



# **ANALYZING OLIST E-COMMERCE OPERATIONS IN THE TOP 5 STATES DURING PEAK TIME**

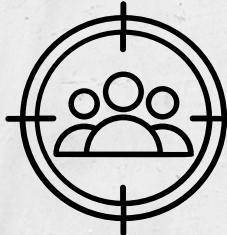
# Overview of the Analysis

## Top 5 States - Peak Time



### Objectives

Evaluate the previous Peak Time performance to prepare for the next cycle.



### Target Audience

Business/Logistics Analyst Manager of Olist



### Metrics

- **Number of Orders (Order Quantity, Order Q)**
- **% Change of Orders (of a month)**

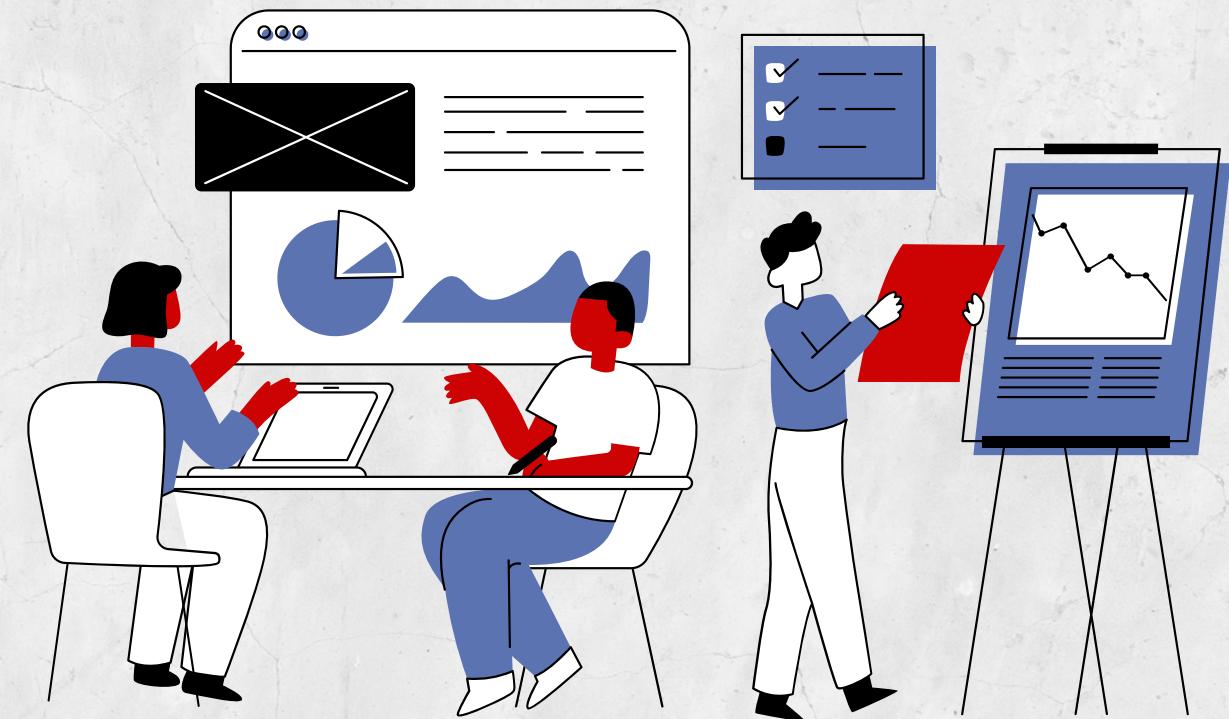
= Order Q (*this month*) - Order Q (*previous month*) / Order Q (*previous month*) \*100%

- **Ratio of Late Orders** = Late Orders / Total Orders (*same criteria*) \*100%



### Flow of Analysis

Analysis by Category -> Analysis by Location



# About Olist Dataset

9 tables

- **Overview:** a Brazilian e-commerce public dataset of orders made at Olist Store.
- **Period:** Feb 2017 - Aug 2018
- **Number of rows:** 98.946

## Existing Fields

| Name    | Meaning                     |
|---------|-----------------------------|
| o_id    | Order ID                    |
| p_id    | Product ID                  |
| s_state | Seller's State (Location)   |
| c_state | Customer's State (Location) |

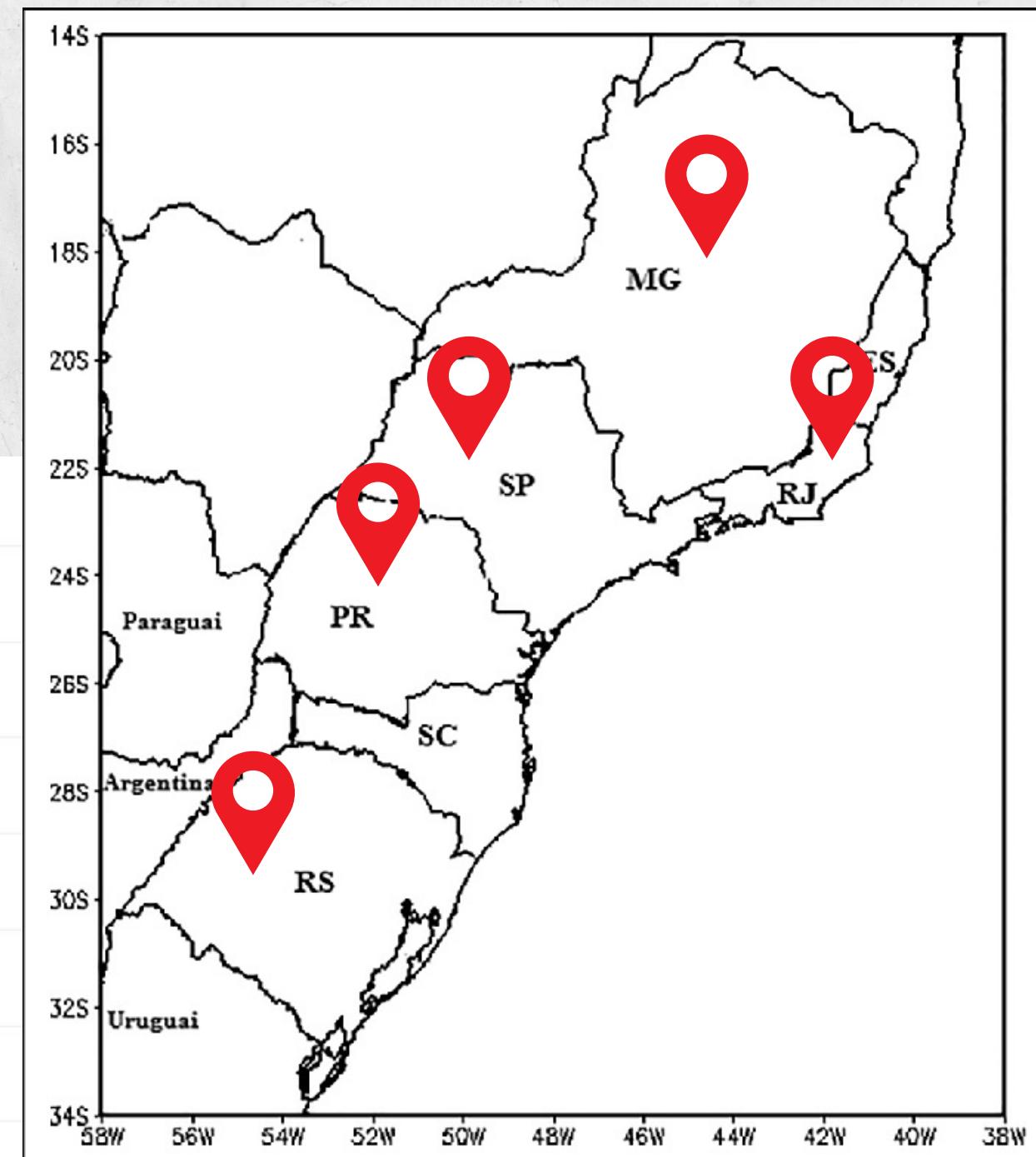
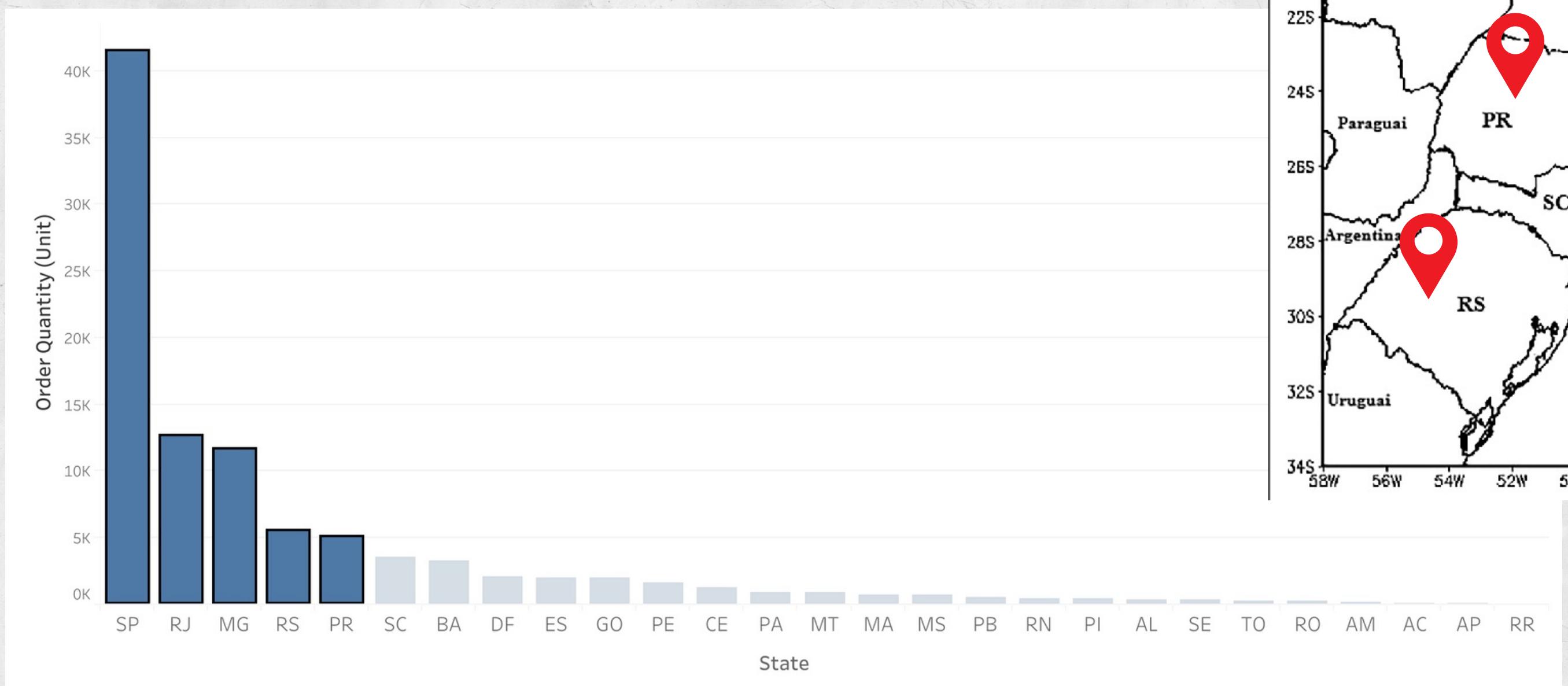
## Calculating New Fields

| Name          | Meaning                                     |
|---------------|---|
| revenue       | Revenue of an order (price+freight)         |
| main_category | Re-classified existing categories           |
| late_dlv      | Whether an order is on time or late         |
| year_month    | year - month of <i>purchasing</i> moment    |
| est_dlv       | Number of estimated delivery days           |
| act_dlv       | Number of actual delivery days              |
| dlv_pur       | Number of days between purchase and deliver |
| dlv_cr        | Number of days between carrier and deliver  |
| same_state    | Whether an order is delivered in same state |



