Consumer Surplus of Alternative Payment Methods: Paying Uber with Cash

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A Proofs

Proof. (of Proposition 1) The first step uses a standard results form demand theory. From the definition of the indirect utility function $v(p_a, p_c; \theta)$. Given the quasi-linearity replacing the budget constraint, and using the assumption that I is large enough:

$$v(p_a, p_c, p_2, \ldots, p_n; \phi) = \max_{a,c,x_2,\ldots,x_n} u\left(H\left(a, c; \phi\right)\right), x_2, \ldots, x_n; \theta) - \left[p_a a + p_c c + \sum_{i=2}^{n} p_i x_i\right] + I$$

Thus, using the envelope theorem:

$$\frac{\partial}{\partial p_a} v(p_a, p_c, p_2, \ldots, p_n; \phi) = -\tilde{a}\left(p_a, p_c, p_2, \ldots, p_n; \phi\right)$$

Hence, using the fundamental theorem of calculus:

$$v(\bar{p}_a, p_c, p_2, \ldots, p_n; \phi) - v(\underline{p_a}, p_c, p_2, \ldots, p_n; \phi) = -\int_{\underline{p_a}}^{\bar{p}_a} \tilde{a}\left(p_a, p_c, p_2, \ldots, p_n; \phi\right) dp_a$$

The second step, uses a characterization of the extensive margin choice. We can write the two parts of the expression for $\mathcal{C}_{ban}$. First we take the case of those that prior to the ban have registered a card, i.e. those types for which $1_c\left(1, 1; \theta\right) = 1$. The third step describes the adoption decision as a threshold rule on ψ. To do so, we rewrite the vector of type as $(\psi, \phi) = \theta$, so that ϕ contains all the information of the types except the fixed cost, i.e. u and H are indexed on ϕ. Using this notation we can fix a type ϕ and describe her decision to register a credit card as:

$$1_c\left(p_a, p_c; (\psi, \phi)\right) = 1 \iff \psi \leq \bar{\psi}(p_a, p_c; \phi) \equiv v(p_a, p_c; \phi) - v(p_a, \infty; \phi)$$

The fourth step is to differentiate the firm term of $\mathcal{CS}(p_a, 1)$:

$$\begin{aligned}
&\frac{\partial}{\partial p_a} \int 1_c\left(1, 1; \theta\right) \left[v(1, 1; \phi) - v(p_a, 1; \phi)\right] dF(\theta) \\
&= -\int 1_c\left(1, 1; \theta\right) \; \frac{\partial}{\partial p_a} v(p_a, 1; \phi) dF(\theta) \\
&= \int 1_c\left(1, 1; \theta\right) \tilde{a}(p_a, 1; \phi) dF(\theta)
\end{aligned}$$

where the last term uses the expression derived for the derivative of the indirect utility function.

The fifth step is to rewrite the second term of $\mathcal{CS}(p_a, 1)$:

$$\begin{aligned}
&\int \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] dF(\theta) \\
&= \int \left(\int_{\underline{\psi}}^{\bar{\psi}(p_a,1;\phi)} \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] g(\psi|\phi) d\psi \right) dK(\phi) \\
&+ \int \left(\int_{\bar{\psi}(p_a,1;\phi)}^{\infty} \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] g(\psi|\phi) d\psi \right) dK(\phi) \\
&= \int \left(\int_{\underline{\psi}}^{\bar{\psi}(p_a,1;\phi)} \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - v(p_a,1;\phi) + \psi\right] g(\psi|\phi) d\psi \right) dK(\phi) \\
&+ \int \left(\int_{\bar{\psi}(p_a,1;\phi)}^{\infty} \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - v(p_a,\infty;\phi)\right] g(\psi|\phi) d\psi \right) dK(\phi)
\end{aligned}$$

where we first use that $\theta = (\psi, \phi)$, and then we use the characterization of the optimality of registering a credit card in $\mathcal{V}$ in terms of $\bar{\psi}$. Now we compute the derivative of this second term with respect to p_a:

$$\begin{aligned}
&\frac{\partial}{\partial p_a} \int \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] dF(\theta) \\
&= - \int \left(\int_{\underline{\psi}}^{\bar{\psi}(p_a,1;\phi)} \left[1 - 1_c\left(1,1;\theta\right)\right] \frac{\partial}{\partial p_a} v(p_a,1;\phi) g(\psi|\phi) d\psi \right) dK(\phi) \\
&- \int \left(\int_{\bar{\psi}(p_a,1;\phi)}^{\infty} \left[1 - 1_c\left(1,1;\theta\right)\right] \frac{\partial}{\partial p_a} v(p_a,\infty;\phi) g(\psi|\phi) d\psi \right) dK(\phi) \\
&+ \int \left(\left[v(1,\infty;\phi) - v(p_a,1;\phi) + \bar{\psi}(p_a,1;\phi) - v(1,\infty;\phi) + v(p_a,\infty;\phi)\right] g(\psi|\phi) \right) dK(\phi)
\end{aligned}$$

where we pass the derivative inside the integral sign, and use Leibniz rule. Rearranging terms and using the definition of $\bar{\psi}$ we have eliminate the last term:

$$\begin{aligned}
&\frac{\partial}{\partial p_a} \int \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] dF(\theta) \\
&= - \int \left(\int_{\underline{\psi}}^{\bar{\psi}(p_a,1;\phi)} \left[1 - 1_c\left(1,1;\theta\right)\right] \frac{\partial}{\partial p_a} v(p_a,1;\phi) g(\psi|\phi) d\psi \right) dK(\phi) \\
&- \int \left(\int_{\bar{\psi}(p_a,1;\phi)}^{\infty} \left[1 - 1_c\left(1,1;\theta\right)\right] \frac{\partial}{\partial p_a} v(p_a,\infty;\phi) g(\psi|\phi) d\psi \right) dK(\phi)
\end{aligned}$$

and using the derivative of the indirect utility function:

$$\begin{aligned}
&\frac{\partial}{\partial p_a}\int \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] dF(\theta) \\
&= \int \left(\int_{\underline{\psi}}^{\bar{\psi}(p_a,1;\phi)} \left[1 - 1_c\left(1,1;\theta\right)\right] \tilde{a}(p_a,1;\phi) g(\psi|\phi) d\psi\right) dK(\phi) \\
&+ \int \left(\int_{\bar{\psi}(p_a,1;\phi)}^{\infty} \left[1 - 1_c\left(1,1;\theta\right)\right] \tilde{a}(p_a,\infty;\phi) g(\psi|\phi) d\psi\right) dK(\phi)
\end{aligned}$$

which can also be written, using the characterization of optimality the extensive margin decision as:

$$\begin{aligned}
&\frac{\partial}{\partial p_a}\int \left[1 - 1_c\left(1,1;\theta\right)\right]\left[v(1,\infty;\phi) - \mathcal{V}(p_a,1;\theta)\right] dF(\theta) \\
&= \int \left[1 - 1_c\left(1,1;\theta\right)\right] a^*(p_a,1;\theta) dF(\theta)
\end{aligned}$$

Putting the two parts together we have:

$$\frac{\partial}{\partial p_a}\mathcal{CS}(p_a,1) = A(p_a,1)\,.$$

Using the definition we can verify that $\mathcal{CS}(1,1) = 0$. Thus

$$\mathcal{CS}(p_a,1) = \int_1^{p_a} A(p,1) dp\,.$$

□

B Details on the Rider's Model

This section presents some details on the rider's model.

B.1 CES Sub-utility for Means of Payments Choice

Let $H(a,c) = \left[\alpha^{\frac{1}{\eta}} c^{\frac{\eta-1}{\eta}} + (1-\alpha)^{\frac{1}{\eta}} a^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$ so α and $1-\alpha$ are the share of rides in credit and cash when both prices are the same, i.e. if $p_a = p_c = 1$. The parameter η is the elasticity of substitution.

The optimal credit and cash trips, which minimize expenditure subject to obtaining one util of composite trips are:

$$c(p_a, p_c) = c\left(\frac{p_a}{p_c}, 1\right) = \alpha\left[\alpha + (1-\alpha)\left(\frac{p_a}{p_c}\right)^{1-\eta}\right]^{\frac{\eta}{1-\eta}}$$

$$a(p_a, p_c) = a\left(\frac{p_a}{p_c}, 1\right) = (1-\alpha)\left[\alpha\left(\frac{p_c}{p_a}\right)^{1-\eta} + (1-\alpha)\right]^{\frac{\eta}{1-\eta}}$$

Note that $c(p,p) = \alpha$ and $a(p,p) = 1-\alpha$, i.e. α and $1-\alpha$ are the shares at equal prices. Note also that, as standard:

$$\frac{a(p_a, p_c)}{c(p_a, p_c)} = \frac{1-\alpha}{\alpha}\left(\frac{p_a}{p_c}\right)^{-\eta}$$

The ideal price index is:

$$\mathbb{P}(p_a, p_c) = \left[\alpha p_c^{1-\eta} + (1-\alpha) p_a^{1-\eta}\right]^{\frac{1}{1-\eta}}$$

B.2 Exponential Utility for Composite Rides

Let denote the aggregate composite trips by x. Assume that:

$$U(x) = -k \exp\left(-\left(x + \bar{x}\right)/k\right)$$

We are interested in:

$$U'(x) = P$$

or

$$\exp\left(-\left(x+\bar{x}\right)/k\right) = P \text{ or } -\left(x+\bar{x}\right)/k = \log P \text{ or } x = -k\log P - \bar{x}$$

In general:

$$X(P) = -k \log P - \bar{x}$$

The choke point is:

$$X(\bar{P}) = 0 = -k \log \bar{P} - \bar{x} \text{ or } \log \bar{P} = -\bar{x}/k$$

Demand, Choke price and elasticity. Note we can write:

$$X(P) = -k \log P + k \log \bar{P} \tag{1}$$

so that the intercept divided by the slope is the choke point. Also note:

$$\begin{aligned} -P\frac{\partial X(P)}{\partial P} &= k \text{ thus} \\ -\frac{P}{X(P)}\frac{\partial X(P)}{\partial p} &= \frac{k}{k\log(\bar{P}/P)} = \frac{1}{\log(\bar{P}/P)} \text{ or} \\ \bar{P}/P &= \exp\left(\frac{1}{-\frac{P}{X(P)}\frac{\partial X(P)}{\partial P}}\right) \end{aligned}$$

We can define the elasticity as:

$$\epsilon(P) \equiv -\frac{P}{X(P)}\frac{\partial X(P)}{\partial P}$$

$$\bar{P}/P = \exp\left(\frac{1}{\epsilon(P)}\right)$$

Consumer Surplus for composite trips. We define the consumer surplus as:

$$C(P_0) = \int_{P_0}^{\bar{P}} X(p)dp$$

so using the form of the demand as well as the first order conditions, we have:

$$\begin{aligned} C(P_0) &= \int_{P_0}^{\bar{P}} X(p)dp = -k\int_{P_0}^{\bar{P}} \log p dp + [-\bar{x}]\left(\bar{P} - P_0\right) \\ &= k(\bar{P} - P_0) - P_0 X(P_0) \end{aligned}$$

which are, in principle, observables, since we can estimate k and $\bar{p}$. To see that the consumer surplus is positive note that:

$$C(P_0) = k\left[\left(\bar{P} - P_0\right) - P_0\left(\log\bar{P} - \log P_0\right)\right] > 0$$

where the inequality follows from the concavity of log. Note that :

$$C(P_0) = kP_0\left(\frac{\bar{P} - P_0}{P_0}\right)^2 + o\left(\left(\bar{P} - P_0\right)^2\right)$$

We can normalize the consumer surplus by the current revenue:

$$\frac{C(P_0)}{P_0 X(P_0)} = \frac{k}{X(P_0)}\frac{(\bar{P} - P_0)}{P_0} - 1 = \epsilon(P_0)\left[\exp\left(\frac{1}{\epsilon(P_0)}\right) - 1\right] - 1$$

where $\epsilon(P_0)$ is the elasticity evaluated at p_0. Note that expanding the exponential up to second order only we get:

$$\frac{C(P_0)}{P_0 X(P_0)} > \epsilon(P_0)\left[1 + \frac{1}{\epsilon(P_0)} + \frac{1}{2}\left(\frac{1}{\epsilon(P_0)}\right)^2 - 1\right] - 1 = \frac{1}{2}\frac{1}{\epsilon(P_0)}$$

which is the expression for a linear demand. The inequality follows because the remaining terms in the MacLaurin expansion are all positive. As $\epsilon(P_0) \to \infty$, the two expression converge.

