log-concavity

Lemma 8. *If q is twice differentiable and log-concave, then Assumption 3 holds: $\frac{q^2}{-q'} - CS \geq 0$.*

Proof. Since q is differentiable, q' exists and is finite. $\frac{q^2}{-q'} = 0$ and $CS = 0$ if $q = 0$. As $\lim_{p\to+\infty} q = 0$, $\lim_{p\to\infty} \frac{q^2}{-q'} - CS = 0$. Taking the derivatives of $f(p) := \frac{q^2}{-q'} - CS$, we get:

$$f'(p) = \frac{-2qq'^2 + q^2q''}{q'^2} + q = \frac{-qq'^2 + q^2q''}{q'^2} = q\frac{-q'^2 + qq''}{q'^2} < 0,$$

as q is log-concave. So $f(p)$ is decreasing in p. From $\lim_{p\to\infty} f(p) = 0$ we get $f(p) \geq 0$. □

A.4.2 Decreasing Marginal Revenue

We provide an equivalent expression of decreasing marginal revenue for a twice-differentiable function.

Lemma 9. *If q is twice differentiable, then $2q'^2 - qq'' \geq 0$ if and only if q has decreasing marginal revenue.*

Proof. Rewrite marginal revenue MR as a function of p by inverse function theorem:

$$MR(p) = p + \frac{q(p)}{q'(p)}.$$

Taking the derivative with respect to p yields:

$$MR'(p) = 1 + \frac{q'^2 - qq''}{q'^2} = \frac{2q'^2 - qq''}{q'^2}.$$

so that marginal revenue is increasing in p if and only if $2q'^2 - qq'' \geq 0$. Since q is decreasing in p, marginal revenue is decreasing in q if and only if $2q'^2 - qq'' \geq 0$. □

A.4.3 Proof of Lemma 1

Case 1: $\lambda < 1$ In this case, the first order condition for the retailer holds and therefore:

$$F_2 := p - t + (1-\lambda)\frac{q}{q'} = 0.$$

Taking the derivatives with respect to t yields:

$$\frac{dp}{dt} = -\frac{\frac{\partial F_2}{\partial t}}{\frac{\partial F_2}{\partial p}} = \frac{1}{\lambda + (1-\lambda)\frac{2(q')^2 - qq''}{(q')^2}}.$$

By Assumption 1, $\frac{dp}{dt} > 0$. Imposing condition F_2 on Equation (1), we obtain:

$$F_1 := -\frac{q}{\frac{q'p'}{q} + \frac{1}{t-c}} + \frac{1-\zeta}{\zeta}\left[-(1-\lambda)\frac{q^2}{q'} + \lambda\,\mathrm{CS}\right] = 0,$$

such that:

$$\begin{aligned}
\frac{\partial F_1}{\partial \zeta} &= -\frac{1}{\zeta^2}\left[-(1-\lambda)\frac{q^2}{q'} + \lambda CS\right] \\
\frac{\partial F_1}{\partial t} &= -\frac{\frac{(2q'^2 - qq'')p'^2 - qq'p''}{q} + \frac{q'p'(t-c)+q}{(t-c)^2}}{\left(\frac{q'p'}{q} + \frac{1}{t-c}\right)^2} + \frac{1-\zeta}{\zeta}\left[-(1-\lambda)\frac{qp'(2q'^2 - qq'')}{q'^2} - \lambda qp'\right].
\end{aligned}$$

It follows immediately that $\frac{\partial F_1}{\partial \zeta} < 0$. The sign of p'' is determined by $\frac{d\frac{qq''}{q'^2}}{dp}$ since:

$$p'' = \frac{(1-\lambda)\frac{d\frac{qq''}{q'^2}}{dp}\frac{dp}{d\lambda}}{[(2-\lambda) - (1-\lambda)\frac{qq''}{q'^2}]^2}.$$

From Assumption 2, $\frac{d\frac{qq''}{q'^2}}{dp} \geq 0$, and therefore $p'' \geq 0$. The first term of $\frac{\partial F_1}{\partial \zeta}$ is weakly negative, and the second term is negative, so $\frac{\partial F_1}{\partial \zeta} < 0$. Therefore $\frac{\partial t}{\partial \zeta} = -\frac{\frac{\partial F_1}{\partial \zeta}}{\frac{\partial F_1}{\partial t}} < 0$. In addition, we get $\frac{\partial p}{\partial \zeta} < 0$ since $\frac{dp}{dt} > 0$.

Case 2: $\lambda \geq 1$ With a sufficiently high weight given to consumer surplus, in particular when $\lambda > 1$, the retailer will set the price equal to its marginal cost, as shown by equation (2). The Nash bargaining first-order condition in equation (1) becomes:

$$F := \frac{-q^2(t)(t-c)}{(t-c)q'(t)+q(t)} + \frac{1-\zeta}{\zeta} CS(t) = 0.$$

Taking the partial derivative with respect to ζ yields:

$$\frac{\partial F}{\partial \zeta} = -\frac{1}{\zeta^2} CS(t) < 0; \quad \frac{\partial F}{\partial t} = -\frac{\frac{2q'^2 - q''q}{q} + \frac{q'(t-c)+q}{(t-c)^2}}{\left(\frac{q'}{q} + \frac{1}{t-c}\right)^2} - \frac{1-\zeta}{\zeta} q < 0.$$

and it follows that under Assumption 1 that $\partial t / \partial \zeta < 0$.

A.4.4 Proof of Lemma 2

Case 1: $\lambda \geq 1$ For $\lambda \geq 1$, the retailer sets price equal to marginal cost, $p = t$. The Nash bargaining first order condition is:

$$F := \frac{-q^2(t)(t-c)}{(t-c)q'(t)+q(t)} + \frac{1-\zeta}{\zeta} CS(t) = 0,$$

which does not contain λ, so that t does not depend on λ. Thus $\frac{\partial t}{\partial \lambda} = 0$. From $p = t$, we have $\frac{\partial p}{\partial \lambda} = 0$.

Case 2: $\lambda < 1; \zeta = 0$ In the special case in which $\zeta = 0$, the upstream firm acts as a monopoly and sets the wholesale price to maximize its profits. In this case, the upstream firm and retailer profit functions become:

$$\begin{aligned} \Pi_U &= (t-c)q(p) \\ V_D &= (p-t)q(p) + \lambda \, \mathrm{CS}(p), \end{aligned}$$

and the upstream firm and retailer first order conditions become:

$$\begin{aligned} F_1 &:= (t-c)q'p' + q = 0 \\ F_2 &:= p - t + (1-\lambda)\frac{q}{q'} = 0, \end{aligned}$$

such that from the retailer's first order condition we obtain:

$$p' = -\frac{\frac{\partial F_2}{\partial t}}{\frac{\partial F_2}{\partial p}} = \frac{1}{1 + (1-\lambda)\frac{q'^2 - qq''}{q'^2}},$$

which we plug into the upstream firm's first order condition to rewrite F_1 as:

$$q + (t-c)q' \frac{1}{1 + (1-\lambda)\frac{q'^2 - qq''}{q'^2}} = 0.$$

By combining the two first order conditions, we get:

$$F := \begin{bmatrix} q + (t-c)q' \frac{1}{1+(1-\lambda)\frac{q'^2-qq''}{q'^2}} \\ p - t + (1-\lambda)\frac{q}{q'} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}.$$

Note that:

$$\begin{bmatrix} \frac{\partial F_1}{\partial \lambda} \\ \frac{\partial F_2}{\partial \lambda} \end{bmatrix} = \begin{bmatrix} (t-c)q' p'^2 \frac{q'^2 - qq''}{q'^2} \\ -\frac{q}{q'} \end{bmatrix},$$

and the Jacobian matrix of F is:

$$J := \begin{bmatrix} \frac{\partial F_1}{\partial t} & \frac{\partial F_1}{\partial p} \\ \frac{\partial F_2}{\partial t} & \frac{\partial F_2}{\partial p} \end{bmatrix} \begin{bmatrix} q'p' & q' + (t-c)\left[q''p' + q'p'^2(1-\lambda)\frac{d\frac{qq''}{q'^2}}{dp}\right] \\ -1 & \frac{1}{p'} \end{bmatrix},$$

while the determinant of J is:

$$\begin{aligned} det(J) &= q' + (t-c)\left[q''p' + q'p'^2(1-\lambda)\frac{d\frac{qq''}{q'^2}}{dp}\right] + \frac{q'p'}{p'} \\ &= \frac{2q'^2 - qq''}{q'} - (1-\lambda)qp'\frac{d\frac{qq''}{q'^2}}{dp}. \end{aligned}$$

From Assumption 1 and Lemma 9, $2q'^2 - qq'' \geq 0$. This yields $\frac{2q'^2-qq''}{q'} \leq 0$. From assumption 2,$\frac{d\frac{qq''}{q'^2}}{dp} \geq 0$. So $det(J) \leq 0$.

The inverse matrix of J is:

$$J^{-1} = \frac{1}{det(J)} \begin{bmatrix} \frac{1}{p'} & -q' - (t-c)\left[q''p' + q'p'^2(1-\lambda)\frac{d\frac{qq''}{q'^2}}{dp}\right] \\ 1 & q'p' \end{bmatrix},$$

and using the implicit function theorem we show that:

$$\begin{aligned}\frac{\partial p}{\partial \lambda} &= -\frac{1}{det(J)}\left[q'p'\cdot\left(-\frac{q}{q'}\right)+(t-c)q'p'^2\frac{q'^2-qq''}{q'^2}\right]\\ &= \frac{1}{det(J)}qp'\frac{2q'^2-qq''}{q'^2}<0.\end{aligned}$$

<u>*Case 3:* $\lambda < 1; \zeta < 1$</u> Rewrite the first order condition for the bargaining problem as:

$$\frac{\frac{\partial \pi_u}{\partial t}}{\pi_u}-\frac{\zeta}{1-\zeta}\frac{q}{V_D}=0 \Longrightarrow (1-\zeta)F_2-\zeta q\frac{\pi_u}{V_D}=0.$$

where $F_2 := q+(t-c)q'(p)p'(t)$. The first order condition of the retailer is:

$$F_1 := p-t+(1-\lambda)\frac{q}{q'}=0.$$

Combining both conditions yields:

$$F := \begin{bmatrix} F_1 \\ (1-\zeta)F_2-\zeta q\frac{\pi_u}{V_D}\end{bmatrix}=\begin{bmatrix}0\\0\end{bmatrix},$$

for which the partial derivative with respect to λ is:

$$\frac{\partial F}{\partial \lambda}=\begin{bmatrix}\frac{\partial F_1}{\partial \lambda}\\ (1-\zeta)\frac{\partial F_2}{\partial \lambda}-\zeta q\frac{\partial \frac{\pi_u}{V_D}}{\partial \lambda}\end{bmatrix}.$$

and the Jacobian is:

$$J=\begin{bmatrix}\frac{\partial F_1}{\partial t} & \frac{\partial F_1}{\partial p}\\ (1-\zeta)\frac{\partial F_2}{\partial t}-\zeta q\frac{\partial \frac{\pi_u}{V_D}}{\partial t} & (1-\zeta)\frac{\partial F_2}{\partial p}-\zeta q'\frac{\pi_u}{V_D}-\zeta q\frac{\partial \frac{\pi_u}{V_D}}{\partial p}\end{bmatrix},$$

for which the determinant is:

$$\det(J)=(1-\zeta)\left(\frac{\partial F_1}{\partial t}\frac{\partial F_2}{\partial p}-\frac{\partial F_1}{\partial p}\frac{\partial F_2}{\partial t}\right)+\zeta\left[q'\frac{\pi_u}{V_D}+q\frac{\partial\frac{\pi_u}{V_D}}{\partial p}+q\frac{\partial\frac{\pi_u}{V_D}}{\partial t}\frac{1}{p'(t)}\right].$$

