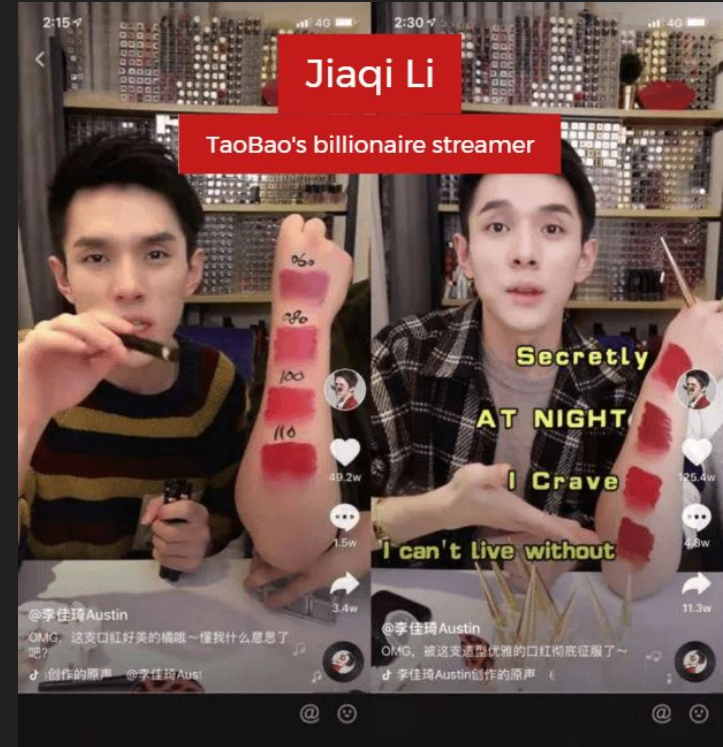


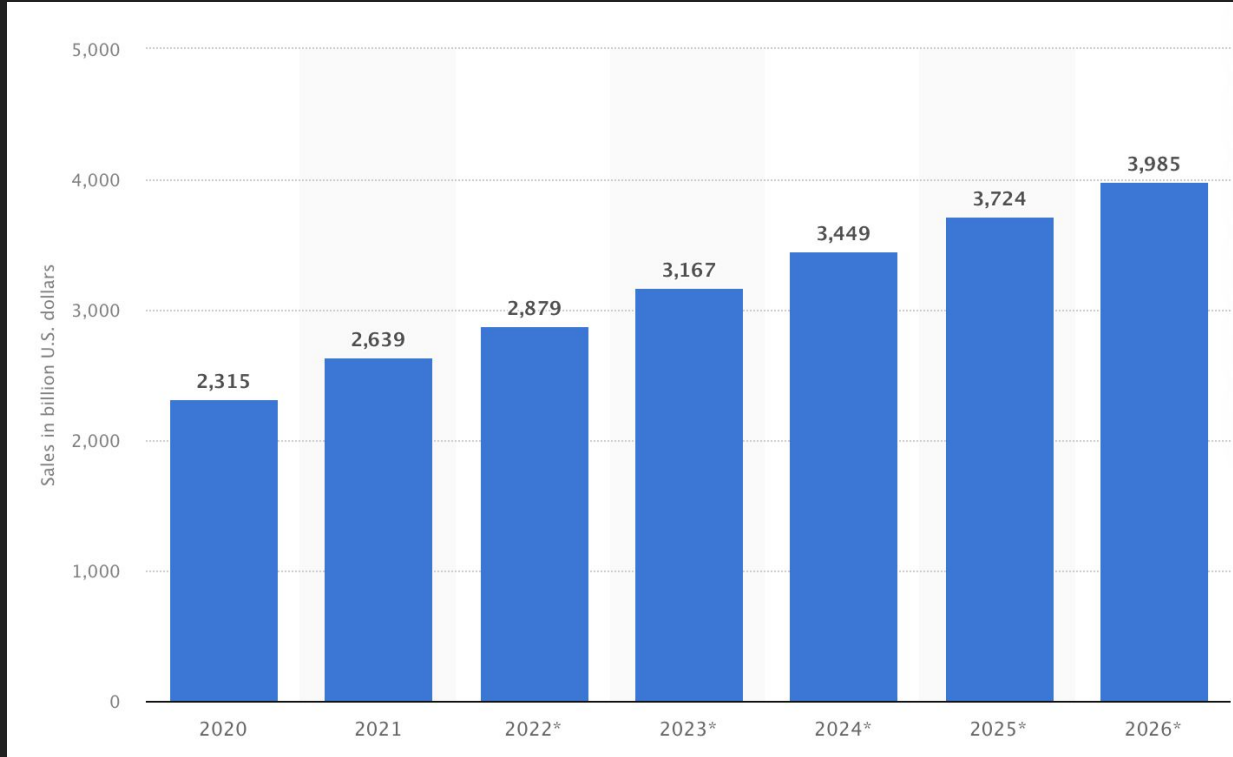
# Social Media Influencers' Effects On Cloth Shop in China