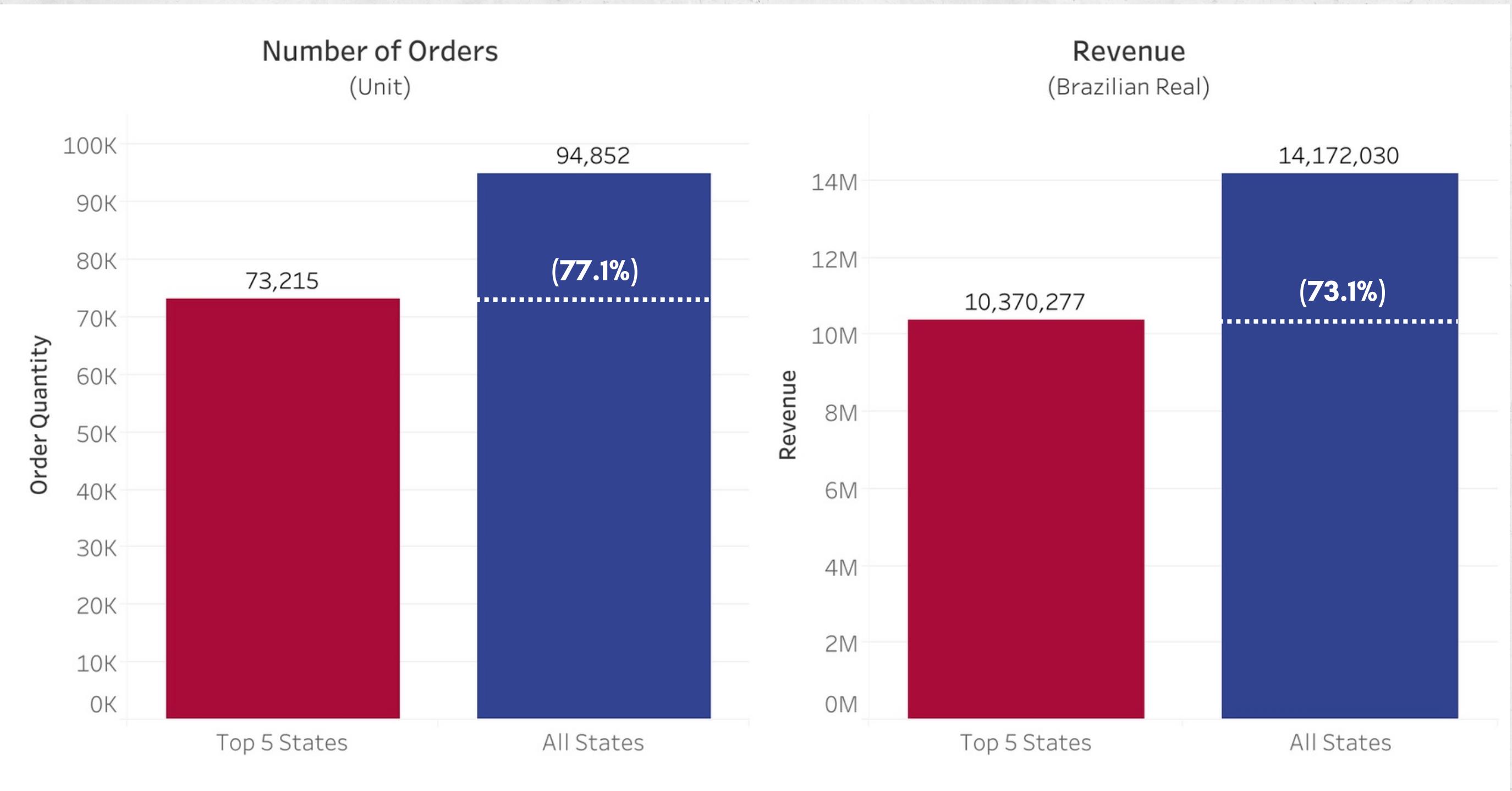
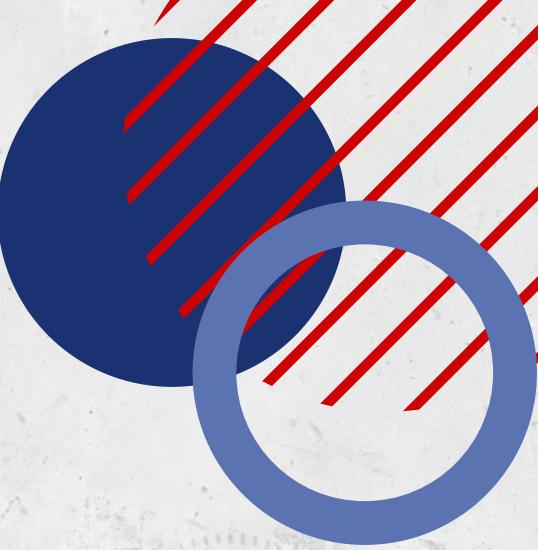
# What are Top 5 States?

- **SP** (São Paulo)
- **RJ** (Rio de Janeiro)
- **MG** (Minas Gerais)
- **RS** (Rio Grande do Sol)
- **PR** (Paraná)