We know that when $\zeta=0$, then $\frac{\partial F_1}{\partial t}\frac{\partial F_2}{\partial p}-\frac{\partial F_1}{\partial p}\frac{\partial F_2}{\partial t}>0$. So we focus on $M := q'\frac{\pi_u}{V_D}+q\frac{\partial\frac{\pi_u}{V_D}}{\partial P}+q\frac{\partial\frac{\pi_u}{V_D}}{\partial t}\frac{1}{p'(t)}$, which can be simplified to $M = \frac{q}{\zeta V_D p'}\left[(1+\zeta)q'p'(t-c)+q\right]$. This yields:

$$\det(J) = (1-\zeta)\left(\frac{\partial F_1}{\partial t}\frac{\partial F_2}{\partial p} - \frac{\partial F_1}{\partial p}\frac{\partial F_2}{\partial t}\right) + \frac{q}{V_D p'}\left[(1+\zeta)q'p'(t-c)+q\right].$$

where the first term is greater than 0 given $\zeta = 0$. The second term is decreasing in ζ. When $\zeta \to 1$, $t \to c$ because the wholesaler's profit has zero weight in the bargaining stage. Thus the second term is equal to $\frac{q^2}{V_D p'} > 0$. So $|J| > 0$ for all ζ. Thus, the inverse of the Jacobian is:

$$J^{-1} = \frac{1}{det(J)}\begin{bmatrix} (1-\zeta)\frac{\partial F_2}{\partial p} - \zeta q' \frac{\pi_u}{V_D} - \zeta q \frac{\partial \frac{\pi_u}{V_D}}{\partial p} & -\frac{\partial F_1}{\partial p} \\ -(1-\zeta)\frac{\partial F_2}{\partial t} + \zeta q \frac{\partial \frac{\pi_u}{V_D}}{\partial t} & \frac{\partial F_1}{\partial t} \end{bmatrix}.$$

Using these results, we can write the partial derivative of retail price with respect to λ as:

$$\frac{\partial p}{\partial \lambda} = -\frac{1}{\det(J)}\left[(1-\zeta)\left(-\frac{\partial F_2}{\partial t}\frac{\partial F_1}{\partial \lambda} + \frac{\partial F_1 \partial F_2}{\partial t}\right) + \zeta q\left(\frac{\partial \frac{\pi_u}{V_D}}{\partial t}\frac{\partial F_1}{\partial \lambda} - \frac{\partial \frac{\pi u}{v_D}}{\partial \lambda}\frac{\partial F_1}{\partial t}\right)\right],$$

where since $\zeta = 0$ we know that $-\frac{\partial F_2}{\partial t}\frac{\partial F_1}{\partial \lambda} + \frac{\partial F_1 \partial F_2}{\partial t} > 0$, so we can focus on the sign of the last term:

$$\frac{\partial \frac{\pi_u}{V_D}}{\partial t}\frac{\partial F_1}{\partial \lambda} - \frac{\partial \frac{\pi u}{v_D}}{\partial \lambda}\frac{\partial F_1}{\partial t} = \left[-\frac{q}{q'}\frac{q\,(V_D+\pi_u)}{V_D{}^2} - \frac{\mathrm{CS}\,\pi_u}{V_D{}^2}\right] = \frac{1}{V_D^2}\left[-\frac{q^2}{q'}V_D + \pi_u(-\frac{q^2}{q'} - CS)\right],$$

and from Assumption 3, we have $N > 0$. Therefore, $\frac{\partial p}{\partial \lambda} < 0$.

<u>*Case 4: $\lambda < 1; \zeta = 1$*</u> In this case, the upstream firm will set the wholesale price equal to the marginal cost, $t = c$. Equation (2) can be written as:

$$F := (p-c)q' + (1-\lambda)q = 0.$$

from where by taking partial derivatives with respect to p we get:

$$\frac{\partial F}{\partial p} = [q' + (p-c)q''] + (1-\lambda)q' = \lambda q' + (1-\lambda)\frac{2q'^2 - qq''}{q'} < 0$$
$$\frac{\partial F}{\partial \lambda} = -q < 0,$$

such that under Assumption 1, $\frac{\partial p}{\partial \lambda} = -\frac{\frac{\partial F}{\partial \lambda}}{\frac{\partial F}{\partial t}} < 0$.

A.4.5 Proof for Lemma 3 (CES demand)

Notice that the CES function is not quasi-concave. Note also that Assumption 1 holds:

$$2q'^2 - qq'' = 2\alpha^2 p^{2\alpha-2} - \alpha(\alpha-1)p^{2\alpha-2} = \alpha(\alpha+1)p^{2\alpha-2} > 0,$$

and that Assumption 2 holds:

$$(\log q)' + (\log q'')' - 2(\log(-q'))' = \log(-\alpha) + \log(1-\alpha) - 2\log(-\alpha) = \log(1-\alpha) - log(-\alpha) > 0,$$

such that Lemma 1 implies that $\partial p/\partial\zeta < 0$ and $\partial t/\partial\zeta < 0$. However, Assumption 3 fails to hold since:

$$\frac{p^{2\alpha}}{-\alpha p^{\alpha-1}} + \frac{p^{\alpha+1}}{\alpha+1} = \frac{p^{\alpha+1}}{-\alpha} + \frac{p^{\alpha+1}}{\alpha+1} = \frac{-p^{\alpha+1}}{\alpha(\alpha+1)} < 0.$$

From equation (2) we get:

$$p = \frac{\alpha}{\alpha+(1-\lambda)}t,$$

and then from equation (1) we get:

$$(t-c)\alpha p^{\alpha-1}\frac{\alpha}{\alpha+(1-\lambda)} + p^{\alpha} = \frac{\zeta}{1-\zeta}\frac{t-c}{\frac{\lambda-1}{\alpha+1-\lambda}t + \lambda(-\frac{p}{\alpha+1})},$$

which can be simplified to:

$$\alpha^2(t-c) + \alpha t + \frac{\zeta}{1-\zeta}\left(\alpha^2+\alpha\right)(t-c) = 0,$$

from where it follows that t is independent of λ, and so $\frac{\partial t}{\partial\lambda} = 0$ and $\frac{\partial p}{\partial\lambda} = \frac{\alpha}{(\alpha+(1-\lambda))^2}t < 0$.

A.4.6 Proof for Lemma 4 (CMR demand)

Notice that the CMR demand is not quasi-concave. Note also that Assumption 1 holds:

$$2q'^2 - qq'' = \frac{2}{(p-a)^4} - \frac{2}{(p-a)^4} = 0,$$

and that Assumption 2 also holds given:

$$\log q + \log q'' - 2\log q' = -\log(p-a) + \log 2 - 3\log(p-a) + 4\log(p-a) = \log 2$$

is constant on p, i.e., weakly increasing in p. Then from Lemma 1, $dp/d\zeta < 0$ and $dt/d\zeta < 0$. However, Assumption 3 fails to hold since:

$$\frac{q^2}{-q'} - CS = 1 + \log(p - a).$$

We now check the sign of $\frac{\partial p}{\partial \lambda}$ when $\lambda \leq 1$. The first order condition for the Nash problem in equation (1)) implies:

$$F := \frac{\zeta}{1-\zeta}\left(\frac{t-c}{c-a}\right) - \frac{1-\lambda}{\lambda} - \log\lambda + \log(t-a) - C = 0,$$

where C is an arbitrary constant that nonetheless determines the price. Taking partial derivatives yields:

$$\begin{aligned}
\frac{\partial F}{\partial t} &= \frac{\zeta}{(1-\zeta)(c-a)} + \frac{1}{t-a} > 0 \\
\frac{\partial F}{\partial \lambda} &= -\frac{-\lambda + (1-\lambda)}{\lambda^2} - \frac{1}{\lambda} = \frac{1-\lambda}{\lambda^2} > 0.
\end{aligned}$$

Using the implicit function theorem:

$$\frac{\partial t}{\partial \lambda} = -\frac{\frac{\partial F}{\partial \lambda}}{\frac{\partial F}{\partial t}} < 0.$$

and plugging these terms back into p yields:

$$\frac{\partial p}{\partial \lambda} = \frac{1}{\lambda}\frac{\partial t}{\partial \lambda} - \frac{1}{\lambda^2}(t-a) < 0.$$

When $\lambda > 1$, $p = t$. t is not affected by λ. So $\frac{\partial p}{\partial \lambda} = \frac{\partial t}{\partial \lambda} = 0$.

A.4.7 Proof for Lemma 5 (Logit demand)

The logit demand is log-concave, since:

$$\begin{aligned}
q'^2 - qq'' &= \beta^2 q^2 (1-q)^2 - \beta^2 q^2 (1-q)(1-2q) \\
&= \beta^2 q^2 (1-q)(1-q-1+2q) = \beta^2 q^3 (1-q) > 0.
\end{aligned}$$

so that Assumptions 1 and 3 hold. In addition, Assumption 2 holds, since:

$$\frac{qq''}{q'^2} = \frac{\beta^2 q^2(1-q)(1-2q)}{\beta^2 q^2(1-q)^2} = \frac{1-2q}{1-q} = 1 - \frac{q}{1-q}$$

is decreasing in q, and thus increasing in p.

A.4.8 Proof for Lemma 6 (Exponential demand)

The exponential function is log-concave since:

$$q'^2 - qq'' = \beta^2 e^{-2\beta p} - \beta^2 e^{-\beta p} \cdot e^{-\beta p} = 0,$$

so that Assumptions 1 and 3 hold. In addition, Assumption 2 also holds, since:

$$(\log q)' + (\log q'')' - 2(\log(-q'))' = \beta + \beta - 2\beta = 0.$$

A.4.9 Proof for Lemma 7 (ρ-linear Demand)

The ρ-linear function is log-concave since:

$$q'^2 - qq'' = b^2 \frac{1}{\rho}(a - bp)^{2/\rho - 2} > 0,$$

so that Assumptions 1 and 3 hold. In addition, Assumption 2 also holds, since:

$$(\log q)' + (\log q'')' - 2(\log(-q'))' = \frac{-b}{a-bp}(\frac{1}{\rho} + \frac{1}{\rho} - 2 - 2(\frac{1}{\rho} - 1)) = 0.$$

Online Appendix B Experimental evidence on shopping behavior

Our experiment provided consumers with information on the availability of public pharmacies as an affordable alternative for purchasing drugs. This appendix studies whether consumers learned about the availability and attributes of public pharmacies, and whether knowing about them changed their shopping behavior in the short term. We estimate the equation:

$$y_i = \beta T_i + X_i'\gamma + \eta_{c(i)} + \varepsilon_i, \tag{3}$$

where y_i is the outcome of interest; T_i indicates whether a consumer was treated; X_i is a vector of controls that includes the dependent variable at baseline along with consumer age, education, gender, and indicators for whether the consumer is covered by public insurance and whether a household member suffers a chronic condition; $\eta_{c(i)}$ are county fixed effects. The coefficient β measures the average treatment effect of our informational intervention.

Information about public pharmacies rendered consumers more aware of their availability and attributes. Panel A in Table A.10 displays these results. Columns (1) and (2) show that information increased awareness about the availability of the public pharmacy by 7 percentage points, from a baseline level of 77 percent. Moreover, columns (4) and (5) show that information shifted consumer perceptions about drug prices at public pharmacies, which is their most salient attribute. In particular, perceived public pharmacy prices decreased by 9 percent as a result of the intervention. We also find that perceived waiting time for receiving drugs at the public pharmacy increased, which is their main disadvantage relative to private pharmacies. In particular, perceived waiting time increased by 20 percent.[2] These results are consistent with consumers becoming aware of public pharmacies and their competitive advantages and disadvantages relative to private pharmacies as public pharmacies enter local markets.

