OPTIMIZING THE COST OF INVESTMENT IN PROMOTIONAL CAMPAIGNS AND LEVERAGING THE SELLER'S CAPITAL TO ENHANCE REVENUE

Dictionary:

ADO: Average daily order
GMV: Gross Merchandise Volume
AGD: Average daily GMV

BAU: Business as Usual
Spike: Doudle Day (12/12)

Adoption rate: percentage of sellers who join the program over total sellers

Seller Tier Description

ST	**: Sellers with ADO >=20**
Ultra ST	: Sellers with ADO >=400
Super ST	: Sellers with ADO >=100
Upper ST	: Sellers with ADO >=50
Lower ST	: Sellers with ADO >=20
MT	**: Sellers with ADO >=5**
LT	**: Sellers with ADO <5**

Category:
- ELHA: Electronic & Home Appliances
- FMCG: Fast-moving consumer goods
- Lifestyle
- Fashion

Investment Groups

Seller Investment

Cash Portion (Revenue)
- Real Cash: Revenue from packages selling
- Commission
- Transaction fees (Handling fees)
- Paid Ads: $ seller top-up to Paid-ads
- FSS CCB (Service Fee): Service fee seller has to pay for program.

Non Cash Portion
- Seller Voucher: Budget from Seller, not cash
- Other

Shopee Investment

Program
- FSS Logistics Cost: $ Shopee invest in Freeship Extra voucher
- CCB Extra Voucher: $ Shopee invest in Coin Cashback voucher

Non-Program
- Other Rebate: $ Rebate on seller SKUs
- Other Voucher: $ invest in Voucher (not include Freeship & Coin voucher)
- Other Coin: $ invest in sellers who join trial Coin Cashback
- Other Logistics: all sellers) (not include Freeship Extra voucher)

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1. Background:

After having benchmarked commercial performance of 2021 vs. 2020, leadership continued investigating how much Spike contributed to platform. Turned out **21.16% ST sellers & 21.64% orders** came from Spike, which was not healthy.

Breakdown problems:
- On average, Spike day's orders are more than 8 times higher than the average number of orders on a normal day.
- Spike Day contributed more than 21% of total orders and nearly 17% of GMV for the month
- In particular, more than 21% of ST Sellers gain sales from Spike (although for BAU ADO, these are Long-tail and Mid-tail Seller groups)
- Average Daily Order table: Spike daily orders account for a high % of Tier sellers (there are sellers up to 53%, 35%)

SELLER PERFORMANCE IN DECEMBER 2021

Seller_tier_name: All

| EL&HA | Fashion | FMCG | Lifestyle |

402.95 Average of spike_ADO

48.63 Average of BAU ADO

15.07M Sum of spike_ADG

Number Of Sellers

General Tier	Full Month	BAU	% Spike
Short-tail	6668	5257	21.16%
Long-tail		5	
Mid-tail		1406	

Average Daily Order

Seller_tier_name	Full month	BAU	% Spike
Ultra Short-tail	27418.8968	13,143.12	53.61%
Super Short-tail	141344.8510	93,657.61	35.88%
Upper Short-tail	100433.4310	83,207.71	19.82%
Lower Short-tail	131307.7329	109,269.33	19.47%
Mid-tail		25,004.29	
Long-tail		9.98	

Total Order in December
Spike Orders 2.69M (21.64%)
Other days GMV 9.73M (78.36%)

GMV in December
Spike GMV 15.07M (16.92%)
Other days GMV 73.98M (83.08%)

BUSINESS QUESTION:
**How to monetize the sellers who are leveraging Spike to gain sale?**

2. Intial Data Analysis

2.1. Data Preprocessing:

The dataset provided by Shopee includes information related to the business activities and commercial performance of 6,668 ST sellers. Additionally, it consists of investments made by Shopee in each individual seller, as well as the investments made by the sellers themselves. The dataset focusses on data in December 2021 on the Shopee e-commerce platform, particularly on the Spike Day - 12/12/2021.

This is a project in my externship, to ensure data security as commited, the data will not be shared.
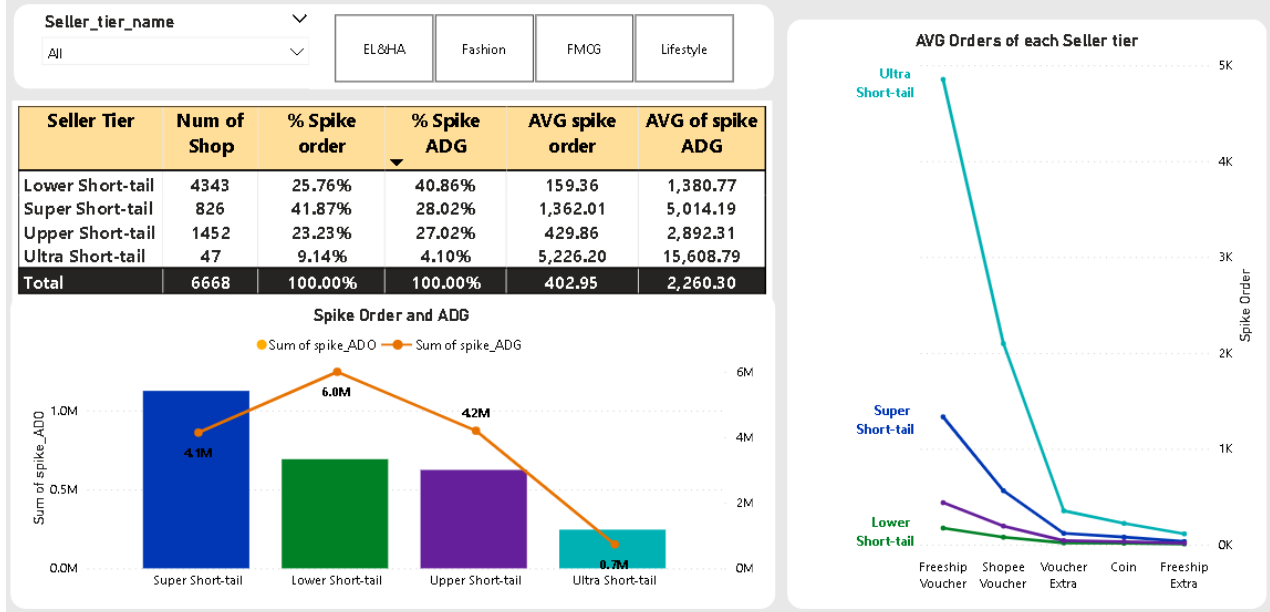
- Data Modeling (Power BI):
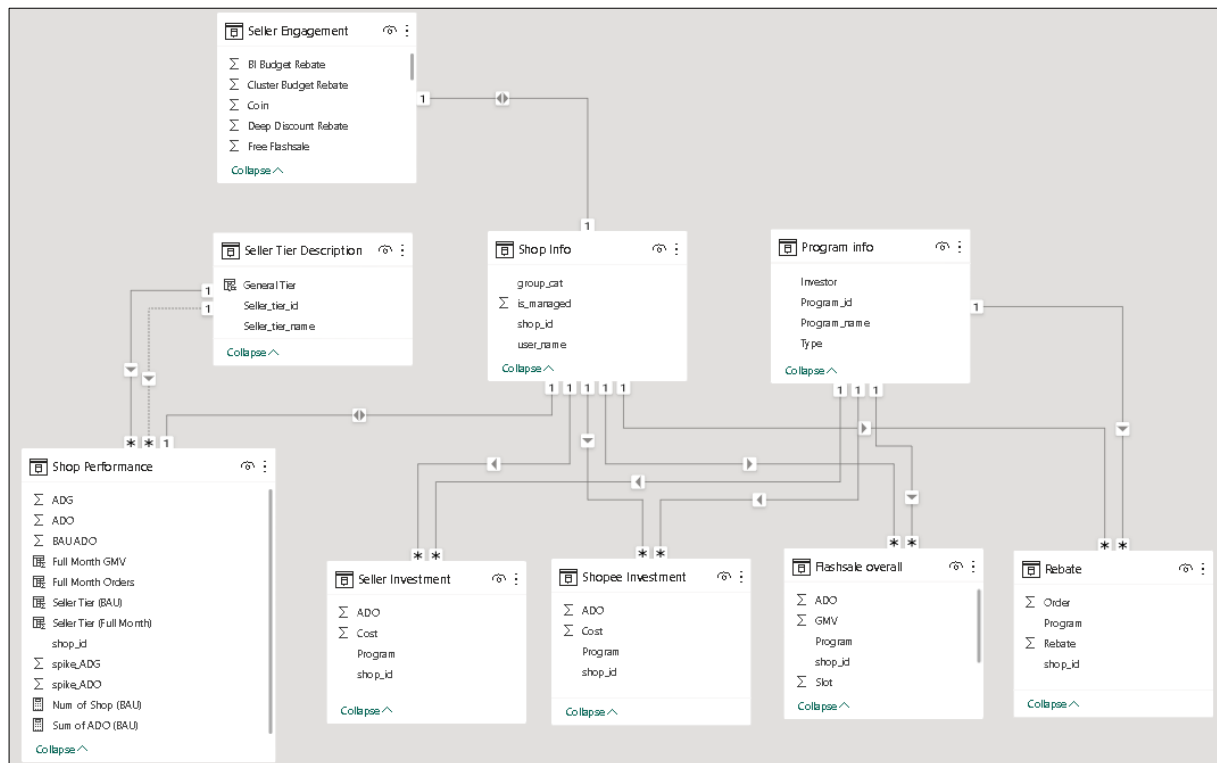
2.2. Initial Data exploration:

a. Seller performance during Spike

- Sellers in the Ultra Short-tail and Super Short-tail groups have a very high number of orders and ADG on Spike day, each Ultra shop on Spike day averages more than 5000 orders and earns an average of more than $ 15,600
- Overall, the Lower ST group has the highest percentage contribution to GMV (more than 40%), the Super ST group has the highest % contribution to total orders (more than 41%).
- In terms of efficiency, combined with the total number of sellers of each group and ADG values, the average number of orders of a shop during the Spike day, it can be seen that the Ultra ST group is a group of high-value sellers, although there are very

few shops in this tier. The Super ST group is also a good performer, with only 826 but contributing more than 41% of orders and 28% of GMV.
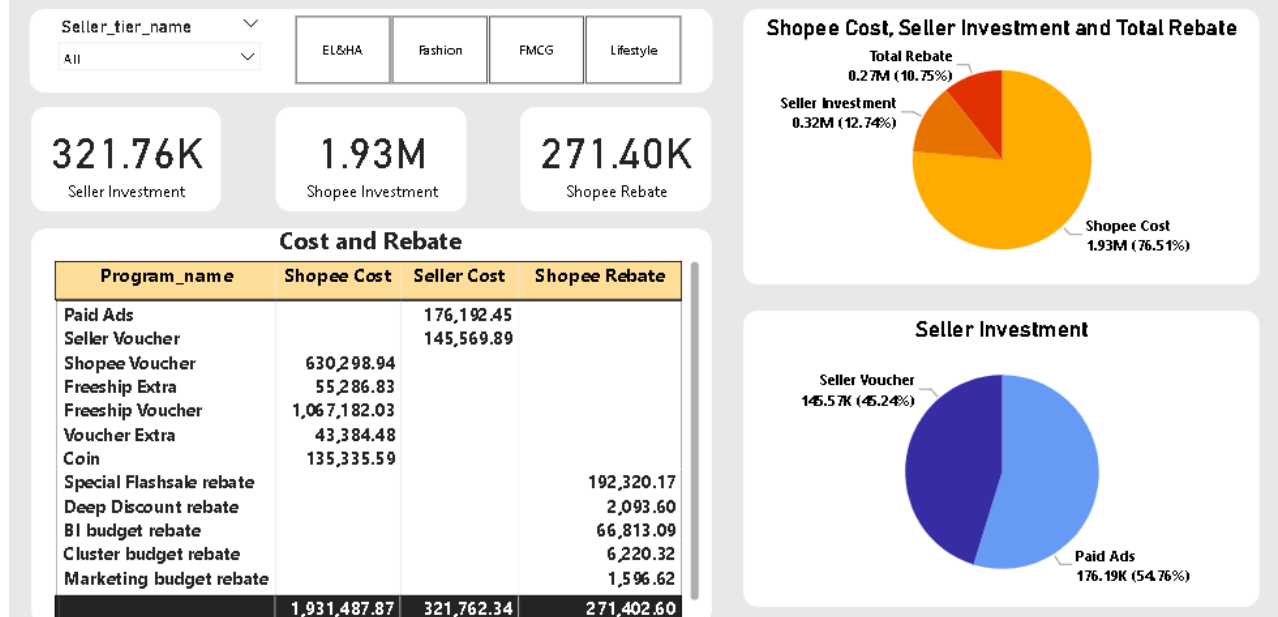
SELLER PERFORMANCE IN SPIKE

Seller_tier_name: All

EL&HA | Fashion | FMCG | Lifestyle

Seller Tier	Num of Shop	% Spike order	% Spike ADG	AVG spike order	AVG of spike ADG
Lower Short-tail	4343	25.76%	40.86%	159.36	1,380.77
Super Short-tail	826	41.87%	28.02%	1,362.01	5,014.19
Upper Short-tail	1452	23.23%	27.02%	429.86	2,892.31
Ultra Short-tail	47	9.14%	4.10%	5,226.20	15,608.79
Total	6668	100.00%	100.00%	402.95	2,260.30

Spike Order and ADG
● Sum of spike_ADO ── Sum of spike_ADG

AVG Orders of each Seller tier

b. **Shopee Investment and Seller Investment**
- Shopee's expenses account for more than 76%, rebates for sellers account for 10.75%, the rest are Seller's investments (there are two main items: Paid ads and Seller Vouchers)

COST

Seller_tier_name: All

EL&HA | Fashion | FMCG | Lifestyle

321.76K Seller Investment

1.93M Shopee Investment

271.40K Shopee Rebate

Cost and Rebate

Program_name	Shopee Cost	Seller Cost	Shopee Rebate
Paid Ads		176,192.45	
Seller Voucher		145,569.89	
Shopee Voucher	630,298.94		
Freeship Extra	55,286.83		
Freeship Voucher	1,067,182.03		
Voucher Extra	43,384.48		
Coin	135,335.59		
Special Flashsale rebate			192,320.17
Deep Discount rebate			2,093.60
BI budget rebate			66,813.09
Cluster budget rebate			6,220.32
Marketing budget rebate			1,596.62
	1,931,487.87	321,762.34	271,402.60