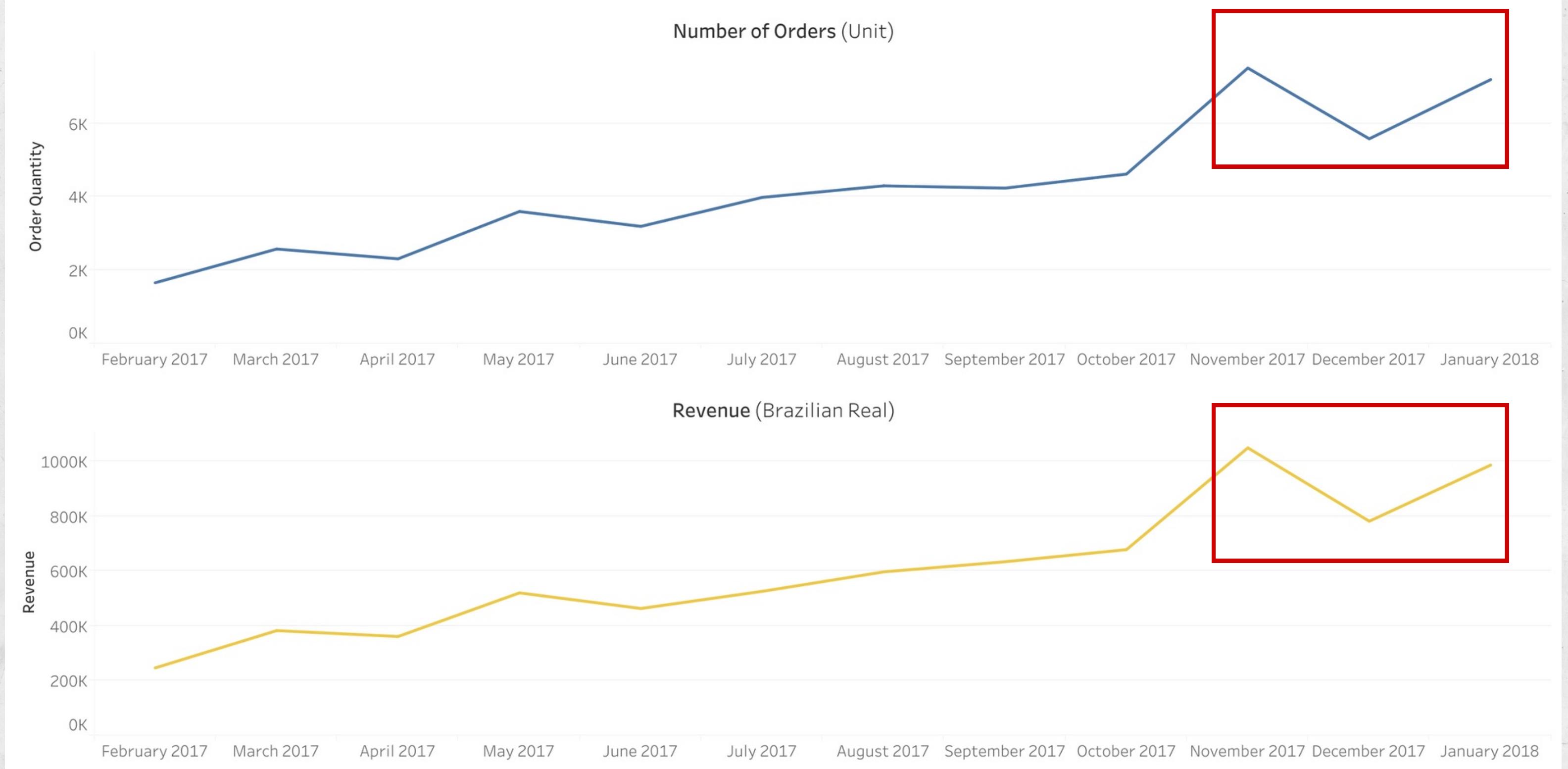
Total Number of Orders, by State

# Top 5 States, Why?



Total Number of Orders, Revenue of Top 5 states and All states

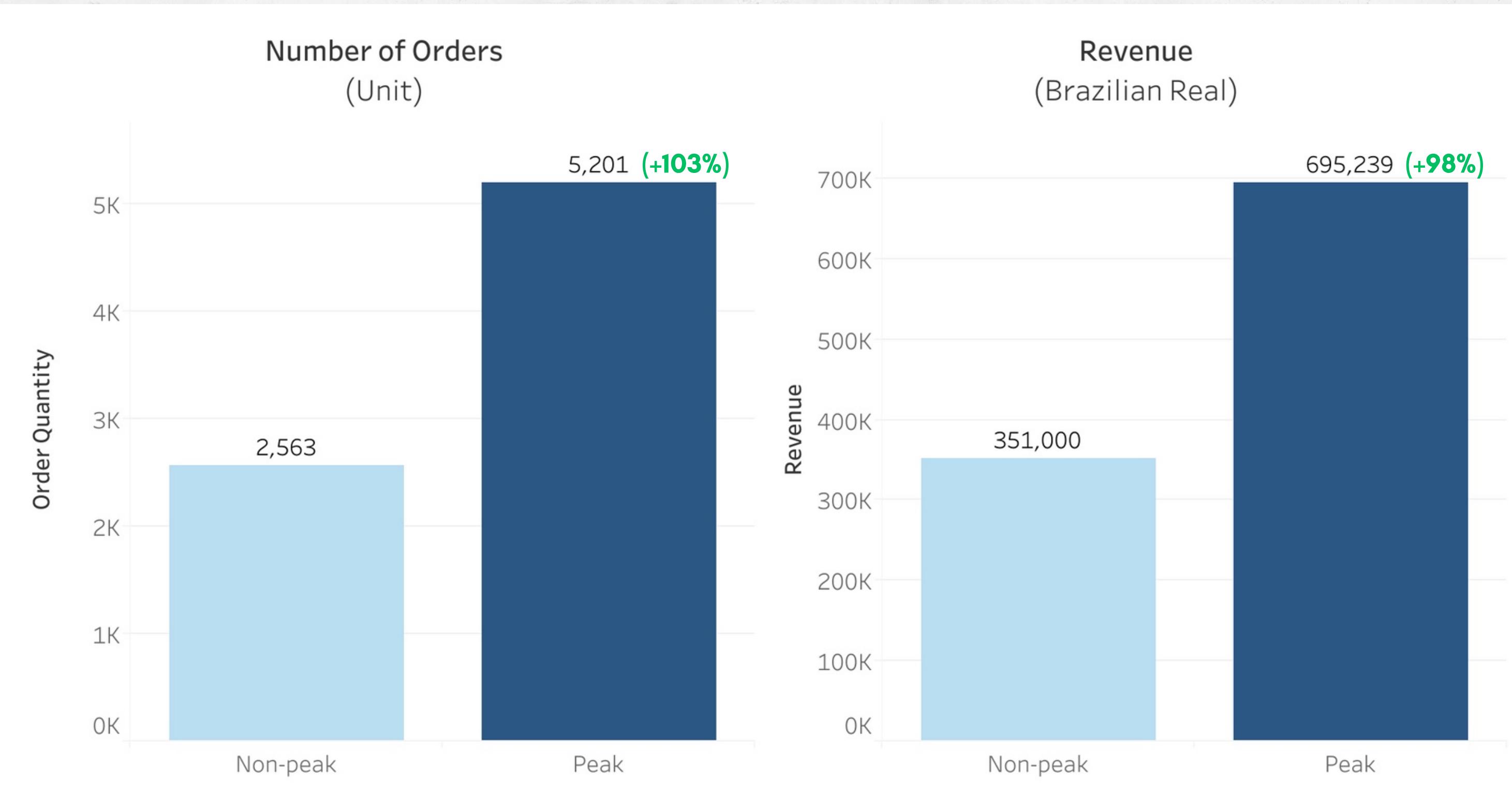
# Peak Time: When?



Total Number of Orders and Revenue in 12-month period (Feb 2017 to Jan 2018)

Peak Time:  
November  
to January  
(3 months)

# Peak Time: Why?



Average Number of Orders and Revenue by month, in the Non-peak and Peak time

# Late Delivery in Peak Time: Overview

Although the number of orders increased in November and January, **Ratio of late orders decreased** over the period.



Nov - **Early Peak**

Dec - **Mid Peak**

Jan - **Last Peak**

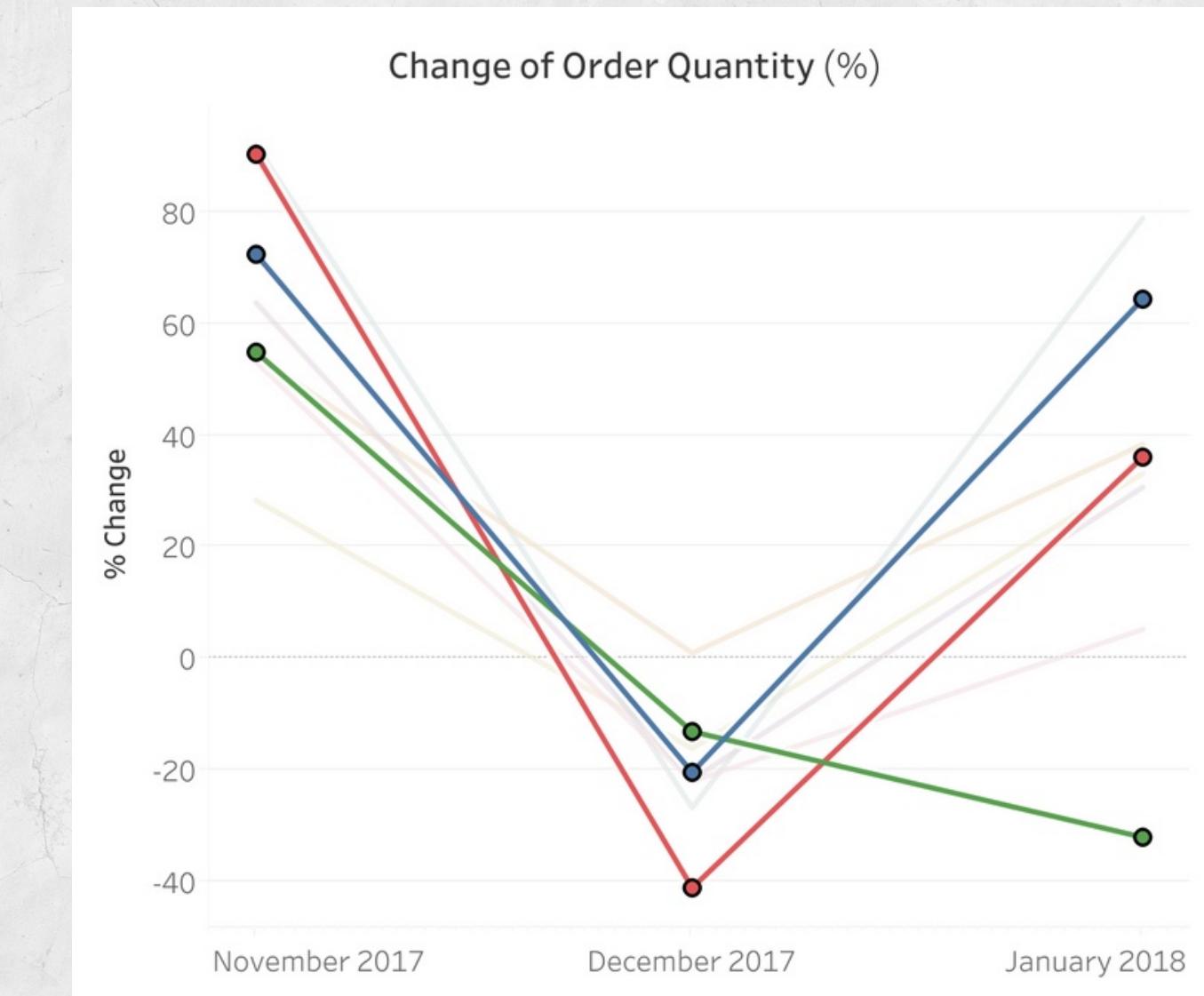
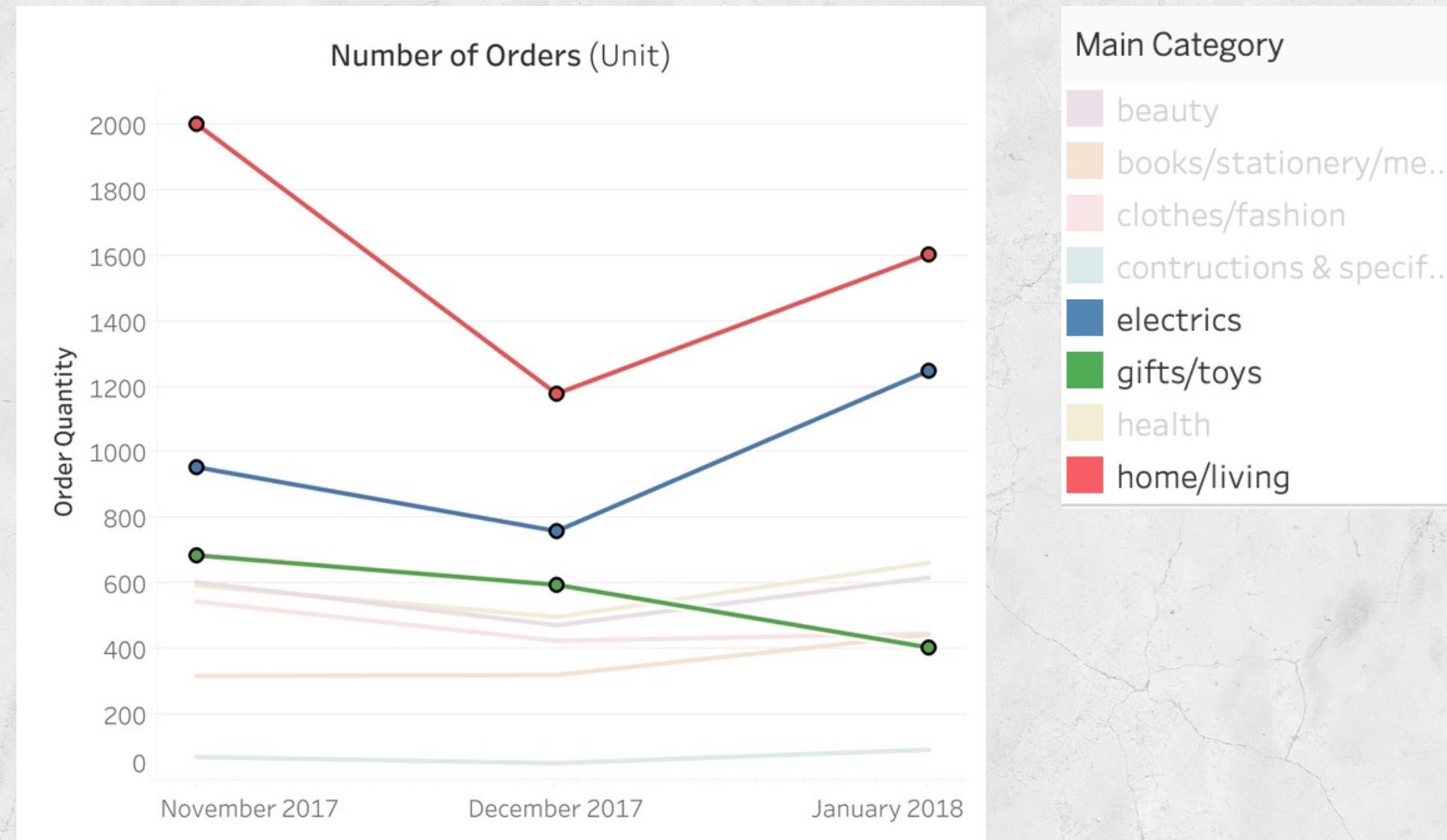
# Analysis by Category