Consumers also seem to have reacted to the intervention in terms of shopping behavior. Panel B in Table A.10 displays results from linear probability models for enrollment in the public pharmacy, the decision to purchase, and the plan to use the pharmacy in the future. Although estimates are imprecise, they are positive and economically meaningful. The point estimate in column (2) indicates a 2-percentage-points increase in enrollment with public pharmacies by treated households—almost a 30 percent increase relative to the mean of the control group. The results in column (5) imply a 2.3-percentage-points increase in purchases in public pharmacies by treated households—more than an 80 percent increase relative to a baseline share of 2.8 percent in the control group. Finally, column (8) shows that our intervention increased the extent to which households plan to use the public pharmacy by 5 percentage points, which is as much as 10 percent relative to the baseline level for the control group.

Households with members who suffer chronic conditions react more strongly to the treatment. Columns (3), (6), and (9) study heterogeneity along this margin. All effects are larger for households with chronic conditions, although the differences are not statistically significant. Moreover, the treatment effects on effective and planned purchases are marginally statistically significant for consumers with chronic conditions. Consumers with chronic conditions are more likely to periodically shop for drugs and thus the group for which short-term effects are more likely to be

[2]We address concerns related to sample attrition by reporting bounds suggested by Lee (2009) in Table A.10-A. In all cases, point estimates for both the lower and upper bound have the same sign as our estimated treatment effects. However, in some cases, the point estimate of the bound is not statistically different from zero, which implies that under relatively negative attrition scenarios, our treatment effects are not distinguishable from zero.

detectable. Moreover, in many cases, public pharmacies prioritize the provision of drugs to treat chronic conditions, and thus the information in our intervention may be less relevant for consumers without any household member with a chronic condition. Treatment effects on consumers without a household member with a chronic condition are indeed close to zero across outcomes.[3]

These results suggest that as public pharmacies enter local markets, consumers become aware of their entry, their relative advantages in terms of lower prices, and their relative disadvantages in terms of convenience. Moreover, our findings suggest that consumers value the availability of public pharmacies and some—particularly those affected by a chronic condition—substitute toward public pharmacies to take advantage of their lower drug prices.

Online Appendix C The price effects of competition by public pharmacies

In this section, we develop a simple model of consumer choice and firm competition based on Chen and Riordan (2008). The goal is to illustrate the conditions under which the entry of an additional firm to a market induces an increase or a decrease in the prices set by an incumbent firm. The environment is simple but captures several features of our setting.

C.1 Setup

Environment. There is a population of consumers of size one that faces the discrete choice problem of purchasing from the incumbent, purchasing from the entrant, or not purchasing at all, which is the outside option. We denote these options by $j \in \{I, E, O\}$, respectively. After normalizing the value of the outside option to 0, the value that consumer i gets from each option is

$$\begin{aligned} u_{iI} &= v_{iI} - p_r \\ u_{iE} &= v_{iE} - p_u \\ u_{iO} &= 0 \end{aligned}$$

where v_{ij} is the willingness to pay and p_j is the price of each option. Willingness to pay v_i is drawn from a differentiable joint distribution $H(v)$, and may feature average differences across firms, may be heterogeneous across consumers within each firm and may be correlated across firms. Consumers choose the option that gives the highest utility, so that the probability that consumer i

[3]We report Lee bounds in Panel B in Table A.10 to address concerns about attrition. We find that point estimates for both the lower and upper bound for all outcomes have the same sign as our estimated treatment effects, although some of those bounds are not statistically different from zero.

chooses option j is

$$\sigma_{ij} = P(u_{ij} \geq u_{ik} \quad \forall k)$$

which induces demand functions

$$s_j = \int \sigma_{ij} h(v) dv$$

which naturally depend on the set of firms in the market.

On the supply side, the incumbent firm I chooses p^I to maximize profits $s_I(p_I - c_I)$, which leads to an optimal monopoly price p_I^m before entry and an optimal duopoly price p_I^d after entry. The entrant firm is meant to capture public pharmacies in our setting. As such, we assume it sets prices at marginal cost to satisfy a break-even condition, which is $p_E^d = c_E$.[4]

C.2 When does entry increase prices?

The net price effects of entry depend on the relative importance of two competing forces: (i) the extent of substitution away from the monopolist, which imposes downward pressure on the incumbent price, and (ii) the extent to which the demand faced by the monopolist becomes steeper after entry, which imposes upward pressure on the incumbent price. To establish this intuition formally, we define $F(v_I)$ as the marginal distribution of willingness to pay for the incumbent and $G(v_E|v_I)$ as the distribution of willingness to pay for the entrant, conditional on that for the incumbent. Both of these distributions are defined under the joint distribution $H(v)$. With this notation, we can restate Theorem 1 in Chen and Riordan (2008), which establishes that—under a few fairly general assumptions—the incumbent price will increase upon entry if and only if

$$\int_{p_I^m}^{\infty} [G(v|v) - G(p_I^m|v)] f(v) dv \leq (p_I^m - c_I) \int_{p_I^m}^{\infty} [g(p_I^m|v) - g(v|v)] f(v) dv$$

and will otherwise decrease.

This condition compares the magnitude of the two effects of entry. The left-hand side of the equation is the *market share effect* of entry. This term measures the difference between the market share the incumbent gets from charging the monopoly price as a monopoly and as a duopoly; that is, before and after entry. The more market share the entrant takes away from the incumbent, the stronger the incentives the incumbent has to decrease price in response to entry. The right-hand side of the equation is the *price sensitivity effect* of entry. The magnitude of this effect depends on the difference between the slope of the residual demand curve the incumbent faces before and after entry. The steeper the demand curve after entry relative to before entry, the lower the extent

[4] All results hold for the case in which the entrant sets a profit-maximizing price.

of substitution away from the incumbent from marginal consumers upon entry, and therefore the stronger the incentive of the incumbent to increase price upon entry.

The relative strength of these effects will largely depend on the distribution of consumer preferences. For example, the likelihood of a price increase is higher with a negative correlation in willingness to pay. In this case, substitution toward the entrant is lower than under a distribution of preferences with a positive correlation. Moreover, those who substitute away from the incumbent are consumers with a relatively low willingness to pay for the incumbent among those who purchase from the incumbent before entry, which leads to a steeper residual demand curve after entry.

C.3 Simulation

In this section, we show the results of simulating the model. The goal is to show numerically how different parameter combinations yield different predictions regarding the sign of the price effect of entry.

Specification. A key input in the simulation is the joint distribution of willingness to pay for the firms in the market, H_v, which we assume follows a joint normal distribution:

$$\begin{pmatrix} v_I \\ v_E \end{pmatrix} \sim N\begin{pmatrix} \delta_I & \sigma_I^2 & \rho\sigma_I\sigma_E \\ \delta_E & \rho\sigma_I\sigma_E & \sigma_E^2 \end{pmatrix}$$

where the mean willingness to pay for each firm is denoted by δ_I and δ_U. Differences between δ_I and δ_U capture vertical differentiation between firms and relative to the outside option. The dispersion of willingness to pay is captured by the variances σ_I^2 and σ_E^2, and the correlation between the willingness to pay for the incumbent and the entrant is captured by ρ. If the willingness to pay is positively correlated ($\rho > 0$), then consumers share similar preferences for both goods relative to the outside option. If instead willingness to pay is negatively correlated ($\rho < 0$), then consumers with a strong taste for one of the firms have a weak taste for the other firm. This parameter determines the extent to which the slope of demand the incumbent faces changes upon entry, which is key in determining the price effects of entry.

Simulation details. We simulate equilibrium prices and market shares for the environments before and after entry, for a range of parameters of the distribution of preferences. In particular, we set δ_I and δ_E so that $(\delta_I + \delta_E)/2 = 10$ and $\delta_I/\delta_E = k_\delta$ for a a grid of values for k_δ from 1 to 10; we set $\sigma_I = \sigma_E = \sigma$ and construct a grid of values for σ from 1 to 15; and we construct a grid of values for ρ between -1 and 1. We set marginal costs at $c_I = 6$ and c_E. For each combination of

(k_δ, σ, ρ), we solve for optimal prices and resulting market shares before and after entry.

C.4 Results

Results on price effects and the distribution of preferences. Our simulations illustrate that consumer preferences over firms play a key role in determining the equilibrium effects of entry on prices. Figure A.5 displays results for simulations over a grid of values for heterogeneity in preferences σ and correlation in preferences across firms ρ, for relative mean preferences of $\delta_I/\delta_E = 4$.

These results show two main patterns. First, the price charged by the incumbent firm is more likely to increase when preferences for the incumbent are more negatively correlated with those for the entrant. A more negative correlation implies that marginal consumers who substitute toward the entrant are those with a low willingness to pay for the incumbent, which makes the residual demand curve of the incumbent steeper and therefore imposes incentives to increase prices. This is consistent with a stronger price-sensitivity effect. Second, the results show that the price charged by the incumbent is more likely to increase when there is more dispersion in preferences, which is partly driven by the fact that when such dispersion is low, the demand curve is flatter and there is limited scope for price increases.

In the context of our setting and empirical results, this simulation suggests that the correlation between preferences for private and public pharmacies is likely negative. This suggests that pharmacy attributes—beyond drug prices—play an important role in pharmacy choice. An attribute that could be important in generating this pattern is heterogeneity in consumer locations relative to pharmacies: Consumers who live closer to private pharmacies are likely to pay more for them than for public pharmacies, whereas the opposite may be true for consumers who live closer to public pharmacies.

Results on price effects and the relative quality of the entrant. In addition to studying the conditions under which incumbent prices increase upon entry, we use the model to illustrate the importance of vertical quality difference in determining the penetration of the entrant and the differences in prices between the incumbent and the entrant. Figure A.6 shows results from simulations of the model for a grid of values for the relative quality of the incumbent δ_I/δ_E, while keeping average quality across firms fixed. We fix the remainder of the distribution of preferences to values such that the price of the incumbent increases; namely, $\rho = -0.99$ and $\sigma = 2.55$.

We study the implications of vertical differentiation for market shares and prices. Panel A in Figure A.6 shows that while the entrant is able to steal market share from the incumbent, the extent of business stealing decreases substantially as the quality of the entrant relative to the incumbent decreases. Panel B in Figure A.6 shows that the incumbent price is higher when the quality of the entrant relative to the incumbent is lower. Furthermore, these results also show that the price effects of entry on the incumbent price depend on the relative quality of the entrant. The higher the relative quality of the entrant, the more likely the incumbent price will decrease upon entry.

These results are consistent with our descriptive evidence and main empirical findings. In Section 3.1, we documented that public pharmacies entered the market offering lower quality along several dimensions, which suggests that δ_I/δ_E is relatively large in our setting. These results indeed imply that entrants with low relative quality have low penetration, allow the incumbent to sustain higher prices, and make it more likely that the incumbent will increase prices.