Shopee Cost, Seller Investment and Total Rebate
- Total Rebate 0.27M (10.75%)
- Seller Investment 0.32M (12.74%)
- Shopee Cost 1.93M (76.51%)

Seller Investment
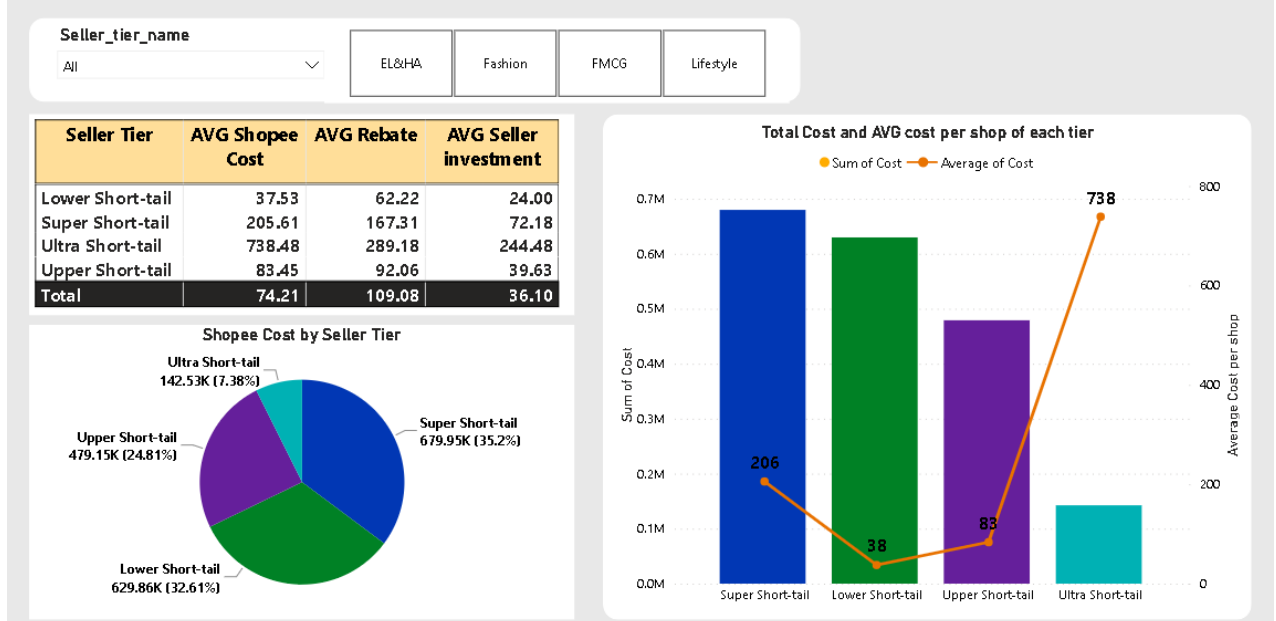- Seller Voucher 145.57K (45.24%)
- Paid Ads 176.19K (54.76%)

c. **Shopee Cost by Seller Tier**
- The cost for the Super ST and Lower ST groups is the highest, the Ultra group has the lowest total costs.

- However, the average seller in the Ultra ST group gets the highest investment (over $738 per shop), followed by Super sellers. The same goes for rebates and sellers investing themselves.
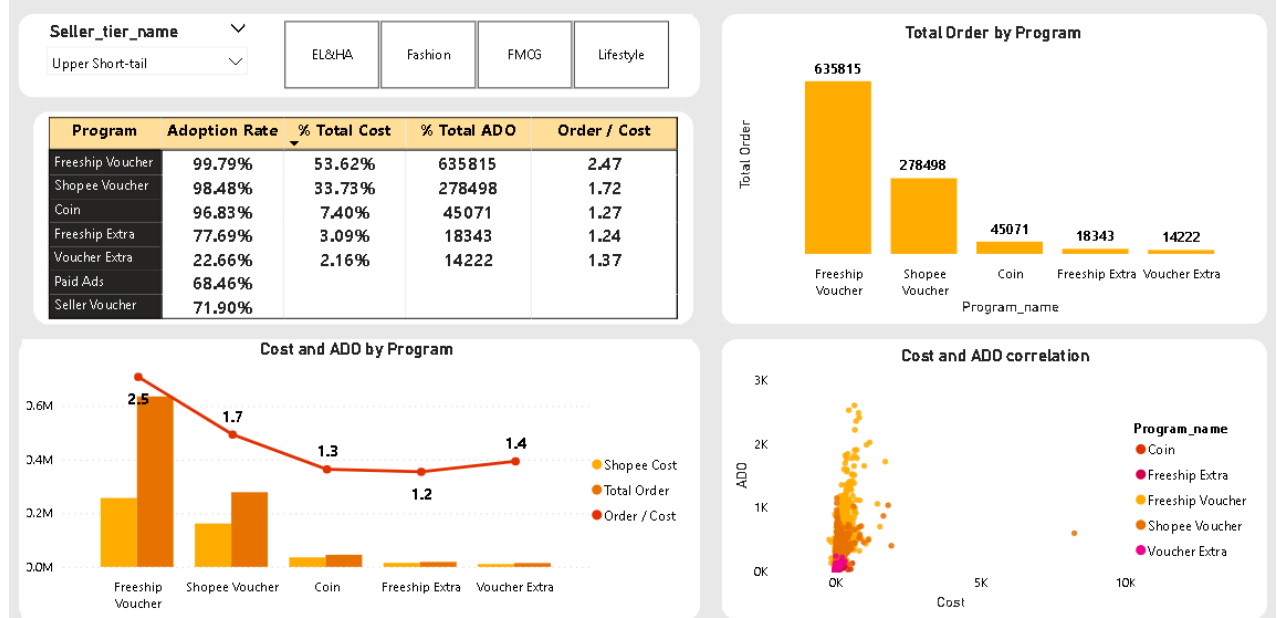
COST BY SELLER TIER

Seller Tier	AVG Shopee Cost	AVG Rebate	AVG Seller investment
Lower Short-tail	37.53	62.22	24.00
Super Short-tail	205.61	167.31	72.18
Ultra Short-tail	738.48	289.18	244.48
Upper Short-tail	83.45	92.06	39.63
Total	74.21	109.08	36.10

d. **Program Performance**
- Shopee's Freeship discount codes bring the most orders (more than 635 000 orders), followed by Shopee Vouchers.
- The Order / Cost ratio represents the number of orders achieved over $1, which can be seen as the most effective Freeship program.

PROGRAM'S PERFORMANCE

Program	Adoption Rate	% Total Cost	% Total ADO	Order / Cost
Freeship Voucher	99.79%	53.62%	635815	2.47
Shopee Voucher	98.48%	33.73%	278498	1.72
Coin	96.83%	7.40%	45071	1.27
Freeship Extra	77.69%	3.09%	18343	1.24
Voucher Extra	22.66%	2.16%	14222	1.37
Paid Ads	68.46%			
Seller Voucher	71.90%			

4

e. Rebate

Rebate is a subsidy that Shopee supports sellers in programs and other items such as marketing, discounts, clusters ...