B.3 Demand Functions for Different Users Types

In this section we use the demand for composite rides coming from an exponential utility function $U(\cdot)$ described by parameters k, λ and $\bar{P}$, as well as CES sub-utility H, which share parameter α for credit and with elasticity of substitution η. Note that composite rids equal total rides only when both means of payment are available. In what follows, we consider several other cases:

1. Mixed users cash demand when facing $p = p_a = p_c$:

$$\tilde{a}(p,p) = \begin{cases} (1-\alpha)k\log\bar{P} - (1-\alpha)k\log p & \text{if } p < \bar{P} \\ 0 \text{ otherwise} \end{cases}$$

2. Mixed users cash demand for arbitrary prices (p_a, p_c):

$$\tilde{a}(p_a,p_c) = \begin{cases} (1-\alpha)k\left(\frac{p_a}{\mathbb{P}(p_a,p_c)}\right)^{-\eta}\left[\log\left(\frac{\bar{P}}{\mathbb{P}(p_a,p_c)}\right)\right] & \text{if } \mathbb{P}(p_a,p_c) \leq \bar{P} \\ 0 & \text{if } \mathbb{P}(p_a,p_c) > \bar{P} \end{cases}$$

3. Mixed users cash demand for arbitrary cash price p_a but fixed credit price $p_c = 1$:

$$\tilde{a}(p_a, 1) = \begin{cases} k(1-\alpha)\left(\frac{p_a}{\mathbb{P}(p_a,1)}\right)^{-\eta} \log\left(\frac{\bar{P}}{\mathbb{P}(p_a,1)}\right) & \text{if } \mathbb{P}(p_a,1) < \bar{P} \\ 0 & \text{otherwise} \end{cases}$$

4. Pure cash users, i.e. users facing arbitrary p_a but infinite credit price $p_c = \infty$.

$$\tilde{a}(p_a, \infty) = \begin{cases} k(1-\alpha)^{\frac{1}{1-\eta}}\left[\log\left(\frac{\bar{P}}{(1-\alpha)^{\frac{1}{1-\eta}}}\right)\right] - k(1-\alpha)^{\frac{1}{1-\eta}} \log p_a & \text{if } (1-\alpha)^{\frac{1}{1-\eta}} p_a < \bar{P} \\ 0 & \text{otherwise} \end{cases}$$

5. Pure credit users, i.e. credit demand when facing arbitrary p_c but infinite cash price $p_a = \infty$.

$$\tilde{c}(\infty, p_c) = \begin{cases} k\alpha^{\frac{1}{1-\eta}}\left[\log\left(\frac{\bar{P}}{\alpha^{\frac{1}{1-\eta}}}\right)\right] - k\alpha^{\frac{1}{1-\eta}} \log p_c & \text{if } \alpha^{\frac{1}{1-\eta}} p_c < \bar{P} \\ 0 & \text{otherwise} \end{cases}$$

Note that if $p_c = p_a = 1$, when both means of payments are available, total trips $T = X(1) = k \ln \bar{P}$. This is because the total demand for trips paid in credit is $\tilde{c}(1,1) = \alpha X(1)$ and the total demand for trips paid in cash is $\tilde{a}(1,1) = (1-\alpha)X(1)$ so that $T = \tilde{c}(1,1) + \tilde{a}(1,1) = X(1)$.

B.4 Indirect Utility

Let U be exponential $U(x) = -\exp\left(-(x+\bar{x})/k\right)/k$ and $H(a,c) = \left[\alpha c^{1-\frac{1}{\eta}} + (1-\alpha)a^{1-\frac{1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$ CES as above.

The indirect utility $v(p_a, p_c)$ is thus

$$v(p_a, p_c) = U(X(P)) + (I - PX(P)) = -ke^{-X(P)/k}e^{-\bar{x}/k} + (I - PX(P))$$

Using that the demand is $X(P) = -k\log(P/\bar{P})$ and $e^{-\bar{x}/k} = \bar{P}$ we have:

$$v(p_a, p_c) = -ke^{\log P/\bar{P}}\bar{P} + (I + Pk\log(P/\bar{P})) = -k\frac{P}{\bar{P}}\bar{P} + (I + Pk\log(P/\bar{P}))$$

Thus the indirect utility, in terms of the numeraire:

$$v(p_a, p_c) = \begin{cases} k\mathbb{P}(p_a,p_c)\left[\log(\mathbb{P}(p_a,p_c)/\bar{P}) - 1\right] + kI & \text{if } \mathbb{P}(p_a,p_c) \le \bar{P} \\ -k\bar{P} + kI & \text{if } \mathbb{P}(p_a,p_c) > \bar{P} \end{cases}$$

Indirect Utilities for selected cases

1. Mixed user

$$v(1,1) = -k + kI - k\log \bar{P}$$

2. Pure cash user

$$v(1,\infty) = \begin{cases} k(1-\alpha)^{\frac{1}{1-\eta}}\left[\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right] + kI & (1-\alpha)^{\frac{1}{1-\eta}} \leq \bar{P} \\ -k\bar{P} + kI & \text{if } (1-\alpha)^{\frac{1}{1-\eta}} > \bar{P} \end{cases}$$

3. Pure credit user

$$v(\infty,1) = \begin{cases} k\alpha^{\frac{1}{1-\eta}}\left[\log\left(\frac{\alpha^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right] + kI & \alpha^{\frac{1}{1-\eta}} \leq \bar{P} \\ -k\bar{P} + kI & \text{if } \alpha^{\frac{1}{1-\eta}} > \bar{P} \end{cases}$$

4. Non-Uber user

$$v(\infty,\infty) = -k\bar{P} + kI$$

Indirect Utility Comparisons:

1. Indirect utility of Mixed users vs. Pure credit users, relative to total trips (or fares) of mixed users:

$$\frac{v(1,1) - v(\infty,1)}{(c^*(1,1) + a^*(1,1)))} = \begin{cases} \frac{1}{\log \bar{P}}\left[-\log(\bar{P}) - 1 + \bar{P}\right] & \text{if } \alpha^{\frac{1}{1-\eta}} \geq \bar{P} \\ \frac{1}{\log \bar{P}}\left[-\log(\bar{P}) - 1 - \alpha^{\frac{1}{1-\eta}}\left(\log\left(\frac{\alpha^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right)\right] & \text{otherwise} \end{cases} \tag{2}$$

2. Indirect utility of Pure cash users vs. non Uber-users

$$\frac{v(1,\infty) - v(\infty,\infty)}{a^*(1,\infty)} = \begin{cases} \frac{\frac{\bar{P}}{(1-\alpha)^{\frac{1}{1-\eta}}} - 1}{\log\left(\frac{\bar{P}}{(1-\alpha)^{\frac{1}{1-\eta}}}\right)} - 1 & \text{if } \bar{P} > (1-\alpha)^{\frac{1}{1-\eta}} \\ 0 & \text{otherwise} \end{cases}$$

and

$$v(1,\infty) - v(\infty,\infty) = \begin{cases} k(1-\alpha)^{\frac{1}{1-\eta}}\left[\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right] + k\bar{P} & \text{if } \bar{P} > (1-\alpha)^{\frac{1}{1-\eta}} \\ 0 & \text{otherwise} \end{cases}$$

3. Indirect utility of Pure credit users vs. non Uber-users

$$\frac{v(\infty,1)-v(\infty,\infty)}{a^*(1,\infty)} = \begin{cases} \frac{\frac{\bar{P}}{\alpha^{\frac{1}{1-\eta}}}-1}{\log\left(\frac{\bar{P}}{\alpha^{\frac{1}{1-\eta}}}\right)} - 1 & \text{if } \bar{P} > \alpha^{\frac{1}{1-\eta}} \\ 0 & \text{otherwise} \end{cases}$$

and

$$v(\infty,1)-v(\infty,\infty) = \begin{cases} k\alpha^{\frac{1}{1-\eta}}\left[\log\left(\frac{\alpha^{\frac{1}{1-\eta}}}{\bar{P}}\right)-1\right]+k\bar{P} & \text{if } \bar{P} > \alpha^{\frac{1}{1-\eta}} \\ 0 & \text{otherwise} \end{cases}$$

4. Indirect utility of Mixed Users vs Pure cash Users

$$\frac{v(1,1)-v(1,\infty)}{a^*(1,\infty)} = \begin{cases} \frac{1}{0}\left[-\log(\bar{P})-1+\bar{P}\right] & \text{if } (1-\alpha)^{\frac{1}{1-\eta}} \geq \bar{P} \text{ and otherwise} \\ \frac{1}{(1-\alpha)^{\frac{1}{1-\eta}}\log\bar{P}}\left[-\log(\bar{P})-1-(1-\alpha)^{\frac{1}{1-\eta}}\left(\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\bar{P}}\right)-1\right)\right] & \end{cases}$$

and

$$v(1,1)-v(1,\infty) = \begin{cases} k\left[-\log(\bar{P})-1+\bar{P}\right] & \text{if } (1-\alpha)^{\frac{1}{1-\eta}} \geq \bar{P} \text{ and otherwise} \\ k\left[-\log(\bar{P})-1-(1-\alpha)^{\frac{1}{1-\eta}}\left(\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\bar{P}}\right)-1\right)\right] & \end{cases}$$

B.5 Heterogeneity of Mixed Users

Index riders by i and assume that $\bar{P}_i$ is rider specific. Assume that the demands of total trips by mixed riders facing $P = p_a = p_c$ can be written as:

$$x_i = k\log\bar{P}_i - k\log P = \beta_{0i} + \beta_1 \log P$$

Thus we assume that k, and hence the slope of the regression, be common across riders. We can then write:

$$\log\bar{P}_i = \frac{\beta_{0i}}{\beta_1}$$

The rider specific elasticity is thus

$$\log\bar{P}_i/\log P = 1/\epsilon_i(P) \text{ or } \log P/\log\bar{P}_i = \epsilon_i(P)$$

and evaluating it at $P = 1$:

$$\log \bar{P}_i = 1/\epsilon_i(1)$$

Thus

$$1/\epsilon_i(1) = \log \bar{P}_i = \frac{\beta_{0i}}{\beta_1} \text{ or } \epsilon_i(1) = \frac{\beta_1}{\beta_{0i}}$$

Note that if we normalize the price to $P = p_a = p_c = 1$, then we are measuring x in fares. Thus, we first estimate the elasticity with a regression in our experimental data of:

$$X_i = \beta_0 + \beta_1 \log P$$

so that β_0 has the interpretation of the fares of the control group. Given the randomization the control group has the same average fares, pre-experiment, as the treatment groups. We let:

$$\epsilon(1) = \beta_1/\beta_0$$

Then we can correct the elasticities to other groups with different fares as follows:

$$\epsilon_i(1) = \frac{\beta_1}{\beta_0}\frac{\beta_0}{\beta_{0,i}} \approx \epsilon(1)\,\frac{Avg\,Fare}{Fare_i}$$

B.6 Random Quasi-linear Utility Test

Table B1: Random Quasi-linear Utility Test: Experiment 1 (Mixed Users)

Note: The table shows descriptive statistics of the mixed users that were part of the experiment described in the main text. The table reports statistics for the control group and the six treatment groups. The variables reported are those use to test that the users in the experiment were maximizing some quasi-linear utility function. The variables reported are the average trips per user, trips paid in cash per user, fares per user, fare paid in cash per user, total users, and the prices faced by users in the control group and the six treatment groups.

	(1) Trips	(2) Trips Cash	(3) Fares	(4) Fares Cash	(5) Users	(6) Price Cash	(7) Price Credit
Control	0.79	0.31	4.20	1.44	87001	1	1
Treatment 1	0.86	0.38	4.49	1.80	11078	0.9	1
Treatment 2	0.87	0.30	4.63	1.44	11209	1	0.9
Treatment 3	0.88	0.35	4.59	1.67	11175	0.9	0.9
Treatment 4	0.84	0.40	4.40	1.90	11204	0.8	1
Treatment 5	0.88	0.28	4.69	1.29	11261	1	0.8
Treatment 6	0.98	0.39	5.25	1.86	11189	0.8	0.8

Table B2: Random Quasi-linear Utility Test: Experiment 2 (Pure Cash Users)

Note: The table shows descriptive statistics of the pure cash users that were part of the experiment described in the main text. The table reports statistics for the control group and the four treatment groups. The variables reported are those use to test that the users in the experiment were maximizing some quasi-linear utility function. The variables reported are the average trips per user, fares per user, total users, and the prices faced by users in the control group and the four treatment groups.

