A Model for Trust Driven Advertising

July 26 2024

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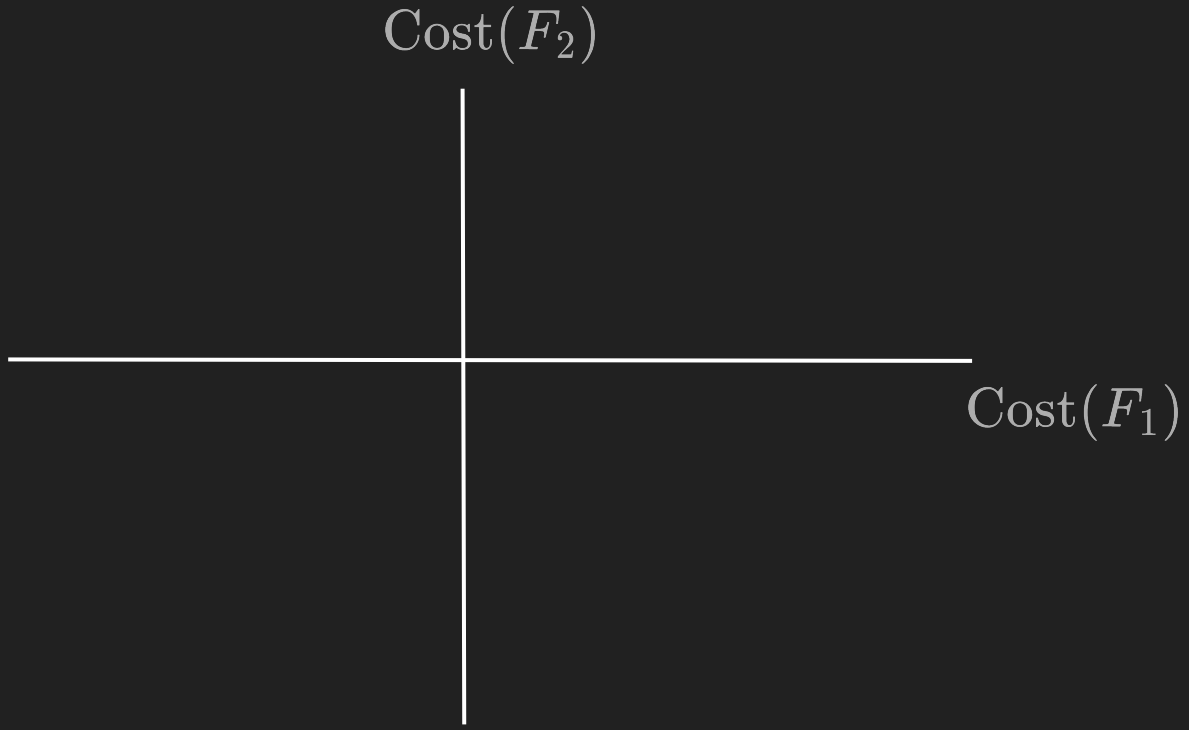
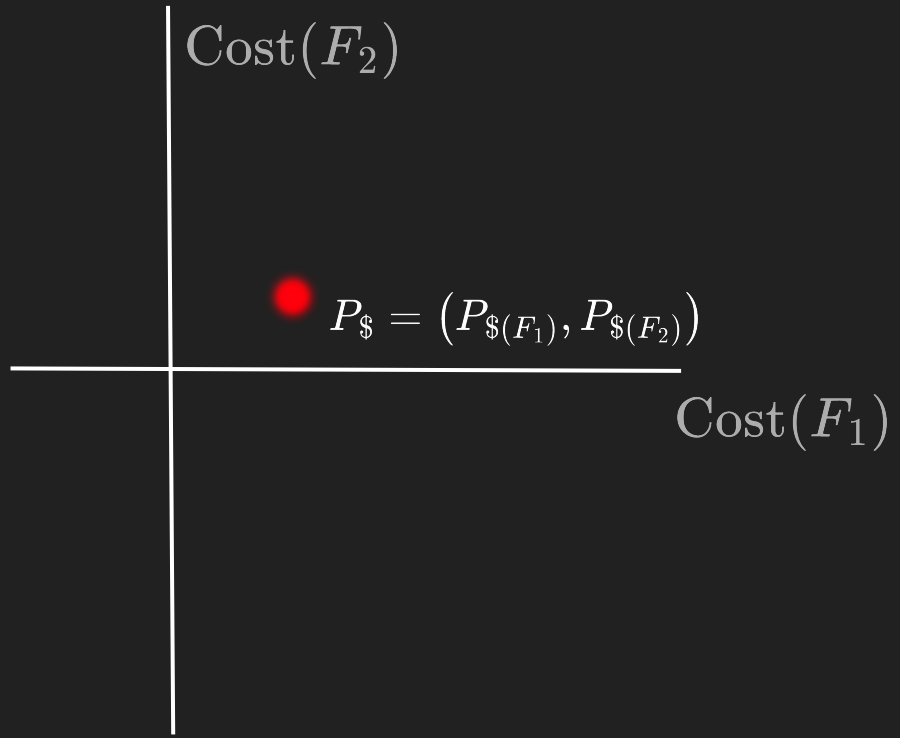
Contents

Market Exchanges - Production Costs



Market Exchanges - Production Costs

Producer
$\text{ProductionCost} = P_{\$(F_1)} + P_{\$(F_2)}$

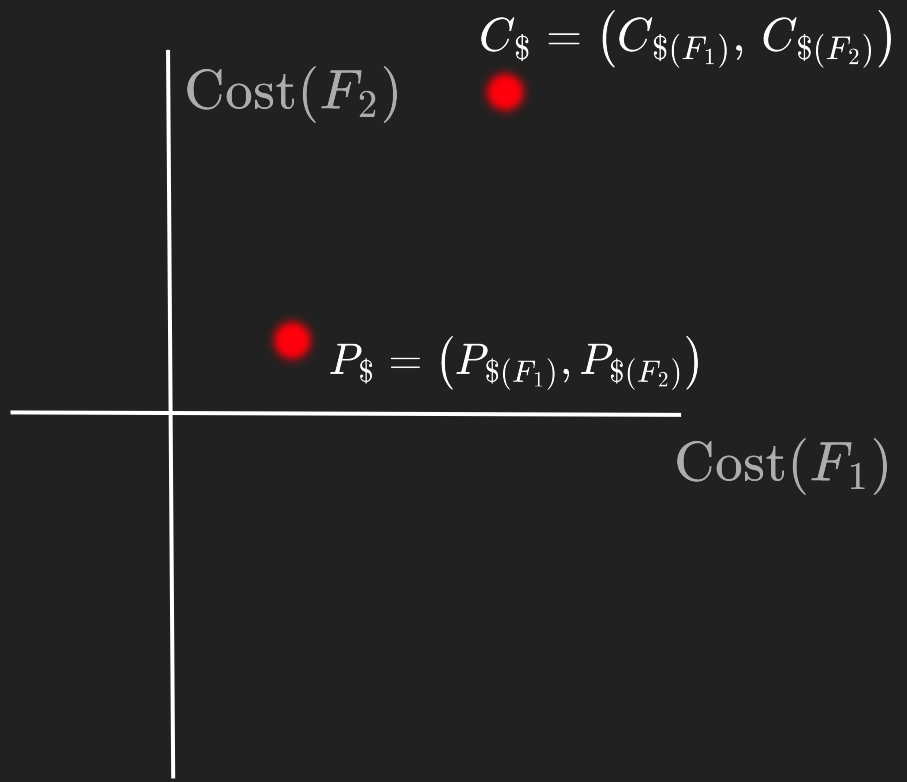


Market Exchanges - Production Costs

Producer
$\text{ProducerCost} = P_{\$(F_1)} + P_{\$(F_2)}$

Consumer
$\text{ConsumerCost} = C_{\$(F_1)} + C_{\$(F_2)}$

$$\text{ConsumerCost} \gg \text{ProducerCost}$$



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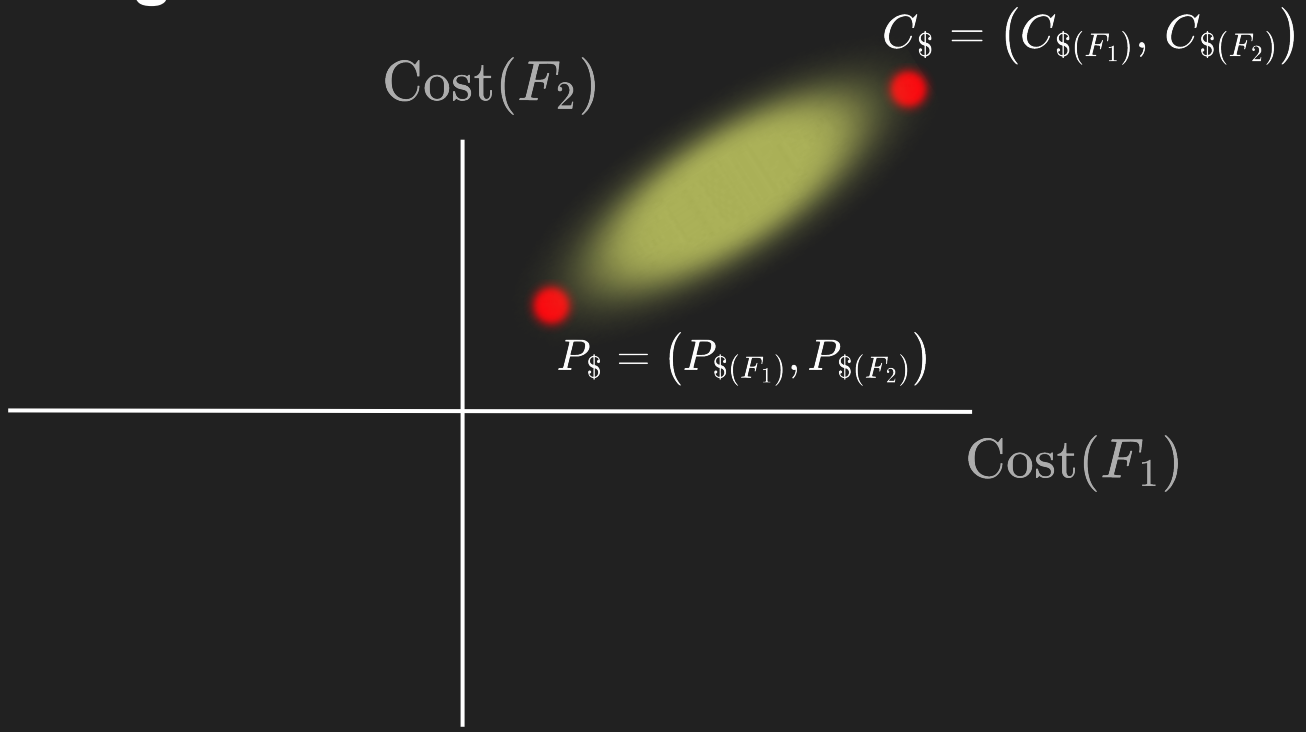