- In particular, Special Flashsale (1K, 9K, 99K discounts) brings the most orders.
- The cost of Special Flahsale accounted for more than 70%, bringing in about 3.34 orders / $1. Besides, the investment for Marketint and Deep Discount activities is also relatively effective.
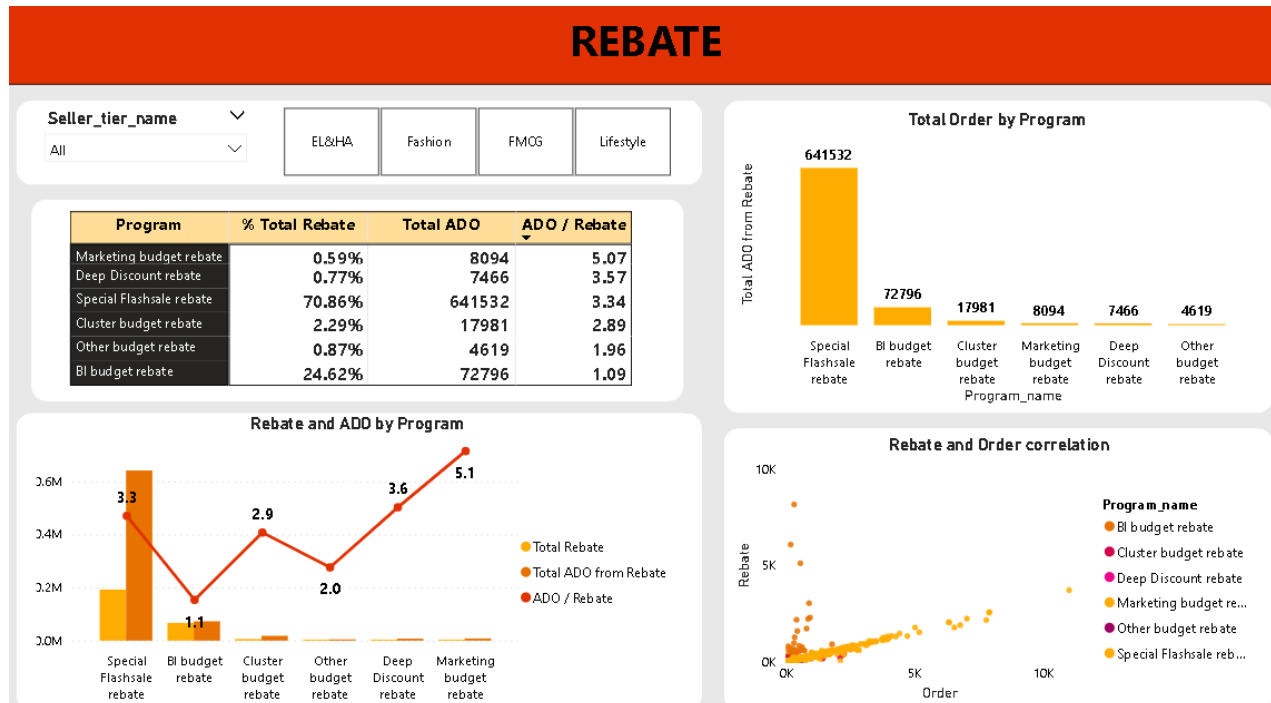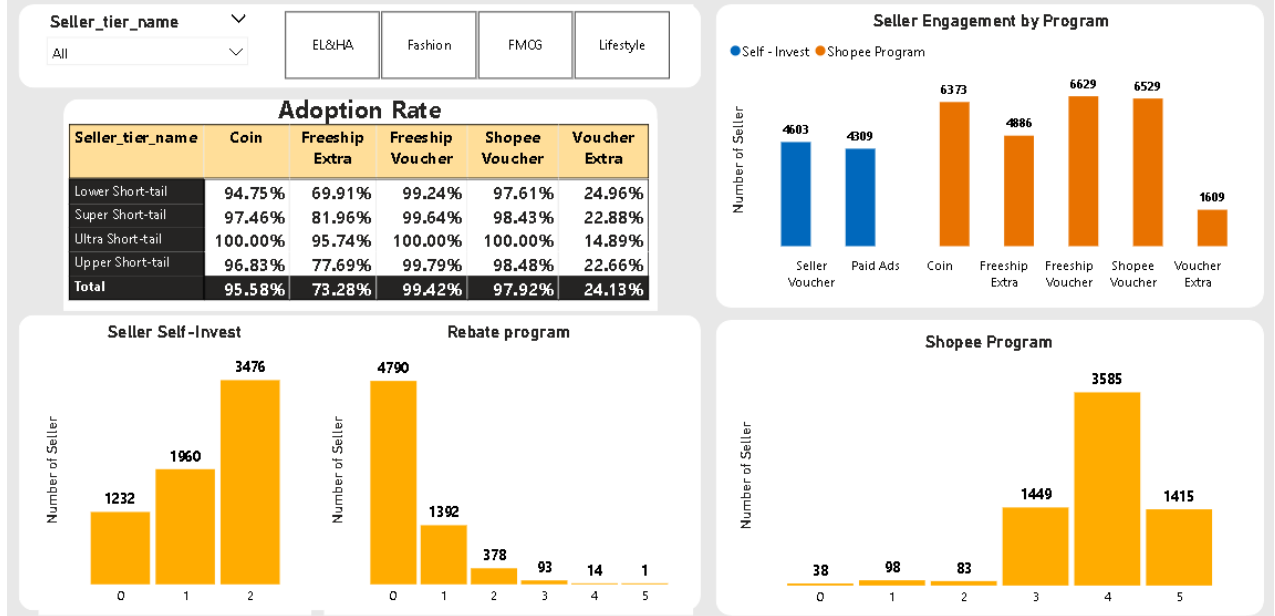

f. Seller Engagement

Shopee sells two main packages, Freeship Extra and Voucher Extra (sellers will pay commission for each order and package maintenance fee)

- The Ultra ST group was more likely to participate in programs, followed by the Super group. The Freeship Extra program has an adoption rate of 73%, while the Extra voucher has a lower adoption rate of 24%.
- About 2/3 of sellers have their own investment for Ads and seller vouchers.
- More than half of sellers participate in 4 programs, most of the rest also participate in 3 or 5 programs

SELLER ENGAGEMENT

Seller_tier_name	Coin	Freeship Extra	Freeship Voucher	Shopee Voucher	Voucher Extra
		Adoption Rate			
Lower Short-tail	94.75%	69.91%	99.24%	97.61%	24.96%
Super Short-tail	97.46%	81.96%	99.64%	98.43%	22.88%
Ultra Short-tail	100.00%	95.74%	100.00%	100.00%	14.89%
Upper Short-tail	96.83%	77.69%	99.79%	98.48%	22.66%
Total	95.58%	73.28%	99.42%	97.92%	24.13%

3. Hypothesis and Solution Exploration

3.1. Hypothesis for monetizing sellers

+ Clustering seller groups

+ Make appropriate recommendations for each group of sellers

** Seller Segmentation based on Spike performance

Seller Tier	Num of Shop	% Spike order	% Spike ADG	AVG spike order	AVG of spike ADG
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a. Ultra ST:

- High-performing sellers with high orders and value, these sellers also actively participate in Shopee's programs.