	(1) Trips	(2) Fares	(3) Users	(4) Price
Control	0.37	1.66	54779	1
Treatment 1	0.41	1.81	22841	0.9
Treatment 2	0.45	2.02	22827	0.85
Treatment 3	0.48	2.17	22836	0.8
Treatment 4	0.51	2.31	22840	0.75

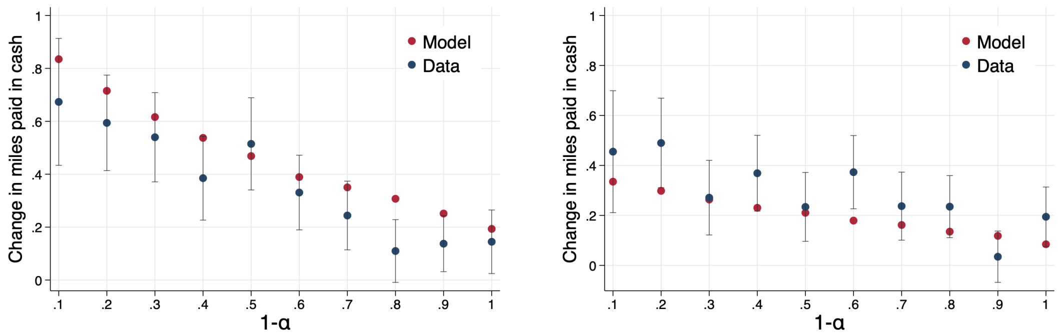
B.7 Implied Elasticities of Mixed Users' Demand for Cash Trips

In this Appendix, we compute the price elasticities of mixed users' demand for cash trips using our structural model – evaluated at the estimated parameters – and compare them with the observed elasticities from the experimental data. In particular, we compare the two elasticities obtained after giving riders discounts on cash trips in Experiment 1; recall that, while there are six treatment groups, only two of them, treatment (i) and treatment (iv), involved discounts conditional on paying only with cash.

Figure B1 compares the observed percent change in miles paid in cash with those predicted by our model for each decile of the riders' historical cash share. In the data, the riders' elasticities are estimated as the difference between the average number of miles of riders in the treatment and control groups for each of the two discounts. In the model, we use our preferred parameter estimates (i.e. $\eta = 3$ and $\epsilon = 1.1$) to compute the elasticities implied by mixed users' cash demand described in Section B.3 together with a choice of $\bar{P}$ to match the historical cash fares of each rider. Note that η and ϵ are estimated using different price changes; they are estimated using either all six treatment groups in Experiment 1 or using only the treatment groups where Uber prices are the same for rides paid in cash and paid with cards. Figure B1 shows that the model predictions are roughly in line with the observed elasticities for both 20% and 10% discounts on trips paid with cash.

Figure B1: Elasticity of Demand: Trips Paid in Cash (Model vs Data)

(a) 20% off trips paid with cash (b) 10% off trips paid with cash



Note: Panel (a) shows the percent change in miles paid in cash for mixed users that received 20% off for trips paid in cash (relative to the control group) for different deciles of riders' cash share. Panel (b) shows the percent change in miles paid in cash for mixed users that received 10% off for trips paid in cash (relative to the control group) for different deciles of riders' cash share. The estimates are computed using experimental data collected in the State of Mexico. The vertical lines are 95% standard error bands. The estimates include mixed users with more than 1% of their fares paid in cash and less than 99%. In both panels, the red dots indicate the changes in miles paid in cash for mixed users predicted by the model using $\eta = 3$ and $\epsilon = 1.1$.

C Experiments

C.1 Descriptive Statistics: Experiments

Table C1: Summary Statistics: Experiments

Note: The table reports summary statistics of the users included in the experimental data. Pure cash users are those that have not registered a card in the application. Mixed users are those that have a registered card and have used both payment methods. Column (2) includes users with more than 1% of their fares paid in cash and less than 99%. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Pure credit users are those that have never used cash as a payment method. The table reports the mean of historical variables such as fares, trips, fares in cash, trips paid in cash, share of fares paid in cash, and tenure. All the variables, except for tenure, are computed for the weeks of the calendar year when the experiment took place. The table also reports the average of the fares, trips, fares in cash, and trips paid in cash during the week of the experiment.

	(1) Pure Cash	(2) Mixed 1%	(3) Mixed 5%	(4) Pure Credit
Fares per week (historical)	1.54	4.26	3.84	3.58
Trips per week (historical)	0.36	0.83	0.76	0.52
Fares per week cash (historical)	1.54	1.57	1.57	0.00
Trips per week cash (historical)	0.36	0.34	0.34	0.00
Share of fares cash (historical)	1.00	0.43	0.45	0.00
Tenure in weeks (historical)	42.99	74.52	72.92	90.61
Fares week (experiment)	1.73	4.35	3.94	3.88
Trips week (experiment)	0.40	0.82	0.76	0.55
Fares cash week (experiment)	1.73	1.51	1.51	0.00
Trips cash week (experiment)	0.40	0.32	0.32	0.00
Users	138725	109365	98773	88844

Table C2: Summary Statistics: Ubernomics

Note: The table reports summary statistics of the users included in the Ubernomics experiment. Pure cash users are those that have not registered a card in the application. Mixed users are those that have a registered card and have used both payment methods. Column (2) includes users with more than 1% of their fares paid in cash and less than 99%. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Pure credit users are those that have never used cash as a payment method. The table reports the mean of historical variables such as fares, trips, fares in cash, trips paid in cash, share of fares paid in cash, and tenure. All the variables, except for tenure, are computed for the weeks of the calendar year when the experiment took place. The table also reports the average of the fares, trips, fares in cash, and trips paid in cash during the week of the experiment.

	(1) Pure Cash	(2) Mixed 1%	(3) Mixed 5%	(4) Pure Credit
Fares per week (historical)	1.43	5.29	4.56	5.16
Trips per week (historical)	0.36	1.11	0.98	1.02
Fares per week cash (historical)	1.43	1.33	1.44	0.00
Trips per week cash (historical)	0.36	0.31	0.33	0.00
Share of fares cash (historical)	1.00	0.33	0.37	0.00
Tenure in weeks (historical)	47.36	88.80	85.53	114.83
Fares week (experiment)	3.00	7.00	6.34	6.55
Trips week (experiment)	0.73	1.40	1.27	1.19
Fares cash week (experiment)	2.91	2.22	2.39	0.00
Trips cash week (experiment)	0.71	0.49	0.53	0.00
Users	4869	4306	3719	26162

Table C3: Summary Statistics: Mandin

Note: The table reports summary statistics of the users included in the Mandin experiment. Pure cash users are those that have not registered a card in the application. Mixed users are those that have a registered card and have used both payment methods. Column (2) includes users with more than 1% of their fares paid in cash and less than 99%. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Pure credit users are those that have never used cash as a payment method. The table reports the mean of historical variables such as fares, trips, fares in cash, trips paid in cash, share of fares paid in cash, and tenure. All the variables, except for tenure, are computed for the weeks of the calendar year when the experiment took place. The table also reports the weekly average of the fares, trips, fares in cash, and trips paid in cash during the weeks of the experiment.

	(1) Pure Cash	(2) Mixed 1%	(3) Mixed 5%	(4) Pure Credit
Fares per week (historical)	4.30	12.32	10.61	11.53
Trips per week (historical)	1.08	2.37	2.10	2.12
Fares per week cash (historical)	4.30	3.27	3.65	0.00
Trips per week cash (historical)	1.08	0.71	0.79	0.00
Share of fares cash (historical)	1.00	0.34	0.39	0.00
Tenure in weeks (historical)	50.91	86.15	82.23	115.73
Fares week (experiment)	6.74	14.68	13.21	13.10
Trips week (experiment)	1.66	2.87	2.65	2.47
Fares cash week (experiment)	6.43	4.03	4.48	0.00
Trips cash week (experiment)	1.60	0.89	0.98	0.00
Users	5668	11660	9254	47849

C.2 CES

If H is a CES we obtain the following expression for the ratio of expenditure:

$$\frac{p_a a}{p_c c} = \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{p_a}{p_c}\right)^{1-\eta} \tag{3}$$

using the identity

$$s_c = \frac{p_c c}{p_a a + p_c c} = \frac{1}{1 + (p_a a)/(p_c c)} \tag{4}$$

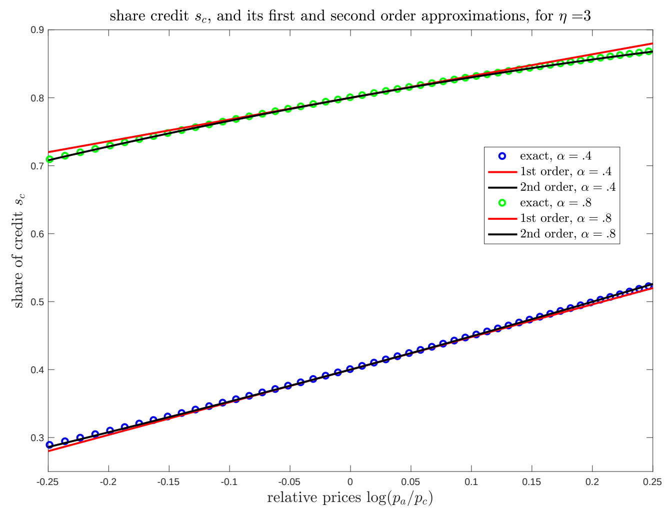
thus

$$s_c = \frac{1}{1 + \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{p_a}{p_c}\right)^{1-\eta}} \tag{5}$$

A first order approximation of s_c around $\log(p_a/p_c) = 0$ gives equation (21). A second order approximation of s_c around $\log(p_a/p_c) = 0$ gives equation (22). Note that the second order approximation can be convex or concave depending on whether $\alpha \geq 1/2$ or not. Figure C1 plots the exact expression given by equation (5) and its first and second order approximation given by equation (21) and equation (22) respectively. The range of the x-axis coincides with the range on variability on the relative prices the experiment for mixed users. The value $\eta = 3$

used for the elasticity of substitution in the figure is our preferred estimate. We plot the exact expression for s_c and its two approximations for two values of α, one above 1/2 and one below. From Figure C1 we conclude that for this range of parameters the first order approximation is very accurate and the second order approximation is almost exact.

Figure C1: Quality of the approximations



Note: The figure plots the share of credit s_c for $\eta = 3$ for two values of α. For each α we plot the exact expression, the first order approximation, and the second order approximation.

C.3 Estimation of Elasticities

C.3.1 Elasticity of Demand: Pure Cash Users

Table C4: Semi-Elasticity of Demand: Pure Cash Users (Miles)

Note: The table reports the semi-elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-2.035***	-2.044***	-6.611***	-2.331**
	(0.127)	(0.116)	(0.982)	(1.189)
Observations	138,725	138,725	4,279	3,569
R-squared	0.002	0.174	0.448	0.181
$\hat{y}$	1.479	1.478	5.937	2.869
Controls	No	Yes	Yes	Yes

Table C5: Elasticity of Demand: Pure Cash Users (Miles - at Least 5 Trips)

Note: The table reports the elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Elasticity	1.351***	1.345***	1.138***	0.825*
	(0.105)	(0.082)	(0.176)	(0.464)
Observations	88,326	88,326	3,394	1,869
Controls	No	Yes	Yes	Yes

Table C6: Semi-Elasticity of Demand: Pure Cash Users (Miles - at Least 5 Trips)

Note: The table reports the semi-elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-2.842***	-2.831***	-7.678***	-3.696*
	(0.189)	(0.174)	(1.185)	(2.080)
Observations	88,326	88,326	3,394	1,869
R-squared	0.003	0.159	0.435	0.139
$\hat{y}$	2.104	2.105	6.748	4.482
Controls	No	Yes	Yes	Yes

Table C7: Elasticity of Demand: Pure Cash Users (Trips)

Note: The table reports the elasticity of demand of pure cash users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Elasticity	1.271***	1.270***	1.080***	1.218***
	(0.093)	(0.071)	(0.157)	(0.384)
Observations	138,725	138,725	4,279	3,569
Controls	No	Yes	Yes	Yes

Table C8: Semi-Elasticity of Demand: Pure Cash Users (Trips)

Note: The table reports the semi-elasticity of demand of pure cash users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-0.440***	-0.440***	-1.586***	-0.820***
	(0.028)	(0.024)	(0.230)	(0.259)
Observations	138,725	138,725	4,279	3,569
R-squared	0.002	0.214	0.485	0.216
$\hat{y}$	0.346	0.346	1.468	0.674
Controls	No	Yes	Yes	Yes

Table C9: Elasticity of Demand: Pure Cash Users (Trips - Poisson)

Note: The table reports the elasticity of demand of pure cash users estimated using a poisson a regression using trips as dependent variable and the log of prices as independent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-1.094***	-1.110***	-0.795***	-1.091***
	(0.039)	(0.039)	(0.107)	(0.217)
Observations	138,725	138,725	4,279	3,569
Controls	No	Yes	Yes	Yes

C.3.2 Elasticity of Demand: Mixed Users

Table C10: Semi-Elasticity of Demand: Mixed Users (Miles)