Rosy Xu

# Social Media Influencers in China



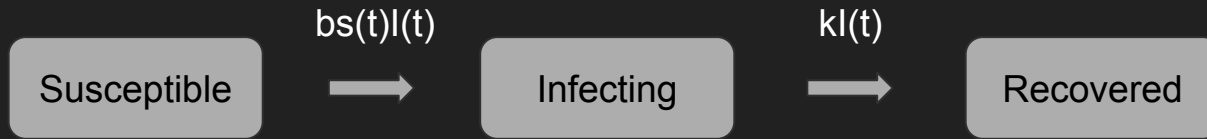
# E-commerce in China



12% increase  
compared to 2020

Reference: Statista

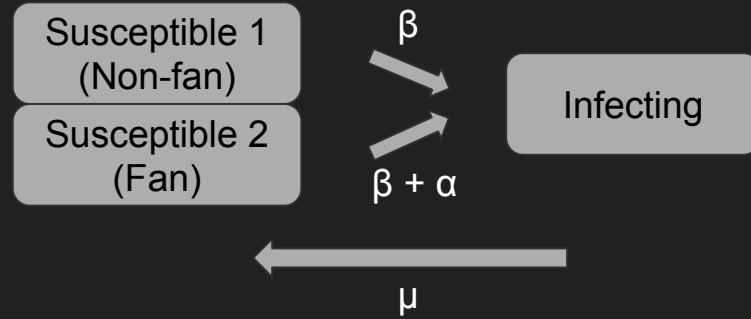
# SIR Model in Epidemiology



$\left\{ \begin{array}{l} b \text{ is the average number of people each infected person contact per unit time} \\ k \text{ is average proportion of people will lose infect ability per unit time} \\ s \text{ is the proportion of S among all population} \end{array} \right.$

$$\left\{ \begin{array}{l} \frac{dS}{dt} = -bsI \\ \frac{dI}{dt} = bsI - kI \\ \frac{dR}{dt} = kI \end{array} \right.$$

# SIS Model in Cloth Shop



$\beta$ : fraction of people attracted to purchase due to factors other than influencer's post per unit time  
 $\alpha$ : fraction of people attracted to purchase due to influencer's post per unit time  
 $\mu$ : fraction of people regenerate the desire to repurchase the product in the future per unit time