+ **Next step:** perform surveys or interviews with sellers to understand their specific needs and motivations. This qualitative data can provide valuable insights into their goals and challenges. Here are some suggestions:

  ➔ Premium Marketing: support featured listings, prime placement on the platform

  ➔ Cross – promotion: enhance the opportunities for co-branded content of high-performing seller such as: promotional posters, giveaways, minigames, joint events...

  ➔ Exclusive deals: Offer high-performing sellers exclusive deals and discounts

b. Other Seller tiers: approach segmentation seller

+ Define metrics: ADG, ADO of full month and on Spike day, Spike Contribution

+ In each Seller ties, base on these define metrics, segment seller into 3 groups:

1. **Sustainable sellers:** high number of normal day orders, high number of Spike day orders and high revenue

➔ Optimizing marketing and shipping to improve service quality for these shops, there are special incentives to encourage and support shop development. Develop a special marketing campaign for Spike Day to increase orders for these shops, helping them expand their customer base and attract more leads.

2. **Seller leveraging from Spike too much:** the number of daily orders is usually very low, but the number of daily orders for Spike is very high

➔ Analyze the costs, profits, business efficiency of these shops.

➔ Implement price increases for services and packages: for this proposal, it is necessary to perform deep-analysis to analyze the factors that will affect ADO and GMV (Sellers leave the floor, Sellers increase product prices to maintain profit, sellers cancel package subscriptions,...). Besides, it is necessary to analyze competitors to make recommendations on the most detailed adjustment.

3. **Remaining sellers**

➔ Sellers with average performance and average Spike contribution need to analyze and provide the necessary support to optimize revenue for sellers on both weekdays and Spike days.

3.2. Hypothesis for enhance seller engagement in program

Shopee offers 3 main packages: Freeship Extra, Voucher Extra and Coin (service fee, package maintenance fee)

- The participation rate of the Coin package is high (96.83%), the Freeship Extra package is relatively high (77.7%), and the Extra Voucher package is low (22.66%).

Program	Adoption Rate	% Total Cost	Total ADO	Order / Cost
Freeship Voucher	99.79%	53.62%	635815	2.47
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Coin	96.83%	7.40%	45071	1.27
Freeship Extra	77.69%	3.09%	18343	1.24
Seller Voucher	71.90%			
Paid Ads	68.46%			
Voucher Extra	22.66%	2.16%	14222	1.37

- Trends when buying Seller packages: The lift basket index of Voucher Extra – Freeship Extra gives a positive relationship between the two packages. If customers purchase Extra Vouchers, the likelihood of purchasing Freeship packages increases by 3.65 times.

Support, Confidence and Lift

Basket	Support	Confidence of Program 1	Confidence of Program 2	Lift basket
Voucher Extra - Freeship Extra	21.24%	88.00%	28.98%	3.65
Coin - Freeship Extra	72.09%	75.43%	98.38%	0.79
Coin - Voucher Extra	24.13%	25.25%	100.00%	0.26

For the development of plans to sell packages, adjustments or promotions, it is necessary to analyze more deeply the data related to the cost of packages, the profit of packages, the level of customer satisfaction.

Some initial proposals:

➔ Combining analysis with customer buying behavior, we can recommend two Freeship Extra and Extra voucher packages together, Use marketing campaigns or promotions to promote double purchases of two packages A and B (combo sales)

➔ About 29% of sellers buy the Freeship Extra package and continue to buy the Extra Voucher package, we can increase this stat by implementing a campaign to buy the Freeship Extra package with an Extra Voucher package (consider limiting the time or number of vouchers)

+ The hypothesis is given if combining combos

- Shopee can increase overall package sales
- Combos can improve customer satisfaction, encouraging customers to buy products.

Next step: deep-analysis on reaction because maybe more than 1 program drive orders, analysis of the profit and cost of packages to ensure no damage.

➔ Make a conclusion whether to sell combos or not? Determine the price of the Combo if there is a hypothetical guarantee.

3.3.   Hypothesis for efficient allocation of promotional budgets
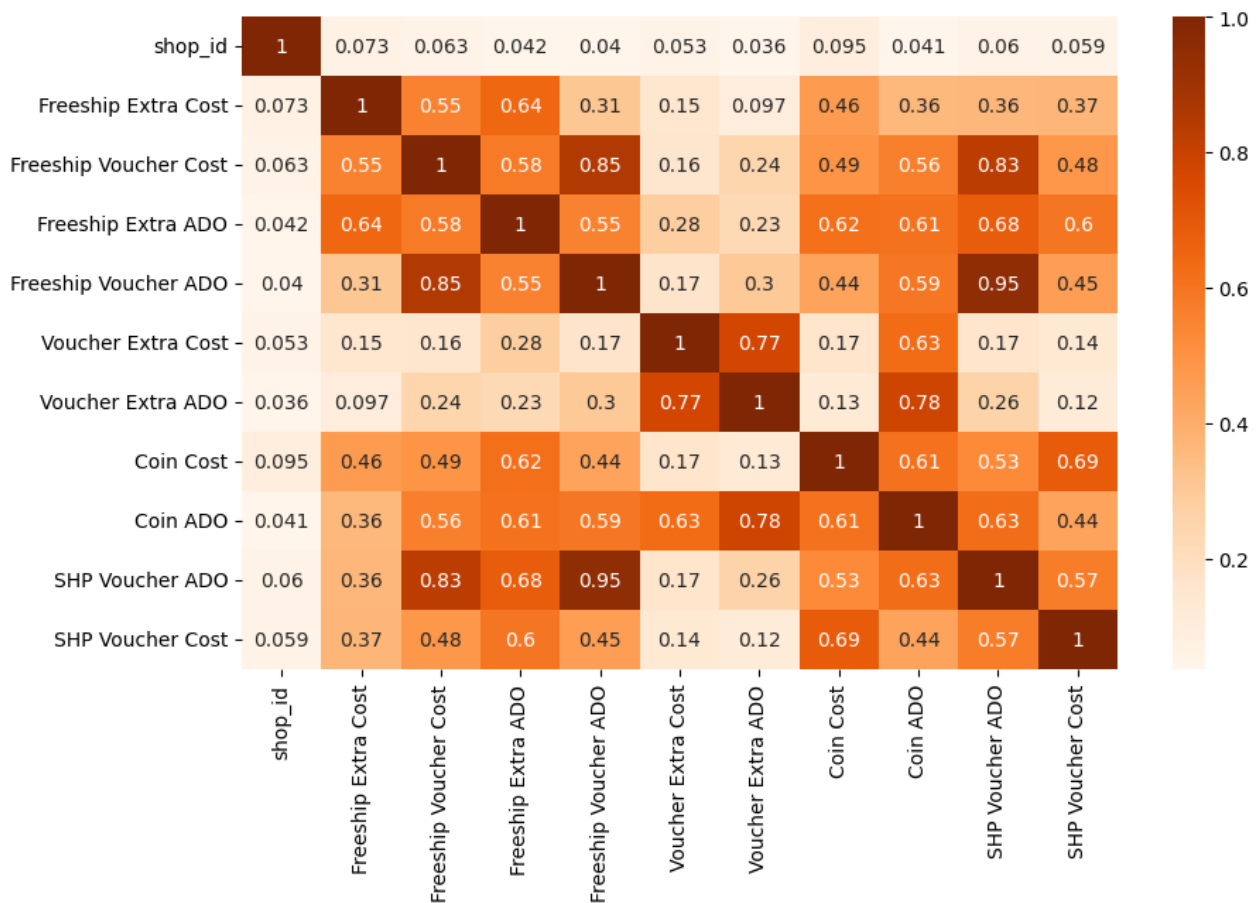
a. Cost

Within the framework of the case study, data are obtained on programs with order numbers and costs. So, it is impossible to determine indicators related to direct revenue. The approach to the problem will focus on the number of orders, with the goal of increasing transactions on the floor and expanding the potential customer base, sustainable sellers.