Note: The table reports the semi-elasticity of demand of mixed users estimated using equation (1) using miles as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Log Price	-4.543***	-4.334***	-4.165***	-16.292***	-9.409***
	(0.416)	(0.360)	(0.355)	(0.962)	(1.921)
Observations	109,365	109,365	98,773	11,660	4,306
R-squared	0.001	0.253	0.232	0.550	0.243
$\hat{y}$	4.199	4.206	3.800	12.744	6.478
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

Table C11: Elasticity of Demand: Mixed Users (Miles - at Least 5 Trips)

Note: The table reports the elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Elasticity	1.096***	1.041***	1.109***	1.263***	1.428***
	(0.103)	(0.086)	(0.095)	(0.075)	(0.300)
Observations	97,586	97,586	87,014	11,282	3,930
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

Table C12: Semi-Elasticity of Demand: Mixed Users (Miles - at Least 5 Trips)

Note: The table reports the semi-elasticity of demand of mixed users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Log Price	-5.069***	-4.820***	-4.684***	-16.502***	-9.942***
	(0.460)	(0.400)	(0.399)	(0.986)	(2.089)
Observations	97,586	97,586	87,014	11,282	3,930
R-squared	0.001	0.244	0.223	0.545	0.232
$\hat{y}$	4.624	4.632	4.223	13.067	6.963
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

Table C13: Elasticity of Demand: Mixed Users (Trips)

Note: The table reports the elasticity of demand of mixed users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Elasticity	1.106***	1.050***	1.084***	1.175***	1.235***
	(0.094)	(0.076)	(0.082)	(0.068)	(0.262)
Observations	109,365	109,365	98,773	11,660	4,306
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

Table C14: Semi-Elasticity of Demand: Mixed Users (Trips)

Note: The table reports the semi-elasticity of demand of mixed users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Log Price	-0.878***	-0.835***	-0.791***	-2.964***	-1.617***
	(0.071)	(0.060)	(0.060)	(0.171)	(0.343)
Observations	109,365	109,365	98,773	11,660	4,306
R-squared	0.001	0.292	0.274	0.557	0.299
$\hat{y}$	0.794	0.795	0.730	2.522	1.309
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

Table C15: Elasticity of Demand: Mixed Users (Trips - Poisson)

Note: The table reports the elasticity of demand of mixed users estimated using a poisson a regression using trips as dependent variable and the log of prices as independent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, share of fares paid in cash, cash trips, and cash trips squared. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) AA	(4) Mandin	(5) Ubernomics
Log Price	-0.996***	-0.998***	-0.998***	-0.829***	-1.133***
	(0.044)	(0.044)	(0.048)	(0.043)	(0.145)
Observations	109,365	109,365	98,773	11,660	4,306
Controls	No	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct	1 pct

C.3.3 Elasticity of Demand: Pure Credit Users

Table C16: Elasticity of Demand: Pure Credit Users (Miles)

Note: The table reports the elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Elasticity	0.622***	0.604***	0.776***	0.375***
	(0.114)	(0.092)	(0.037)	(0.121)
Observations	88,844	88,844	47,849	26,162
Controls	No	Yes	Yes	Yes

Table C17: Semi-Elasticity of Demand: Pure Credit Users (Miles)

Note: The table reports the semi-elasticity of demand of pure credit users estimated using equation (1) using miles as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-2.331***	-2.265***	-9.328***	-2.411***
	(0.411)	(0.347)	(0.439)	(0.779)
Observations	88,844	88,844	47,849	26,162
R-squared	0.000	0.290	0.595	0.345
$\hat{y}$	3.745	3.749	12.014	6.423
Controls	No	Yes	Yes	Yes

Table C18: Elasticity of Demand: Pure Credit Users (Miles - at Least 5 Trips)

Note: The table reports the elasticity of demand of pure cash users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Elasticity	0.608***	0.579***	0.771***	0.376***
	(0.116)	(0.095)	(0.037)	(0.125)
Observations	64,648	64,648	45,036	21,141
Controls	No	Yes	Yes	Yes

Table C19: Semi-Elasticity of Demand: Pure Credit Users (Miles - at Least 5 Trips)

Note: The table reports the semi-elasticity of demand of pure credit users estimated using equation (1) using miles as dependent variable. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-2.957***	-2.824***	-9.671***	-2.850***
	(0.546)	(0.464)	(0.461)	(0.948)
Observations	64,648	64,648	45,036	21,141
R-squared	0.000	0.276	0.588	0.331
$\hat{y}$	4.868	4.875	12.546	7.585
Controls	No	Yes	Yes	Yes

Table C20: Elasticity of Demand: Pure Credit Users (Trips)

Note: The table reports the elasticity of demand of pure credit users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Elasticity	0.732***	0.707***	0.693***	0.408***
	(0.103)	(0.080)	(0.033)	(0.110)
Observations	88,844	88,844	47,849	26,162
Controls	No	Yes	Yes	Yes

Table C21: Semi-Elasticity of Demand: Pure Credit Users (Trips)

Note: The table reports the semi-elasticity of demand of pure credit users estimated using equation (1) using trips as dependent variable. Column (1) reports the estimates without using controls. Column (2) estimates the semi-elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) AA	(2) AA	(3) Mandin	(4) Ubernomics
Log Price	-0.387***	-0.375***	-1.585***	-0.477***
	(0.052)	(0.043)	(0.075)	(0.128)
Observations	88,844	88,844	47,849	26,162
R-squared	0.001	0.332	0.639	0.396
$\hat{y}$	0.529	0.530	2.287	1.169
Controls	No	Yes	Yes	Yes

Table C22: Elasticity of Demand: Pure Credit Users (Trips - Poisson)

Note: The table reports the elasticity of demand of pure credit users estimated using a poisson a regression using trips as dependent variable and the log of prices as independent variable. Column (1) reports the estimates without using controls. Column (2) estimates the elasticity using controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, and log of tenure. Column (3) reports the results using the users included in the Mandin experiment. Column (4) reports the results using the users included in the Ubernomics experiment. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	AA	AA	Mandin	Ubernomics
Log Price	-0.681***	-0.680***	-0.507***	-0.361***
	(0.052)	(0.051)	(0.024)	(0.066)
Observations	88,844	88,844	47,849	26,162
Controls	No	Yes	Yes	Yes

C.3.4 Elasticity of Substitution: Cash-Credit

Table C23: Semi-Elasticity of Substitution: Mixed Users (Miles)

Note: The table reports estimates of the semi-elasticity of substitution between cash and credit for mixed users. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative miles between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. Column (1) reports the results of estimating γ using the transformed share specification denoted in equation (23) and including mixed users with more than 1% of their fares paid in cash and less than 99%. Column (2) reports the same specification including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Column (4) includes the constant specified in equation (23) as a regressor. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Log Price	0.284***	0.262***	0.285***	0.255***
	(0.021)	(0.018)	(0.020)	(0.017)
Observations	53,966	53,966	46,328	53,966
R-squared	0.003	0.222	0.174	0.304
Controls	No	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct
Specification	Transf.	Transf.	Transf.	Translog-Constant

Table C24: Elasticity of Substitution: Mixed Users (Miles - at Least 5 Trips)

Note: The table reports estimates of the elasticity of substitution between cash and credit for mixed users. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative miles between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the results after using the transformed share specification denoted in equation (23) and including mixed users with more than 1% of their fares paid in cash and less than 99%. Column (2) reports the same specification including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Column (4) includes the constant specified in equation (23) as a regressor. Column (5) estimates the elasticity using the CES first order approximation in equation (21). Column (6) estimates the elasticity using the CES second order approximation in equation (22). Column (7) reports the results of the elasticity of substitution estimated in two steps. First, we compute the predicted share of fares paid in credit (i.e. $\hat{\alpha}$) using all the controls variables. Then, we estimate equation (21) using the predicted share. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Elasticity	3.169***	2.893***	2.620***	2.992***	2.569***	2.569***	2.241***
	(0.373)	(0.349)	(0.181)	(0.217)	(0.103)	(0.103)	(0.080)
Obs.	52,562	52,562	44,927	52,562	52,562	52,562	67,984
Controls	No	Yes	Yes	Yes	Yes	Yes	No
Type	1 pct	1 pct	5 pct	1 pct	1 pct	1 pct	1 pct
Spec.	Transf.	Transf.	Transf.	Transf.-Cons	CES - First	CES - Second	CES - First IV

Table C25: Semi-Elasticity of Substitution: Mixed Users (Miles - at Least 5 Trips)

Note: The table reports estimates of the semi-elasticity of substitution between cash and credit for mixed users. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative miles between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the results of estimating γ using the transformed share specification denoted in equation (23) and including mixed users with more than 1% of their fares paid in cash and less than 99%. Column (2) reports the same specification including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. Column (3) includes users with more than 5% of their fares paid in cash and less than 95%. Column (4) includes the constant specified in equation (23) as a regressor. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Log Price	0.275***	0.253***	0.276***	0.247***
	(0.021)	(0.018)	(0.021)	(0.017)
Observations	52,562	52,562	44,927	52,562
R-squared	0.003	0.227	0.179	0.312
Controls	No	Yes	Yes	Yes
Type	1 pct	1 pct	5 pct	1 pct
Specification	Transf.	Transf.	Transf.	Translog-Constant

Table C26: Elasticity of Substitution: Mixed Users (Trips)

Note: The table reports estimates of the elasticity of substitution between cash and credit for mixed users. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative trips between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. Column (1) reports the results after using the transformed share specification denoted in equation (23) and including mixed users with more than 1% of their trips paid in cash and less than 99%. Column (2) reports the same specification including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. Column (3) includes users with more than 5% of their trips paid in cash and less than 95%. Column (4) includes the constant specified in equation (23) as a regressor. Column (5) estimates the elasticity using the CES first order approximation in equation (21). Column (6) estimates the elasticity using the CES second order approximation in equation (22). Column (7) reports the results of the elasticity of substitution estimated in two steps. First, we compute the predict share of trips paid in credit (i.e. $\hat{\alpha}$) using all the controls variables. Then, we estimate equation (21) using the predicted share. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Elasticity	1.449***	1.475***	1.902***	1.593***	1.555***	1.559***	1.331***
	(0.500)	(0.498)	(0.304)	(0.483)	(0.185)	(0.185)	(0.288)
Obs.	3,336	3,336	3,176	3,336	3,336	3,336	1,814
Controls	No	Yes	Yes	Yes	Yes	Yes	No
Type	1 pct	1 pct	5 pct	1 pct	1 pct	1 pct	1 pct
Spec.	Transf.	Transf.	Transf.	Transf.-Cons	CES - First	CES - Second	CES - First IV

Table C27: Elasticity of Substitution: Mixed Users (Trips - at Least 5 Trips)

Note: The table reports estimates of the elasticity of substitution between cash and credit for mixed users. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative trips between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. The sample includes users with at least 5 trips during the year before the week of the experiment. Column (1) reports the results after using the transformed share specification denoted in equation (23) and including mixed users with more than 1% of their trips paid in cash and less than 99%. Column (2) reports the same specification including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. Column (3) includes users with more than 5% of their trips paid in cash and less than 95%. Column (4) includes the constant specified in equation (23) as a regressor. Column (5) estimates the elasticity using the CES first order approximation in equation (21). Column (6) estimates the elasticity using the CES second order approximation in equation (22). Column (7) reports the results of the elasticity of substitution estimated in two steps. First, we compute the predict share of trips paid in credit (i.e. $\hat{\alpha}$) using all the controls variables. Then, we estimate equation (21) using the predicted share. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