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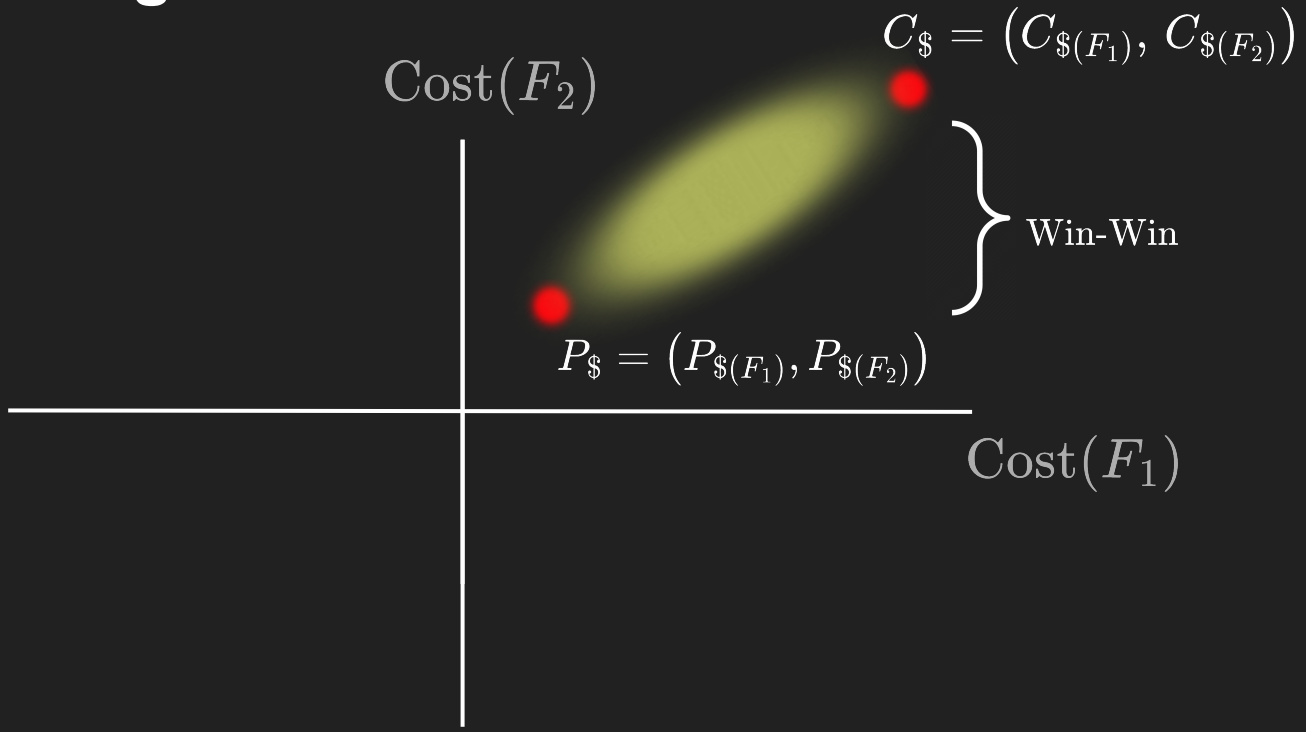
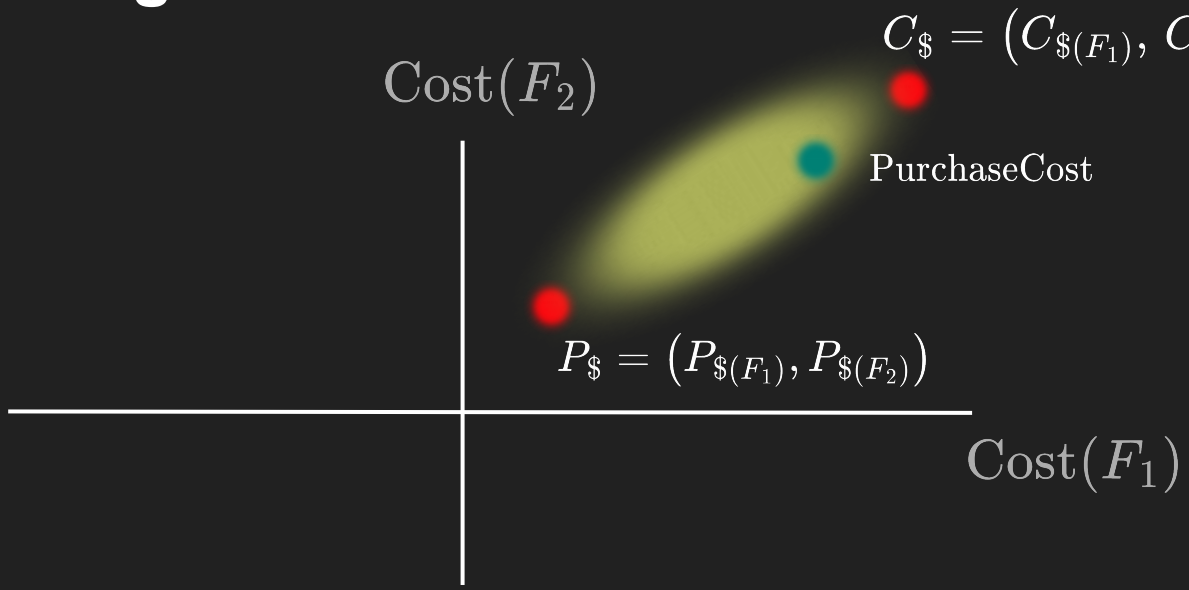


Market Exchanges - Production Costs

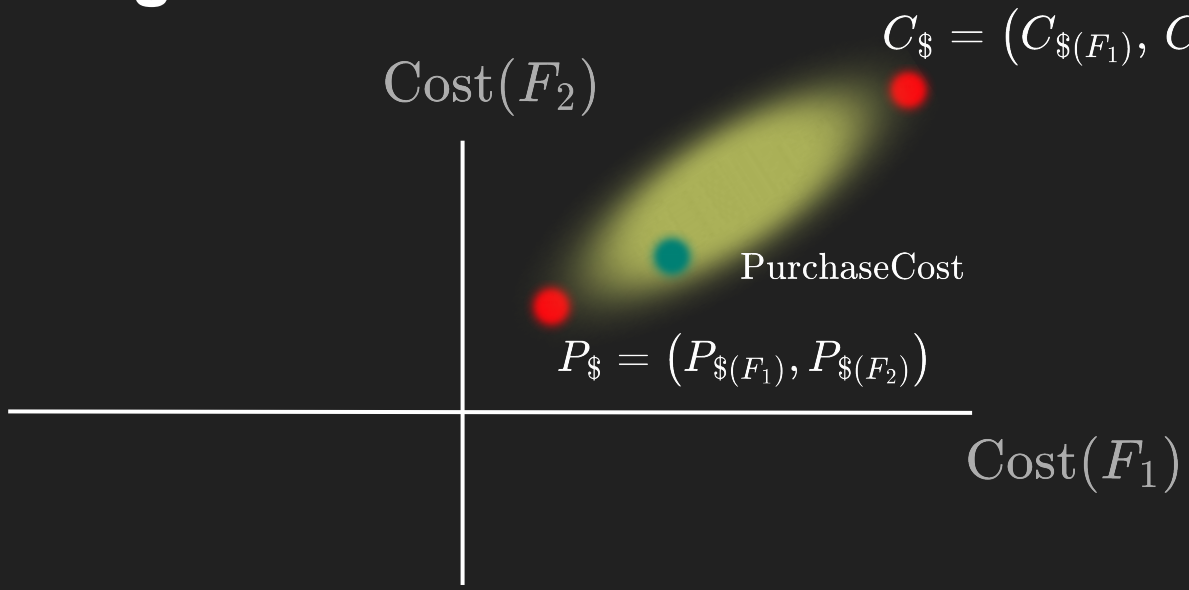


$$C_\$ - \text{PurchaseCost} < \text{PurchaseCost} - P_\$$$

money saved by consumer

money made by producer

Market Exchanges - Production Costs

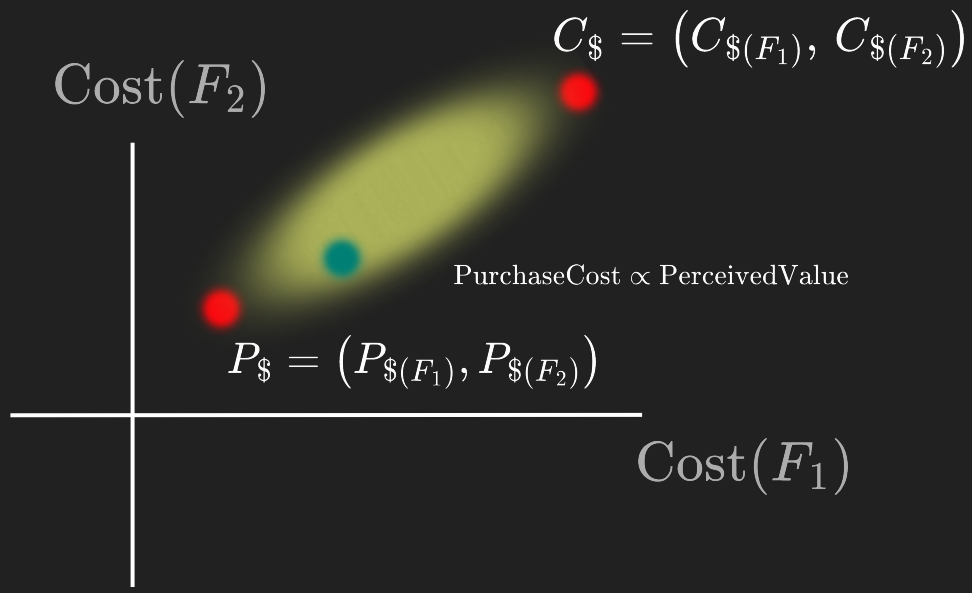


$$\underbrace{C_\$ - \text{PurchaseCost}}_{\text{money saved by consumer}} > \underbrace{\text{PurchaseCost} - P_\$}_{\text{money made by producer}}$$

Market Exchanges - with Advertising

Advertising Dynamics

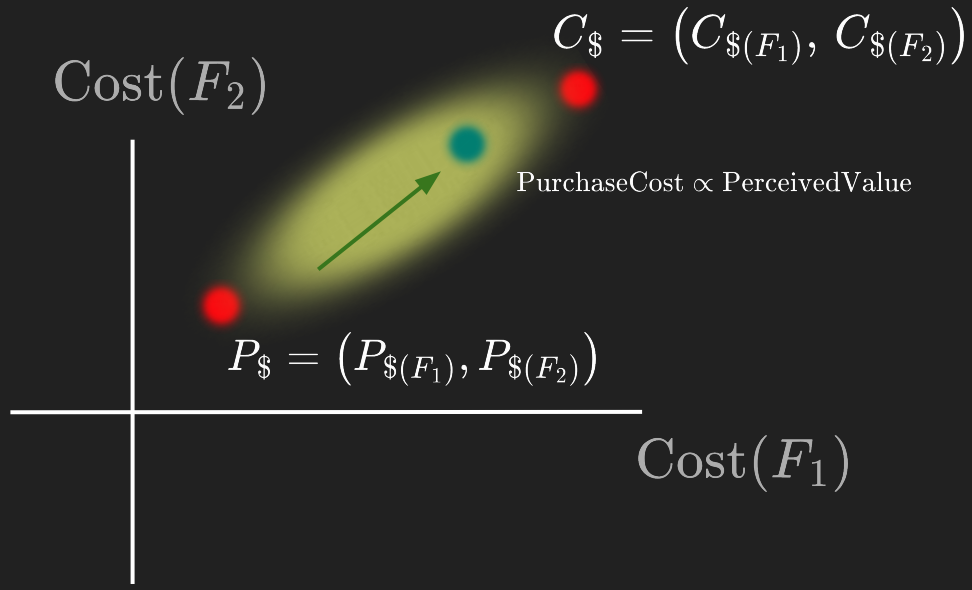
- Purchase Cost $\propto$ Perceived Value



Market Exchanges - with Advertising

Advertising Dynamics

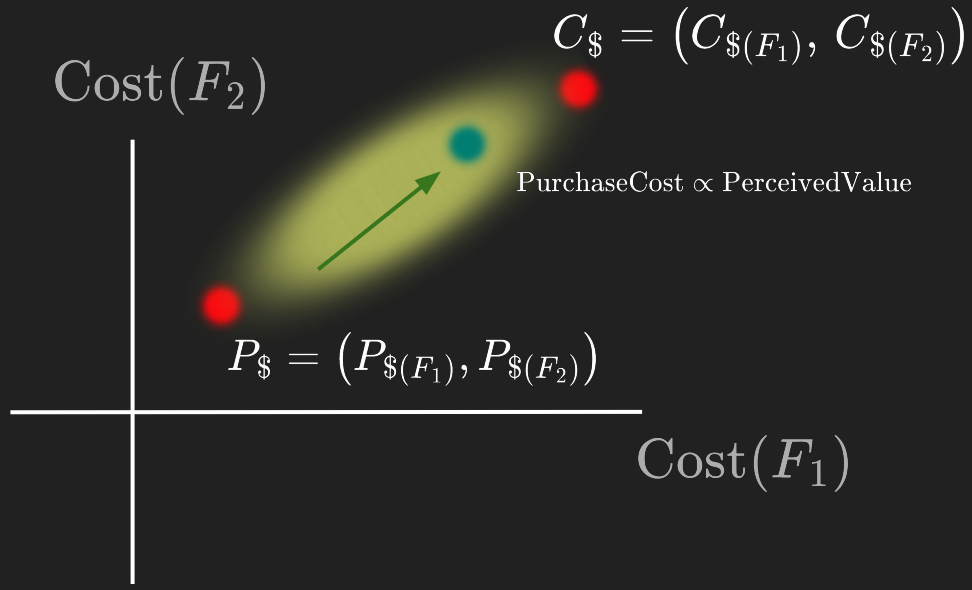
- Purchase Cost $\propto$ Perceived Value
- Producer will run ads to **increase** the perceived value