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Figure A.1: Examples of private and public pharmacies

(a) Outside a private pharmacy

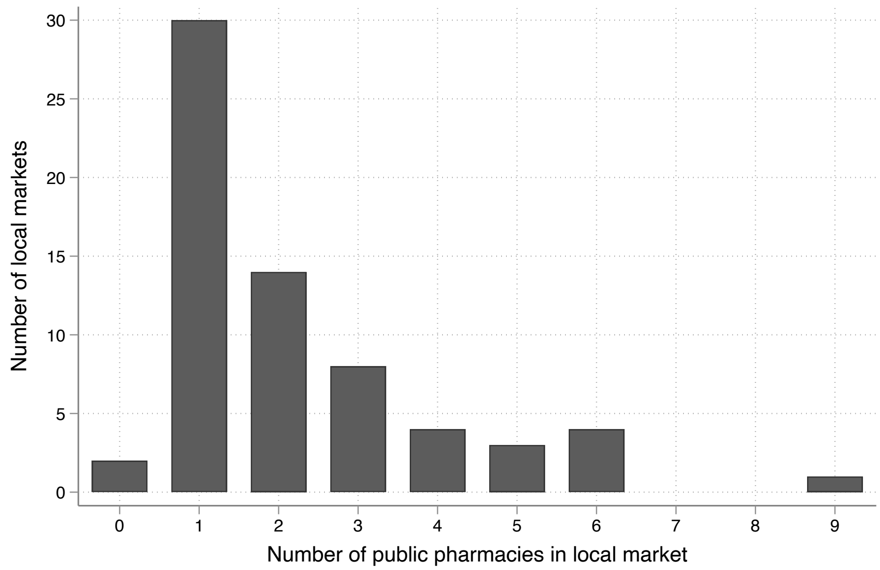
(b) Inside a private pharmacy

(c) Outside a public pharmacy

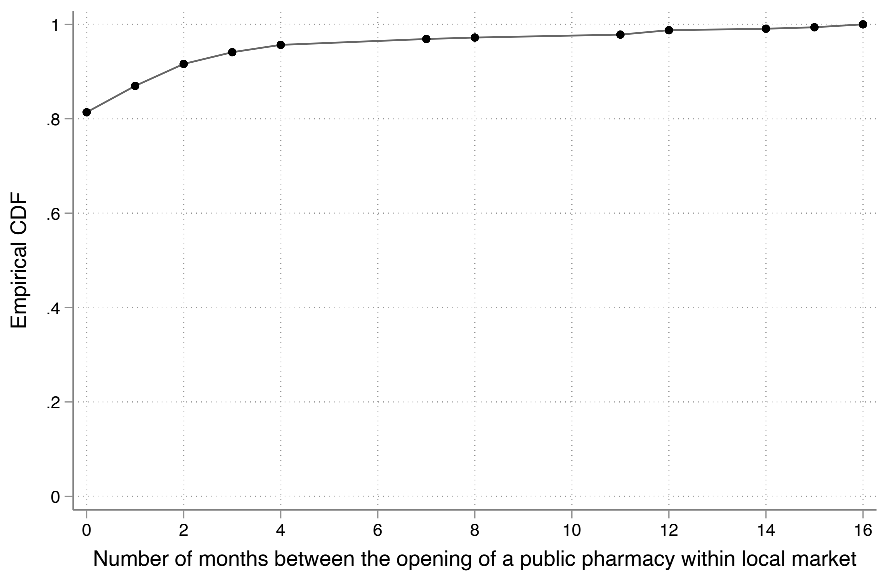
(d) Inside a public pharmacy

Notes: This figure displays photos of private and public pharmacies from the outside and inside. The private pharmacy in Panels (a) and (b) is a somewhat generic building and is one of the three leading chains in the market. The public pharmacy in Panels (c) and (d) is located in the city capital and is part of our experimental sample.

Figure A.2: Number of events per market and time dispersion



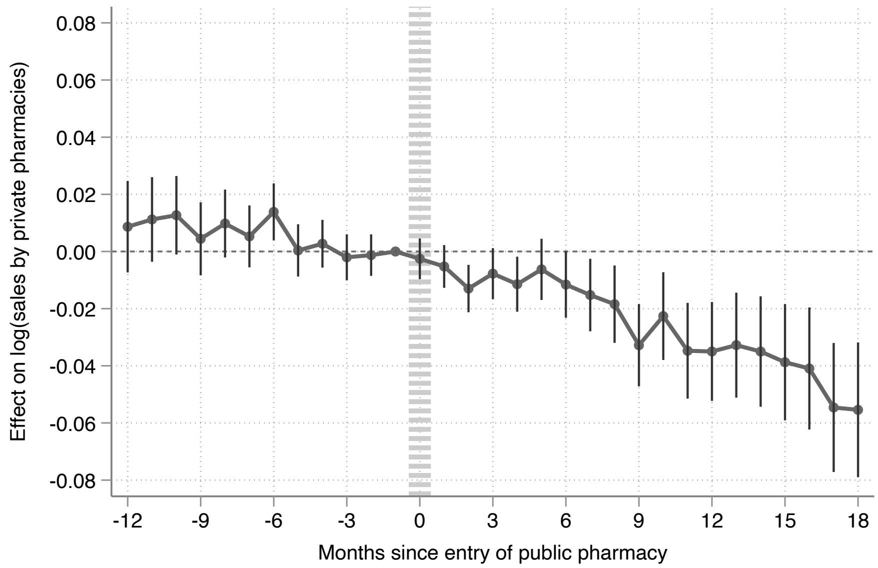
(a) Number of public pharmacy entries by market



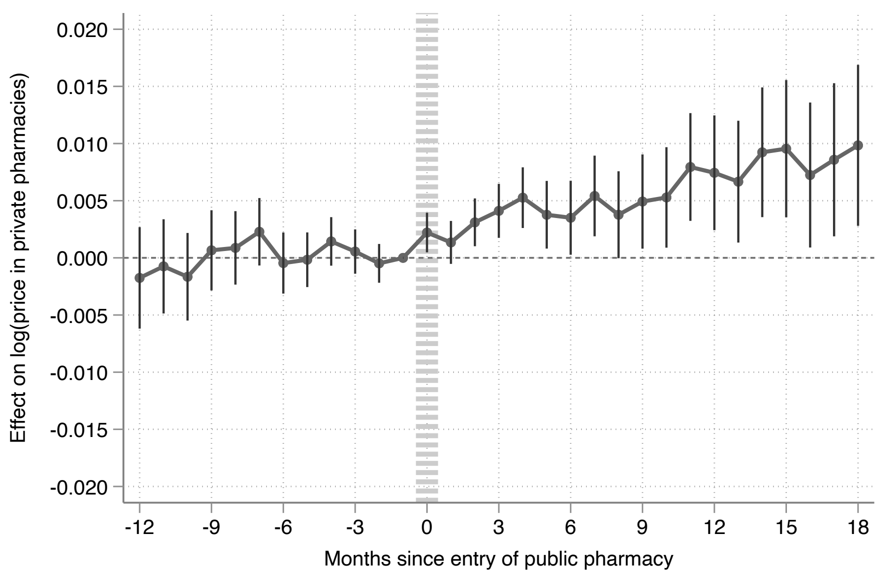
(b) Time between subsequent public pharmacy entries within a market

Notes: Panel (a) shows the distribution of the number of public pharmacies per local market. Panel (a) shows the cumulative distribution function of the dispersion of events within local markets. For example, more than 80 percent of events within the market occurred within the same month, which is by definition the case for markets with only one event.

Figure A.3: Impact of public pharmacies using only the first entry in a local market



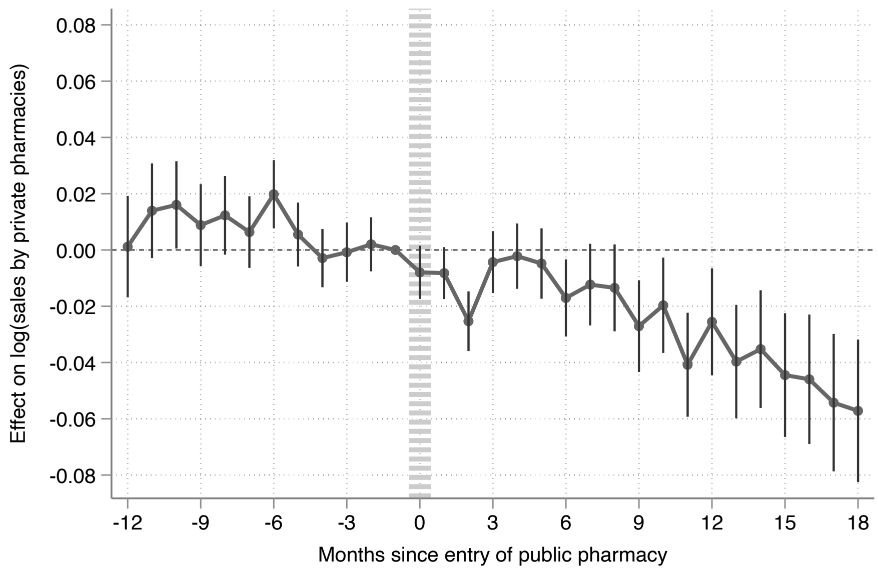
(a) Sales



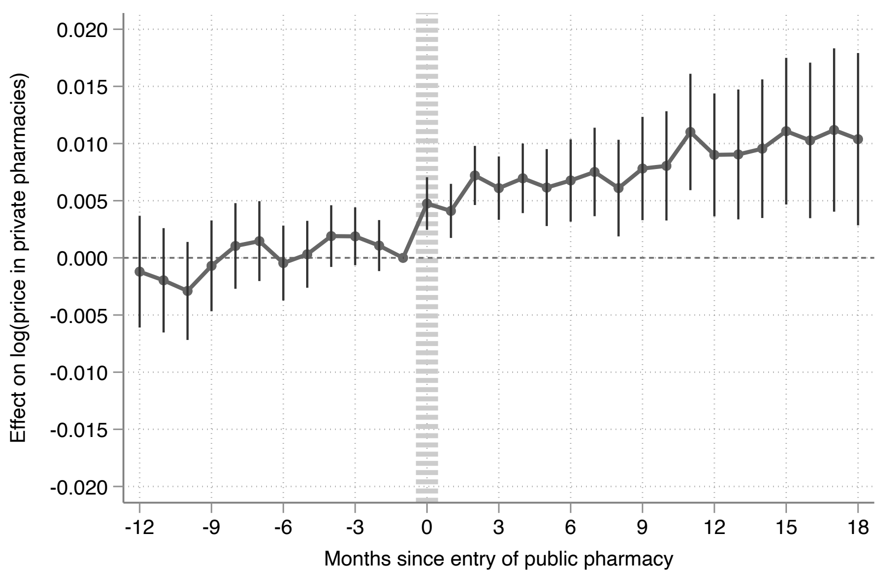
(b) Prices

Notes: These figures present event study estimates of the impact of public pharmacies on private pharmacy sales in Panel (a) and on private pharmacy prices in Panel (b). The unit of observation is a molecule per market in a given month. The empirical strategy uses panel data for the period between 2014 and 2018 and exploits the staggered entry of public pharmacies from October 2015 onward in an event study design. Treatment is defined as the introduction of the *first* public pharmacy in the market. In Panel (a) the dependent variable is logged sales and in Panel (b) the dependent variable is logged prices. The *x*-axis indicates the month with respect to the opening of the public pharmacy, i.e., 18 means 18 months after the opening, and −12 means 12 months before the opening. Dots indicate estimated coefficients, and vertical lines indicate the corresponding 95 percent confidence intervals.

Figure A.4: Impact of public pharmacies among markets with events within less than 1 month