# Orders by Category

During Peak Time: **Home/Livings, Electrics, Gift/Toys experienced strongest growths.**

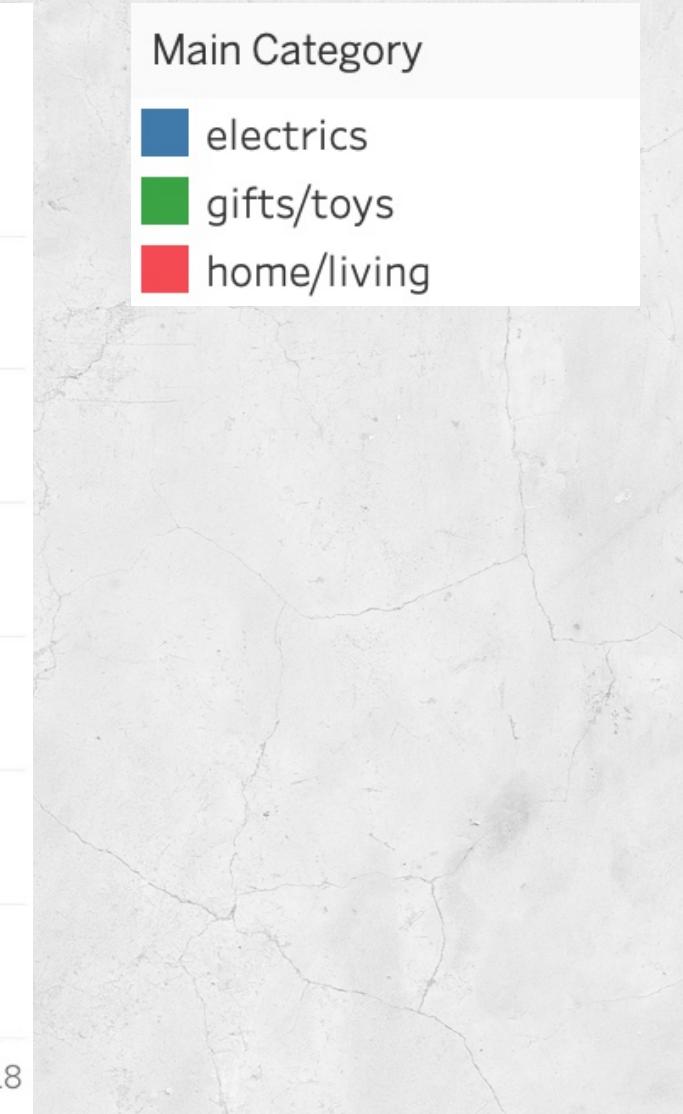
- Early Peak: **Home/Livings & Gift/Toys** - The year-end holidays were coming (Thanksgiving, Christmas, New Year...).
- Last Peak: **Electrics** - People were back to work - Work-personalized items were needed.



Number and % Change of Orders in Top 5 states in Peak Time, by Category

# Late Delivery by Category

- In the Early Peak, the **Ratio of Late Delivery** of 3 main categories **reached its peak (10-17%)**.
- From Mid Peak to Last Peak, its ratio **decreased over the period**.
- However, in the Mid Peak, the **Ratio of Late Gifts/Toys Delivery remained over 10%**.



Number and Ratio of Late Orders in Top 5 states in Peak Time, by Category

# Potential Solutions

- Increase the amount of Home/Living, Electrics products in stock to reduce approval time and send items to carriers.
- In Early-Mid Peak, prioritize processing & delivering items that achieve strong growth in its period such as Gifts/Toys.

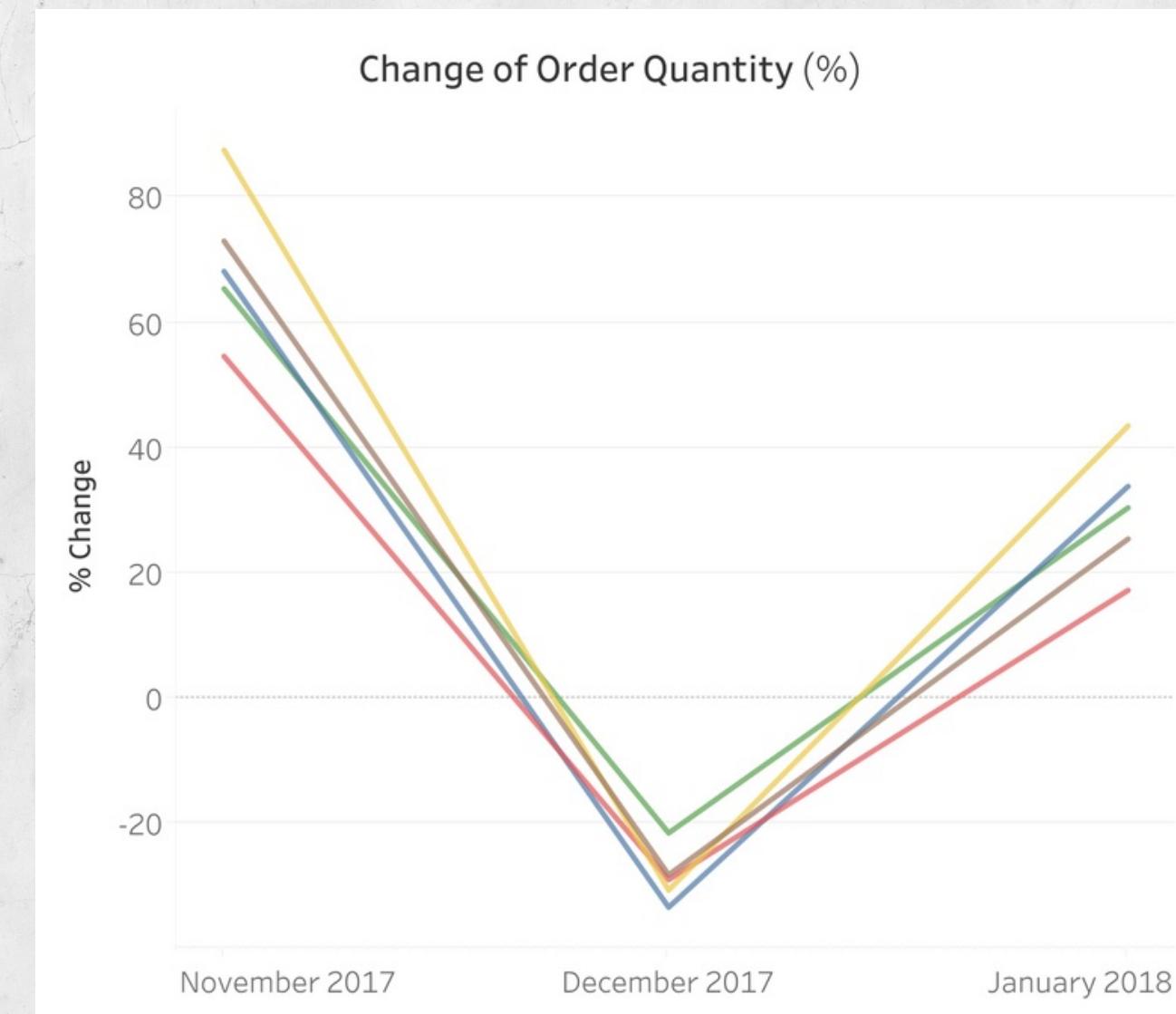
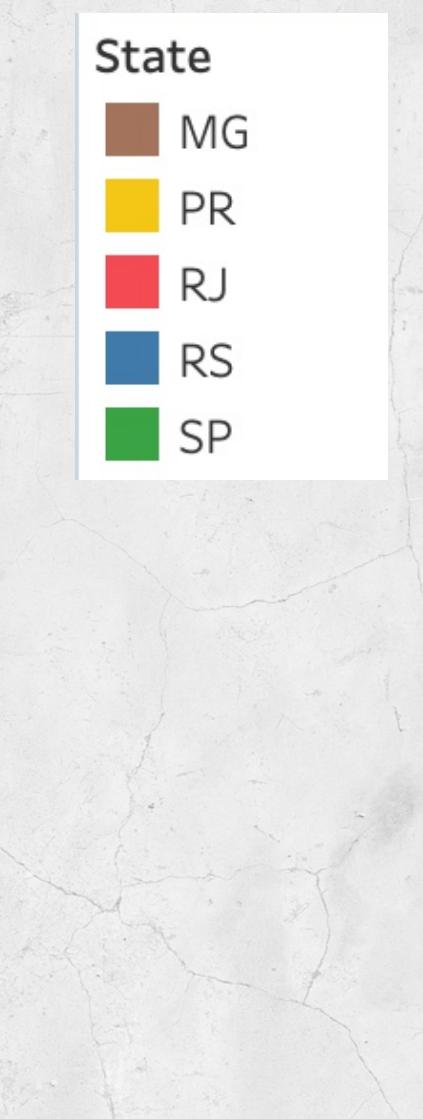
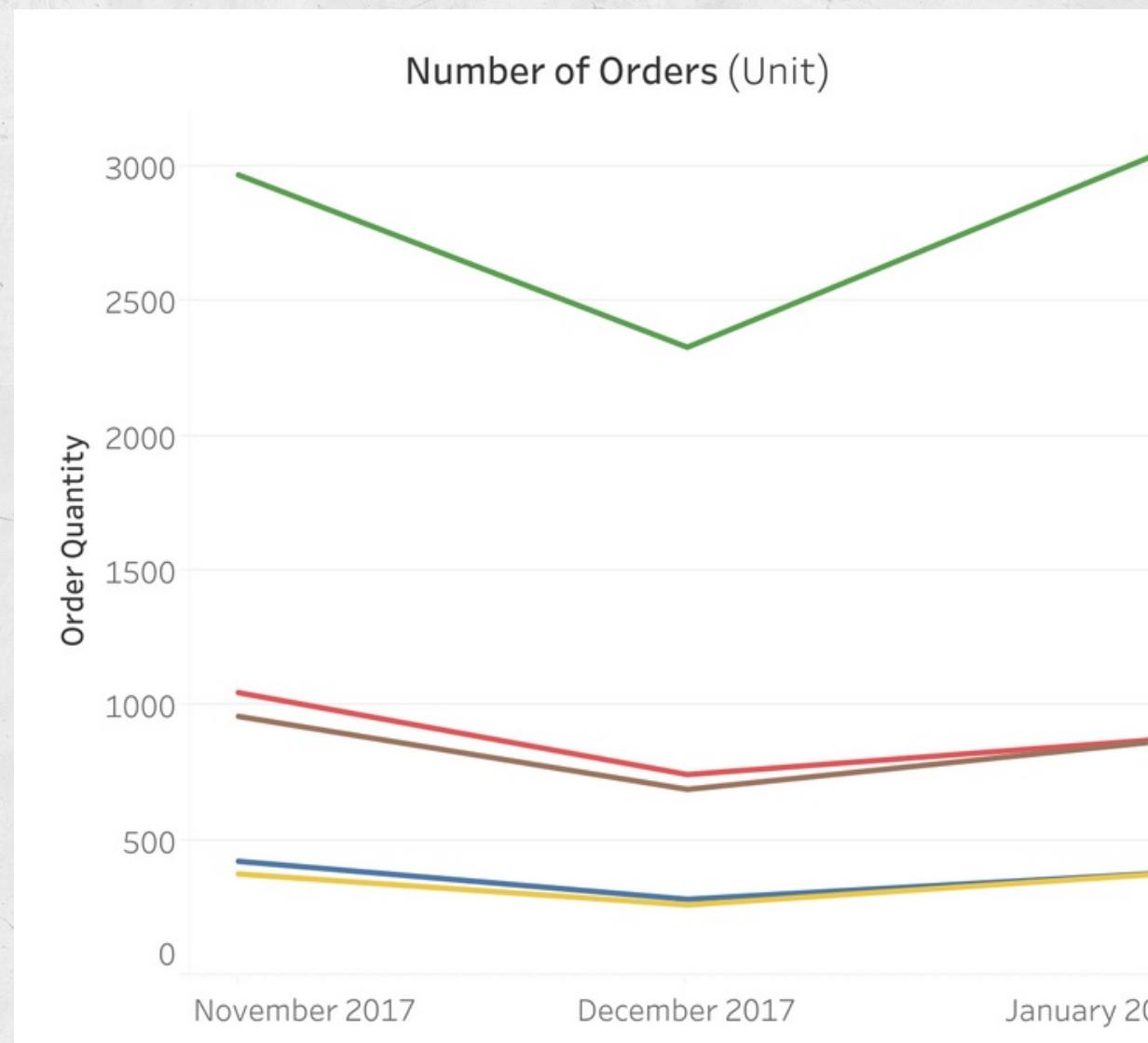