Market Exchanges - with Advertising

Advertising Dynamics

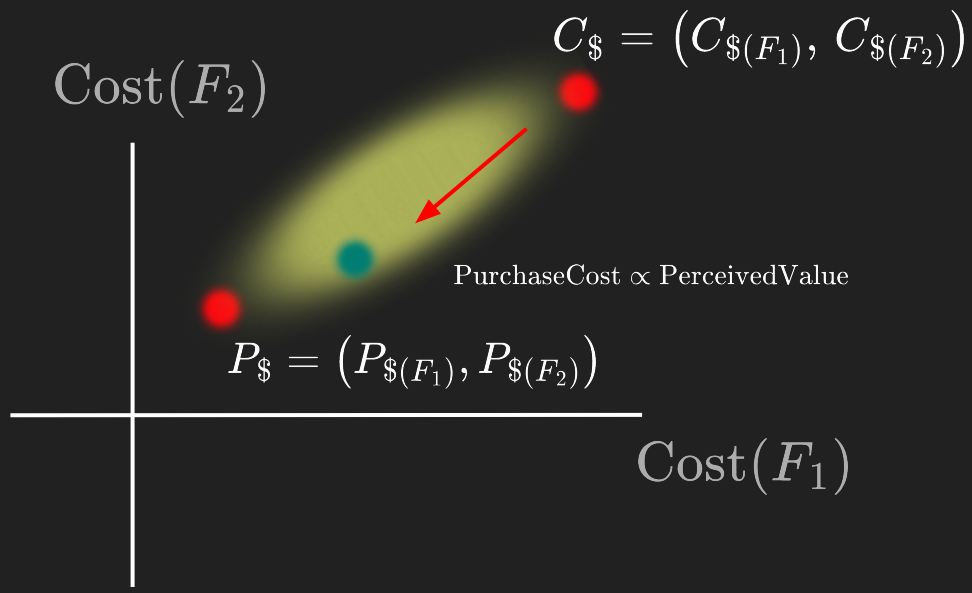
- Purchase Cost $\propto$ Perceived Value
- Producer will run ads to **increase** the perceived value
- Consumer can
  - **Accept** the ad



Market Exchanges - with Advertising

Advertising Dynamics

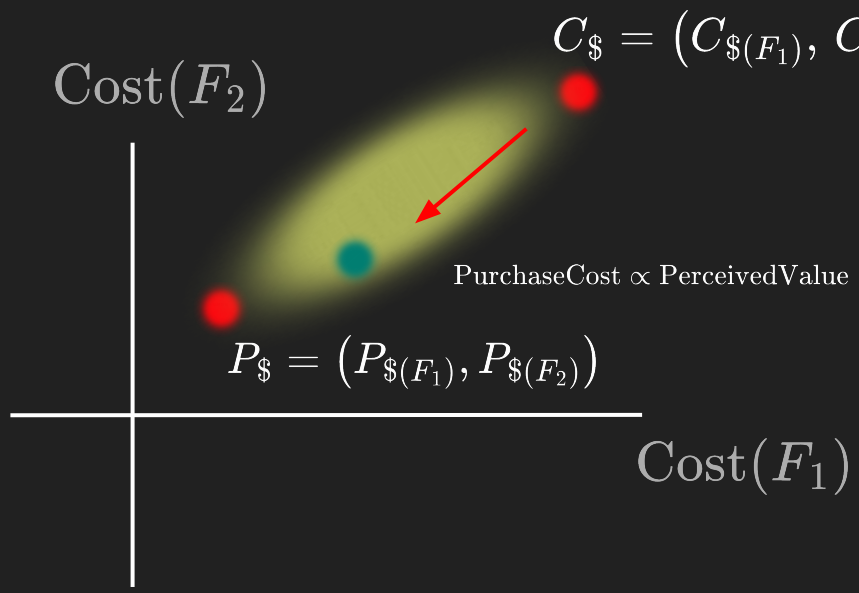
- Purchase Cost $\propto$ Perceived Value
- Producer will run ads to **increase** the perceived value
- Consumer can
  - **Accept** the ad
  - **Reject** the ad



Market Exchanges - with Advertising

Advertising Dynamics

- Purchase Cost $\propto$ Perceived Value
- Producer will run ads to **increase** the perceived value
- Consumer can
  - **Accept** the ad
  - **Reject** the ad
- **Trust** is a key factor in consumer response



[3] Nielsen 2012, Global Trust in Advertising and Brand Messages, https://www.nielsen.com/wp-content/uploads/sites/2/2019/04/global-trust-in-advertising-2012.pdf

Contents

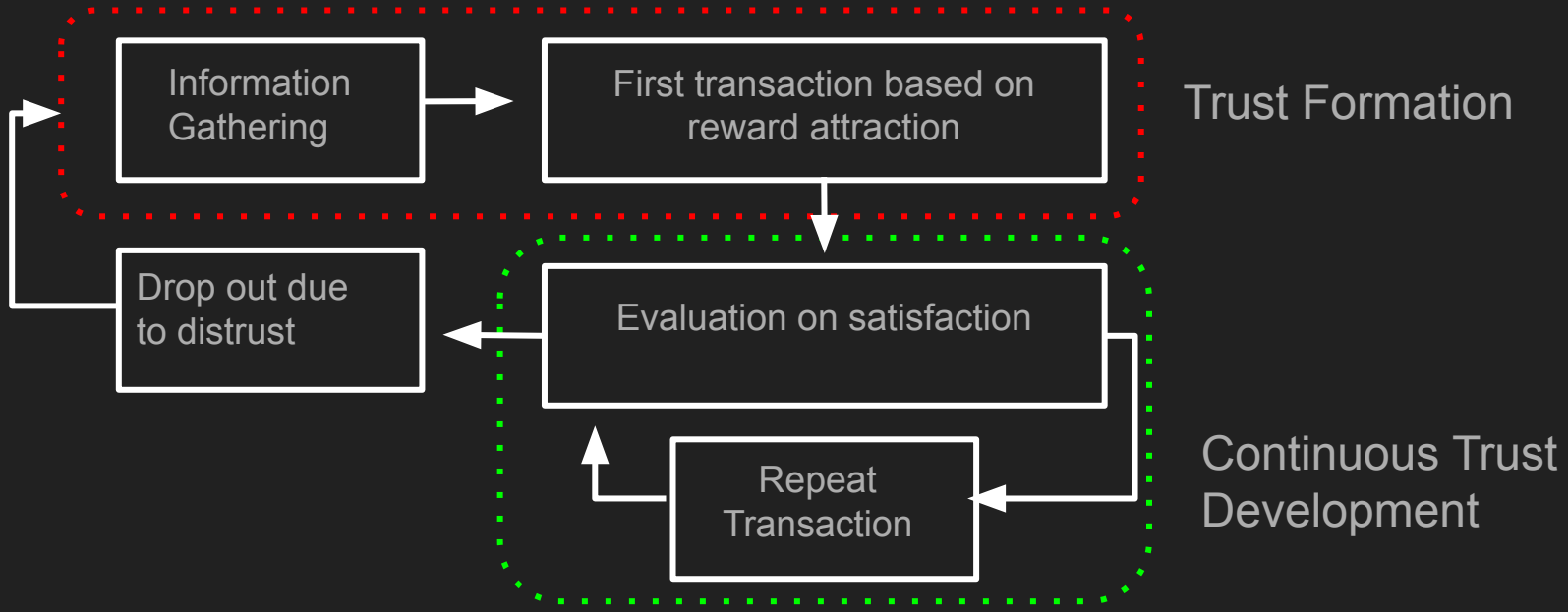
Trust - Generation

“If a product fulfills the prospect’s expectations as formed by the advertisement, trust is generated”

[4] Ogilvy, D. (1985). Ogilvy on Advertising. Vintage Books, New York.

Trust - Generation

"If a product fulfills the prospect's expectations as formed by the advertisement, trust is generated"



[5] Fung, R. and Lee, M. (1999). EC-Trust (Trust in Electronic Commerce): Exploring the Antecedent Factors. In AMCIS 1999 Proceedings, page 179

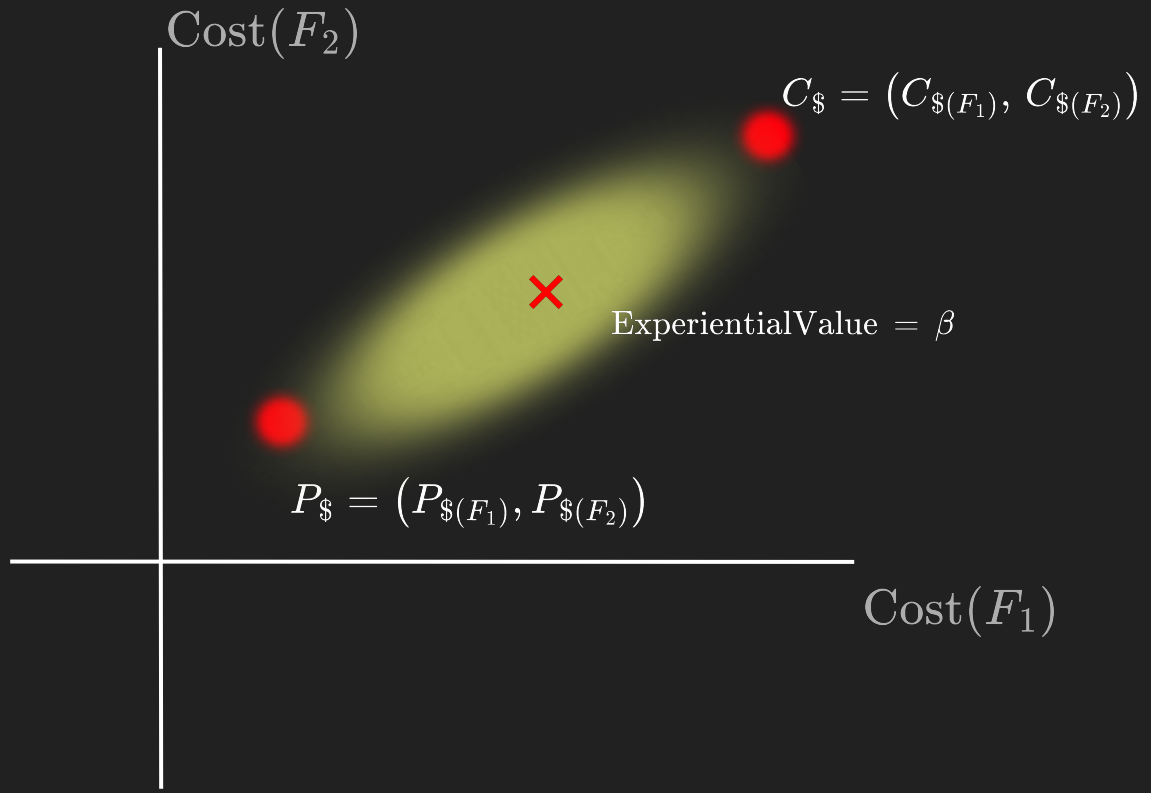
Trust - Abuse

“Just as trust can be produced and leveraged in social processes in other domains, advertisers can both produce and leverage trust”