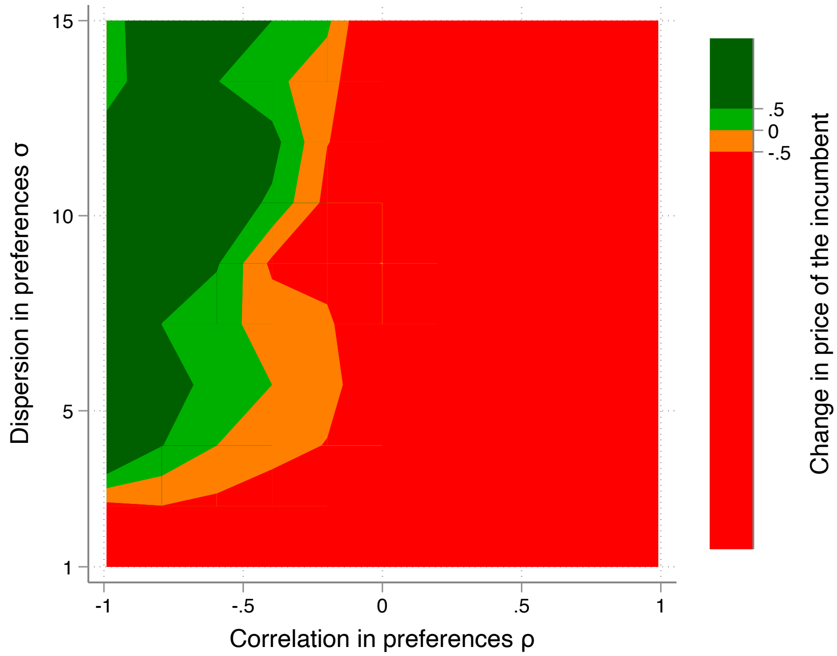
(a) Sales



(b) Prices

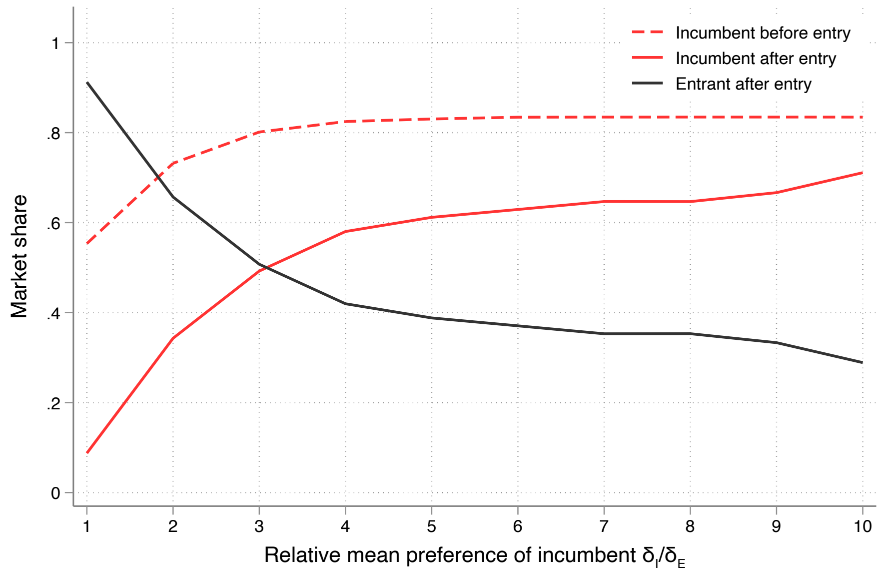
Notes: These figures present event study estimates of the impact of public pharmacies on private pharmacy sales in Panel (a) and on private pharmacy prices in Panel (b). The unit of observation is a molecule per market in a given month. The empirical strategy uses panel data for the period between 2014 and 2018 and exploits the staggered entry of public pharmacies from October 2015 onward in an event study design. Treatment is defined as the introduction of the *first* public pharmacy in the market. The sample only includes never-treated markets and markets with either one event or in which events are no more than 1 month apart. In Panel (a) the dependent variable is logged sales and in Panel (b) the dependent variable is logged prices. The *x*-axis indicates the month with respect to the opening of the public pharmacy, i.e., 18 means 18 months after the opening, and −12 means 12 months before the opening. Dots indicate estimated coefficients and vertical lines indicate the corresponding 95 percent confidence intervals.

Figure A.5: Simulations for the price effects of entry

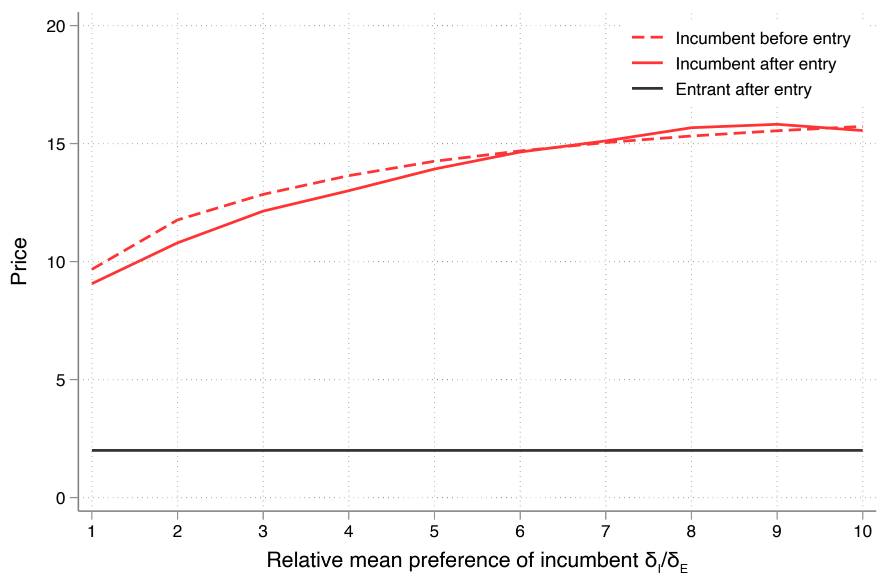


Notes: This figure plots simulated effects of entry on the price the incumbent charges, as discussed in Online Appendix C. The plot provides results for a grid of values of σ and ρ, under mean preferences for the incumbent and entrant $\delta_I/\delta_E = 4$, although the results are qualitatively similar for different values of the latter. The red region indicates that the incumbent price *decreases*, whereas the green region indicates that the incumbent price *increases* for each distribution of preferences, respectively.

Figure A.6: Simulations for the role of relative quality in equilibrium outcomes



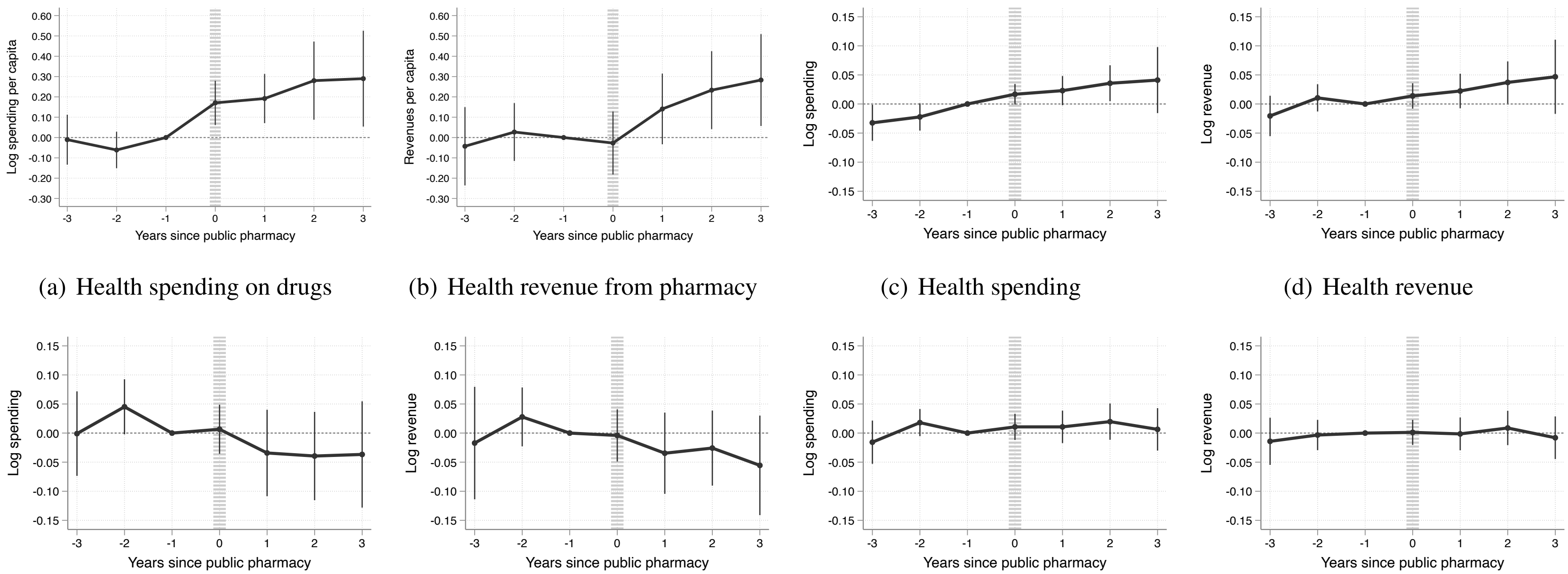
(a) Equilibrium market shares



(b) Equilibrium prices

Notes: Both panels display equilibrium outcomes for the incumbent and entrant, before and after entry for a range of values for the relative quality of the incumbent δ_I/δ_E, while keeping the average quality across both firms fixed. Panel (a) displays equilibrium market shares, whereas Panel (b) displays equilibrium prices. Incumbent outcomes are plotted in red, while entrant outcomes are plotted in black. Outcomes before entry are plotted in dashed lines, while outcomes after entry are plotted in dashed lines.

FIGURE A.7: EVENT STUDY ESTIMATES FOR EFFECTS ON MUNICIPAL FINANCE



(a) Health spending on drugs (b) Health revenue from pharmacy (c) Health spending (d) Health revenue

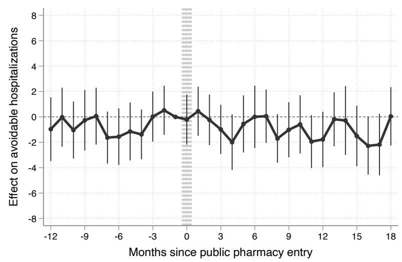
(e) Non-health spending (f) Non-health revenue (g) Total spending (h) Total revenue

Notes: These figures present event study estimates for the impact of public pharmacies on municipal finance using panel data for 2013-2019 from SINIM (2022). Municipal spending and revenue are measured in monetary units per capita. Each plot displays results from an event study version of equation (3) given by:

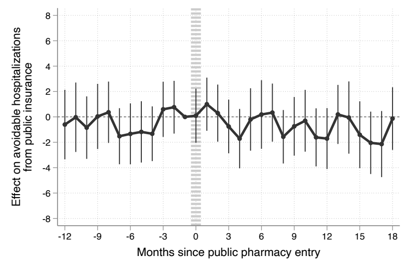
$$y_{ct} = \sum_{k=-3}^{3} \delta_k D_{ct}^k + \theta_c + \lambda_t + \varepsilon_{ct},$$

where the outcomes are the measures of municipal finance (revenue, spending) in logarithms and treatment dummies are defined with respect to the first year with a public pharmacy. All regressions include county fixed effects θ_c and year fixed effects λ_t. Dots indicate point estimates and vertical lines indicate the corresponding 95 percent confidence intervals.

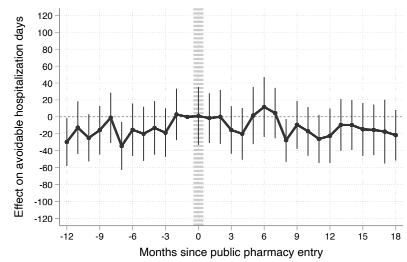
Figure A.8: Event study estimates for effects on avoidable hospitalizations



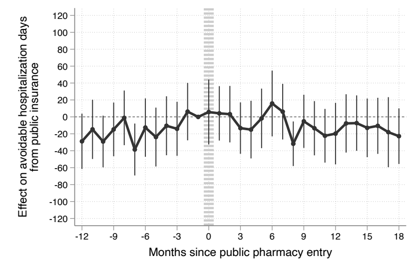
(a) Number of hospitalizations, all insurance



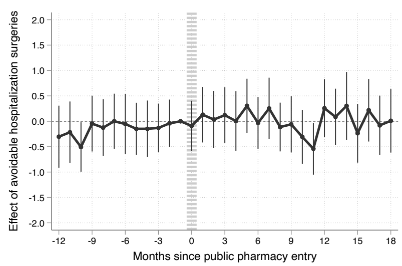
(b) Number of hospitalizations, public insurance



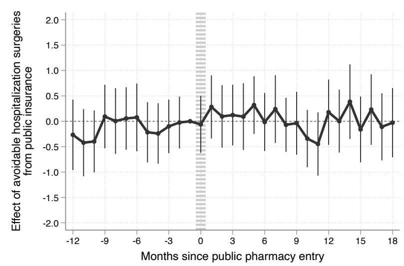
(c) Days of hospitalizations, all insurance



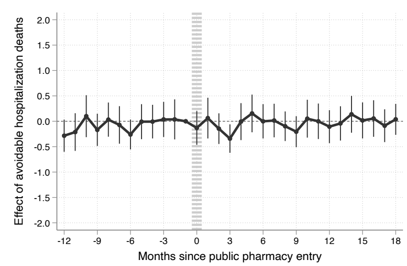
(d) Days of hospitalizations, public insurance