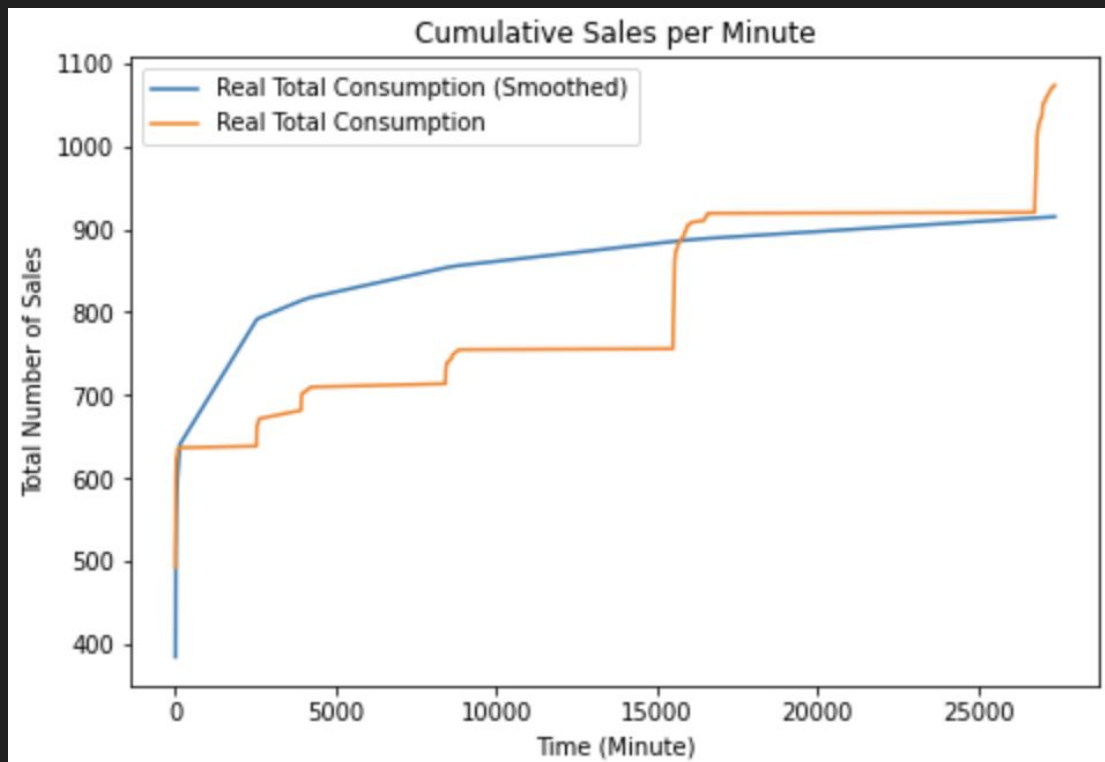
$$\begin{cases} \frac{dS_1}{dt} = -\beta S_1 + \mu S_1 I \\ \frac{dS_2}{dt} = -(\beta + \alpha) S_2 + \mu S_2 I \\ \frac{dI}{dt} = \beta S_1 + (\alpha + \beta) S_2 - \mu S_1 I - \mu S_2 I \end{cases}$$

# Assumption of SIS Model in Cloth Shop

- The total population ( $S + I$ ) does not change over time
- People in infecting group going back to  $S_1$  and  $S_2$  group proportionally
- Non-fan will not be influenced by the social media influencer

# Dataset

- From: A Cloth Shop in China
- Product Type: Coat
- Release Time: 2022-10-25
- Cardinality: 1073
- Duration: 27404 minutes