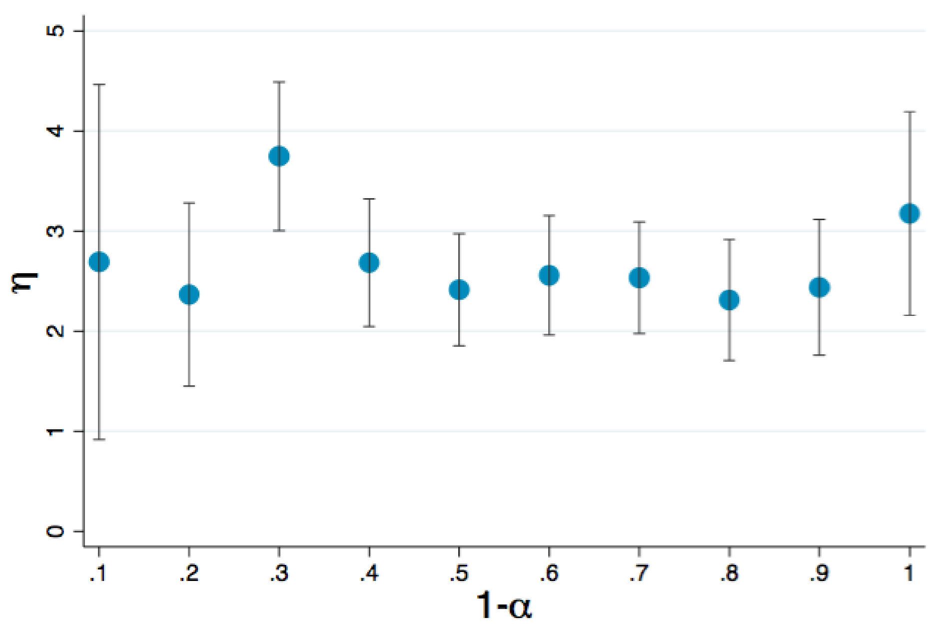
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Elasticity	1.449***	1.475***	1.902***	1.593***	1.555***	1.559***	1.352***
	(0.500)	(0.498)	(0.304)	(0.483)	(0.185)	(0.185)	(0.282)
Obs.	3,336	3,336	3,176	3,336	3,336	3,336	1,749
Controls	No	Yes	Yes	Yes	Yes	Yes	No
Type	1 pct	1 pct	5 pct	1 pct	1 pct	1 pct	1 pct
Spec.	Transf.	Transf.	Transf.	Transf.-Cons	CES - First	CES - Second	CES - First IV

Table C28: Elasticity of Substitution: Mixed Users (Miles - Price Increases and Price Decreases)

Note: Note: The table reports estimates of the elasticity of substitution between cash and credit for mixed users after splitting price increases and price decreases. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative miles between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. Column (1)-(2) estimate the elasticity for positive price changes and negative price changes using the CES first order approximation in equation (21). Column (3)-(4) estimate the elasticity for positive price changes and negative price changes using the CES second order approximation in equation (22). The elasticity in each column is estimated including controls and mixed users with more than 1% of their fares paid in cash and less than 99%. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Elasticity	2.571***	2.644***	2.702***	2.556***
	(0.154)	(0.155)	(0.156)	(0.157)
Observations	46,003	45,856	46,003	45,856
Controls	Yes	Yes	Yes	Yes
Type	1 pct	1 pct	1 pct	1 pct
Specification	CES - First	CES - First	CES - Second	CES - Second
Direction	Only Positive	Only Negative	Only Positive	Only Negative

Figure C2: Elasticity of Substitution: Mixed Users (by Cash Share)



Note: The figure reports estimates of the elasticity of substitution between cash and credit for mixed users for different deciles of the riders' cash share. The estimates are computed using experimental data collected in the State of Mexico. The dependent variable is the relative miles between credit and cash for each user the week of the experiment and the independent variable are the relative prices for trips in cash and credit. Each dot in the figure was estimated using the CES second order approximation in equation (22) including controls. The controls included for each users are the historical trips, trips squared, fares, fares squared, cash fares, cash fares squared, log of tenure, cash trips, and cash trips squared. The estimates include mixed users with more than 1% of their fares paid in cash and less than 99%. The confidence intervals represent statistical significance at the 5% level.

C.4 Experiment Extensive Margin: Robustness

Table C29: Extensive Margin: Adoption of Credit (Long-Run Effects)

Note: The table reports the percent of users that adopted credit in the long run for each of the treatment groups in experiment three relative to the control group. Migration is an indicator function that equals one if the user took a trip paid in credit from April to June of 2019 conditional on taking trip the weeks of the experiment. The variables "Treatment" report the migration rates relative to the control group of the three treatment groups in the experiment: 3, 6, and 9 times their average weekly fares if the users register a card in the application. Column (1) reports the rates of credit adoption of those users in the experiment that lasted one week. Column (2) reports the rates of credit adoption of those users in the experiment that lasted six weeks.

	(1) 1 week	(2) 1-6 week
Treatment 1 - 1 week	0.0252***	
	(0.009)	
Treatment 2 - 1 week	0.0161*	
	(0.009)	
Treatment 3 - 1 week	0.0171*	
	(0.009)	
Treatment 1 - 6 week		0.0064
		(0.006)
Treatment 2 - 6 week		0.0165***
		(0.006)
Treatment 3 - 6 week		0.0257***
		(0.006)
Constant	0.1477***	0.1390***
	(0.005)	(0.003)
Observations	13,088	28,870
R-squared	0.001	0.001

Table C30: Extensive Margin: Adoption of Credit - Unconditional

Note: The table reports the percent of users that adopted credit for each of the treatment groups in experiment three relative to the control group. Migration is an indicator function that equals one if the user registered a card in the application the weeks of the experiment. The variables "Treatment" report the migration rates relative to the control group of the three treatment groups in the experiment: 3, 6, and 9 times their average weekly fares if the users register a card in the application. Column (3) reports the rates of credit adoption during the first three weeks of the experiment. Column (4) reports the rates of adoption in the last three weeks of the experiment.

	(1)	(2)	(3)	(4)	(5)
	1 week	1 week	1-6 weeks	1-3 weeks	4-6 weeks
Treatment 1 - 1 week	0.0069***				
	(0.001)				
Treatment 2 - 1 week	0.0073***				
	(0.001)				
Treatment 3 - 1 week	0.0094***				
	(0.001)				
Treatment 1 - 6 week		0.0054***	0.0333***	0.0283***	0.0112***
		(0.001)	(0.004)	(0.004)	(0.003)
Treatment 2 - 6 week		0.0062***	0.0394***	0.0382***	0.0088***
		(0.001)	(0.004)	(0.004)	(0.003)
Treatment 3 - 6 week		0.0106***	0.0468***	0.0485***	0.0088***
		(0.001)	(0.004)	(0.004)	(0.003)
Constant	0.0069***	0.0069***	0.0711***	0.0445***	0.0372***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Observations	96,965	97,035	46,996	36,184	46,996
R-squared	0.001	0.001	0.005	0.006	0.001

C.5 Communication

Email Experiments 1

Subject: Ya tienes un descuento de 10% en tus viajes de esta semana (con EFECTIVO) Pre Header: No tienes que hacer nada, sólo viajar.

Header: Viaja más, pagando menos.

[Name], hemos ingresado a tu cuenta un código promocional para que recibas un 10% de descuento en los viajes que pagues con EFECTIVO durante la semana*.

*Promoción válida por un número máximo de 50 viajes realizados desde las 12 del mediodía del Lunes 20 hasta las 12 del mediodía del Lunes 27 de agosto de 2018.

Email Experiments 2

Subject: Ya tienes un descuento de 10% en tus viajes de esta semana.

Pre Header: Promoción especial sólo por esta semana.

Header: Viaja más, pagando menos.

[Name], hemos ingresado a tu cuenta un el código promocional para que recibas un 10% de descuento en todos tus viajes de esta semana*.

*Promoción válida por un número máximo de 50 viajes realizados desde las 12 del mediodía del Lunes 20 hasta las 12 del mediodía del Lunes 27 de agosto de 2018.

Email Ubernomics

Subject: Tienes 10% de descuento en todos tus viajes esta semana.

¡Esta semana te damos un descuento de hasta 10% aplicado automáticamente en todos tus viajes! Llega a tu trabajo, al gym o a una cena con amigos — todo con un costo por viaje menor.

Email Mandin

Subject line: [Nombre], te regalamos 10% de descuento en tus viajes Pre-Header: No te lo puedes perder.

Title: 10% de descuento en tus siguientes viajes*.

Queremos acompañarte en todos tus viajes. Por eso, entre el 19 de junio y 16 de julio de 2018, podrás disfrutar de 10% de descuento en tus viajes de menos de $200 MXN*.

Tu descuento se aplicará automaáticamente, sólo solicita tu viaje que está a un click de distancia. ¡No dejes pasar esta oportunidad!

Email Experiments 3

[Nombre],

Tenemos una promoción especial para ti con la que podrás obtener 2 viajes con descuento por hasta $50 MXN cada uno. Lo único que tienes que hacer es ingresar una tarjeta de crédito o débito a tus métodos de pago en tu cuenta.

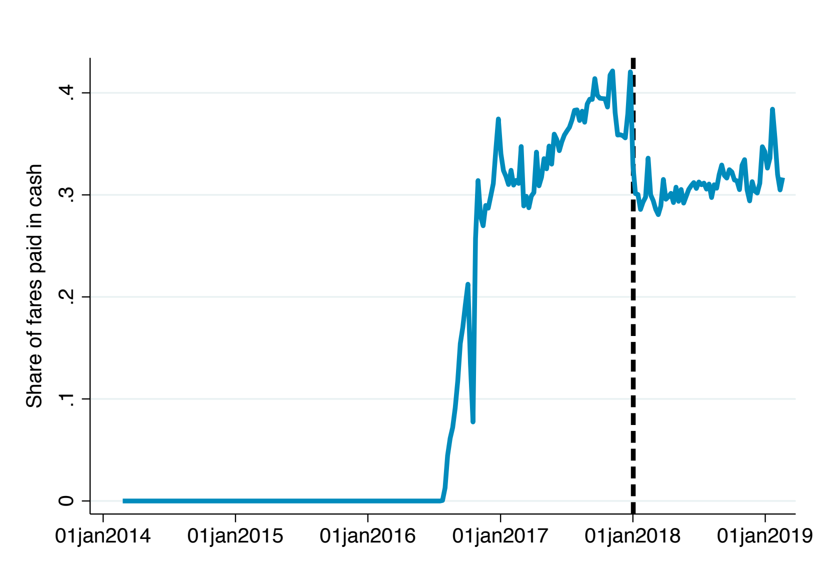
Después de ingresar la tarjeta, espera un periodo de 8 horas para poder utilizar el descuento. Recuerda que podrás disfrutar de esta promoción sin importar el método de pago que elijas para los siguientes viajes.

*Promoción válida desde el lunes 17 de septiembre hasta el domingo 23 de septiembre de 2018. Si el Usuario no consume el valor total del Código, no podrá acumular el remanente en un viaje posterior.

D Panama

Here we collect additional information on the case of Panama. In particular the behaviour of the share of cash and the two regressions estimating semi-log demand functions.

Figure D1: Panama: Share of Fares Paid in Cash



Note: The figure shows the evolution of the share of fares paid in cash in Panama. The frequency of the data is weekly. The black dotted line denotes the date the decree by the government restricting the supply of drivers went into effect.

Table D1: Elasticity of Demand: Panama (Trips)

Note: The table reports the elasticity of demand estimated using equation (1) using trips as dependent variable for Panama. Each observation is a week in 2018; the year after the decree by the government restricting the supply of drivers went into effect. Column (1) reports the estimates using aggregated information of all trips. Column (2) estimates the elasticity using only trips paid in cash. The prices used are the average surge multipler seasonally adjusted using data before the decree went into effect. The standard errors are computed using the Delta Method. The ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1) All Trips	(2) Only Cash Trips
Elasticity	0.955***	1.008***
	(0.135)	(0.142)
Observations	52	52
Specification	Semi-log	Semi-log

E Adapting Puebla's Evidence to the State of Mexico

In this section, we adapt the evidence in Alvarez and Argente (2020) on the rate of migration of pure cash riders in Puebla after the ban, to the rate of migration of pure cash users in an hypothetical ban in the State of Mexico. In their counterfactual analysis of the ban in Puebla using synthetic control method, they found that the State of Mexico is one of the cities with higher weights on the synthetic Puebla. Since the excess rate at which pure cash users migrated to become pure credit users after the ban is an important statistic in the identification of the model, we adapt the estimates Alvarez and Argente (2020) obtained using the actual ban in Puebla to the evaluation of an hypothetical ban in the State of Mexico. They found an excess migration rate of about 30% of the pure cash users. We follow a two steps procedure to adapt this estimate to the State of Mexico. The first step is to document the difference in observable indicators for residents of Puebla and State of Mexico, where we define both locations as the municipalities covered by Uber service. The second step is to include some of these observables in their analysis of the rate of migration in Puebla, so we can take into account the difference in observables between the two cities. Overall, these difference change the estimate to the State of Mexico in less than 1%.

Table E1 displays statistics at the census block level for Puebla and the State of Mexico. Table E2 displays statistics at the municipality level for Puebla and for the State of Mexico. From these tables we conclude that, while Puebla and the State of Mexico are relatively similar in the context of the cities served by Uber across Mexico, Puebla's residents have in average about one more year of education, and have higher financial inclusion. In Table E3 we include the census block level variables we have access to in a linear probability model predicting whether a pure cash rider will take trips paid with a credit card in Puebla after the ban. The sample used in this regression are all the trips in three months on the year before and three months after the ban, which are geolocalized and matched with the census at the block level. [1] The presence of a bank in the geographical statistical area (AGEB) and the average years of education have the expected signs, although the values of the coefficients are small and only marginally statistically significant. Using these coefficients and the average difference between the observables in Puebla and in the State of Mexico, we obtain that the indeed the migration rate will be lower in the State of Mexico than in Puebla, but that correction is smaller than 1%, i.e. it is given by $(0.74 - 0.59) \times 0.0095 + (9.95 - 8.88) \times 0.0056 = 0.0074$.