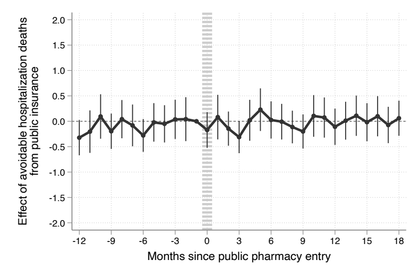
(e) Number of surgeries, all insurance



(f) Number of surgeries, public insurance



(g) Number of deaths, all insurance



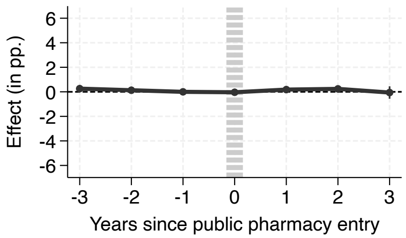
(h) Number of deaths, public insurance

Notes: Each plot displays results from an event study version of equation (3) given by:

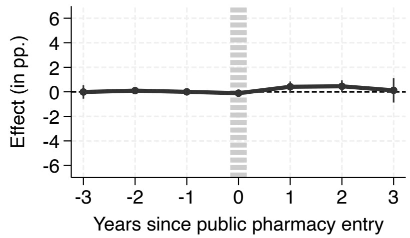
$$y_{ct} = \sum_{k=-12}^{18} \delta_k D_{ct}^k + \theta_c + \lambda_t + \varepsilon_{ct},$$

where the outcomes are the same measures of avoidable hospitalization events as in Table 4 and treatment dummies D_{ct}^k are defined as a month t which is exactly k months after event time in county c. We normalize $\delta_{k=-1} = 0$, so we interpret all coefficients δ_k as the effect of a public pharmacy's opening on the dependent variable exactly k months after its entry. Dots indicate point estimates and vertical lines indicate the corresponding 95 percent confidence intervals.

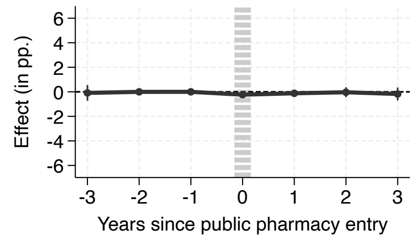
Figure A.9: Other health outcomes, event study evidence



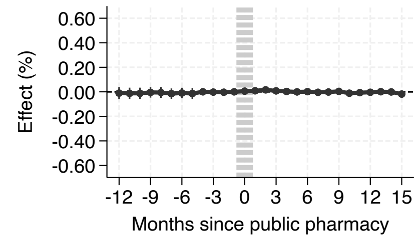
(a) Attendance, all schools



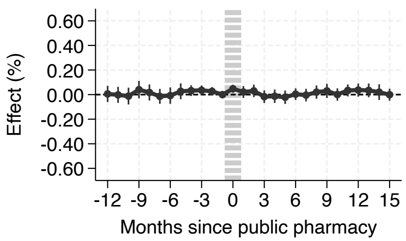
(b) Attendance, public schools



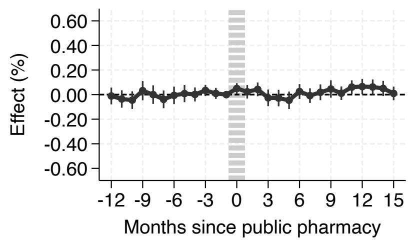
(c) Attendance, rural schools



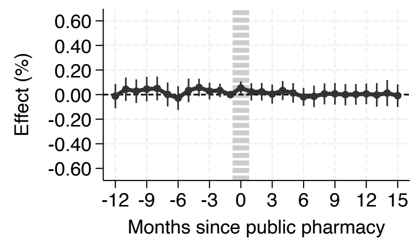
(d) Sick leaves, all



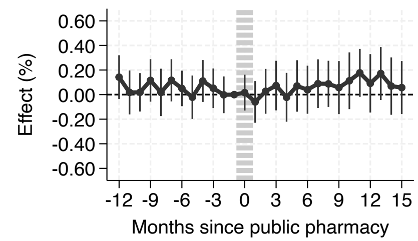
(e) Sick leaves, overall



(f) Sick leaves, acute



(g) Sick leaves, chronic



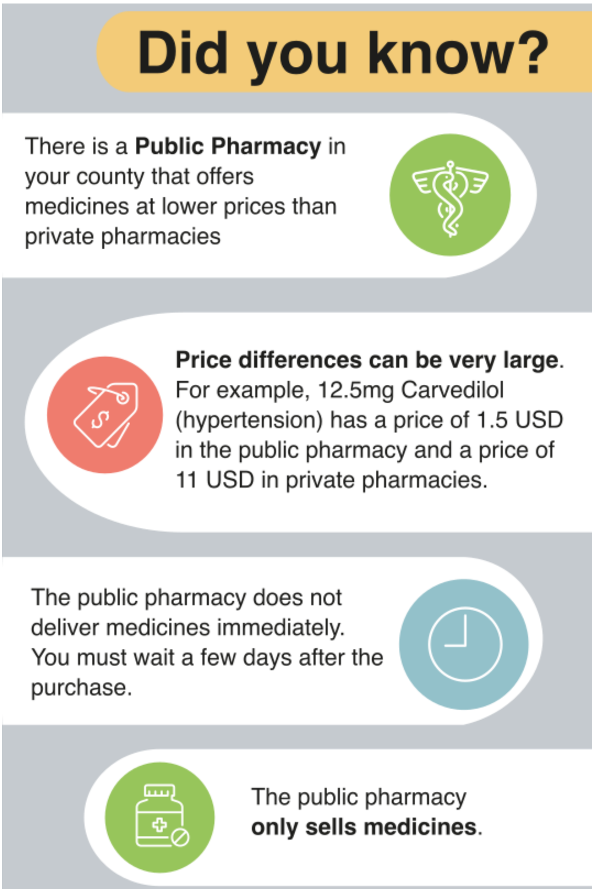
(h) Sick leaves, diabetes

Notes: These figures present event study estimates for the impact of public pharmacies on school attendance using administrative annual panel data for 2014-2019 from MINEDUC (2019) and on sick leave using administrative monthly panel data for 2015-2019 from FONASA (2019). Each plot displays results from an event study regression given by

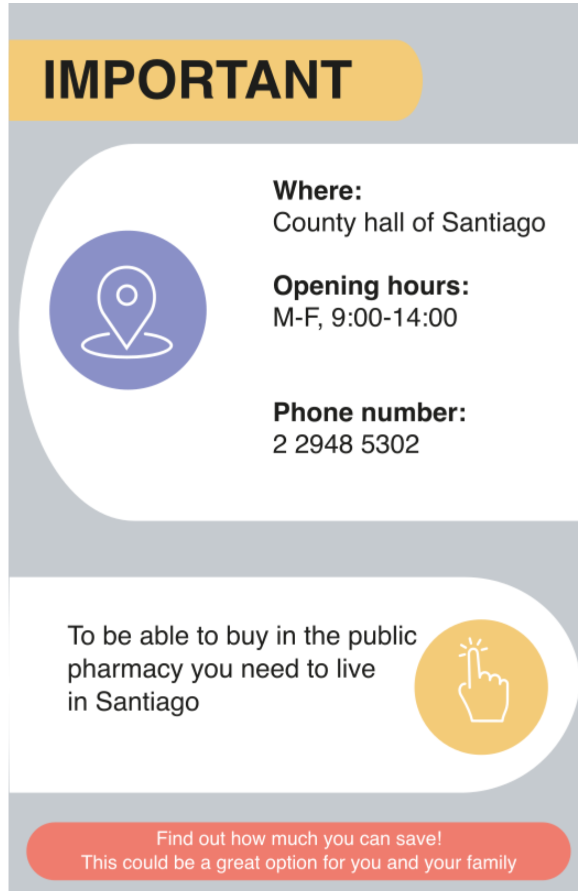
$$y_{ct} = \sum_{k=\kappa_1}^{\kappa_2} \delta_k D_{ct}^k + \theta_c + \lambda_t + \varepsilon_{ct},$$

where the outcomes are school attendance in percentages ($\in [0, 100]$) and the number of sick leave per capita. Treatment indicators are defined with respect to the first year (panels a-c) or month (panels d-h) with a public pharmacy. All estimates include county fixed effects θ_c and year (or month-year) fixed effects λ_t. Each dot represents a coefficient and vertical lines indicate 95 percent confidence intervals.

Figure A.10: Informational treatment



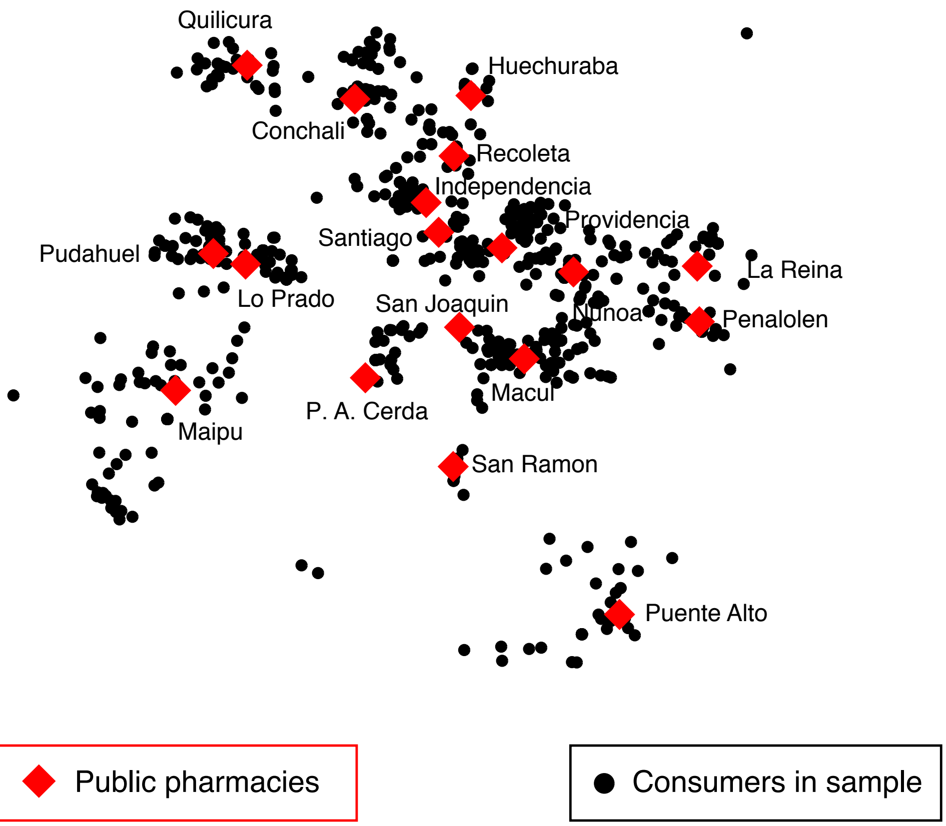
(a) Awareness and convenience



(b) Search details

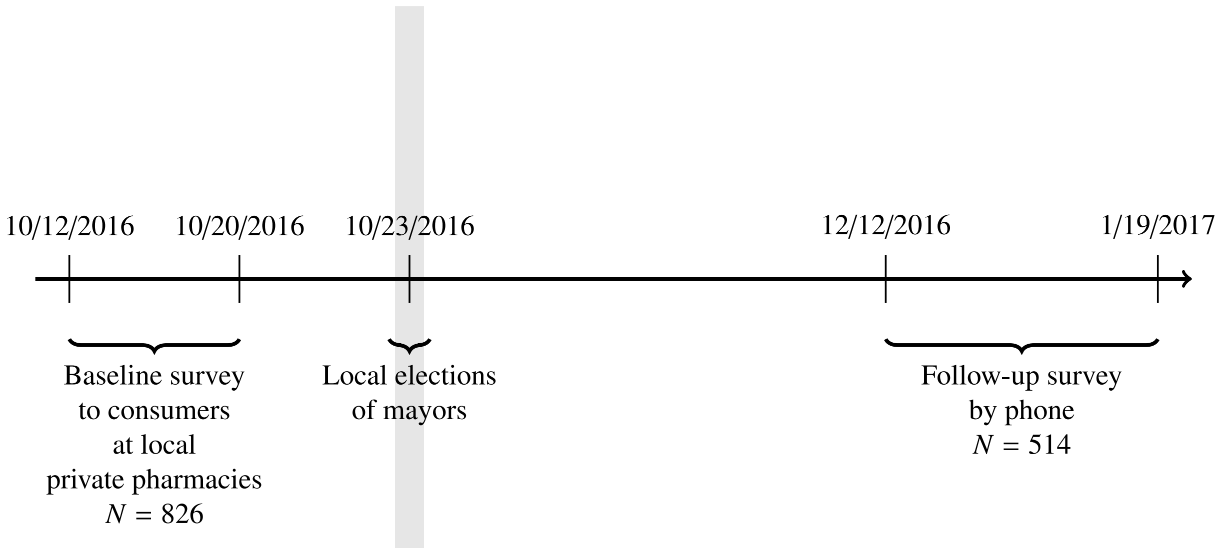
Notes: This figure displays the informational interventions delivered as part of the field experiment. Panel (a) displays the first part of the treatment, which aimed to increase awareness of the public pharmacy. It introduces the public pharmacy and states that it offers lower prices than private pharmacies and that it may take longer to deliver products. Panel (b) displays the second part, which aim to reduce search costs for participants by including detailed location and contact information for the public pharmacy, hours of operation, and eligibility requirements, tailored to the county of each participant.