# Analysis by Location



# Orders by Locations

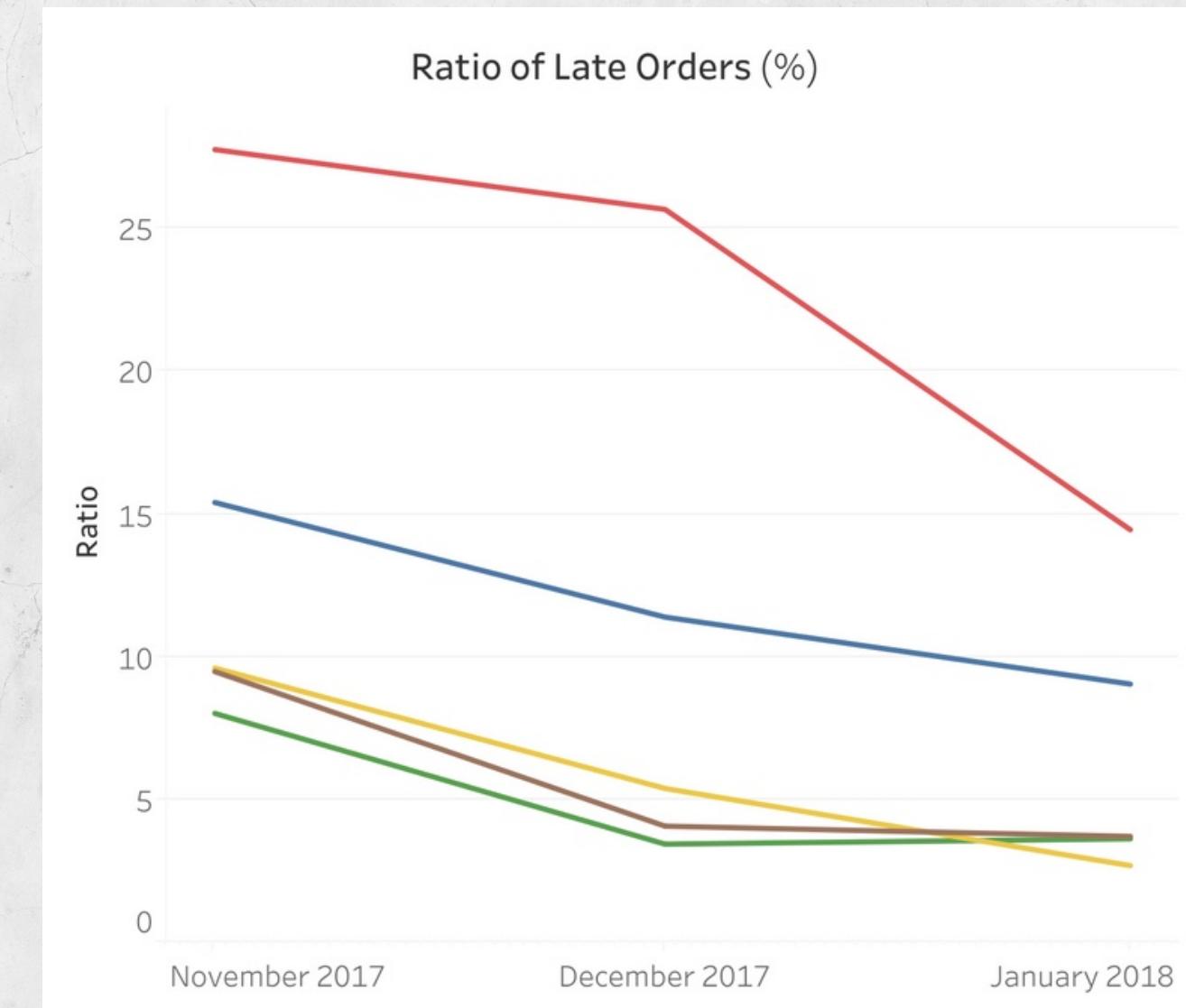
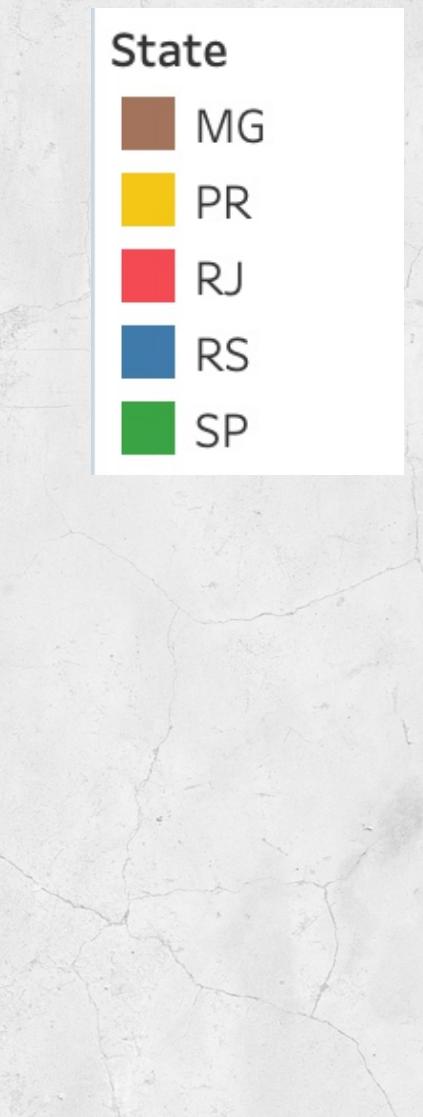
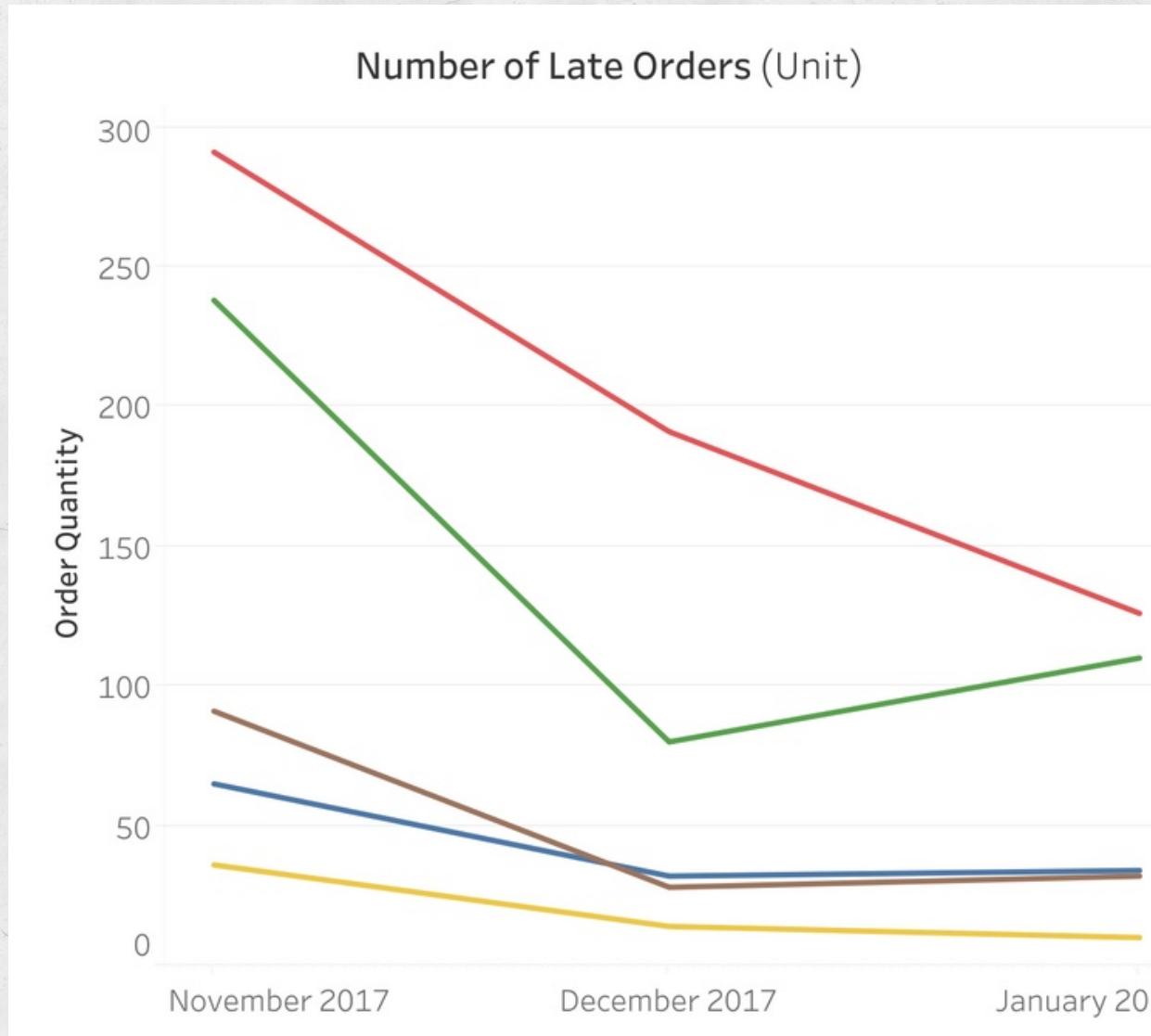
- Number of Orders: **SP** was the outstanding state with the **highest number of orders**. The middle group were **RJ and MG**, followed by **RS and PR** below.
- Growth of Orders: **Every state** experienced **a relatively similar pattern**, with a rate between **50-90% at the Early Peak** and **10-50% at the Last Peak**.