[1] This sample is smaller than the universe used in Alvarez and Argente (2020). The smaller size of the sample is due to the fact that we need to geolocalize all these trips.

Table E1: Puebla vs State of Mexico: Summary Statistics at the Block Level

Note: The table reports the average across census blocks of different variables for Puebla, Mexico City, and the State of Mexico. The variables reported are the share of banks in the census block, the share of banks in the basic geostatistical area, the share of homes with car, the share of homes with phone, the share of homes with internet and the average years of educations. The average across census blocks is computed weighting each block by the total trips that took place in August of 2017. The source of the demographic variables is the Mexican Census.

	(1) State of Mexico	(2) Mexico City	(3) Puebla
Share of banks in the block	0.12	0.31	0.16
Share of banks in basic geo. area	0.59	0.83	0.74
Share of homes with car	0.46	0.50	0.44
Share of homes with phone	0.65	0.67	0.60
Share of homes with internet	0.36	0.49	0.36
Average years of education	8.88	10.63	9.95
Blocks	60056	53606	19899

Table E2: Puebla vs State of Mexico: Financial Inclusion Statistics

Note: The table reports the per capita averages of several variables related to financial inclusion for Puebla, Mexico City, and the State of Mexico. The variables reported include debit cards per capita, credit cards per capita, ATMs per capita, ATM transactions per capita, bank branches per capita, as well as the income per capita and the total population of each State. The statistics are computed using information of the municipalities where Uber was active in 2017. The source of the data is the 2017 Financial Inclusion Database (BDIF).

	(1) State of Mexico	(2) Mexico City	(3) Puebla
Debit cards per capita	0.64	2.93	0.93
Credit cards per capita	0.21	0.67	0.25
ATMs per capita	2.63	8.49	4.30
ATM transactions per capita	1.13	3.01	1.75
Bank branches per capita	0.99	2.21	1.51
Income per capita (USD)	445.52	707.32	454.15
Population (millions)	11.67	8.81	2.76

Table E3: Puebla: Returning After the Ban of Cash

Note: The table reports the probability of returning from 2017-2018 for users in the city of Puebla. The dependent variable is an indicator variable that equals one if the user was active in 2017 and she is also active in the application in 2018. The independent variables include an indicator variable that equals one if a bank is present in the user's geostatistical area and the average years of education of the census block where the user resides. The sample of users are those that only used cash as a payment method in 2017. The regression is weighted by the total trips they took in 2017.

	(1)	(2)	(3)
User Returning			
Bank in basic geo. area	0.0149***		0.0095***
	(0.002)		(0.001)
Years of Education		0.0061**	0.0056*
		(0.003)	(0.003)
Constant	0.2922***	0.2305***	0.2291***
	(0.007)	(0.024)	(0.025)
Observations	91,111	91,111	91,111
R-squared	0.000	0.001	0.001
Users	Pure Cash	Pure Cash	Pure Cash
Weight	Trips in 2017	Trips in 2017	Trips in 2017

F Net Consumer Surplus Lost in the Ban for Pure Cash Users, Details

In this section we compute the adjustment to the consumer surplus of pure cash users in the case of a ban due to the option of becoming pure credit users. We assume that all the pure cash users have a common value of ϕ but they are heterogeneous with respect to the cost of registering/obtaining a credit card. In particular we obtain an interval for the counterfactual value of α for these riders, and for each value of α we describe the corresponding values of k and $\bar{P}$. We assume that the elasticity of substitution η is the same as the one we estimate from mixed users.

For each feasible value of α and the corresponding values of $(k, \bar{P})$ and distribution $g(\cdot)$ for ψ we compute the consumer surplus lost in the ban as:

$$\begin{aligned} CS_{ban,a}(\phi) &\equiv v(1,\infty;\phi) - \int \max\{v(\infty,1;\phi) - \psi, v(\infty,\infty;\phi)\} g(\psi|\phi) d\psi \\ &= v(1,\infty;\phi) - v(\infty,\infty;\phi) \\ &\quad - [v(\infty,1;\phi) - v(\infty,\infty;\phi)] \int_{\underline{\psi}}^{\max\{\underline{\psi},\psi_{ban}\}} g(\psi|\phi)d\psi + \int_{\underline{\psi}}^{\max\{\underline{\psi},\psi_{ban}\}} \psi g(\psi|\phi)d\psi \end{aligned} \tag{6}$$

where g is the distribution of fixed cost among the pure cash users before the ban conditional on ϕ, $\underline{\psi}$ is the lower bound of the support of g, and ψ_{ban} is the highest fixed cost for which a rider will migrate from being pure cash to pure credit in the case of a ban. Note that a lower bound of equation (6) is

$$\begin{aligned} CS_{ban,a}(\phi) \geq \underline{CS}_{ban,a}(\phi) &\equiv v(1,\infty;\phi) - v(\infty,\infty;\phi) \\ &\quad - \left[v(\infty,1;\phi) - \underline{\psi} - v(\infty,\infty;\phi)\right] \int_{\underline{\psi}}^{\max\{\underline{\psi},\psi_{ban}\}} g(\psi|\phi)d\psi \end{aligned} \tag{7}$$

We proceed in two steps. The first step jointly identify the set of values for ϕ and range of values $\underline{\psi}$ and ψ_{ban}. The second step obtains the distribution g within $[\underline{\psi}, \psi_{ban}]$.

1. We obtain a set of values of $\phi = (\eta, \alpha, k, \bar{P})$, which can be represented as an interval for α and the corresponding unique values for each value of α in this interval. These parameter have to satisfy the following conditions/assumptions, which are discussed at the end of Section 3.4.

   (a) The (common) elasticity of substitution η on the function H is the same as the one for mixed riders. Here we use the CES functional form for H.

(b) The value of η and the two parameter values (β_0, β_1) characterizing the demand of pure cash rides $\tilde{a}(p, \infty; \phi) = \beta_0 + \beta_1 \log p$ give two equations for the parameters $(\alpha, k, \bar{P})$. The derivation uses that H is CES and U being exponential. The equations are:

$$\beta_0 = k(1-\alpha)^{\frac{1}{1-\eta}} \left[\log \left(\frac{\bar{P}}{(1-\alpha)^{\frac{1}{1-\eta}}} \right) \right] \tag{8}$$

$$\beta_1 = -k(1-\alpha)^{\frac{1}{1-\eta}} \tag{9}$$

(c) Pure cash users that become pure credit users take fewer rides after the ban. In term of the model it means that $\tilde{a}(1, \infty; \phi) > \tilde{c}(\infty, 1; \phi) > 0$. This was shown in the analysis of Puebla by Alvarez and Argente (2020). Using the expression in Appendix **??** we have:

$$\alpha \leq 1/2 \tag{10}$$

(d) The demand of a pure cash rider that becomes a pure credit rider after the ban must be strictly positive, or $\tilde{a}(\infty, 1; \phi)$. The estimated parameters β_0, β_1 and equation (8) and equation (9) enforce that the demand of pure cash users is positive. Using the expressions in Appendix **??** we have:

$$\frac{\alpha^{\frac{1}{1-\eta}}}{\bar{P}} \leq 1 \tag{11}$$

Proposition 1. Assume that $\eta > 1$, $\beta_0 > 0$, and $\beta_1 < 0$. The set of values for which α satisfies all the conditions described in step 1 above is contained in an interval $[\underline{\alpha}, 1/2]$ where $\underline{\alpha} = 1/\left[1 + \exp\left((1-\eta)\beta_0/\beta_1\right)\right]$. The values of $\bar{P}$ and k for each α are given by

$$\bar{P} = (1-\alpha)^{\frac{1}{1-\eta}} e^{-\beta_0/\beta_1} \text{ and } k = \frac{-\beta_1}{(1-\alpha)^{\frac{1}{1-\eta}}} . \tag{12}$$

2. The last step is to estimate the distribution g corresponding to each set of values (α, k, $\bar{P}$, $\underline{\psi}$, ψ_{ban}).

(a) Prior to the ban, pure cash riders must prefer to use cash, i.e. they must be indifferent when ψ is at the lower bound of the support for g:

$$\underline{\psi} \equiv v(1,1;\phi) - v(1,\infty;\phi) = -k(1+\log \bar{P}) - k(1-\alpha)^{\frac{1}{1-\eta}} \left[\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right] \tag{13}$$

where $\underline{\psi}$ is the lower bound of the support of ψ.

(b) ψ_{ban} triggers that no pure cash users want to registered a card:

$$\psi_{ban} = v(\infty,1;\phi) - v(\infty,\infty;\phi) \equiv k\alpha^{\frac{1}{1-\eta}} \left[\log\left(\frac{\alpha^{\frac{1}{1-\eta}}}{\bar{P}}\right) - 1\right] + k\bar{P} \tag{14}$$

(c) The value of $\int_{\underline{\psi}}^{\max\{\underline{\psi},\psi_{ban}\}} g(\psi|\phi)d\psi$ is the excess migration of pure cash riders to pure credit riders.

(d) The shape of g in the interval $[\underline{\psi},\ \psi_{ban}]$ is obtained by using the information of the Experiment 3, given the parameters $(\alpha,\ k,\ \bar{P},\ \eta)$. For a given discount rate ρ, these experiments give three values of the CDF for g inside the interval $[\underline{\psi},\ \psi_{ban}]$. See equation (17) for the relevant expressions. We interpolate these values so that they are consistent with the experiments and, among them, we choose the one with the highest cost (in a first order stochastic dominance sense). Furthermore, we use $\rho = 0.25$ so the expected duration of the fixed cost is four years.

Next, we note that the consumer surplus lost, for those that do not switch to credit after the ban, is independent of α. This is the quantity plotted in Figure 5 (as a fraction of expenditure) and it is only a function of $\beta_0,\ \beta_1$. To see this recall that the consumer surplus lost for this group is defined as:

$$CS_{ban,a}(\phi) \equiv v(1,\infty;\phi) - v(\infty,\infty;\phi) = k(1-\alpha)^{\frac{1}{1-\eta}} \left[\log\left(\frac{(1-\alpha)^{\frac{1}{1-\eta}}}{\log \bar{P}}\right) - 1\right] + k\bar{P}$$

Using the definitions of β_0 and β_1 and Proposition 1 we can write

$$\widehat{CS}_{ban,a}(\beta_0,\beta_1) = -\beta_0 + \beta_1 - \beta_1 \exp\left(-\beta_0/\beta_1\right) \tag{15}$$

On the other hand, the consumer surplus of pure cash users who switch to credit can be written as a function of α given β_0, β_1, and η. Using Proposition 1 and the definitions of β_0 and β_1 and substituting into equations equation (13) and equation (14) we find

$$\underline{\widehat{\psi}}(\alpha;\beta_0,\beta_1,\eta) = \frac{\beta_1}{(1-\alpha)^{\frac{1}{1-\eta}}}\left(1+\frac{1}{1-\eta}\log(1-\alpha)-\frac{\beta_0}{\beta_1}\right)-\beta_1+\beta_0 \tag{16}$$

and

$$\widehat{\psi}_{ban}(\alpha;\beta_0,\beta_1,\eta) = -\beta_1\left(\frac{\alpha}{1-\alpha}\right)^{\frac{1}{1-\eta}}\left[\frac{1}{1-\eta}\log\left(\frac{\alpha}{1-\alpha}\right)+\frac{\beta_0}{\beta_1}-1\right]-\beta_1 e^{-\beta_0/\beta_1} \tag{17}$$

The consumer surplus lost for switchers can be written as

$$\widehat{CS}_{ban,a}(\alpha;\beta_0,\beta_1,\eta) = \left[-\beta_0+\beta_1-\beta_1\exp\left(-\beta_0/\beta_1\right)\right] - \int_{\underline{\widehat{\psi}}}^{\max\{\underline{\widehat{\psi}},\widehat{\psi}_{ban}\}}\left[\psi-\underline{\widehat{\psi}}\right]\widehat{g}(\psi)d\psi$$

with lower bound

$$\underline{\widehat{CS}}_{ban,a}(\alpha;\beta_0,\beta_1,\eta) \equiv \left[-\beta_0+\beta_1-\beta_1\exp\left(-\beta_0/\beta_1\right)\right] - \tilde{\psi}\int_{\underline{\widehat{\psi}}}^{\max\{\underline{\widehat{\psi}},\widehat{\psi}_{ban}\}}\widehat{g}(\psi)d\psi \tag{18}$$

where $\tilde{\psi} \equiv \widehat{\psi}_{ban} - \underline{\widehat{\psi}}$ and $\widehat{g}$, $\underline{\widehat{\psi}}$, $\widehat{\psi}_{ban}$, and $\tilde{\psi}$ are evaluated at $(\alpha;\beta_0,\beta_1,\eta)$.[2] Given that $\tilde{\psi}$ only affects the consumer surplus of the users that switch to credit after the ban, given β_0, β_1, and η, we can obtain the lower bound of the net consumer surplus by evaluating $\tilde{\psi}$ for all values of $\alpha \in [\underline{\alpha}, \alpha = 1/2]$. In practice $\tilde{\psi}$ is a single-peaked function with maximum either at $\alpha = \underline{\alpha}$ or at $\alpha = 1/2$.