FIGURE A.11: LOCATION OF PHARMACIES AND CONSUMERS IN EXPERIMENTAL SAMPLE



Notes: This figure displays the location of public pharmacies and consumers surveyed in the context of the field experiment. We surveyed 826 people at baseline outside randomly selected private pharmacies located in 18 counties within the city capital. All of these counties had a public pharmacy at the time of the baseline survey.

Figure A.12: Timeline of experiment events



Notes: This timeline displays the main events in our field experiment. Baseline surveys were implemented outside randomly chosen private pharmacies in counties with a public pharmacy. Local elections are a single-day election held every 4 years in which citizens in all 344 counties vote for a mayor using simple majority rule. Follow-up surveys were implemented during a 1-month period to minimize attrition.

Table A.1: Within-county analysis of public pharmacy entry

	(1)	(2)	(3)	(4)
	1(Public pharmacy)			
Private pharmacies in 2014	0.022	0.032	0.030	0.026
	(0.004)	(0.006)	(0.005)	(0.004)
Schools in 2014	0.016	0.011	0.011	0.007
	(0.002)	(0.002)	(0.002)	(0.001)
Cell size is (in meters):	1,000	800	600	400
Cells	10,167	14,046	21,885	43,695
Mean of dependent variable	0.014	0.010	0.006	0.003
Mean of private pharmacies	0.198	0.142	0.088	0.049
County fixed effects	Yes	Yes	Yes	Yes

Notes: The unit of observation is a geographic cell within a county. We use all 146 counties with a public pharmacy operating by December 2018. Private pharmacies are measured in the year 2014, before the opening of public pharmacies. The estimating sample restricts attention to "populated cells," i.e., cells within the convex hull of schools in 2014. Different columns display results for different definitions of cell size, from 1,000×1,000 meters in column (1) to 400×400 meters in column (4). Standard errors clustered by county.

TABLE A.2: EFFECT ON DRUG SALES AND PRICES IN THE PRIVATE MARKET

	(1) log(sales)	(2) log(price)
Panel A: Main estimates		
All sample (β^{jump})	0.0067	0.0033
	(0.0043)	(0.0011)
	[0.0073]	[0.0021]
All sample ($\beta^{\text{phase in}}$)	-0.0029	0.0005
	(0.0005)	(0.0001)
	[0.0008]	[0.0006]
R-squared	0.54	0.84
Panel B: Heterogeneity by chronic condition		
Molecules for chronic conditions ($\beta^{\text{jump}}_{\text{chronic}}$)	-0.0039	0.0030
	(0.0050)	(0.0013)
	[0.0081]	[0.0023]
Molecules for non-chronic conditions ($\beta^{\text{jump}}_{\text{non-chronic}}$)	0.0214	0.0036
	(0.0079)	(0.0020)
	[0.0101]	[0.0027]
Molecules for chronic conditions ($\beta^{\text{phase in}}_{\text{chronic}}$)	-0.0028	0.0005
	(0.0005)	(0.0001)
	[0.0008]	[0.0006]
Molecules for non-chronic conditions ($\beta^{\text{phase in}}_{\text{non-chronic}}$)	-0.0030	0.0005
	(0.0007)	(0.0002)
	[0.0010]	[0.0007]
Panel C: Heterogeneity by relative public/private product variety		
High public-private variety ratio ($\beta^{\text{jump}}_{\text{high variety}}$)	0.0116	0.0033
	(0.0047)	(0.0012)
	[0.0093]	[0.0025]
Low public-private variety ratio ($\beta^{\text{jump}}_{\text{low variety}}$)	0.0026	0.0034
	(0.0058)	(0.0015)
	[0.0079]	[0.0023]
High public-private variety ratio ($\beta^{\text{phase in}}_{\text{high variety}}$)	-0.0035	0.0007
	(0.0005)	(0.0001)
	[0.0009]	[0.0006]
Low public-private variety ratio ($\beta^{\text{phase in}}_{\text{low variety}}$)	-0.0023	0.0003
	(0.0006)	(0.0002)
	[0.0009]	[0.0006]
Panel D: Heterogeneity by distance to private pharmacy		
Private pharmacies are close to public pharmacy ($\beta^{\text{jump}}_{\text{close}}$)	0.0077	0.0039
	(0.0054)	(0.0013)
	[0.0081]	[0.0024]
Private pharmacies are far from public pharmacy ($\beta^{\text{jump}}_{\text{far}}$)	0.0056	0.0025
	(0.0051)	(0.0014)
	[0.0102]	[0.0027]
Private pharmacies are close to public pharmacy ($\beta^{\text{phase in}}_{\text{close}}$)	-0.0033	0.0003
	(0.0006)	(0.0002)
	[0.0009]	[0.0006]
Private pharmacies are far from public pharmacy ($\beta^{\text{phase in}}_{\text{far}}$)	-0.0024	0.0007
	(0.0006)	(0.0002)
	[0.0009]	[0.0006]
Observations	691,620	659,986
Molecule-by-month FE	Yes	Yes
Molecule-by-market FE	Yes	Yes

Notes: This table presents our parametric estimates of the effects of public pharmacy entry on private market outcomes. We estimate the parameters β^{jump} and $\beta^{\text{phase in}}$ using an exposure difference-in-differences design that leverages the staggered introduction of public pharmacies in the panel data of molecules observed by market and month in the period 2014-2018. The parameter π^{jump} measures the immediate impact of public pharmacies and $\pi^{\text{phase in}}$ the additional impact by each year of operation. In Panel B, exposure to public pharmacies is interacted with an indicator for whether a molecule is targeted toward a chronic condition or not. In Panel C, exposure is interacted with an indicator for whether there is a high ratio of variety of products within a molecule in public pharmacies relative to private pharmacies. In Panel D, exposure is interacted with an indicator for whether in the local market private pharmacies were located relatively close to the public pharmacy. Standard errors clustered at the molecule-by-market level displayed in parentheses. We also provide standard errors clustered at the local market level and are displayed in square brackets.

TABLE A.3: MUNICIPAL FINANCE, FULL REGRESSION COEFFICIENTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sub-categories of health related to public pharmacies		All health services		Non-health services		All services	
	Spending	Revenue	Spending	Revenue	Spending	Revenue	Spending	Revenue
π^{jump}: Public pharmacy	0.129	-0.139	0.023	0.004	0.011	-0.003	0.004	0.001
	(0.084)	(0.104)	(0.013)	(0.013)	(0.036)	(0.038)	(0.017)	(0.016)
$\pi^{\text{phase in}}$: Public pharmacy $\times$ trend	0.055	0.130	0.010	0.012	-0.023	-0.011	0.005	0.004
	(0.046)	(0.043)	(0.006)	(0.006)	(0.017)	(0.017)	(0.007)	(0.007)
Avg. dep. var. in 2014	9.144	6.518	182.60	181.43	513.08	548.73	695.68	730.15
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Counties	320	320	321	321	322	322	322	322
Observations	2,200	2,205	2,240	2,240	2,228	2,227	2,243	2,243

Notes: This table presents our estimates for the impact of public pharmacies on municipal finances. We observe a panel of counties every year in the period 2013–2019 and exploit the staggered entry of pharmacies in a parametric event study analysis. The dependent variable is the logarithm of total spending (in U.S. dollars) per capita (2013 population) in odd columns and the logarithm of total revenue per capita in even columns. The parameter π^{jump} measures the immediate impact of public pharmacies and $\pi^{\text{phase in}}$ the additional impact by each year of operation. We focus on 18-month effects to compare the cost of public pharmacies with their impact on sales and prices in private pharmacies (Panel (a) of Table 2). Standard errors clustered at the county level are displayed in parentheses.

TABLE A.4: EFFECTS OF PUBLIC PHARMACIES ON MUNICIPAL FINANCE FOR ALTERNATIVE TRANSFORMATIONS OF THE DEPENDENT VARIABLE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sub-categories of health related to public pharmacies		All health services		Non-health services		All services	
	Spending	Revenue	Spending	Revenue	Spending	Revenue	Spending	Revenue
Panel A: asinh(y)								
Public pharmacy 18-month effect	0.289	0.219	0.047	0.033	0.002	-0.015	0.015	0.010
	(0.055)	(0.065)	(0.015)	(0.016)	(0.080)	(0.076)	(0.015)	(0.015)
Panel B: log(y+1)								
Public pharmacy 18-month effect	0.232	0.163	0.044	0.030	-0.047	-0.035	0.015	0.010
	(0.044)	(0.053)	(0.014)	(0.015)	(0.034)	(0.032)	(0.015)	(0.015)
Panel C: log(y+0.001)								
Public pharmacy 18-month effect	0.297	0.305	0.048	0.034	-0.048	-0.030	0.015	0.010
	(0.132)	(0.134)	(0.016)	(0.016)	(0.035)	(0.034)	(0.015)	(0.014)
Panel D: log(y+10)								
Public pharmacy 18-month effect	0.078	0.039	0.027	0.015	-0.044	-0.032	0.010	0.006
	(0.017)	(0.021)	(0.013)	(0.013)	(0.030)	(0.031)	(0.014)	(0.014)
Avg. dep. var. in 2014	8.945	6.376	182.60	181.43	513.08	548.73	695.68	730.15
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Counties	322	322	322	322	322	322	322	322
Observations	2,248	2,248	2,243	2,243	2,243	2,243	2,243	2,243

Notes: This table presents our estimates for the impact of public pharmacies on municipal finances. We observe a panel of counties every year in the period 2013–2019 and exploit the staggered entry of pharmacies in a parametric event study analysis. The dependent variable is some transformation (see panel header) of total spending per capita (2013 population) in odd columns and the same transformation of total revenue per capita in even columns. The 18-month effect is the linear combination of regression coefficients $\pi^{\text{jump}} + (1.5 + 1) \times \pi^{\text{phase in}}$. We focus on 18-month effects to compare the cost of public pharmacies with their impact on sales and prices in private pharmacies (Panel (a) of Table 2). Standard errors clustered at the county level are displayed in parentheses.