# Parameter Simulation

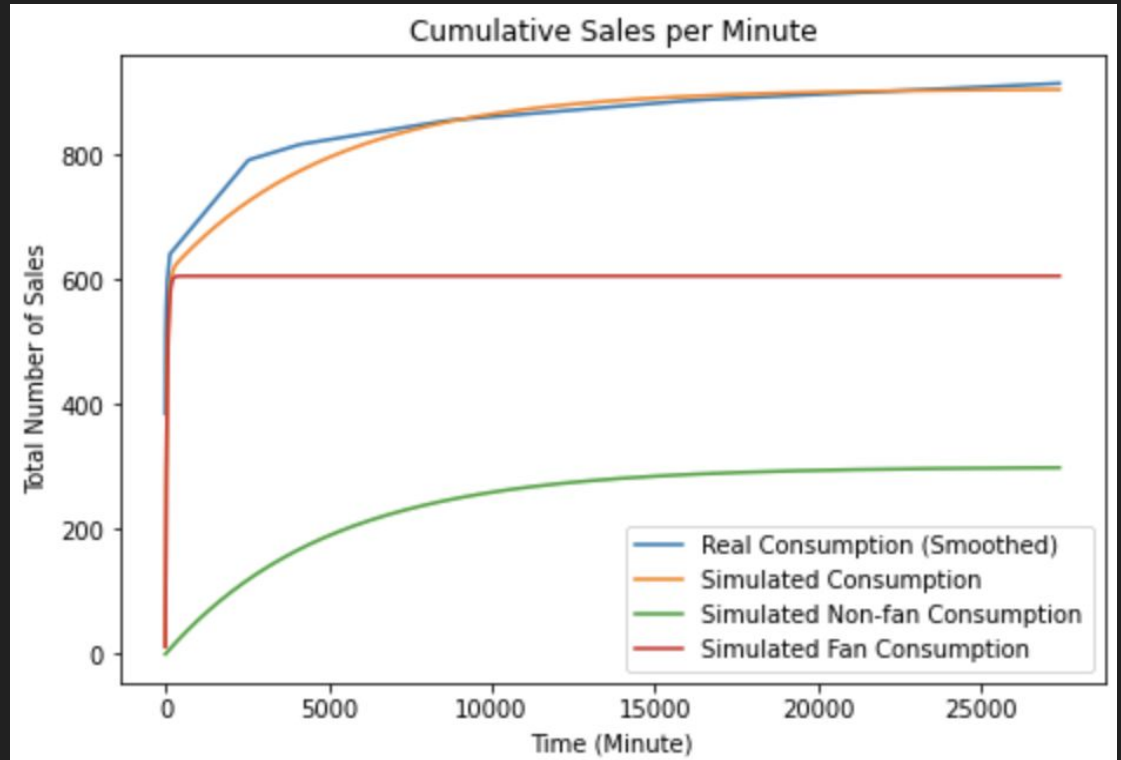
$$\alpha = 0.02$$

$$\beta = 0.0002$$

$$\mu = 0.0000001$$

$$S1(0) = 300$$