F.1 Case with No Heterogeneity

We begin with the case without heterogeneity, all users have the same ϕ. From Table C4 we obtain obtain the following point estimates $\beta_1 = -2.044$ and $\beta_0 = 1.54$ for the miles specification. We use the mile specification because the price of a trip has been normalized to one, as in the theory. This corresponds to an elasticity of 1.38. Aiming to be conservative, this is the largest elasticity, which gives the lowest consumer surplus. Using the values β_0 and β_1 we obtain a consumer surplus lost by the pure cash users that do *not* migrate after the ban, estimated using equation (15), of approximately 39.4 USD per year, or about 0.49 of the yearly expenditure on rides paid in cash.

Moreover, with this values of β_0, β_1 and our benchmark estimates of η, $\alpha \in [0.37, 0.5]$. The difference $\tilde{\psi}$ is increasing in α within this interval, ranging between $\tilde{\psi} = 0$ at $\alpha = 0.37$ and and $\tilde{\psi} = 10.8$ USD per year at $\alpha = 0.5$. Thus we can use the lower bound on the consumer

[2]In what follows, to simplify the notation, we use this convention.

surplus lost is given by selecting $\alpha = 0.5$ and using the formula for the lower bound we obtain $\underline{\widehat{CS}}_{ban,a} \geq 36.1$ USD per year or about 0.45 of the yearly expenditure of cash rides in Uber. For this lower bound we have used $\int_{\underline{\widehat{\psi}}}^{\max\{\underline{\widehat{\psi}},\widehat{\psi}_{ban}\}} \hat{g}(\psi)d\psi = 0.3$, based on Puebla.

We can use the results of Experiment 3 to obtain a better estimate of $\int_{\underline{\widehat{\psi}}}^{\max\{\underline{\widehat{\psi}},\widehat{\psi}_{ban}\}} \psi\hat{g}(\psi)d\psi$. We use that for one time rewards of 5.3, 10.5 and 15.7 USD the excess migration rate in six weeks have been 3.3%, 3.9% and 4.7% respectively –see Table 5, column (3). Since these are one time rewards, we need to convert them into flows, by using a rate of discount, which should take into account the duration of the credit cards. To be conservative we use $\rho = 0.2$, so the average duration is 5 years, i.e. the rewards are about 1, 2.1, and 3.6 USD dollars per year. We can use these figures to obtain a tighter upper bound as follows:

$$\begin{aligned}
&\int_{\underline{\widehat{\psi}}}^{\max\{\underline{\widehat{\psi}},\widehat{\psi}_{ban}\}} \left[\psi - \underline{\psi}\right] \hat{g}(\psi)d\psi \\
&\leq 1 \times 0.033 + 2.1 \times (0.039 - 0.033) + 3.6 \times (0.047 - 0.039) + (10.8 - 3.6) \times (0.3 - 0.047) \\
&= 1.9 \leq 0.3 \times 10.8 = 3.24
\end{aligned}$$

In this case we obtain $\widehat{CS}_{ban,a} \approx 39.4 - 1.9 = 37.5$ USD per year or about 0.47 of the yearly expenditure on Uber paid in cash by pure cash riders. This calculation is our headline number for pure cash users. The results are similar if, instead of using $\eta = 3$, we use a higher value (i.e. η=5). In this case, the net consumer surplus lost is 33.8 USD per year or about 0.42 of the yearly expenditure on Uber paid in cash by pure cash riders.

F.2 Case with Heterogeneity

Next, we allow consumer to have different β_0. This is, for each percentile of the distribution of β_0 reported in Columns (1)-(2) of Table F1, we compute the consumer surplus lost of both pure cash users that do not switch to credit and those that do. Columns (3) reports the percentiles that migrate to credit after a ban on cash consistent to our model (i.e. $\tilde{\psi} > 0$).

We again aim to provide a lower bound for the consumer surplus lost. First, in order to be consistent with the evidence from Puebla, we allow 30% of the users to migrate. We choose the percentiles, whose migration is consistent with our model and with lower consumer surplus lost. These percentiles are reported in Column (4). Second, we evaluate $\underline{\widehat{CS}}_{ban,a}$ at $\alpha = 1/2$ since, for all percentiles that switched to credit, it provides a maximum value for $\tilde{\psi}$ and hence a lower bound for the net consumer surplus. The last column reports the lower bound of the net consumer surplus lost for each percentile. Notice that the net consumer surplus lost is convex in β_0 as shown in equation (15). The consumer surplus lost is drastically higher for pure cash users that travel more using the application because of the convexity of the net consumer surplus lost and due to the large skewness of the distribution of historical trips. The median net consumer surplus lost is 10.3 USD and the mean is 187 USD. If we use a higher value for η (i.e. η=5), the results are similar, the median is 10.6 USD and the mean is 183 USD.

Table F1: Net Consumer Surplus Lost in the Ban for Pure Cash Users

Note: The table reports the net consumer surplus lost of pure cash users after a ban on cash for several percentiles of miles per week, β_0. The net consumer surplus lost is the adjustment to the consumer surplus of pure cash users in the case of a ban due to the option of becoming pure credit users. Column (3) shows the percentiles of the distribution of β_0 that switch to credit (i.e. $\tilde{\psi} > 0$) according to our model. Column (4) shows the percentiles that percentiles of the distribution of β_0 that we elect to migrate to credit in order to be consistent with the data of Puebla (30% of the population) and also to provide a lower bound of the consumer surplus lost. Column (5) reports the lower bound of the net consumer surplus lost by the pure cash users, those that migrate are adjusted by the costs paid to migrate. All calculations use β_1 = -2.044, η=3, and α=1/2 since for that α the consumer surplus lower bound is attained. The average β_0 in our sample is 1.54.

(1) Percentile	(2) β_0	(3) Consistent	(4) Migrate	(5) Net Consumer Surplus Lost (USD)
5	0.16	0	0	0.3471
10	0.23	0	0	0.7359
15	0.30	0	0	1.2043
20	0.36	0	0	1.7879
25	0.42	0	0	2.5156
30	0.49	0	0	3.4231
35	0.57	0	0	4.5722
40	0.65	0	0	6.0297
45	0.74	0	0	7.9076
50	0.84	0	0	10.356
55	0.95	0	0	13.582
60	1.08	0	0	18.011
65	1.23	1	1	24.092
70	1.42	1	1	31.169
75	1.65	1	1	41.562
80	1.96	1	1	57.984
85	2.38	1	1	86.454
90	3.01	1	1	144.71
95	4.11	1	0	309.54
100	8.24	1	0	2974.3

G Ban on the Use of Credit: Argentina

Motivated by the recent legal framework in Argentina, where local credit cards could not be used as a means of payment for Uber rides, we consider a ban on the use of credit in the State of Mexico. The situation in Argentina was that Uber riders could not be paid using credit cards, whose payments are processed by one of the two local firms processing credit card payments. This was due to an initial injunction issued by a public attorney of the City of Buenos Aires, even though it has now been reversed in an appeal. The reason the ban was nationwide, even though the initial injunction was for the city of Buenos Aires, was that the credit card processors cannot distinguish the location where the charges of riders were originated. Uber riders using credit card whose payments were processed abroad, such as most international tourists, were able to pay for Uber rides using their credit cards.

In our calculations we assume that the initial conditions are exactly as the situation in the State of Mexico during 2018 (so that cash and credit are available as means of payment, and we can use our estimates for several quantities) and a permanent unexpected ban on credit is enacted. We distinguish the effect on three type of riders (classified when both cash and credit were available): pure cash riders, mixed riders, and pure credit riders. We will continue to assume that prices will not change, and that drivers will not be affected.

The ban in credit has no effect on the 25% pure cash riders (which account for about 20% of the fares). Pure cash riders continue to be pure cash riders after the ban, and will pay the same price. The ban in credit has a similar effect in mixed riders that the ban in cash. The magnitudes for the ban on credit will be different than the magnitude of the ban in cash because the distribution of the share for credit trips for mixed riders is not symmetric around 0.5. Using the distribution of riders cash share weighted by their total fares –as in Figure 2, a elasticity of substitution $\eta = 3$, and a price elasticity $\epsilon = 1.1$, we obtain that the consumer surplus lost by a ban on credit is 0.43 of the total expenditure of mixed users.

The ban on credit has a large effect on the pure credit riders. Given our assumption of no fixed cost to use cash, we rationalize that rider does not use cash (i.e. that she is a pure credit rider) as having a value of $\alpha \approx 1$. This means that pure credit riders will stop using Uber altogether after a ban in credit and, hence, their loss will be the entire consumer surplus of using Uber. This will be a large multiple of their revenue, since these users tend to be the more inelastic ones. Our estimates for the price elasticity of Uber rides for pure credit users is $\epsilon \approx 0.7$, see Appendix C.3.3. With this elasticity, the consumer surplus lost by the pure credit rides is about 1.22 of their total expenditure in Uber. This number is comparable to the consumer surplus of using Uber estimated by Cohen et al. (2016) using U.S. data and a different identification scheme, which is 1.66. Recall that in that in the U.S. only credit is available as a means of payment. Lastly, we can aggregate the consumer surplus lost by a ban on credit computed above among mixed and pure credit users by weighting them by their share of total expenditure in Uber paid with credit. The consumer surplus lost by a ban on credit is $0.82 = 1.22 \times \frac{0.30}{0.30+0.50\times 0.63} + 0.43 \times \frac{0.50\times 0.63}{0.30+0.50\times 0.63}$ of the total expenditure paid on credit before the ban.

H Survey

The survey was sent to all the users that participated in experiments 1 and 2 approximately 11 months after the experiments took place. The surveys were sent through email on July 9th, 2019 and they were open until July 16th, 2019. We design 6 different surveys, each with 3 questions. This format allowed us to minimize the response time and, at the same time, allowed us to obtain several responses to a given question. A total of 433,356 users received a survey, 287,233 participated in experiment 1 (mixed and pure credit users) and 146,123 participated in experiment 2 (pure cash users). We randomize the 6 surveys within each of the treatment and control groups in experiment 1 and 2. For example, experiment 1 has 6 treatment groups and 1 control group. Within each of those groups a random sample of users got each of the surveys. Since experiment 2 has 4 treatment groups and 1 control group, approximately 72,220 people received each of the surveys. We received 6,341 responses. After dropping illegible responses (in a few cases users provided other information rather than that asked in the questions) and duplicates, our total sample contains an average of 933.5 responses per survey. If a given user responded the survey more than once we kept the response with less missing answers or, in case of a tie, we kept their last response.

All surveys included the following question: "If your receive a 20% discount for one week, how would you change your trips...". Some users were given the options to respond a) no change, b) increase less than 10%, c) increase more than 10%. A second set of users were given the options to respond a) no change, b) increase less than 20%, c) increase more than 20%. And a third set of users were given the options to respond a) no change, b) increase less than 30%, c) increase more than 30%. Each survey also included two additional questions. We split the sample of users in two groups. To the first group we asked the following two questions: 1) "If the price of trips is permanently reduced by half, how would you change your trips..." and 2)"If the price of trips is permanently doubled, how would you change your trips...". To the second group we asked: 1) "If the price of trips is permanently reduced to a third, how would you change your trips..." and 2) "If the price of trips is permanently tripled, how would you change your trips...".