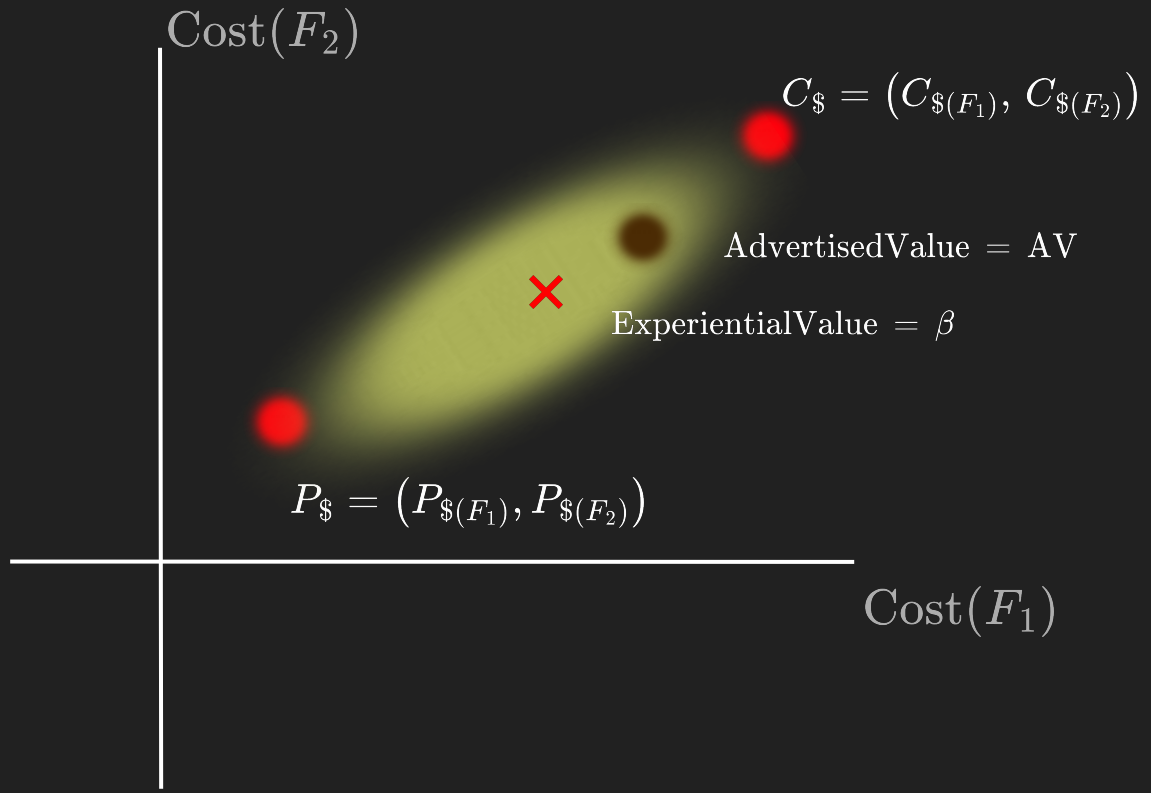
[6] Bednar, J. and Page, S. E. (2021). The interplay between institutions and civic capacity: The paradox of democratic collapse
[7] Michael J. de la Merced and Andrew Ross Sorkin. (2010) Report Details How Lehman Hid Its Woes, The New York Times

Contents

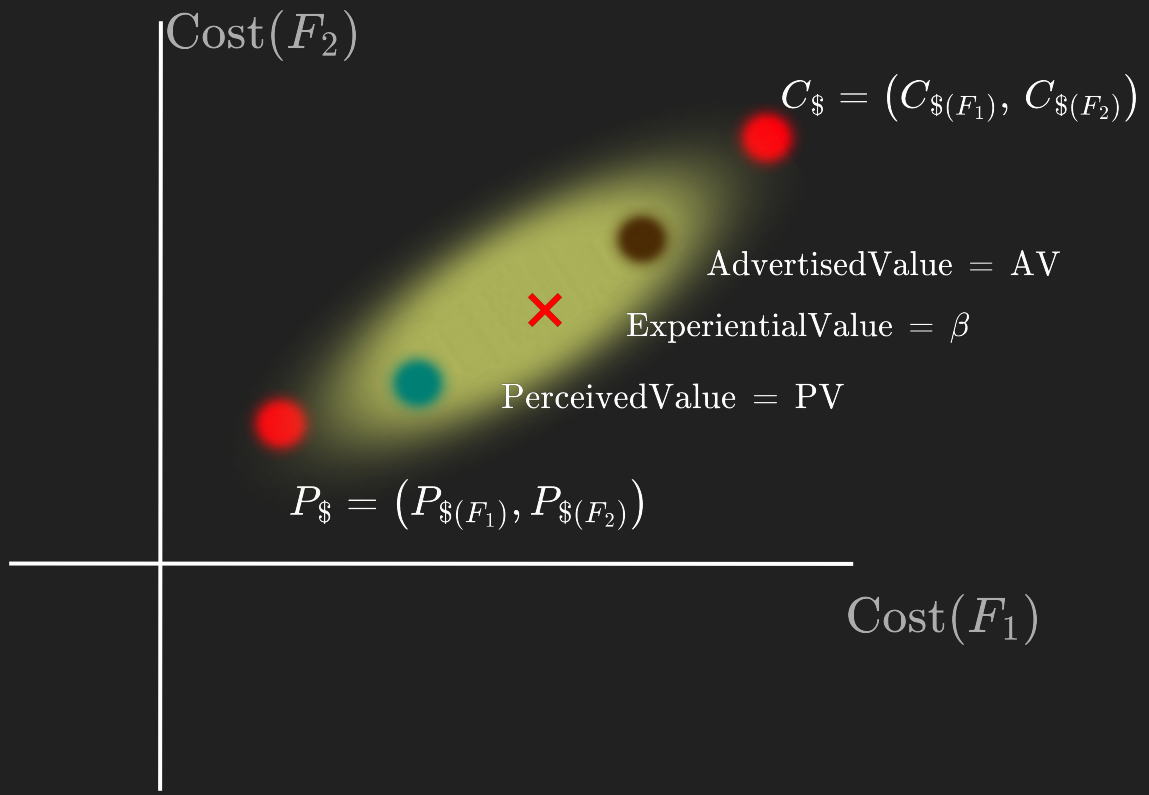
Model


$\text{Cost}(F_2)$
$C_\$ = \left(C_{\$(F_1)}, C_{\$(F_2)}\right)$
$\text{ExperientialValue} = \beta$
$P_\$ = \left(P_{\$(F_1)}, P_{\$(F_2)}\right)$
$\text{Cost}(F_1)$

Model


$\text{Cost}(F_2)$
$C_\$ = \left(C_{\$(F_1)}, C_{\$(F_2)}\right)$
$\text{AdvertisedValue} = \text{AV}$
$\text{ExperientialValue} = \beta$
$P_\$ = \left(P_{\$(F_1)}, P_{\$(F_2)}\right)$
$\text{Cost}(F_1)$

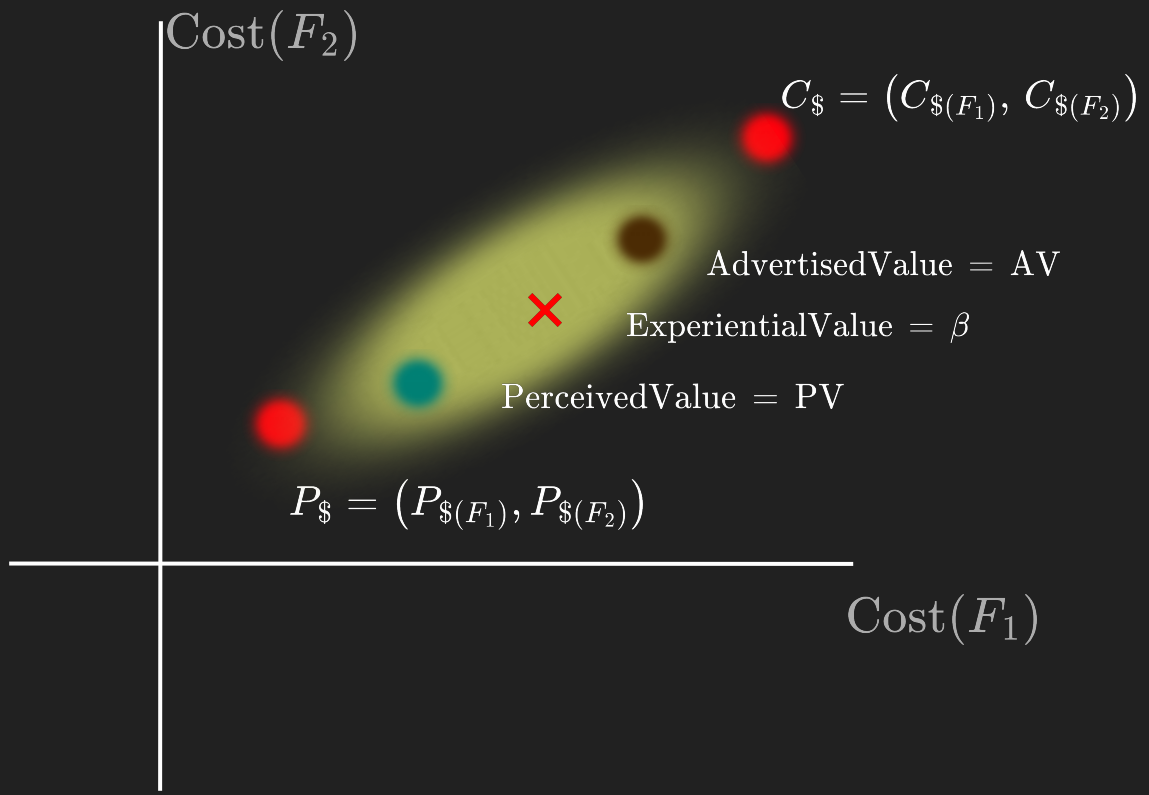
Model



$\text{ConsumerTrust} = T$

$T \in (-\infty, 0)$	Reject
$T \in (0, \infty)$	Accept

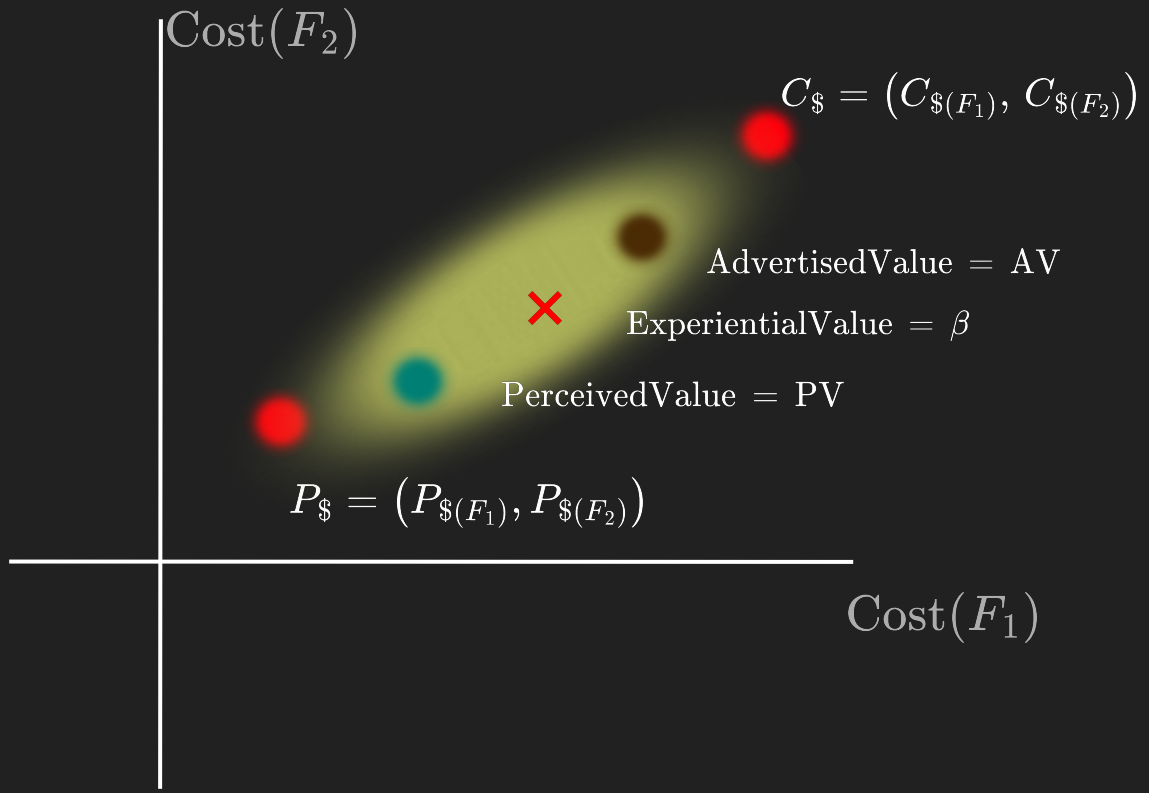
Model



$$\text{ConsumerTrust} = T \begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C$$