Table A.5: Effect on avoidable hospitalizations associated with chronic diseases, full regression coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Avoidable hospitalizations per 100,000 inhabitants							
	Number of hospitalizations		Days of hospitalizations		Number of surgeries		Number of deaths	
π^{jump}: Public pharmacy	0.302	0.557	13.657	17.190	0.182	0.230	-0.036	-0.016
	(0.485)	(0.528)	(7.106)	(7.884)	(0.149)	(0.165)	(0.069)	(0.077)
$\pi^{\text{phase in}}$: Public pharmacy × trend	-0.059	-0.079	-0.977	-1.118	-0.003	-0.007	0.007	0.007
	(0.048)	(0.051)	(0.578)	(0.650)	(0.013)	(0.014)	(0.006)	(0.006)
Health insurance	All	Public	All	Public	All	Public	All	Public
Mean of dep. var. in 2014	17.93	19.18	158.2	172.7	1.725	1.908	0.736	0.829
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.458	0.691	0.270	0.659	0.139	0.626	0.063	0.654
Counties	344	344	344	344	344	344	344	344
Observations (county-month-years)	28,896	28,896	28,896	28,896	28,896	28,896	28,896	28,896

Notes: This table presents our estimates for the impact of public pharmacies on avoidable health outcomes. The outcomes of interest are the number of hospitalizations (columns 1-2), days of hospitalizations (3-4), number of surgeries (columns 5-6), and number of deaths (columns 7-8). For each outcome, the first column uses the count of the outcome per 100,000 inhabitants in a county regardless of individual health insurance, and the second column restricts that count to individuals with publicly provided insurance (FONASA). We observe a panel of counties every month in the period 2013–2019 and exploit the staggered entry of pharmacies in a parametric event study analysis. The parameter π^{jump} measures the immediate impact of public pharmacies and $\pi^{\text{phase in}}$ the additional impact by each year of operation. We report the mean of the dependent variable for 2014 among counties that ever introduce a public pharmacy, the year before most public pharmacies entered the market. Standard errors clustered at the county level are displayed in parentheses.

TABLE A.6: PUBLIC PHARMACIES AND OTHER HEALTH OUTCOMES

	School attendance (county-year panel)			Sick leave (county-month panel)				
	All schools	Public schools	Rural schools	All diseases	Overall	Acute	Chronic	Diabetes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public pharmacy 18-month effect	0.143	0.350	-0.076	0.001	-0.002	0.022	-0.011	-0.017
	(0.134)	(0.212)	(0.153)	(0.023)	(0.032)	(0.032)	(0.053)	(0.126)
Observations	2,064	2,025	1,802	19,917	18,141	17,393	15,067	8,501
Counties	344	344	301	344	340	335	335	310
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Avg. dependent variable	90.9	89.8	93.5	7.20	3.69	3.30	2.77	1.55

Notes: This table present difference-in-differences estimates for the impact of public pharmacies on school attendance using administrative annual panel data for 2014-2019 from MINEDUC (2019) and on sick leave using administrative monthly panel data for 2015-2019 from FONASA (2019). Each column displays results from an event study regression given by:

$$y_{ct} = \theta_c + \lambda_t + \pi^{\text{jump}} PP_{ct} + \pi^{\text{phase in}} PP_{ct}(t - t_e^* + 1) + \varepsilon_{ct},$$

where the outcomes are school attendance in percentages ($\in [0, 100]$) and the number of sick leave per capita in county c and year t, PP_{ct} indicates the share of the year with a public pharmacy in county c, and $(t - t_e^*)$ measures the number of years since the opening of the public pharmacy. All regressions include county fixed effects θ_c and year (or month-year) fixed effects λ_t. Columns (1)-(3) use school absenteeism as dependent variable (years 2014-2019). Columns (4) and (5) use the logarithm of the total number of sick leave per 100,000 inhabitants (years 2015-2019). Standard errors are clustered at the county level.

Table A.7: Balance in covariates across attrition status

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Non-Attriters vs Attriters			Panel B: Non-Attriters		
Variable	Non-Attriters	Attriters	*p*-value $H_0 : (1) = (2)$	Control	Treatment	*p*-value $H_0 : (4) = (5)$
Monthly drug expenditure	75.44	78.48	0.57	78.05	73.56	0.49
	(71.93)	(70.37)		(75.50)	(69.31)	
Chronic condition in household	0.61	0.49	0.00	0.61	0.61	0.98
	(0.49)	(0.50)		(0.49)	(0.49)	
Age	46.70	44.60	0.09	46.62	46.77	0.92
	(16.67)	(18.08)		(16.84)	(16.57)	
Education higher than HS	0.53	0.52	0.89	0.54	0.52	0.58
	(0.50)	(0.50)		(0.50)	(0.50)	
Female	0.64	0.58	0.06	0.62	0.66	0.29
	(0.48)	(0.49)		(0.49)	(0.47)	
Public insurance	0.63	0.66	0.34	0.62	0.63	0.83
	(0.48)	(0.47)		(0.49)	(0.48)	
Day with internet (1-7)	5.26	5.43	0.40	5.12	5.35	0.37
	(2.84)	(2.71)		(2.92)	(2.78)	
Day with social media (1-7)	5.22	5.34	0.56	5.07	5.32	0.33
	(2.89)	(2.82)		(2.96)	(2.83)	
Employed	0.63	0.64	0.74	0.59	0.65	0.13
	(0.48)	(0.48)		(0.49)	(0.48)	
Supports incumbent	0.36	0.38	0.55	0.36	0.36	0.89
	(0.50)	(0.50)		(0.50)	(0.50)	
Voted in previous election	0.75	0.69	0.06	0.73	0.76	0.45
	(0.43)	(0.46)		(0.44)	(0.41)	
Knows public pharmacy	0.67	0.60	0.04	0.64	0.69	0.22
	(0.47)	(0.49)		(0.48)	(0.46)	
Perceived relative price of public pharmacy	0.46	0.47	0.54	0.46	0.46	0.74
	(0.23)	(0.18)		(0.18)	(0.26)	
Perceived days to delivery at private pharmacy	8.52	8.53	1.00	9.71	7.67	0.06
	(12.00)	(12.73)		(14.74)	(9.49)	
Observations	514	312		216	298	

Notes: Columns (1) and (2) display the mean and standard deviation of different covariates at baseline for sample non-attriters and attriters, respectively. Column (3) displays the p-value from a test of equality of means across both groups. Columns (4) and (5) display the mean and standard deviation of different covariates at baseline for treatment and control group within the group of non-attriters surveyed at follow-up. Column (6) displays the p-value from a test of equality of means across both groups within the group of non-attriters surveyed at follow-up.

Table A.8: Was a treatment delivered?

	(1) Delivered	(2) Explained	(3) Content	(4) Useful
Treatment	0.107	0.238	0.304	0.624
	(0.033)	(0.043)	(0.059)	(0.438)
Constant	0.769	0.440	0.379	7.208
	(0.025)	(0.033)	(0.049)	(0.379)
Observations	514	514	297	191
R-squared	0.020	0.060	0.083	0.011

Notes: This table displays results from different regressions of measures of treatment delivery on indicators for each of the treatment groups. Column (1) uses an indicator for treatment delivery as an outcome; column (2) uses an indicator for a treatment's being explained; column (3) uses an indicator for whether the participant recalls that the treatment was related to public pharmacies, conditional on receiving it; and column (4) uses a response on a scale from 1 to 10 regarding the usefulness of information, conditional on recalling the content.

Table A.9: Balance in covariates between treatment and control group

	(1)	(2)	(3)
Variable	Control	Treatment	p-value $H_0 : (1) = (2)$
Monthly drug expenditure	76.31	76.69	0.94
	(73.54)	(69.97)	
Chronic condition in household	0.57	0.56	0.84
	(0.50)	(0.50)	
Age	45.25	46.32	0.39
	(16.81)	(17.50)	
Education higher than HS	0.54	0.51	0.44
	(0.50)	(0.50)	
Female	0.60	0.63	0.47
	(0.49)	(0.48)	
Public insurance	0.62	0.65	0.37
	(0.49)	(0.48)	
Days with internet per week (1-7)	5.47	5.23	0.23
	(2.71)	(2.84)	
Days with social media per week (1-7)	5.37	5.19	0.37
	(2.79)	(2.91)	
Employed	0.62	0.64	0.53
	(0.49)	(0.48)	
Supports incumbent	0.36	0.37	0.84
	(0.48)	(0.48)	
Voted in previous election	0.73	0.73	0.93
	(0.45)	(0.45)	
Knows public pharmacy	0.61	0.67	0.09
	(0.49)	(0.47)	
Perceived relative price of public pharmacy	0.46	0.46	0.96
	(0.18)	(0.23)	
Perceived days to delivery at private pharmacy	8.36	8.12	0.75
	(10.26)	(10.38)	
Observations	319	507	

Notes: Columns (1) and (2) display the mean and standard deviation of different covariates at baseline for each experimental group. Column (3) displays the p-value from a test of equality of means across the groups.

Table A.10: Experimental results for economic outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Panel A - Knowledge about public pharmacies								
	1(Knows about pharmacy)			log(Perceived price)			log(Perceived waiting time)		
Treatment	0.099	0.069		-0.117	-0.094		0.173	0.188	
	(0.034)	(0.026)		(0.046)	(0.045)		(0.107)	(0.103)	
Treatment × chronic			0.032			-0.114			0.134
			(0.033)			(0.061)			(0.140)
Treatment × non-chronic			0.126			-0.063			0.264
			(0.042)			(0.065)			(0.151)
Dependent variable at baseline		0.489	0.488		0.382	0.382		0.397	0.399
		(0.039)	(0.039)		(0.049)	(0.049)		(0.068)	(0.068)
Lee bounds	[-0.018, 0.134]			[-0.236, -0.020]			[0.049 , 0.189]		
p-value for H_0: $\beta_C = \beta_{NC}$	-	-	0.080	-	-	0.570	-	-	0.531
Mean for control group	0.773	0.773	0.773	9.070	9.070	9.070	1.387	1.395	1.395
Observations	514	514	514	498	491	491	445	425	425
R-squared	0.017	0.474	0.478	0.012	0.197	0.197	0.006	0.181	0.182
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
County FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Panel B - Usage of public pharmacies								
	1(Enrolled)			1(Purchased)			Probability of usage		
Treatment	0.018	0.020		0.019	0.023		0.060	0.054	
	(0.024)	(0.024)		(0.017)	(0.018)		(0.035)	(0.036)	
Treatment × chronic (β_C)			0.032			0.043			0.085
			(0.033)			(0.024)			(0.046)
Treatment × non-chronic (β_{NC})			0.002			-0.008			-0.008
			(0.034)			(0.026)			(0.057)
Knows pharmacy at baseline		0.050	0.050		0.015	0.015		-0.042	-0.045
		(0.021)	(0.021)		(0.017)	(0.017)		(0.043)	(0.043)
Lee bounds	[0.007, 0.087]			[0.015, 0.047]			[0.060 , 0.083]		
p-value for H_0: $\beta_C = \beta_{NC}$	-	-	0.524	-	-	0.155	-	-	0.213
Mean for control group	0.069	0.069	0.069	0.028	0.028	0.028	0.540	0.540	0.540
Observations	514	514	514	514	514	514	387	387	387
R-squared	0.001	0.100	0.101	0.002	0.067	0.071	0.008	0.057	0.060
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
County FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: This table displays cross-sectional estimates using data from the field experiment. In particular, we present results using self-reported indicators about awareness and usage as dependent variables, on the treatment indicator and interactions with an indicator for chronic conditions. Columns 1, 4, and 7 include only a treatment indicator on the right-hand side; columns 2, 5, and 8 include the baseline level of the dependent variable, additional control variables, and county fixed effects; and columns 3, 6, and 9 add an interaction of the treatment indicator with an indicator for whether a member of the consumer household has a chronic condition. The set of control variables includes age and indicators for chronic condition, having completed high school education, female, and public insurance. Outcomes in Panel B either do not have baseline counterparts (which is the case by design of indicators for enrollment and purchase) or were not collected at baseline (which is the case for the probability of usage), so we instead control for knowledge of the public pharmacy at baseline. Reported Lee bounds are computed using only the treatment indicator as a covariate. Robust standard errors in parentheses.