- The cost of Freeship Vouchers and Shopee Vouchers accounts for a high percentage, (55% and 32% respectively). These two programs also have the highest Order/Cost index, the remaining programs have relatively uniform efficiency (1.28 ~ 1.38)

Program	Adoption Rate ▼	% Total Cost	Total ADO	Order / Cost
Freeship Voucher	99.42%	55.25%	2710958	2.54
Shopee Voucher	97.92%	32.63%	1168860	1.85
Coin	95.58%	7.01%	181906	1.34
Freeship Extra	73.28%	2.86%	70970	1.28
Seller Voucher	69.03%			
Paid Ads	64.62%			
Voucher Extra	24.13%	2.25%	59793	1.38

- Correlation Matrix of Program cost and ADO:
  + In general, in the programs, Cost and ADO have a positive correlation with each other. In particular, Freeship Voucher, Extra Voucher have a high correlation efficiency (0.85 and 0.77 respectively).
  + Besides, there are some notable correlations such as: Freeship Voucher ADO and SHP Voucher ADO have a positive correlation, high index 0.95, Extra ADO Voucher and Coin ADO with index 0.87. This demonstrates the drive ado relationship of the programs. Understandably, an order is not only driven by one program, but can be from two or three programs. This is a relationship to keep in mind when building strategies about Shopee's future programs.

Correlation Matrix

	shop_id	Freeship Extra Cost	Freeship Voucher Cost	Freeship Extra ADO	Freeship Voucher ADO	Voucher Extra Cost	Voucher Extra ADO	Coin Cost	Coin ADO	SHP Voucher ADO	SHP Voucher Cost
shop_id	1	0.073	0.063	0.042	0.04	0.053	0.036	0.095	0.041	0.06	0.059
Freeship Extra Cost	0.073	1	0.55	0.64	0.31	0.15	0.097	0.46	0.36	0.36	0.37
Freeship Voucher Cost	0.063	0.55	1	0.58	0.85	0.16	0.24	0.49	0.56	0.83	0.48
Freeship Extra ADO	0.042	0.64	0.58	1	0.55	0.28	0.23	0.62	0.61	0.68	0.6
Freeship Voucher ADO	0.04	0.31	0.85	0.55	1	0.17	0.3	0.44	0.59	0.95	0.45
Voucher Extra Cost	0.053	0.15	0.16	0.28	0.17	1	0.77	0.17	0.63	0.17	0.14
Voucher Extra ADO	0.036	0.097	0.24	0.23	0.3	0.77	1	0.13	0.78	0.26	0.12
Coin Cost	0.095	0.46	0.49	0.62	0.44	0.17	0.13	1	0.61	0.53	0.69
Coin ADO	0.041	0.36	0.56	0.61	0.59	0.63	0.78	0.61	1	0.63	0.44
SHP Voucher ADO	0.06	0.36	0.83	0.68	0.95	0.17	0.26	0.53	0.63	1	0.57
SHP Voucher Cost	0.059	0.37	0.48	0.6	0.45	0.14	0.12	0.69	0.44	0.57	1

- Analyze the effectiveness of Freeship Voucher and Shopee Voucher:

+ These two programs have a relatively high efficient correlation between cost and ado, showing that if the cost increases, the ADO also tends to increase and return.

+ More specifically, ADO from Freeship Voucher program has a strong positive correlation with ADO from Shopee Voucher program. This shows that these two chapters come together and drive ado (customers tend to apply shopee discount codes and shipping discount codes at the same time to buy goods at the lowest price)
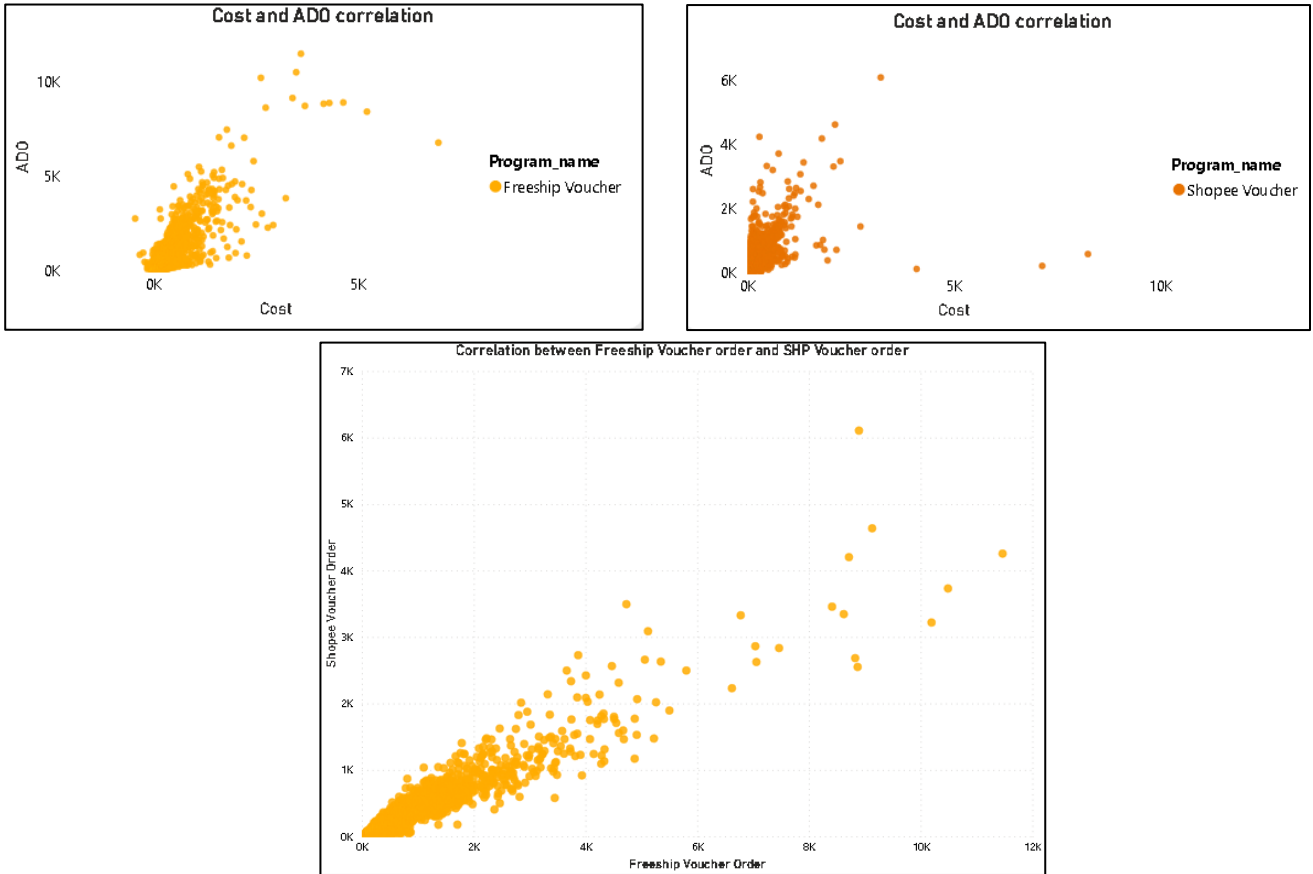
- To approach, we will evaluate the effectiveness of the program through ADO/slot of both programs at different seller tiers:

  + The ADO/cost index of tier sellers in Freeship Program and Voucher Program has many similarities. The Lower ST group had the lowest ADO/cost ratio in both programs, the Super group had the highest.
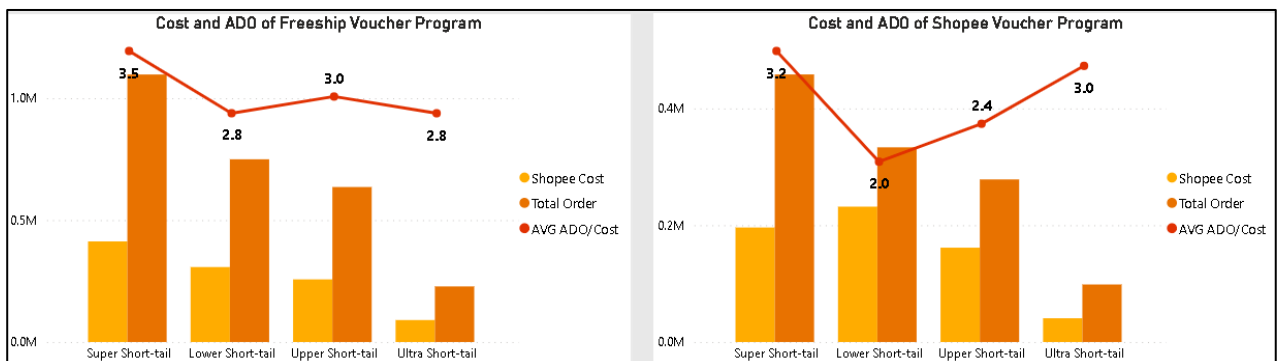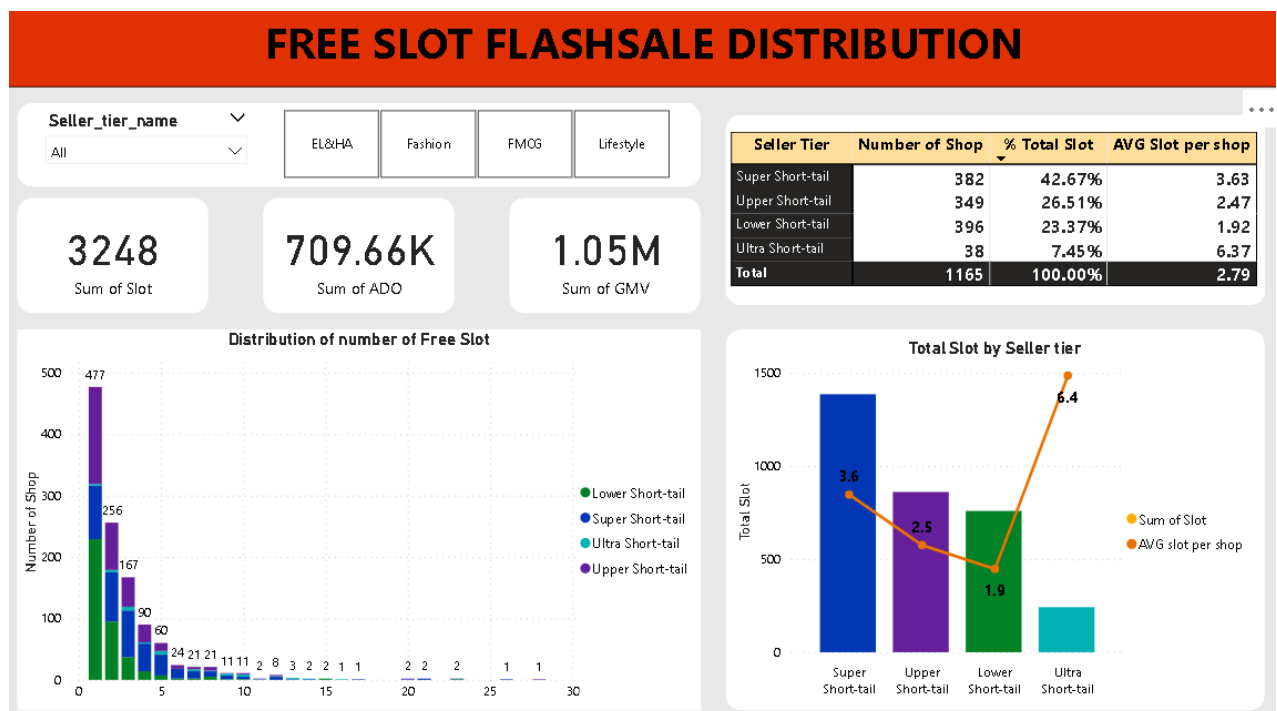
➔ Focus on the Lower ST group to analyze low-performing sellers, then come up with a plan to cut vouchers and costs, paying attention between the two programs. Besides, pay attention to the correlation between programs.

b. Analysis of the distribution of Shopee's Flashsale slots

Shopee has special Flashsale programs on Spike day, in which sellers can buy Flashsale packages or be given free slots by Shopee to promote business. However, the number of Flashsale slots is quite large, we need to analyze whether Shopee is investing too rampantly in shops, leading to wasting resources on inefficient shops.

- Free Flashsale slot distribution:
  + There were a total of 3248 free flashsale slots and collected over 709 000 orders, total profit of 1.05M$.
  + Mainly shops will be free about 1-2 slots, some shops will be freer, there are shops up to 28 slots.
- Super ST group gets more than 42% of free slots, averaging 3.63 slots/shop. Sellers in the Ultra group are given the most slots, averaging 6.37 slots/shop.

FREE SLOT FLASHSALE DISTRIBUTION

Seller Tier	Number of Shop	% Total Slot	AVG Slot per shop
Super Short-tail	382	42.67%	3.63
Upper Short-tail	349	26.51%	2.47
Lower Short-tail	396	23.37%	1.92
Ultra Short-tail	38	7.45%	6.37
Total	**1165**	**100.00%**	**2.79**

- Flashsale program performance
+ Based on the total GMV achieved, the Lower ST and Upper ST groups yield more than 74% of GMV.
+ Based on the total number of orders, Super ST group brings more than 57% of orders.