Model

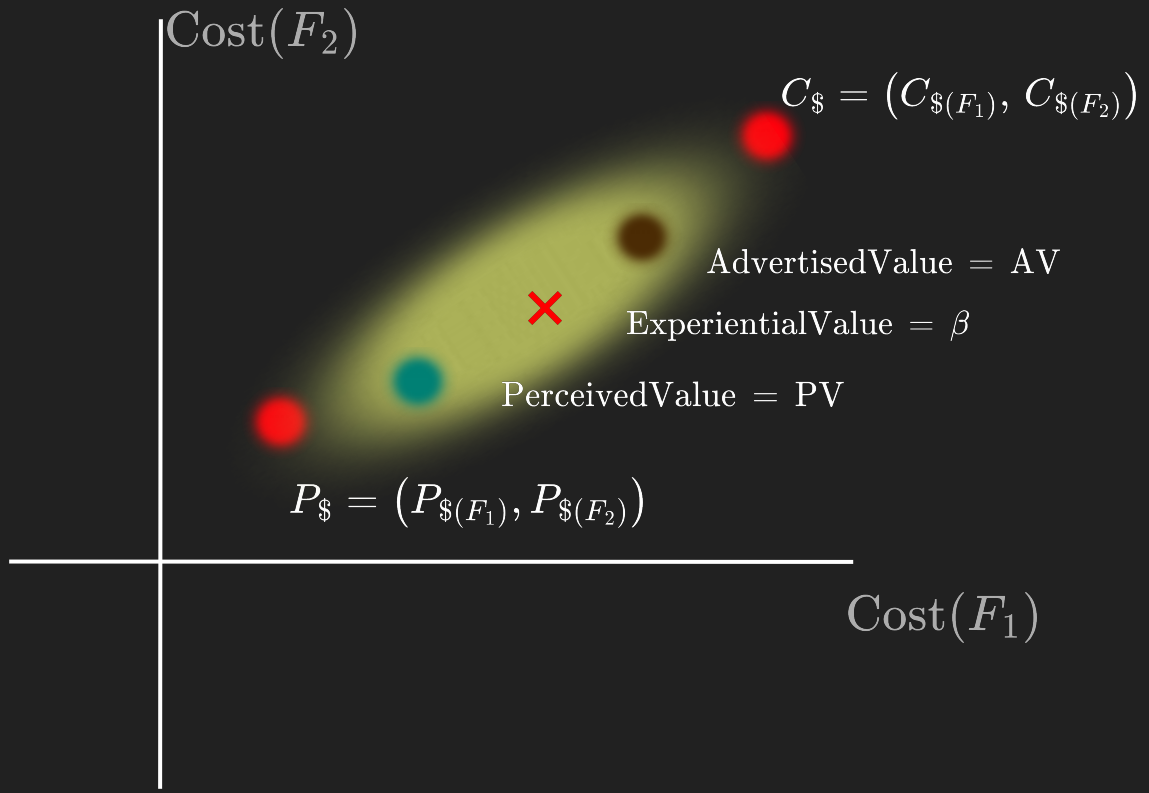


$$\text{ConsumerTrust} = T \begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C$$

$$\Delta PV = \alpha T$$

Model



$$\text{ConsumerTrust} = T \quad \begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C$$