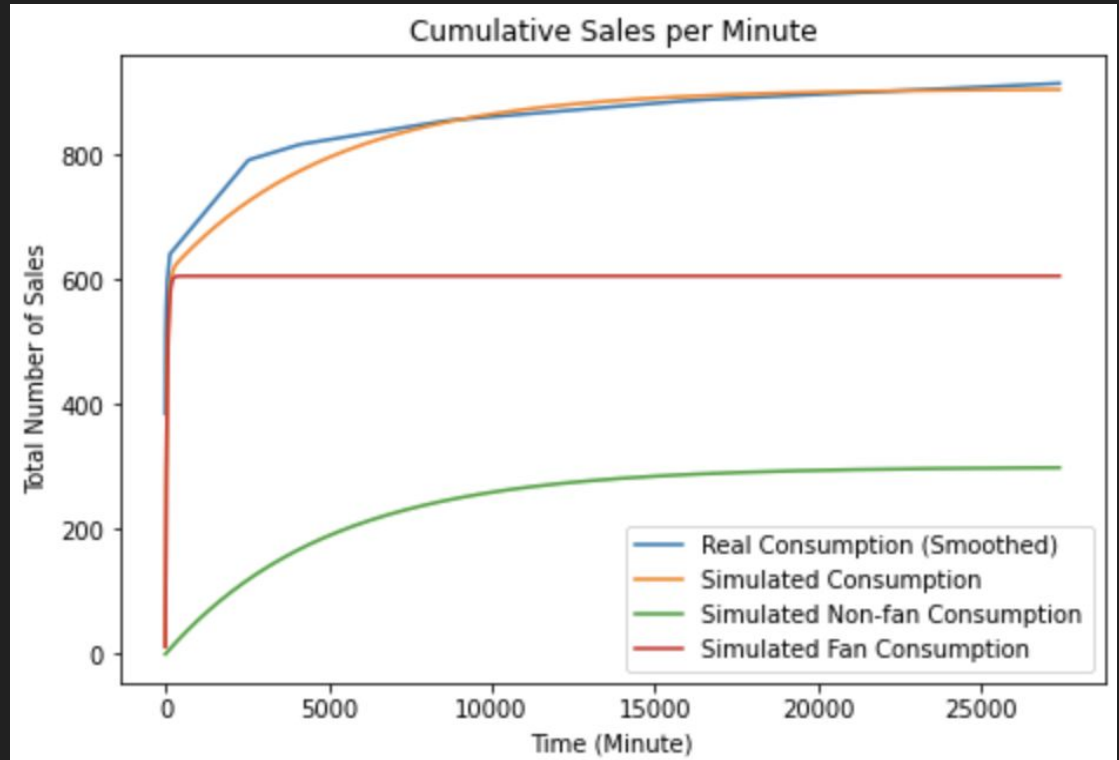
$$S2(0) = 600$$



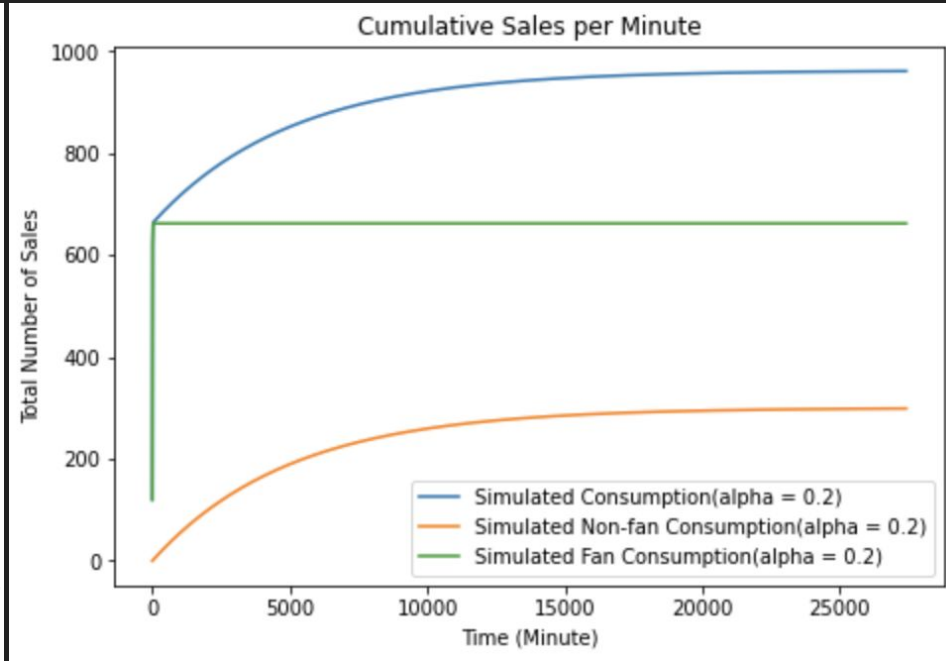
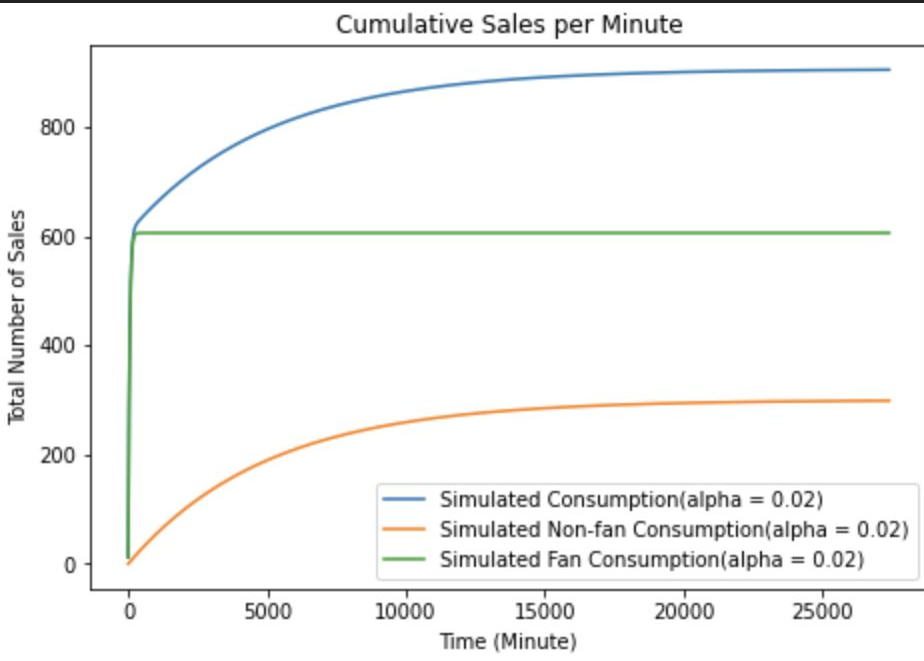