Gross Merchandise Volume by Seller tier

Gross Merchandise Volume by Seller tier
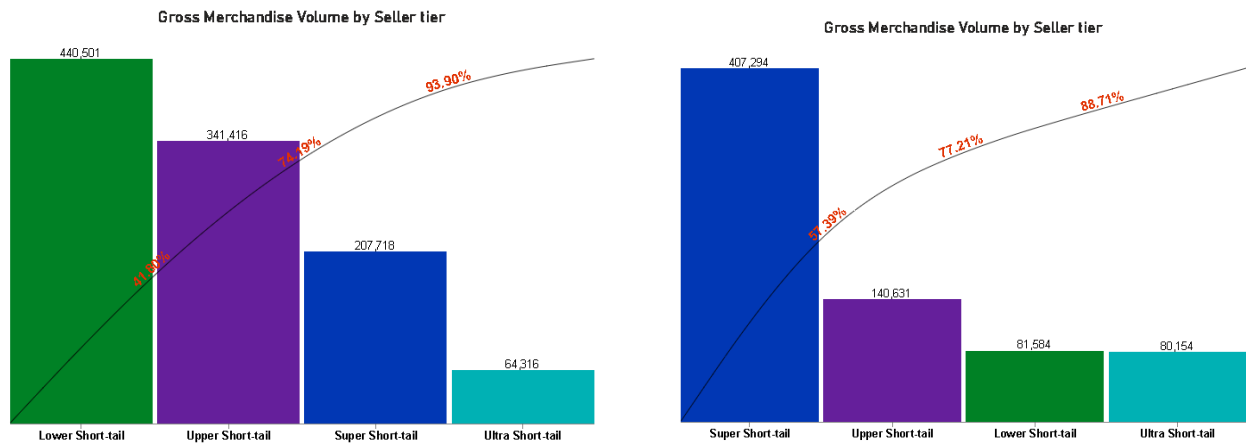
+ However, in terms of efficiency, it can be seen that the Ultra ST group brings more than 331 orders/slot and $299/slot. The Super ST group has a high number of slots (more than 42% of total slots), this group brings more than 57% of orders, however performs poorly in the achieved GMV (only 19%).

+ The other two groups are at medium efficiency, the Lower ST group has a high GMV/slot ($225/slot).

Seller Tier	%GT Sum of Slot	% Total GMV	% Total ADO	AVG ADO per slot	AVG GMV per slot
Ultra Short-tail	7.45%	6.10%	11.29%	331.21	299.17
Lower Short-tail	23.37%	41.80%	11.50%	107.49	225.45
Super Short-tail	42.67%	19.71%	57.39%	293.86	179.73
Upper Short-	26.51%	32.39%	19.82%	163.33	167.43
Total	100.00%	100.00%	100.00%	218.49	195.48

In this case, depending on Shopee's goals, want to increase the number of orders or increase revenue, but offer appropriate strategies. In this analysis, I focus on Shopee's GMV and profitability.
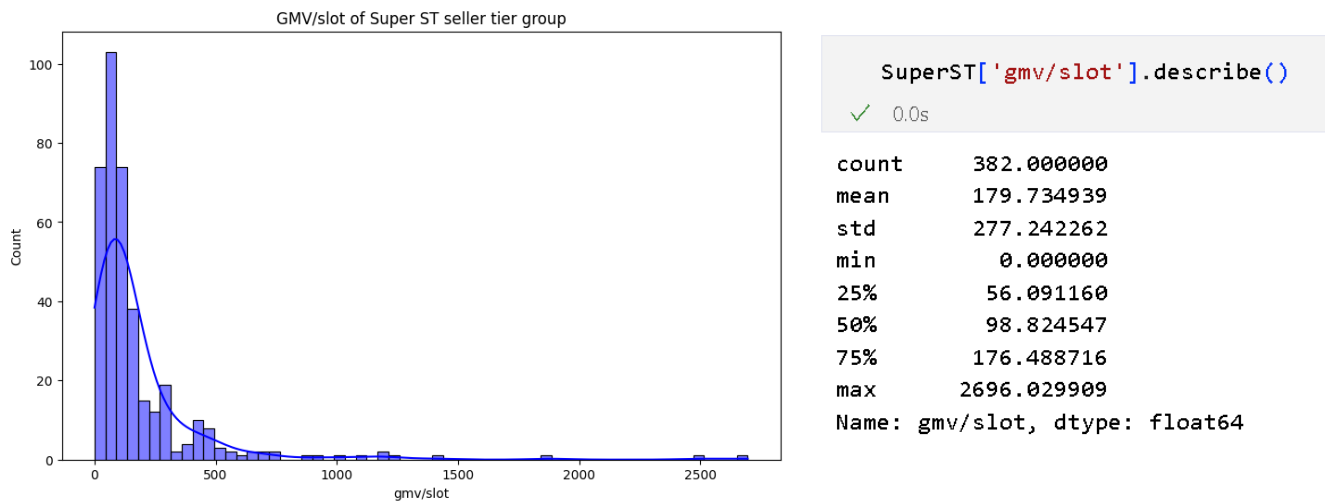
Therefore, to optimize the efficiency of flash sale slots, Shopee needs to analyze and adjust the allocation of these slots to suitable shops to achieve the highest number of orders and GMV.

➔ Approach: Focus only on Super ST sellers, identify groups of low-performing sellers and cut down on their flashsale slots.

➔ Determine the Threshold based on GMV/slot index, reduce the number of slots in these sellers, continue to monitor in the near future to evaluate the effectiveness and adjust the threshold.

- Threshold = 25th gmv /slot = 56.1

Cut all slots of sellers whose gmv/slot is lower than this threshold: There are a total of 94 sellers who failed, cutting 996 slots. (accounting for more than 30% of total slots), the remaining sellers still guarantee 93.4% GMV of Super ST Seller's

total GMV.

GMV/slot of Super ST seller tier group

```
SuperST['gmv/slot'].describe()
✓  0.0s

count     382.000000
mean      179.734939
std       277.242262
min         0.000000
25%        56.091160
50%        98.824547
75%       176.488716
max      2696.029909
Name: gmv/slot, dtype: float64
```

Next Step: develop an effective monitoring and evaluation plan, can continue to analyze more deeply and find low-performing shops in each Seller Tier to propose solutions to reduce slots. For shops with high performance reaching the top 10% according to GMV/slot, increase slots for these shops (this depends on Shopee's budget at that time)

4. Results and future works

- Through the process of analysis, giving information about the performance of the platform, the performance of sellers, programs
- Make recommendations to optimize the use of capital at an initial level
- Propose hypotheses for further research and analysis. Expand data collection, analysis along with data related to customer behavior.
- Build in-depth analysis models of sellers' behavior towards Shopee's programs to make appropriate decisions about pitching packages.
- The process of analyzing, finding insights, proposing solutions, predicting and implementing will take place in a loop and continuously to be able to constantly optimize Shopee's business efficiency (for example, cases set thresholds to group sellers)

** Long - term suggestions:

Sellers' reliance on Spike Day becomes a major risk for both sellers and platforms, so it is important to come up with some long-term plans to address this issue, helping sellers achieve long-term stability and growth.

- Leverage analysis: Regularly monitor and support sellers based on their business analysis reports, providing important insights and recommendations for them to promptly detect business problems and sustainable development
- Market education: Assist sellers to better understand how the marketplace works and how they can take advantage of various opportunities to increase sales and create stability.

- Year-round customer engagement: Enhance the interaction between sellers and customers through many different channels: advertising, marketing, maximizing user experience, making product recommendations based on algorithms.
- Customized Program Hypothesis: Tailoring the program to suit the individual needs and preferences of sellers can lead to higher engagement. A one-size-fits-all approach may not be as effective
- Feedback and Evaluation Hypothesis: Encouraging sellers to provide feedback and regularly evaluating their performance within the program can create a feedback loop that promotes engagement and improvement.