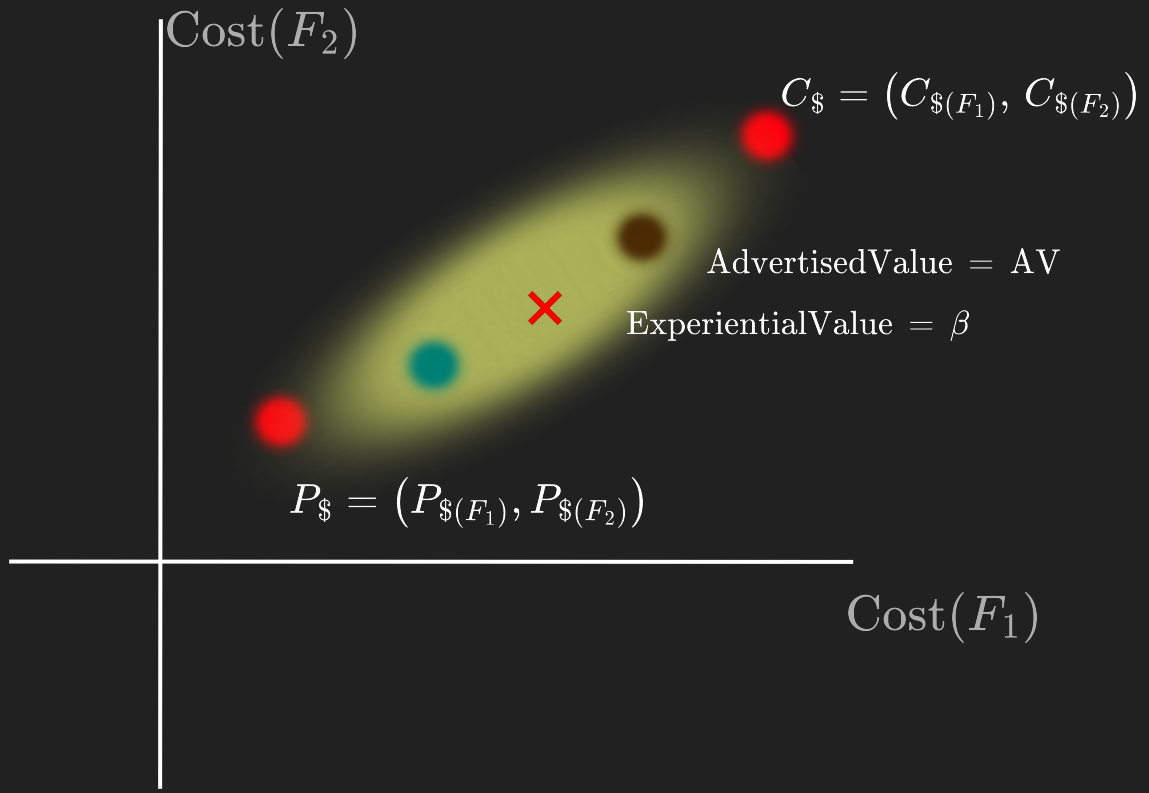
$$\Delta PV = \alpha T$$

$$T = 1$$

$$A_C = 0$$

$$PV = PV_0$$

Model



$\text{ConsumerTrust} = T$

$T \in (-\infty, 0)$ Reject

$T \in (0, \infty)$ Accept

$\text{NumberOfAds} = A_C$

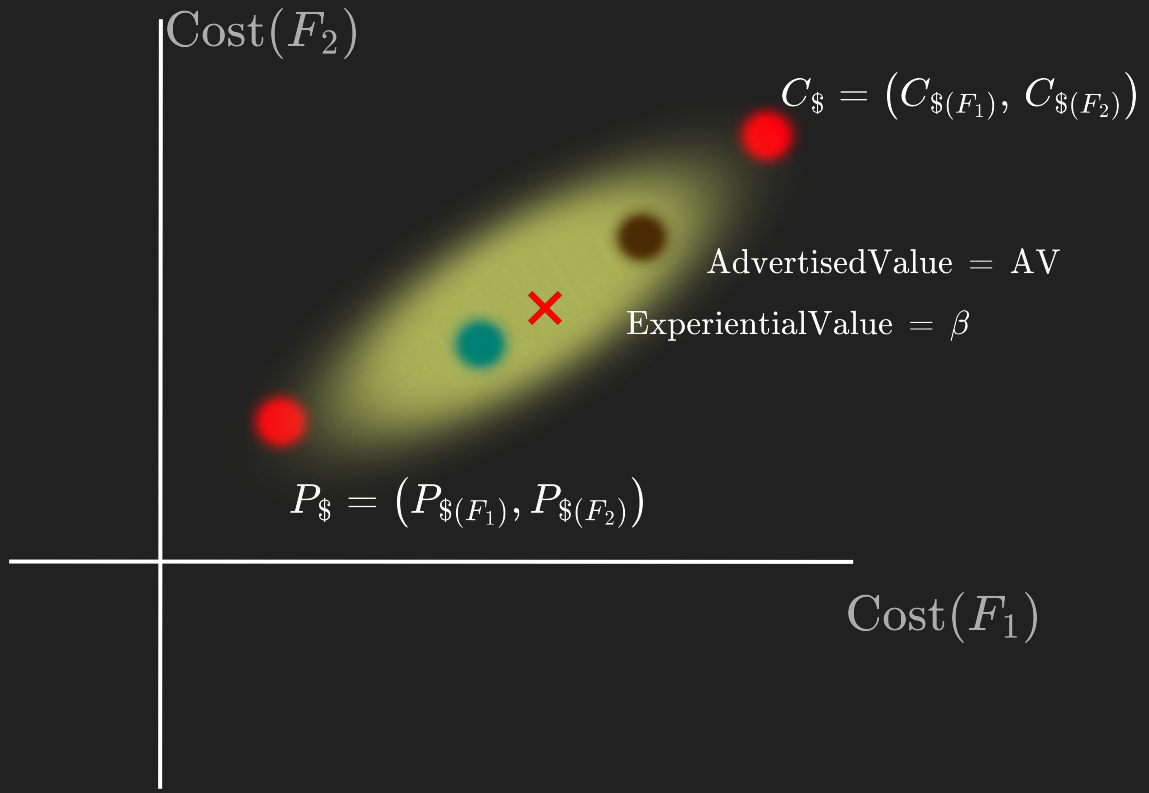
$\Delta PV = \alpha T$

$$T = 1$$

$$A_C = 1$$

$$PV = PV_0 + \Delta PV$$

Model



$\text{ConsumerTrust} = T$

$T \in (-\infty, 0)$ Reject

$T \in (0, \infty)$ Accept

$\text{NumberOfAds} = A_C$

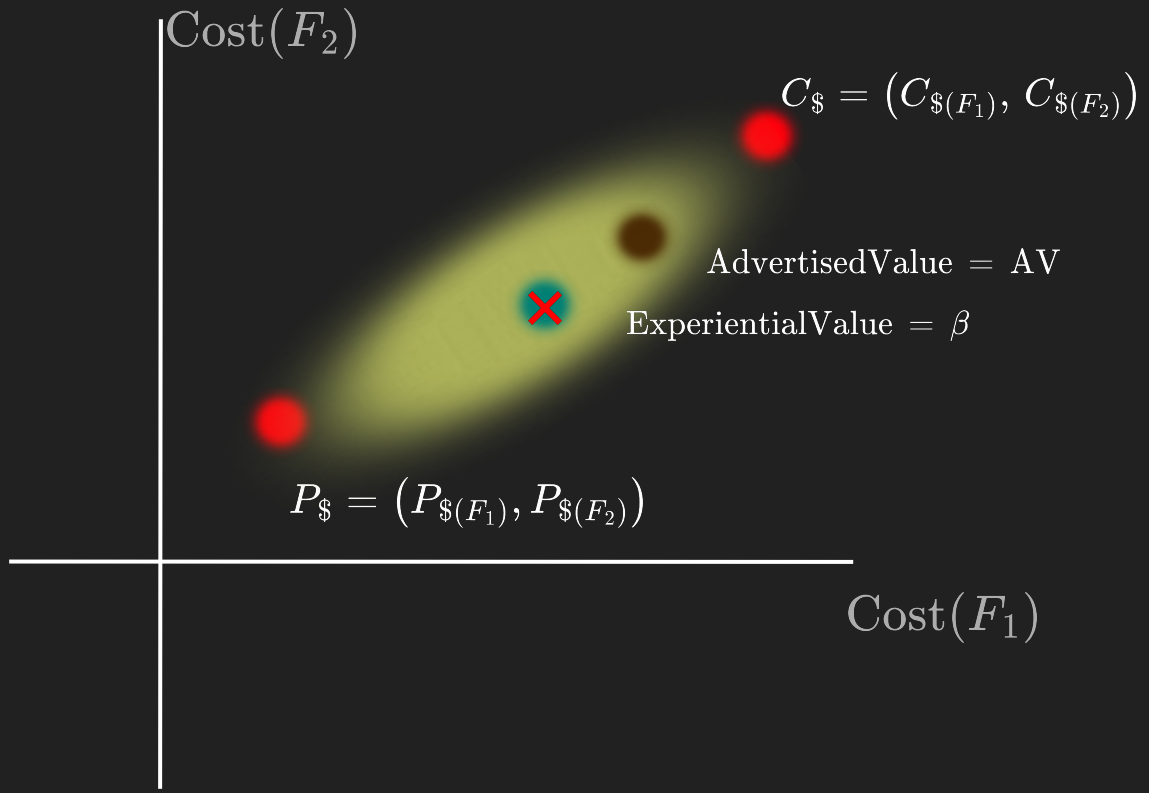
$\Delta PV = \alpha T$

$$T = 1$$

$$A_C = 2$$

$$PV = PV_0 + 2\Delta PV$$

Model



$\text{ConsumerTrust} = T$

$T \in (-\infty, 0)$ Reject

$T \in (0, \infty)$ Accept

$\text{NumberOfAds} = A_C$

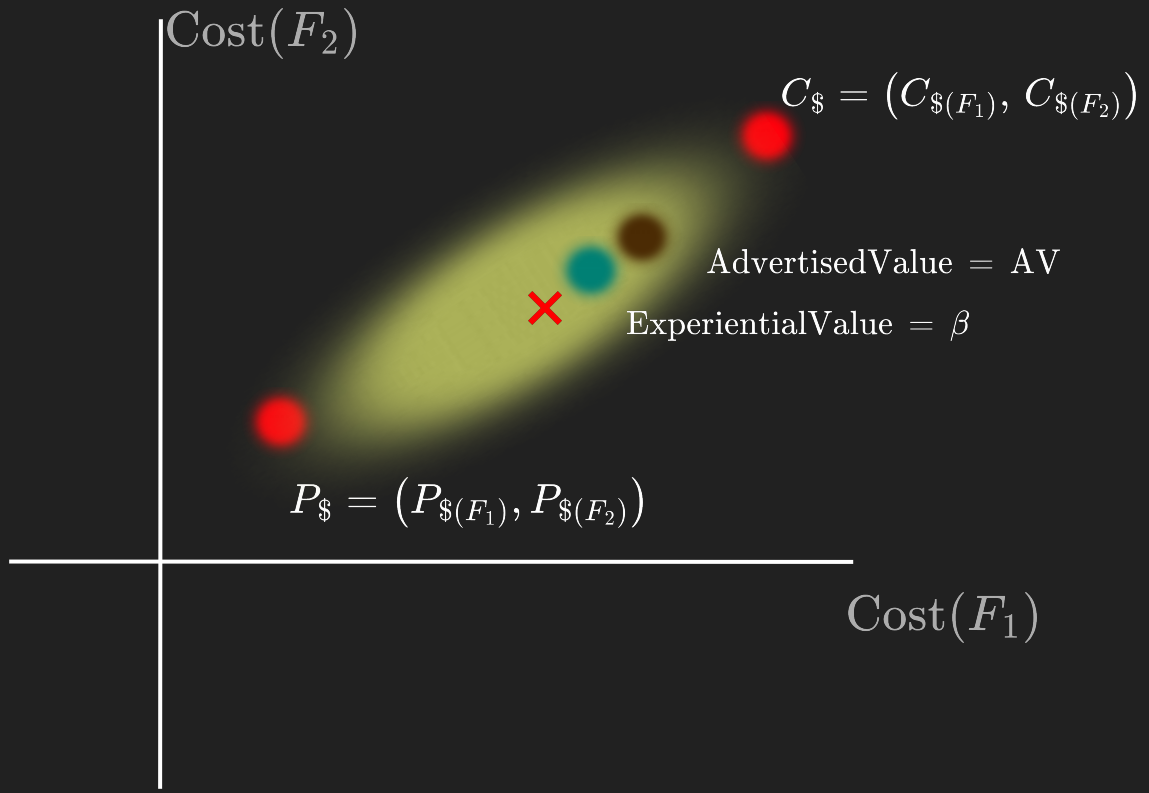
$\Delta PV = \alpha T$

$$T = 1$$

$$A_C = 3$$

$$PV = PV_0 + 3\Delta PV$$

Model



$\text{ConsumerTrust} = T$

$T \in (-\infty, 0)$ Reject

$T \in (0, \infty)$ Accept

$\text{NumberOfAds} = A_C$

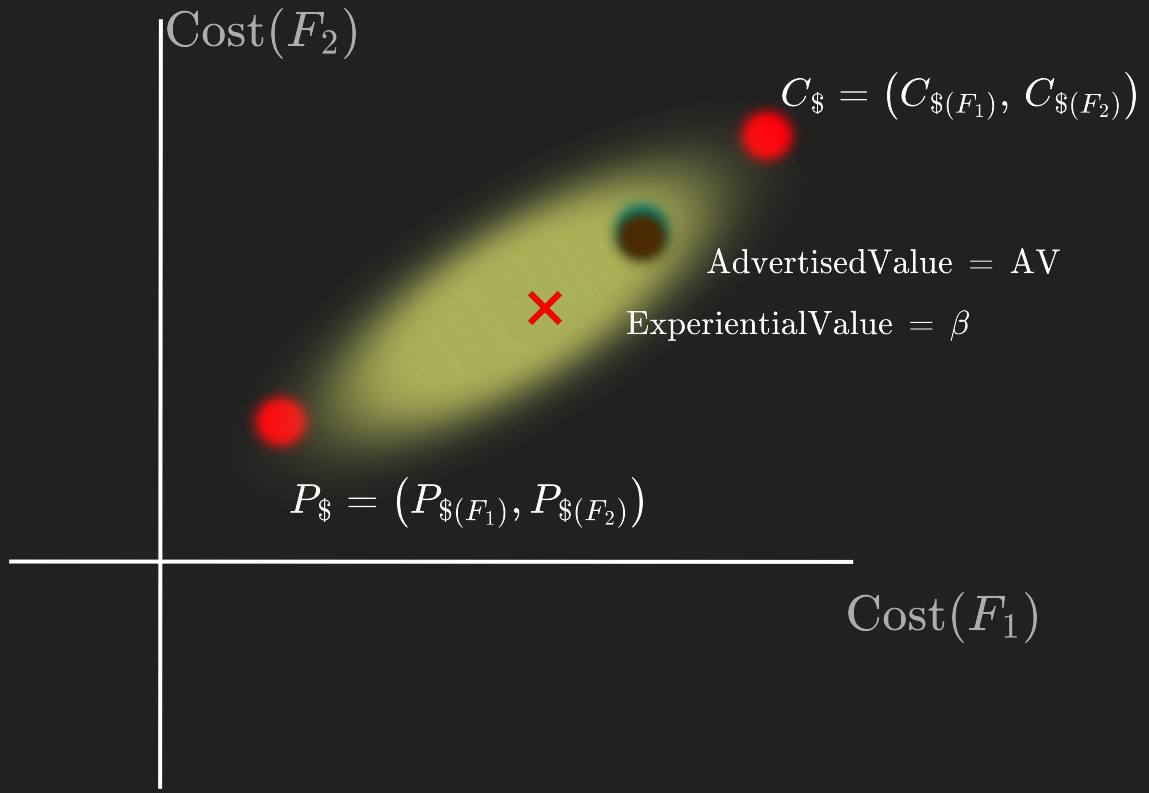
$\Delta PV = \alpha T$

$$T = 1$$

$$A_C = 4$$

$$PV = PV_0 + A_C \Delta PV$$

Model



ConsumerTrust $= T$

$T \in (-\infty, 0)$	Reject
$T \in (0, \infty)$	Accept

NumberOfAds $= A_C$

$\Delta PV = \alpha T$

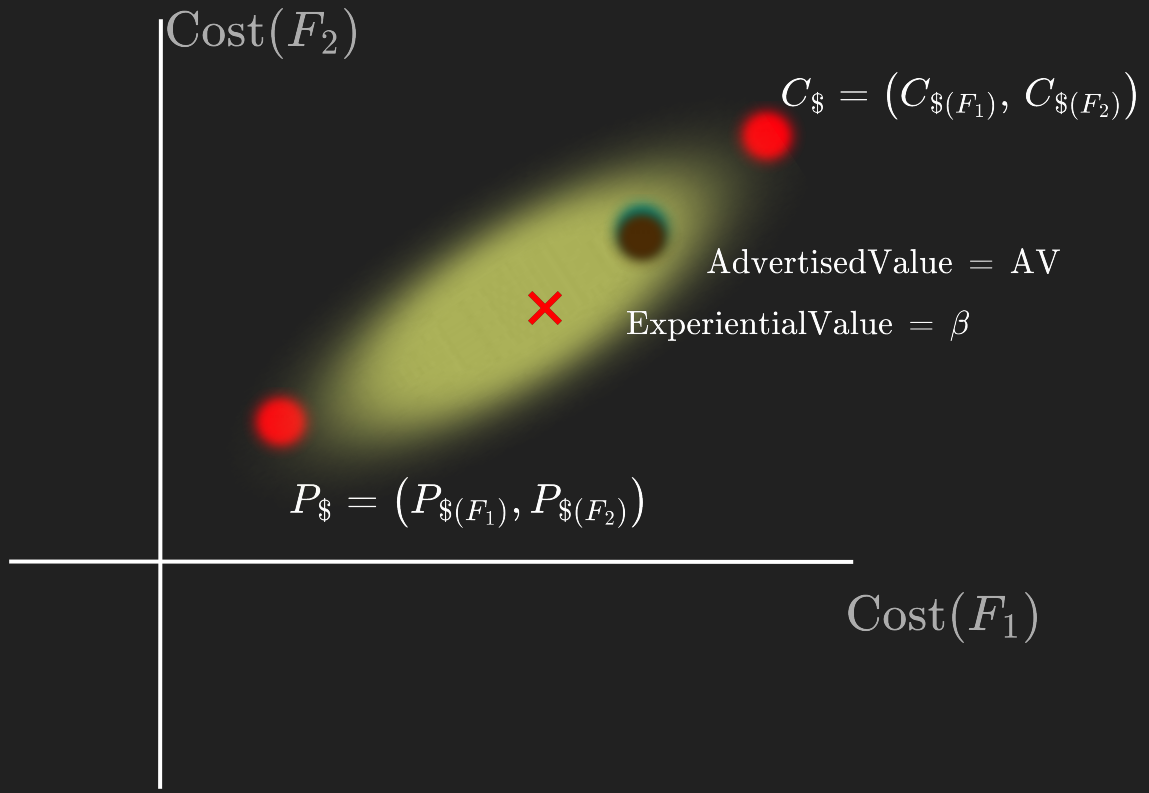
$\mu = \beta - AV$

$T = 1$

$A_C = 5$

$PV = PV_0 + A_C \Delta PV$

Model

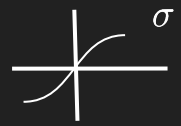


$$\text{ConsumerTrust} = T \begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C$$