# Implication of Simulation

- All consumptions are increasing in decreasing rate
- Almost all population in S2 purchase in 200 minutes
- Social media influencer's attraction ( $\alpha$ ) is 100 times of the attraction other than social media influencer's attraction ( $\beta$ )

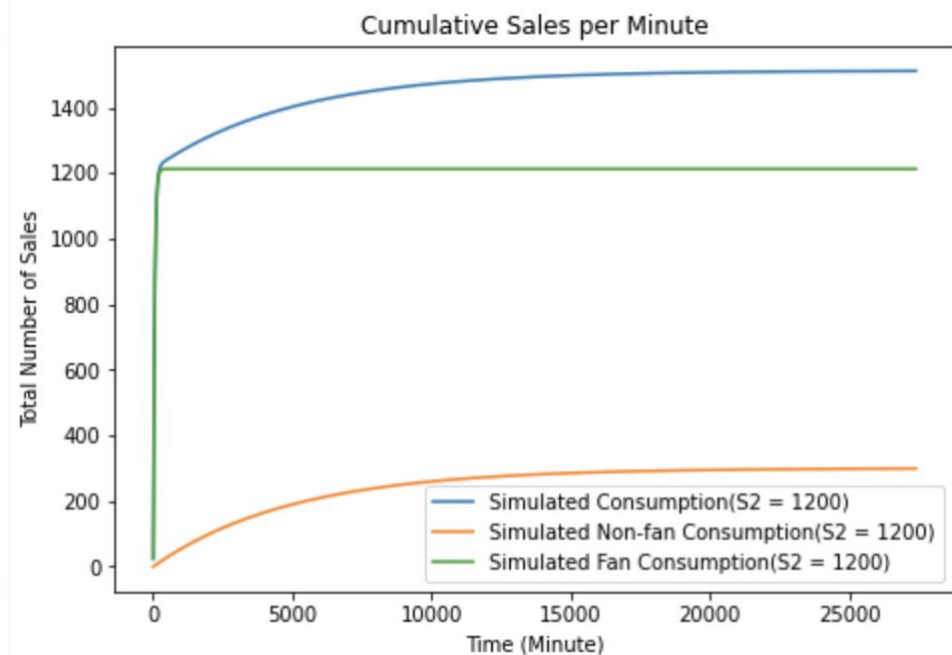
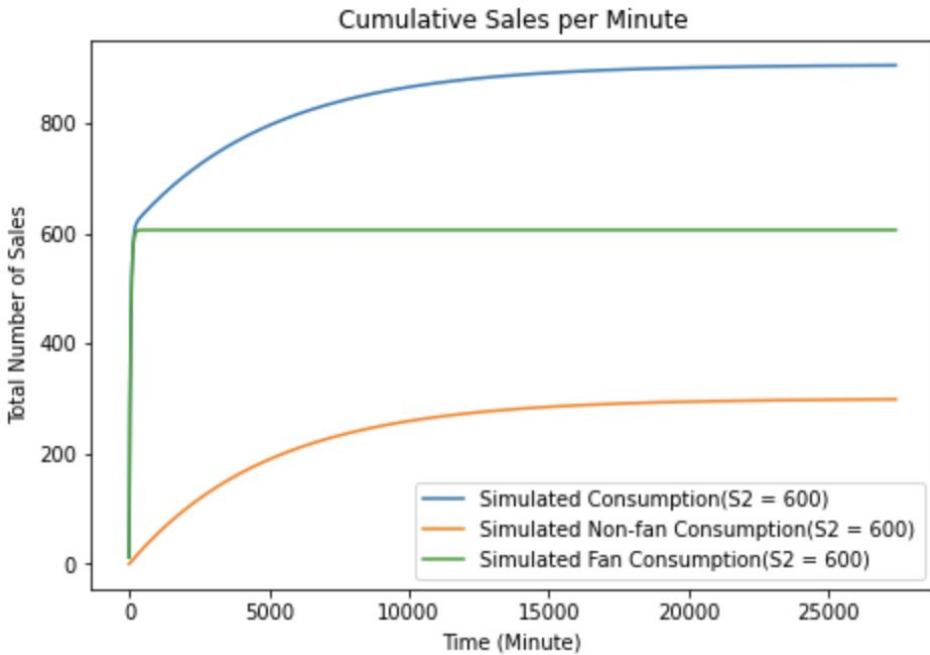