Number and % Change of Orders in Top 5 states in Peak Time, by State

# Late Delivery by Locations

- Despite not being outstanding in the number of orders, **the number and ratio of RJ and RS were the highest** among the Top 5 States.
- The **ratio of late orders tended to decrease** over the period.



Number and Ratio of Late Orders in Top 5 states in Peak Time, by State



**Late delivery  
SP, RS, RJ**

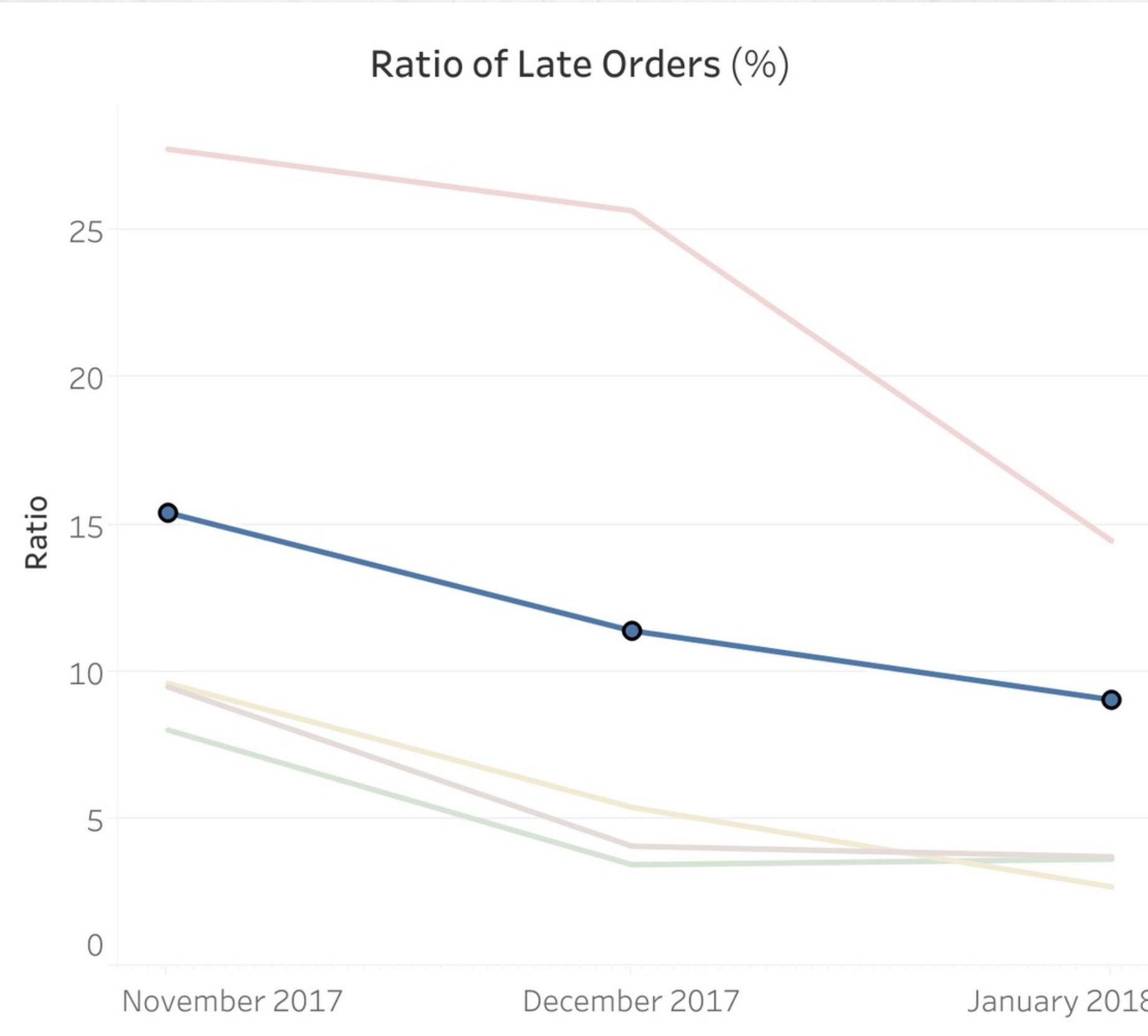




% Change of Order Quantity, Number and Ratio of Late Orders in SP in Peak Time

## Late Delivery in SP

- Accounted for **53% of orders** of the Top 5 states in Peak period.
  - **In the Last Peak**, although the number of total orders rose substantially (while other states had their late index decreased), **the ratio of late deliveries was still maintained.**
- > Not a worrisome pattern.



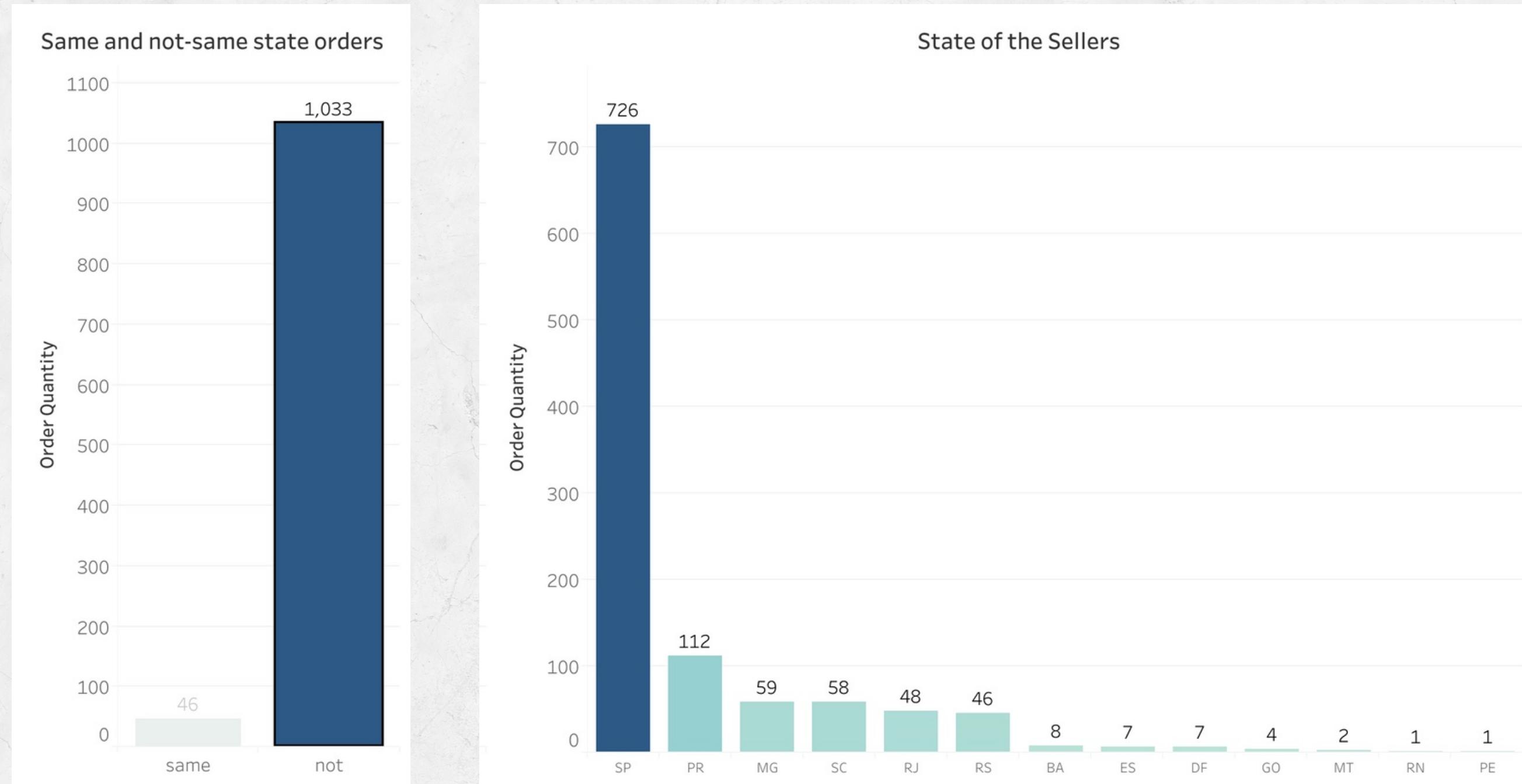
Ratio of Late Orders in RS in Peak Time

## Late Delivery in RS

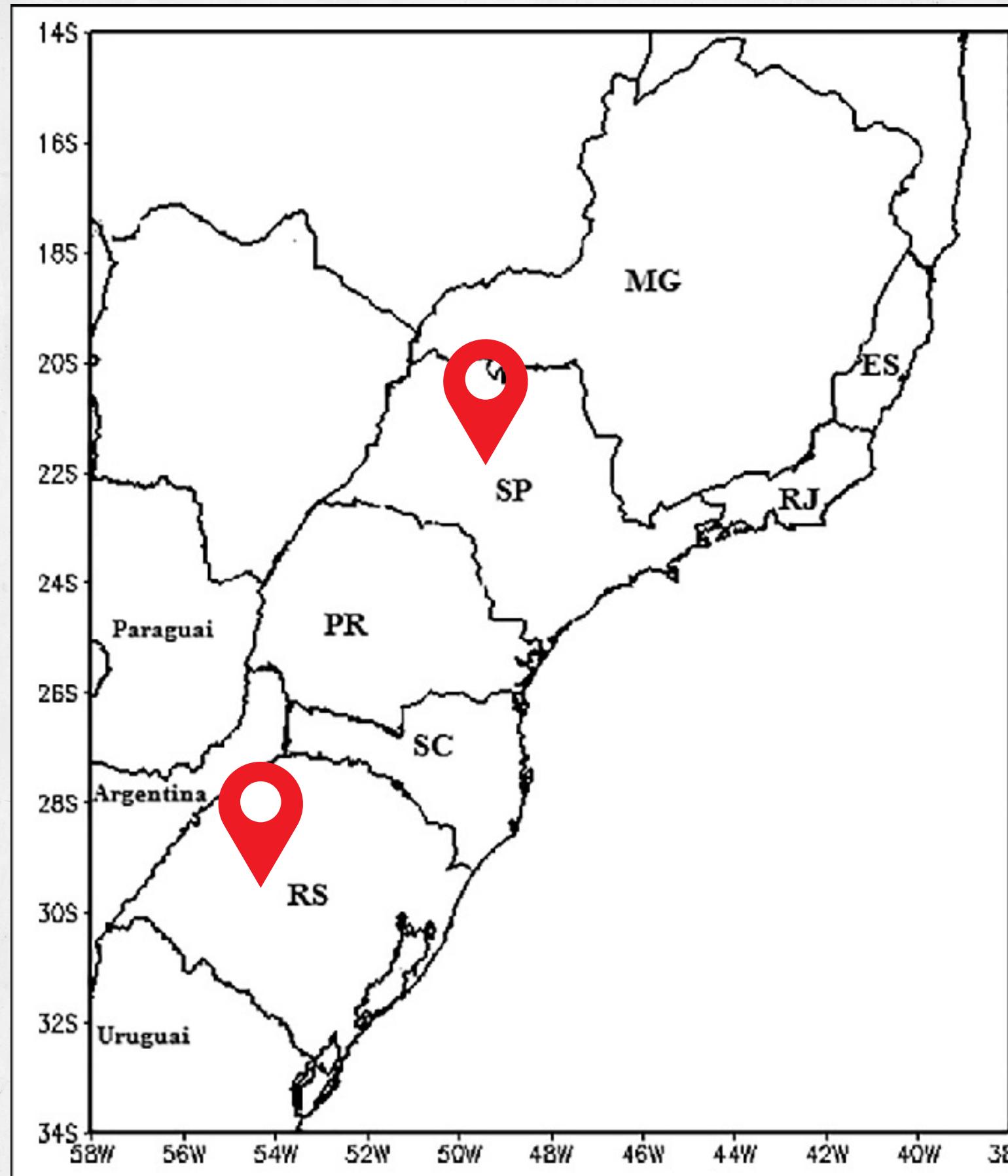
Despite not relatively high in the Top 5 states in terms of the orders' amount,  
**the ratio of late-delivery of RS was considerably higher than SP, MG.**