$$\Delta PV = \alpha T$$

$$\mu = \sigma\left(\beta - AV\right)$$



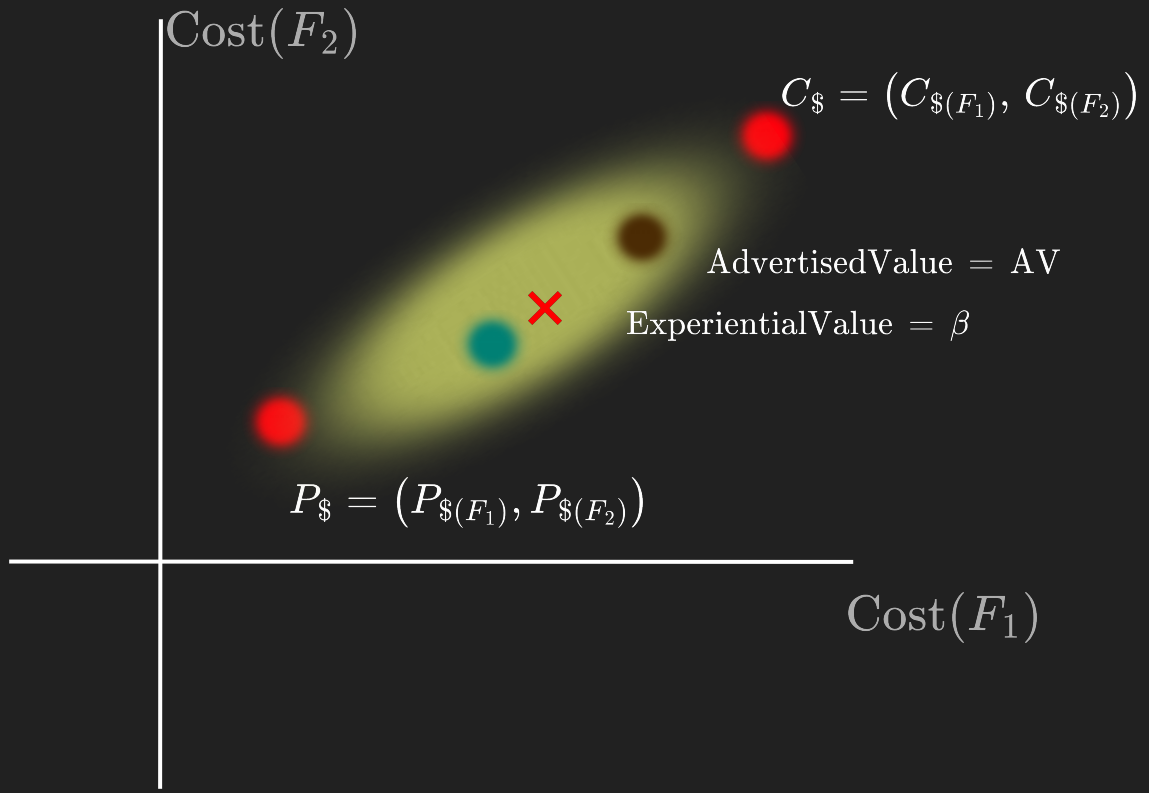
$$T = 1 + \mu$$

$$A_C = 5$$

$$PV = PV_0 + A_C \Delta PV$$

[8]]Khamitov, M., Rajavi, K., Huang, D.-W., and Hong, Y. (2024). Consumer trust: Meta-analysis of 50 years of empirical research. Journal of Consumer Research

Model



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$$\text{NumberOfAds} = A_C$$

$$\Delta PV = \alpha T$$

$$\mu = \sigma(\beta - AV)$$

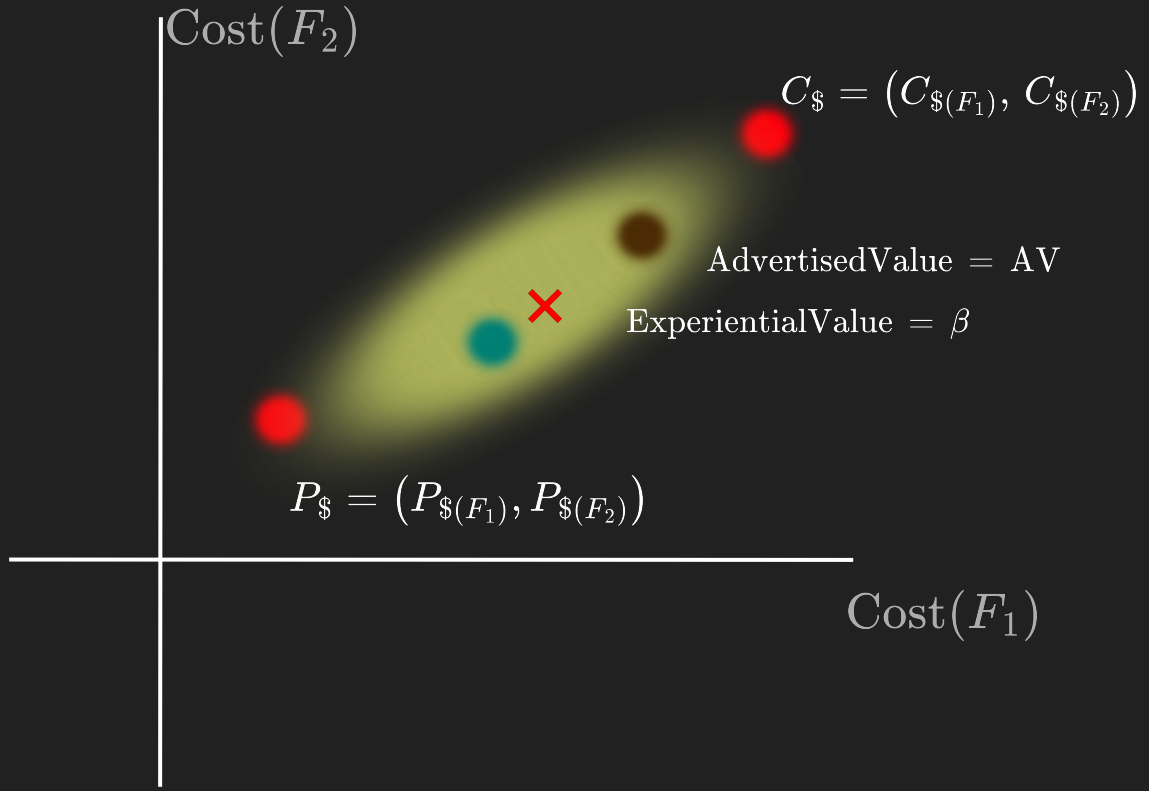
$$T = 1 + \mu$$

$$A_C = 5$$

$$PV = \beta T$$

[9] Sung, E., Chung, W. Y., and Lee, D. (2023). Factors that affect consumer trust in product quality: a focus on online reviews and shopping platforms

Model



$$\text{ConsumerTrust} = T(\tau)$$

$$\begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C(\tau)$$

$$\Delta PV = \alpha T(\tau)$$

$$\mu(\tau) = \sigma(\beta - AV(\tau))$$

$$\text{AdvertisingCycle} = \tau$$

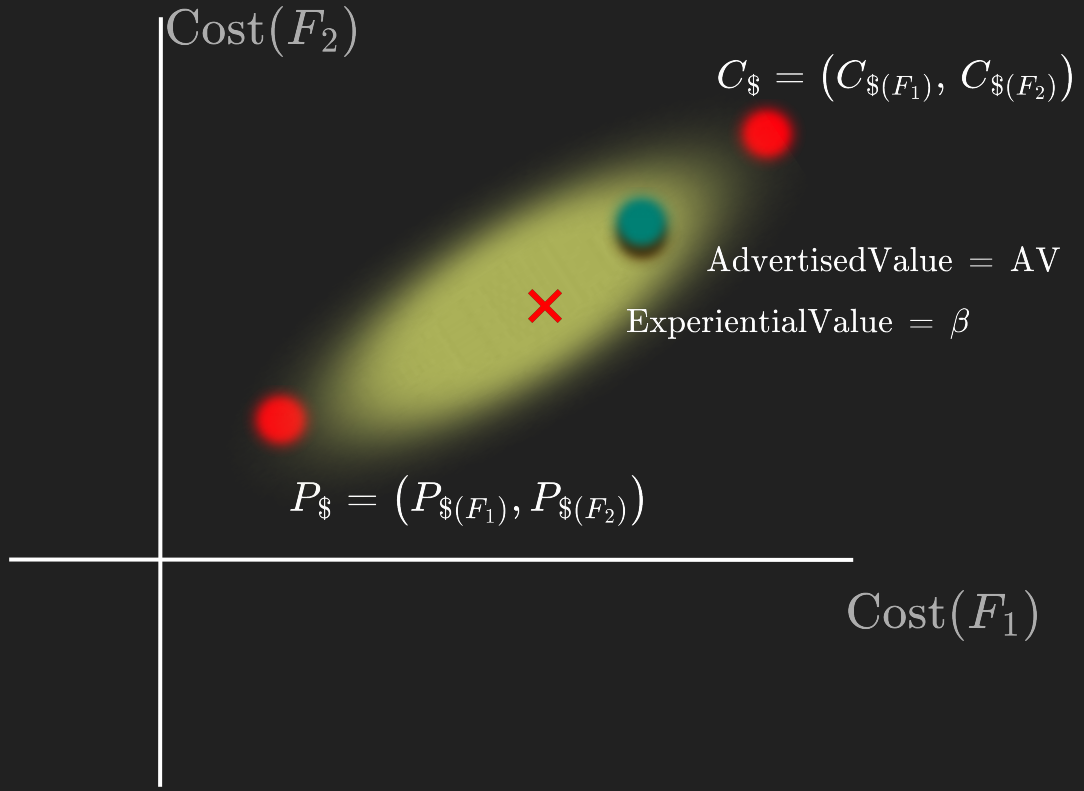
$$\tau = 1$$

$$T(\tau + 1) = T(\tau) + \mu(\tau)$$

$$A_C(\tau) = 5$$

$$PV(\tau + 1) = \beta T(\tau)$$

Model



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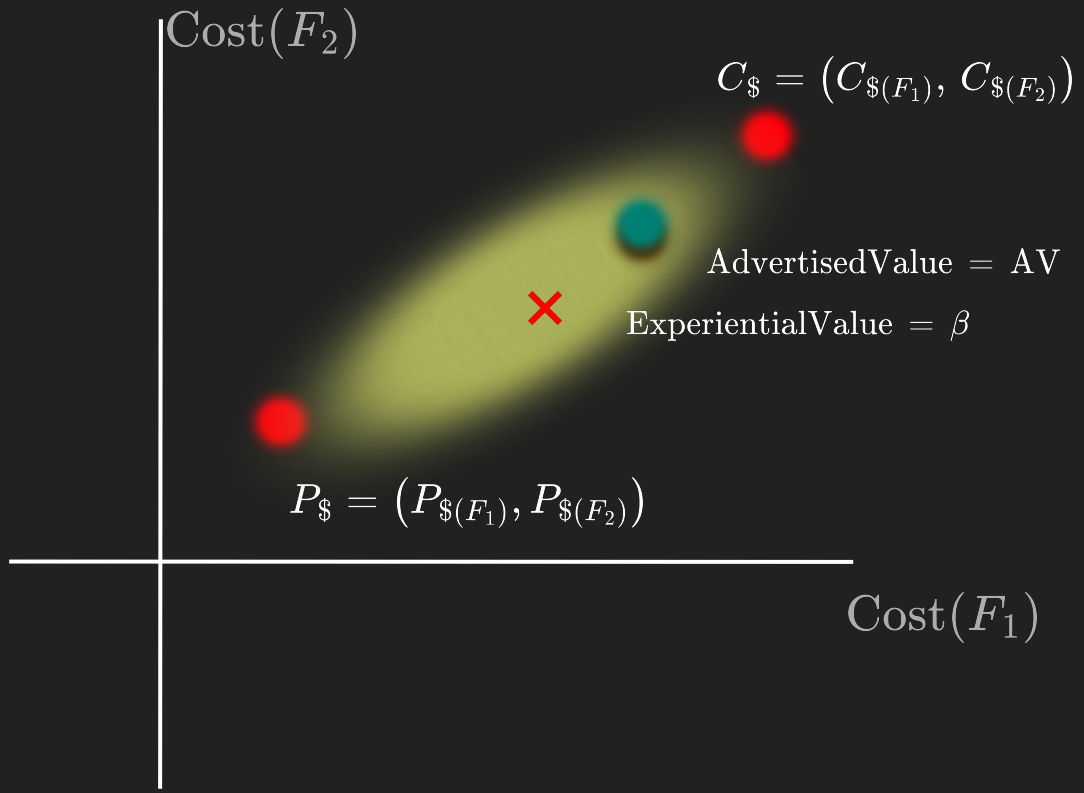
$$\text{NumberOfAds} = A_C(\tau)$$
$$\Delta PV = \alpha T(\tau)$$
$$\mu(\tau) = \sigma(\beta - AV(\tau))$$
$$\text{AdvertisingCycle} = \tau$$
$$\text{ResponseSpeed} = \gamma$$
$$dA_c(\tau) = \gamma \frac{(A_c(\tau) - A_C(\tau - 1))}{\max(A_c(\tau), A_C(\tau - 1))}$$

$$\tau = 2$$
$$T(\tau + 1) = T(\tau) + \mu(\tau)$$
$$A_C(\tau) = 10$$
$$PV(\tau + 1) = \beta T(\tau)$$
$$AV(\tau + 1) = AV(\tau) - dA_c(\tau)$$