# Ceteris Paribus, increase $\alpha$



Increases the total purchase for ~50

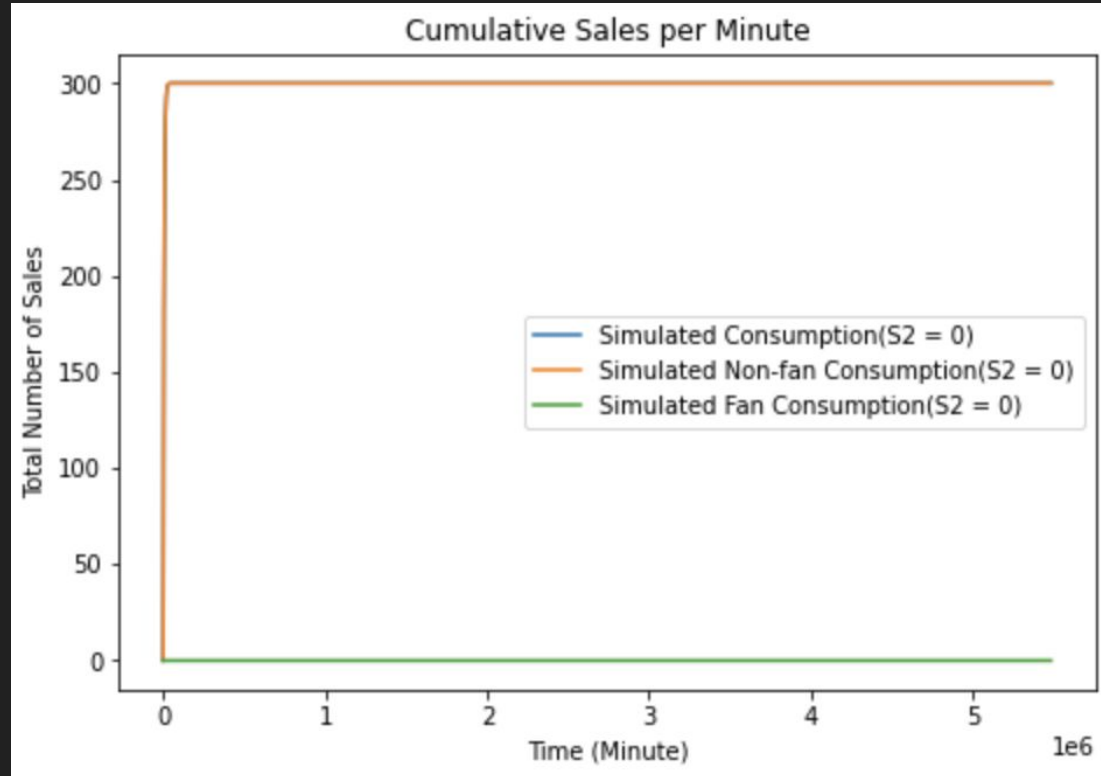
# Ceteris Paribus, double population of fans



Increases the total purchase for ~600

# What if not using any social media influencer...

Takes Endless time!



# Conclusion

- Cooperating with social media influencer do increases the sales of product
- Increasing  $S_2$  would be more effective than increasing  $\alpha$
- Only know the social media influencer's effect after the product is sold

# Improvement

- The parameters are arbitrary. In the future, we can build another model and find the formula for  $\alpha$ ,  $\beta$ , and  $\mu$  using meaningful data, for example, repurchasing rate.
- The population in  $S_1$ ,  $S_2$  are unclear before releasing the product. In the future, we can try to find the  $S_1$ ,  $S_2$  before so that we can predict the sale and choose the social media influencer that maximize the sales.

# Reference

<https://jingdaily.com/liu-genghong-workout-livestreams-fila/>

<https://www.statista.com/statistics/289734/china-retail-e-commerce-sales/>

# Acknowledgement

Thanks for Professor David Meyer help with my model during the whole semester.

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Q&A