# Late Delivery in RS

The data in Peak Time illustrates that **96% of orders made in RS had sellers who were in different states, mainly in SP** (67% orders in Peak Time).

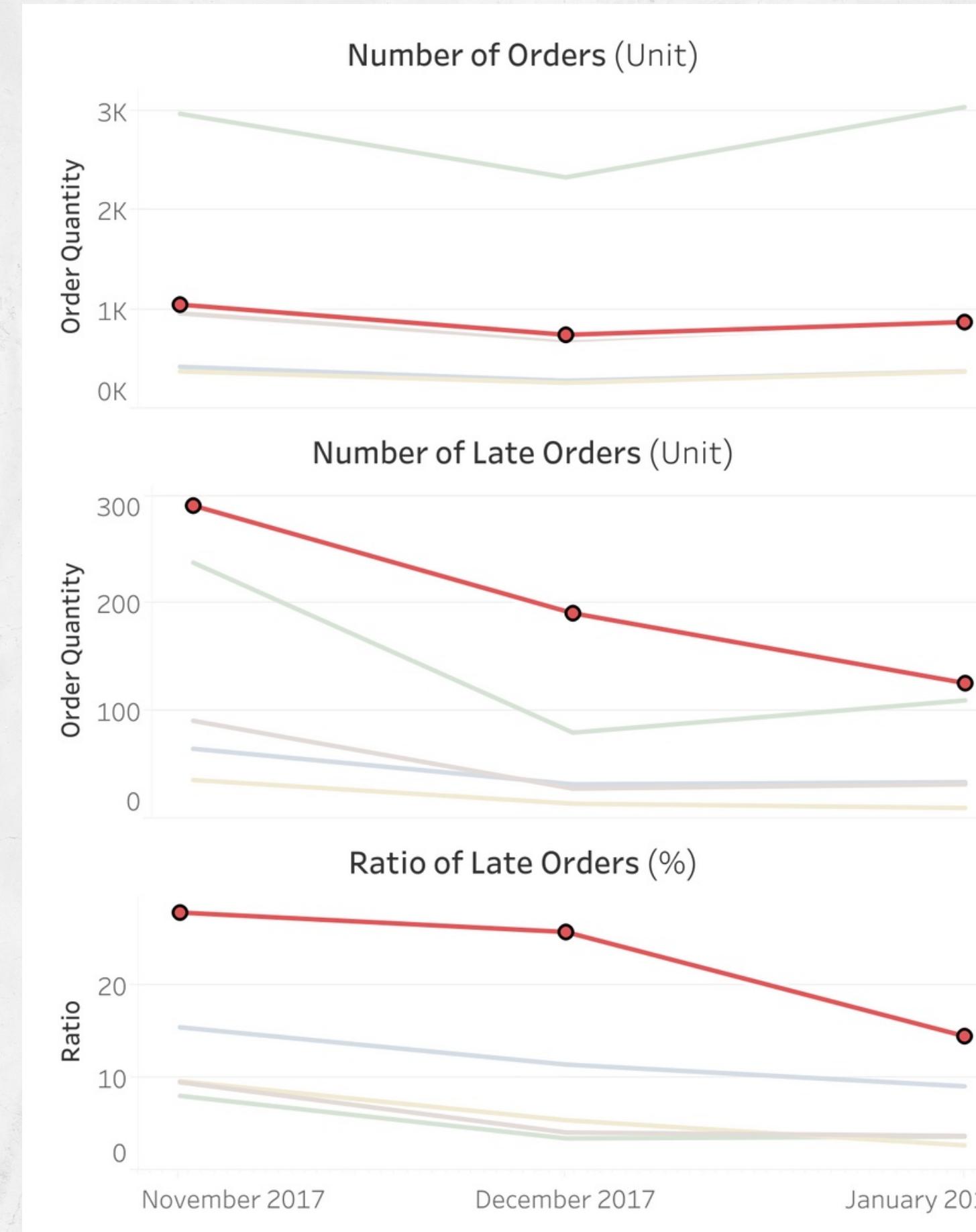


Number of same-state, not-same-state orders, and state of sellers for orders in RS in Peak Time



## Late Delivery in RS

Therefore, in some respects, the high rate of late orders in RS could be explained by **the large distance between SP and RS.**



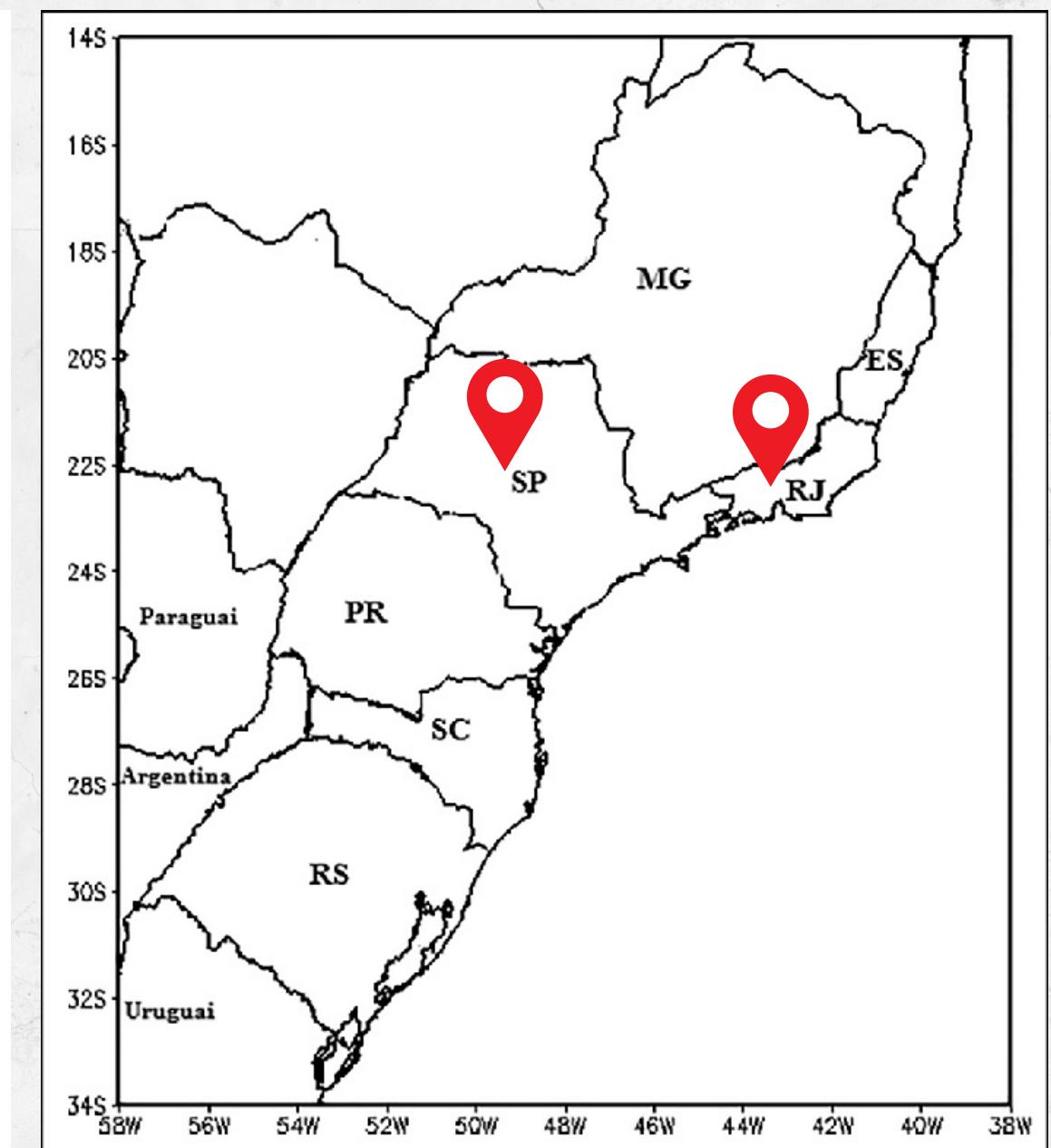
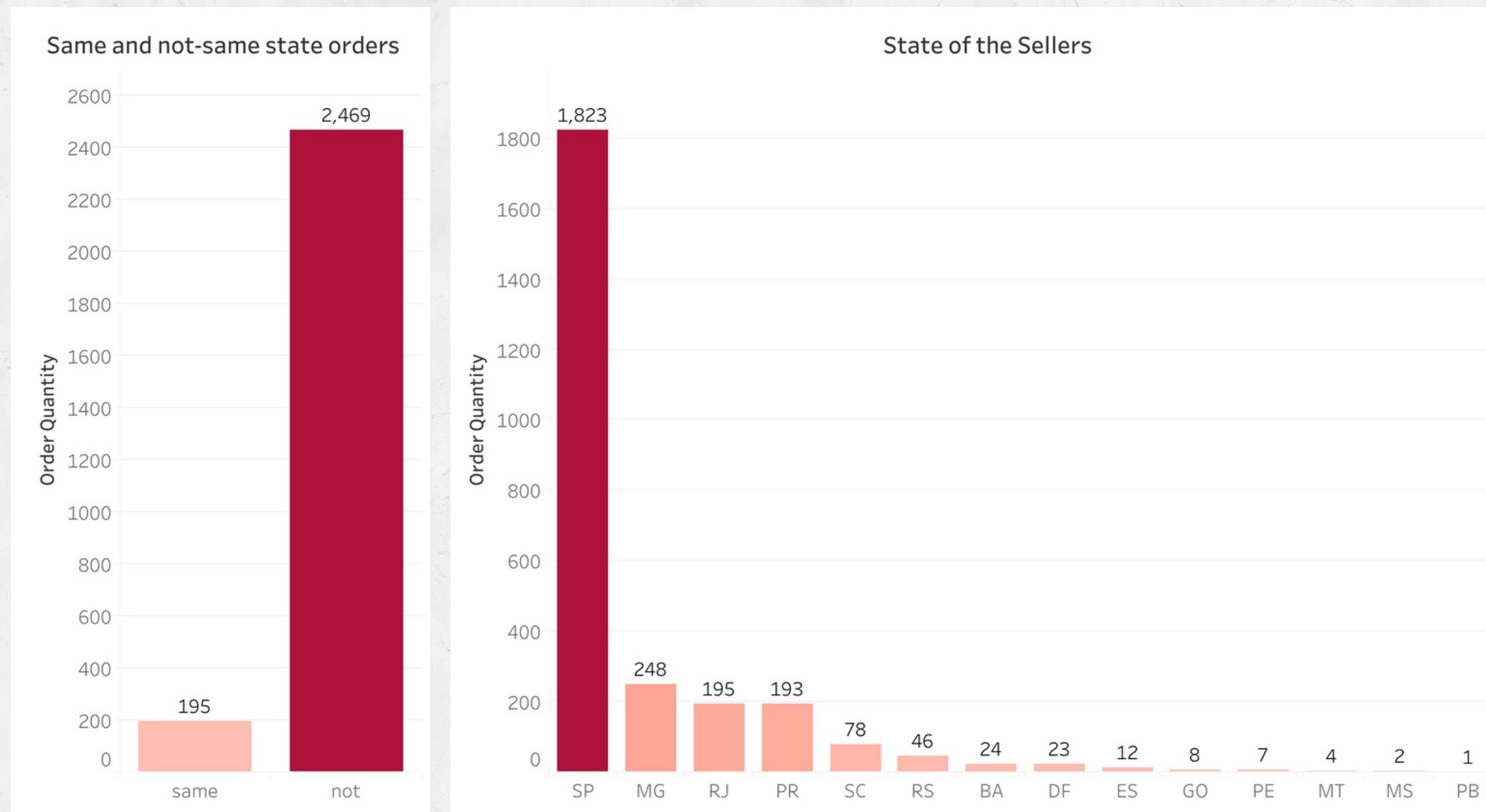
Growth of Orders, Number and Ratio of Late Orders in RJ in Peak Time