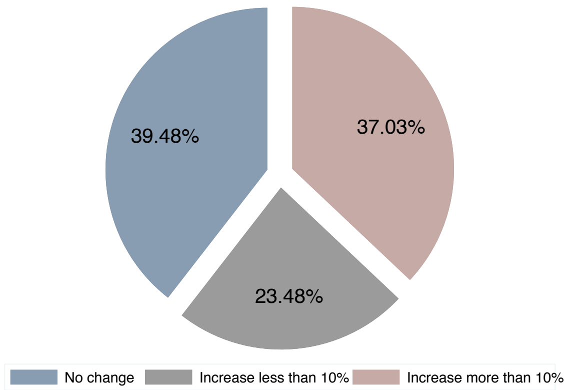
To analyze the responses, we adjust the covariate distribution of the survey respondents by reweighting such that it becomes more similar to the covariate distribution of the entire population that participated in our experiments. We implement entropy balancing, a multivariate reweighting method described in Hainmueller (2012). Entropy balancing is based on a maximum entropy reweighting scheme that fit weights that satisfy a set of balance constraints that involve exact balance on the first, second, and possibly higher moments of the covariate distributions in the treatment and control groups. We reweight the sample of survey respondents based on the historical trips per week and their tenure based on the first and second moments of the distribution. Using higher moments do not affect our findings. The distribution of responses for each question is provided in Section H.1 for mixed users and Section H.2 for pure cash users.

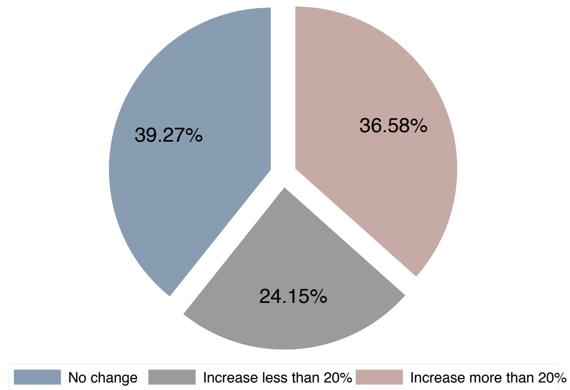
In order to provide external validity to our survey-based evidence, we compare the bounds in the elasticity of demand implied by the survey to those implied by the field experiments. We use the first question of the survey, where users are asked to describe their behavior if they were to receive a 20% discount for one week. Recall that equation (1) shows the relationship between the demand, the choke price, and the elasticity of demand implied by our model. The equation can be used to recover the response of users to a change in prices P that is consistent with both our experimental evidence and our structural framework. We implement equation (1) using the semi-elasticity k estimated in our field experiments and the choke prices $\bar{P}$ of users recovered (when they face prices equal to 1) from the average of their weekly historical fares.[3] In this case, when we decrease prices by 20%, given that in our model users always change their trips if prices change, we find that 11% of users would increase their trips less than 10 %, 32% of users would increase their trips less than 20%, and 49% of users would increase their trips less than 30%. The responses of the survey are remarkably similar. They show that,, conditional on users changing their trips, 14.75% of the users would increase their trips less than 10%, 39.7% would increase their trips less than 20%, and 46% of users would increase their trips less than 30%. Overall, we find that the estimated bounds of the elasticity of demand in the survey are informative of the revealed bounds obtained using our experimental data.

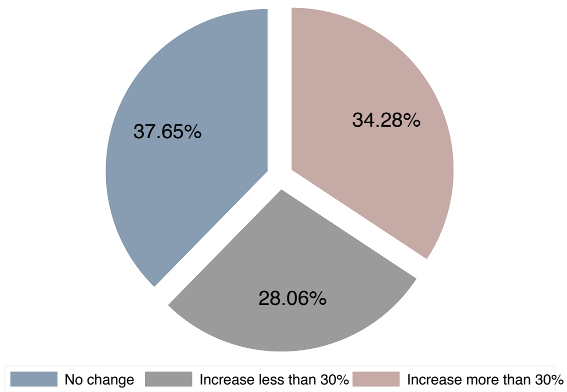
[3] To minimize the measurement error in the average of weekly historical fares, we trim the top and bottom one percent.

H.1 Mixed Users

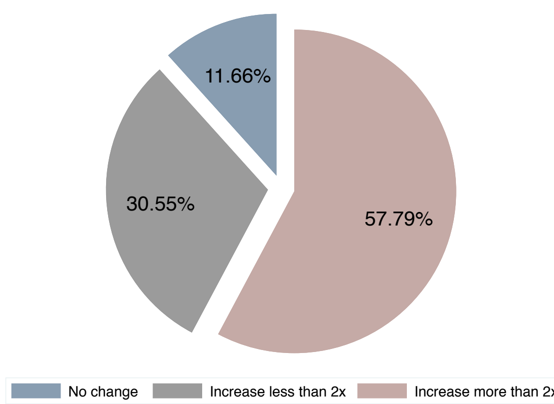
Question 1: If your receive a 20% discount for one week, how would you change your trips...



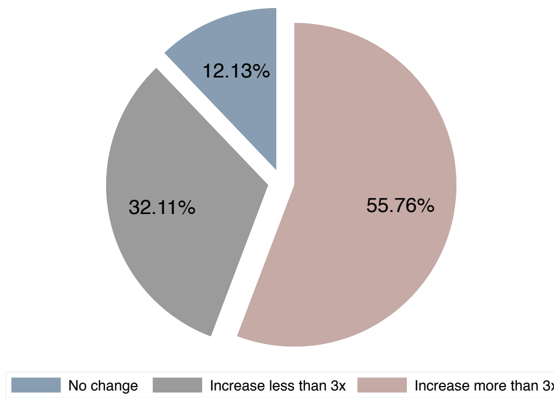




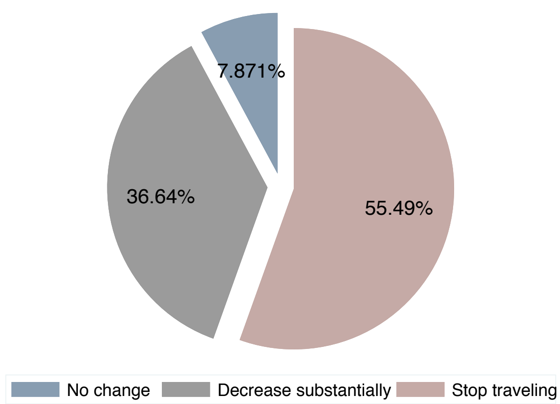
Question 2a: If the price of trips is permanently reduced by half, how would you change your trips...



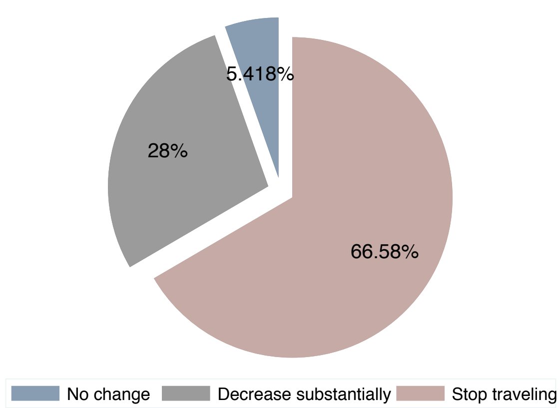
Question 2a: If the price of trips is permanently reduced to a third, how would you change your trips...



Question 3a: If the price of trips is permanently doubled, how would you change your trips...

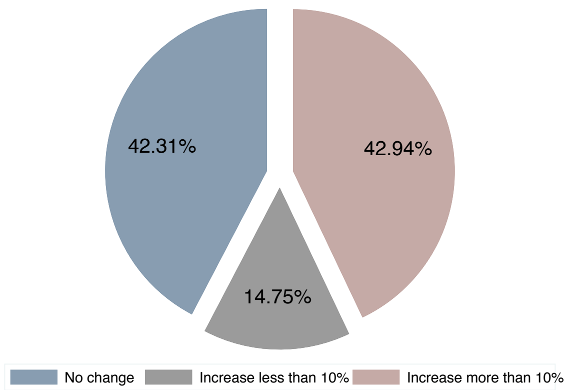


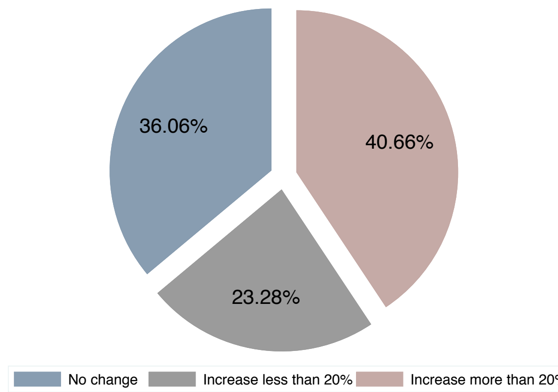
Question 3a: If the price of trips is permanently tripled, how would you change your trips...

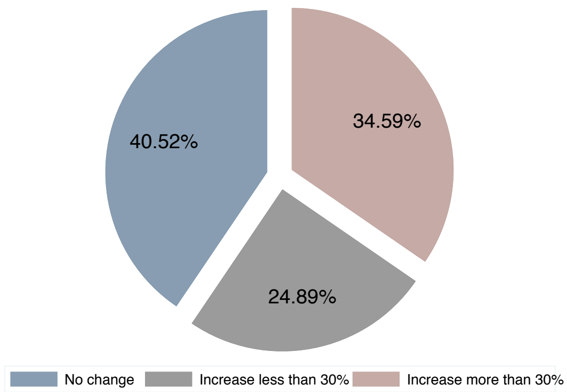


H.2 Pure Cash Users

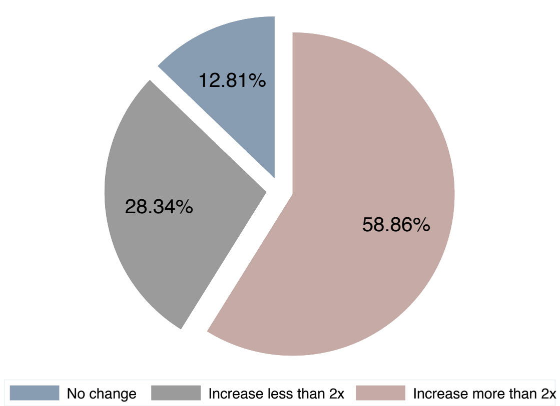
Question 1: If your receive a 20% discount for one week, how would you change your trips...



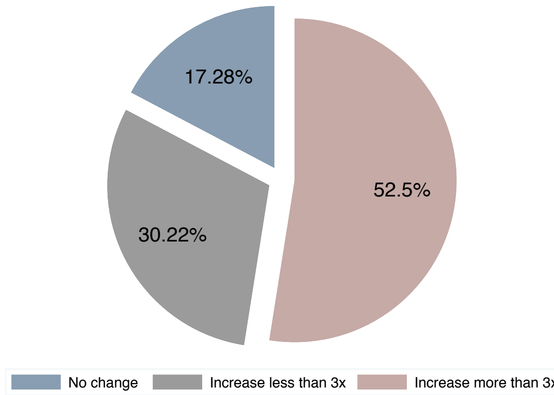




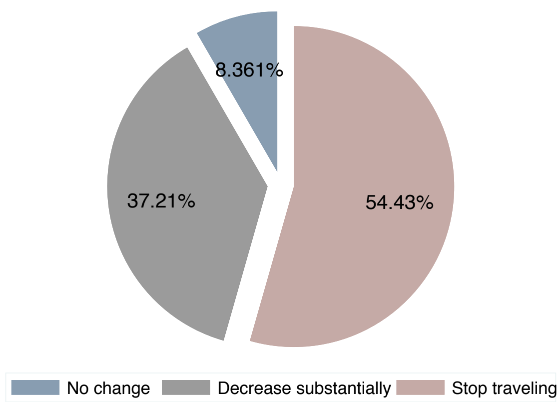
Question 2a: If the price of trips is permanently reduced by half, how would you change your trips...



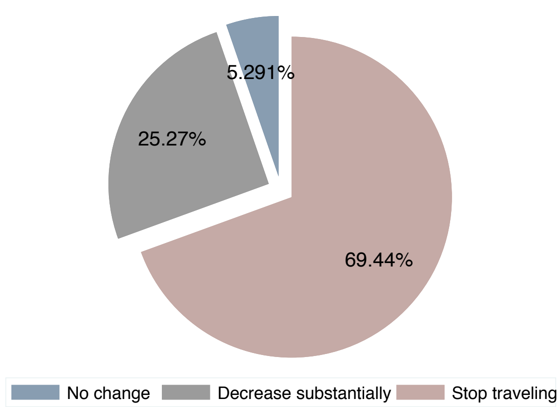
Question 2a: If the price of trips is permanently reduced to a third, how would you change your trips...



Question 3a: If the price of trips is permanently doubled, how would you change your trips...



Question 3a: If the price of trips is permanently tripled, how would you change your trips...



References

Alvarez, F., Argente, D., 2020. On the effects of the availability of means of payments: The case of uber .

Cohen, P., Hahn, R., Hall, J., Levitt, S., Metcalfe, R., 2016. Using Big Data to Estimate Consumer Surplus: The Case of Uber. Working Paper 22627. National Bureau of Economic Research.

Hainmueller, J., 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. Political Analysis 20, 25–46.