Model



$$\text{ConsumerTrust} = T(\tau) \begin{cases} T \in (-\infty, 0) & \text{Reject} \\ T \in (0, \infty) & \text{Accept} \end{cases}$$

$$\text{NumberOfAds} = A_C(\tau)$$

$$\Delta PV = \alpha T(\tau)$$

$$\mu(\tau) = \sigma\left(\frac{1}{\tau}\sum_{i=1}^{\tau} \beta - AV(i)\right)$$

$$\text{AdvertisingCycle} = \tau$$

$$\text{ResponseSpeed} = \gamma$$

$$dA_c(\tau) = \frac{(A_c(\tau) - A_C(\tau - 1))}{\max(A_c(\tau), A_C(\tau - 1))}$$

$$\tau = 2$$

$$T(\tau + 1) = T(\tau) + \mu(\tau)$$

$$A_C(\tau) = 10$$

$$PV(\tau + 1) = \beta T(\tau)$$

$$AV(\tau + 1) = AV(\tau) - dA_c(\tau)$$

Weilbacher, W. (2003). How advertising affects consumers. Journal of Advertising Research

Model

$\tau =$ Purchase Cycle (1)

$N =$ Terminal Purchase Cycle (2)

$E(\tau) =$ Expected Value (3)

$A(\tau) =$ Advertisement Count (4)

$T(\tau) =$ Trust (5)

$P(\tau) =$ Advertised Value (6)

$\beta =$ Experiential Value (7)

$\alpha =$ Expected Value per Unit of Trust (8)

$\gamma =$ Price Response Speed (9)

$n =$ Memory (10)

$$\sigma(z) = \frac{1}{(1+e^{-x})} - 1/2 \tag{11}$$

$$\mu(\tau) = \sigma\left(\frac{1}{n}\sum_{i=\tau-n}^{\tau-1}(\beta - P(\tau))\right) \tag{12}$$

$$A_e(\tau) = \frac{\gamma(A_c(\tau) - A_c(\tau-1))}{2\max(A_c(\tau), A_c(\tau-1))} \tag{13}$$

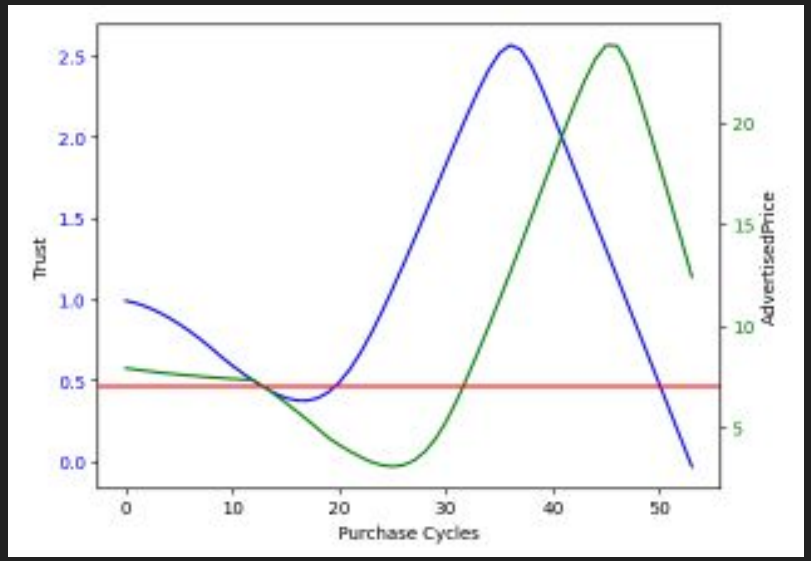
Algorithm 1 Dynamical Model

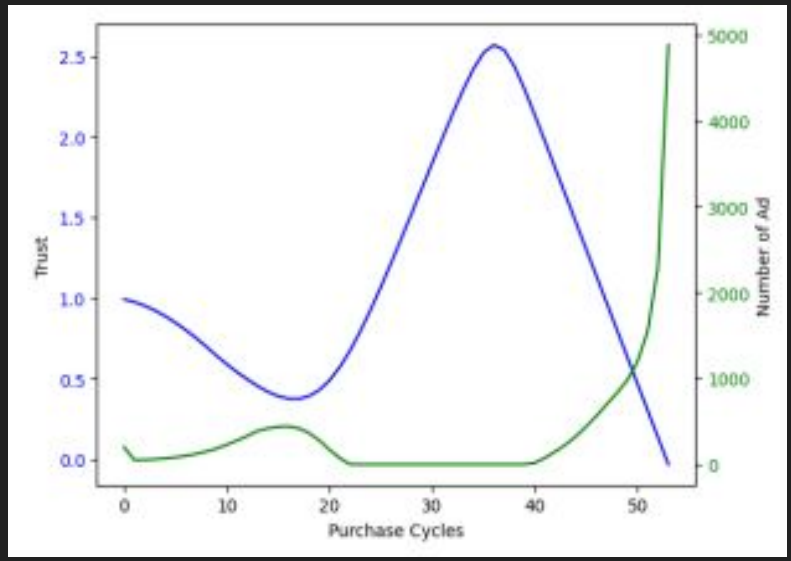
for $\tau = (1,2,3,...,N)$ **do**
  $A_c = 0$
  while $E(\tau) < P(\tau)$ **do**
    $E(\tau) = E(\tau) + \alpha T(\tau)$
    $A_c(\tau) = A_c(\tau) + 1$
  end
  $T(\tau) = T(\tau - 1) + \mu(\tau)$
  $P(\tau) = P(\tau - 1) - A_e(\tau)$
  $E(\tau + 1) = \beta T(\tau)$
end

Contents

Results - Communicative Failure

Low γ_{cf}

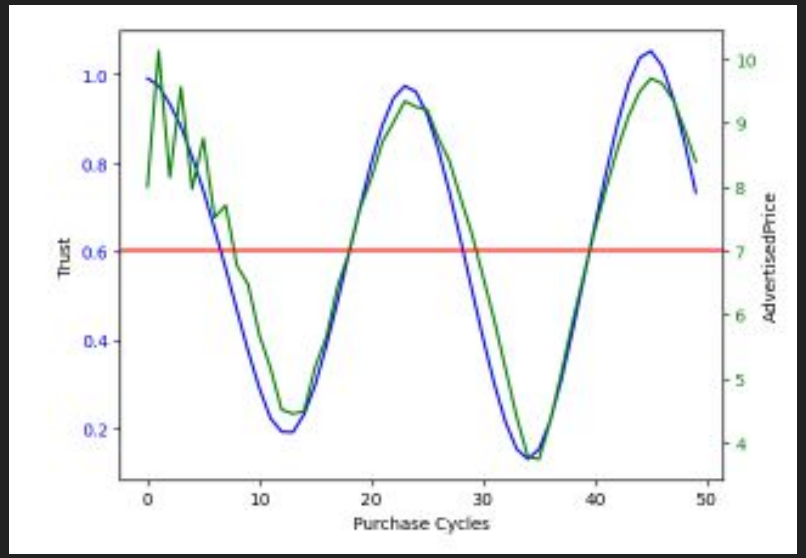


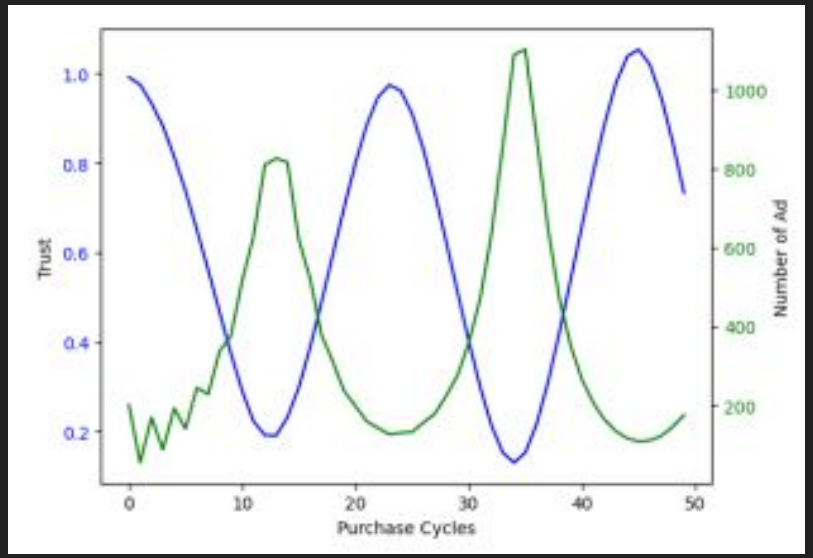


Green: Advertised Value, Blue: Trust, Red: Experiential Value

Results - Opportunistic Advertising

High γ_{oa}

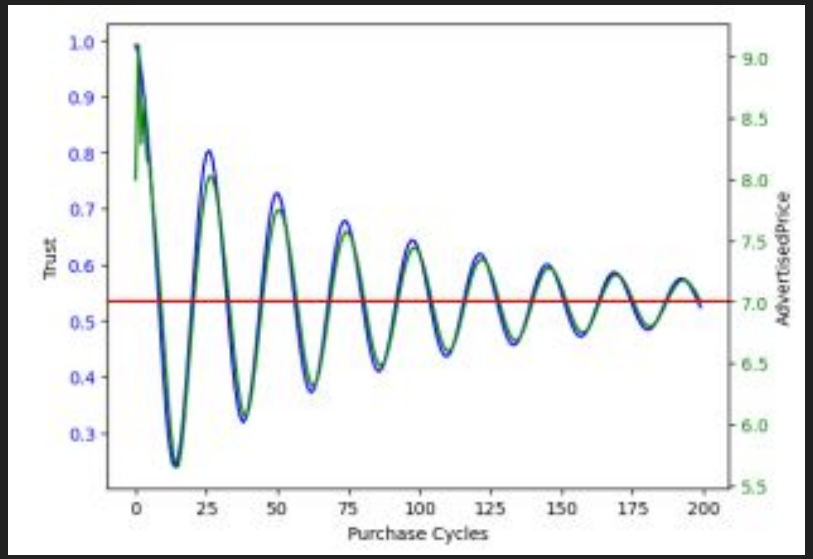


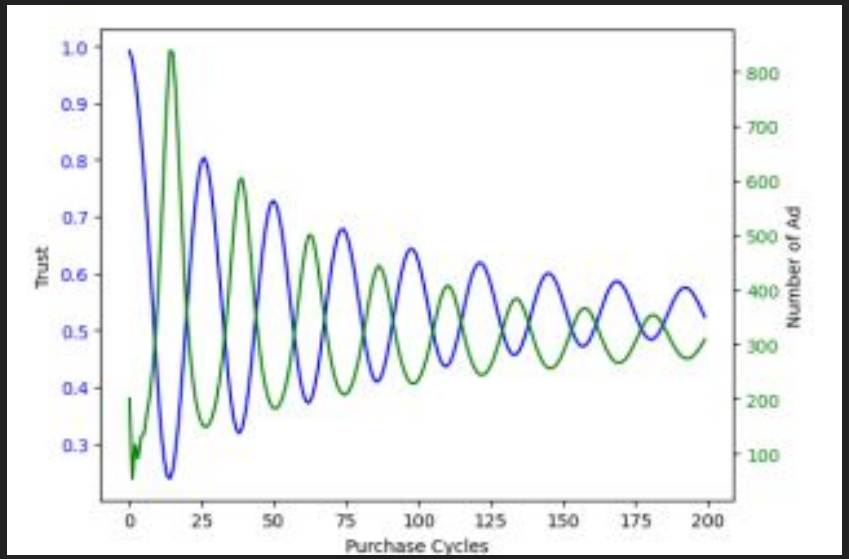


Green: Advertised Value, Blue: Trust, Red: Experiential Value

Results - Restrained Advertising

$$\delta + \gamma_{cf} < \gamma_{ra} < \gamma_{\mathrm{oa}} - \delta$$





Green: Advertised Value, Blue: Trust, Red: Experiential Value

Discussion

1. How can an advertiser influence the experiential value of a product?
2. How can a consumer's present needs factor into how receptive they are to an ad?
3. How do advertisers and consumers adjust their respective hyper parameters like α and γ? Is this process stochastic?
4. How can this framework of modeling trust be applied to other forms of communication?

…. and More!

Thank you!