## Late Delivery in RJ

- RJ was the second-highest order quantity in the Top 5 states.
- However, **the number of late orders in RJ was the highest** (even more than SP).
- Its **ratio of late orders was also the highest**.

# Late Delivery in RJ

Orders from **RJ** **followed a similar pattern** to RS (outstanding not-same-state orders and sellers mainly from SP). However, **these two states are contiguous, which is different from RS.**



Number of same-state, not-same-state orders, and state of sellers for orders in RJ in Peak Time

# Late Delivery in RJ

When RJ orders mainly depended on sellers in SP, one of the main reasons for the high ratio of late deliveries in RJ was the **poor quality of highways and logistics routes** from SP to RJ.



BR-116 Highway



BR-101 Highway



**90% of Brazil's ton-mile freight** is transported nationwide via its **highways and backroads**.



**BR-116, BR-101 are two main routes**, which were recorded for more than 24% of all automobile accident fatalities in 2017.



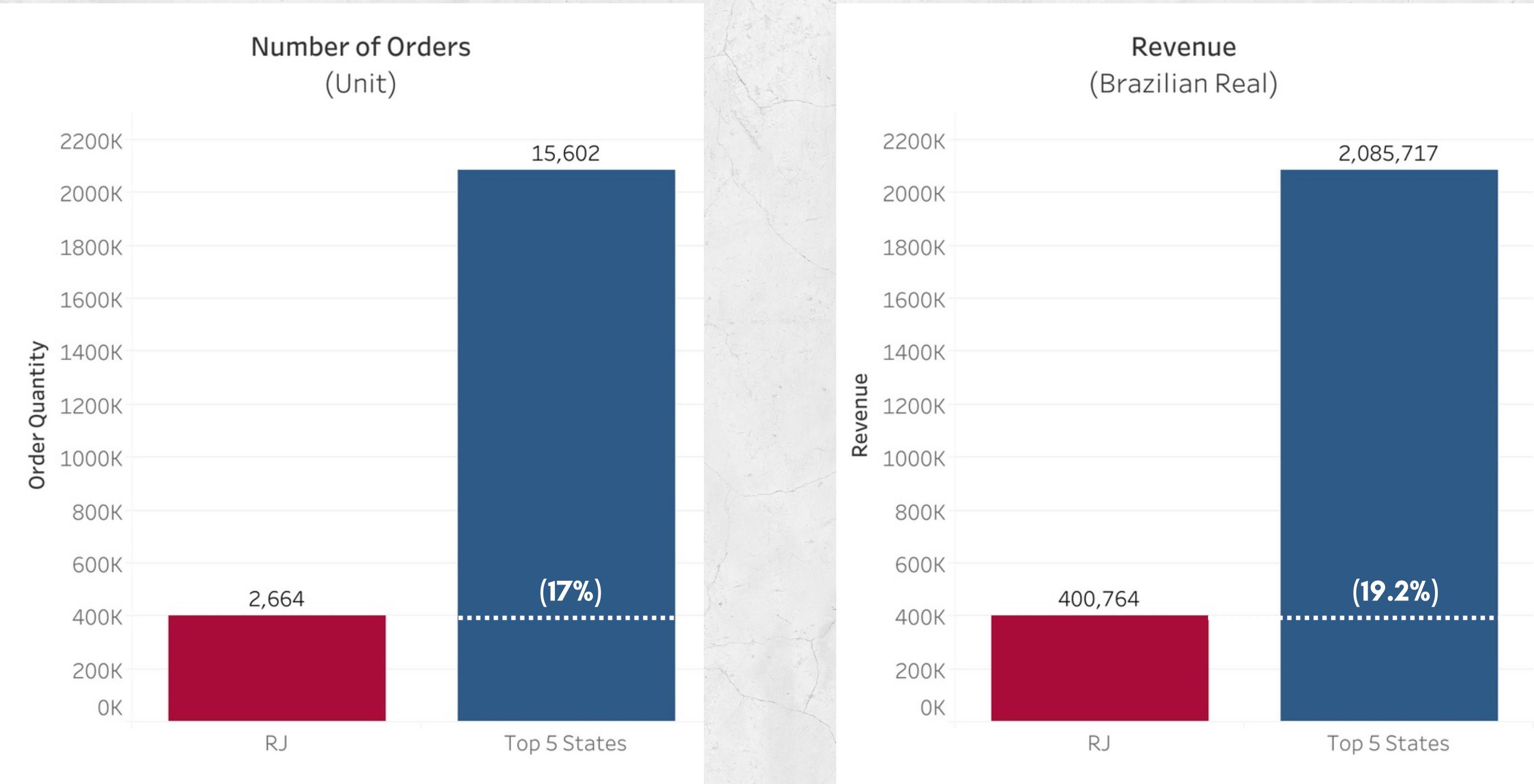
**Just 25% of the federal highways were in good working order** and approximately 65% of Brazil's public roads were deemed to be in poor condition (recorded in 2017).

Source:

Vardy, C (2019, November) Privatization: São Paulo's Proven Solution for Brazil's Long-suffering Highway System. *Brazil Builds*

# Late Delivery in RJ

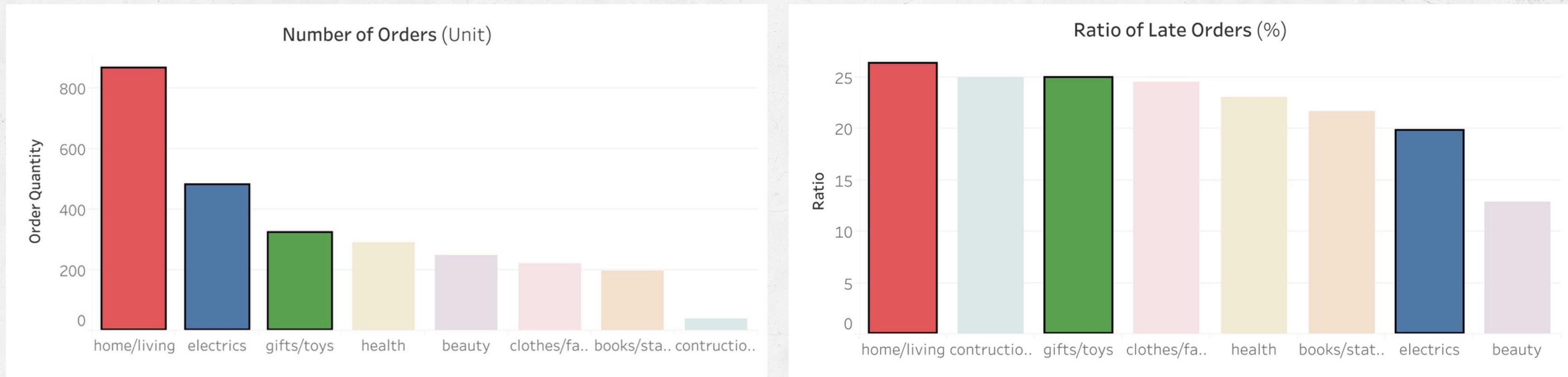
Solutions should be made for RJ if Olist plans to widen the business outside SP.



Total Number of Orders and Revenue in RJ and in Top 5 states in Peak Time

# Late Delivery in RJ by Category

- The top 3 main categories with highest number of orders: **home/living, electrics, gifts/toys**.
- Of those 3 main categories, **home/living** and **gifts/toys** were among **the highest late ratios**.



Total Number of Orders, Ratio of Late Orders in RJ in Peak Time, by Category



# Late Delivery in RJ by Category

## Potential Solutions:

- **Improve ETD Forecast:** optimize transport routes from SP to RJ.
  - **Supply Augmentation:** Consider **increasing imported supply**, leverage RJ's **proximity to the sea**.
  - **Stock up** on more **Home/Living and Electrics products** to expedite approval and dispatch to carriers process.
  - In Early-Mid Peak, **prioritize processing items** experiencing strong **growth during a certain period** such as **Gifts/Toys**.



# Delivery days in RJ

## by Category

**Actual Delivery Days** = 'act\_delivery\_date' - 'purchase'

**Estimated Delivery Days** = 'act\_delivery\_date' - 'purchase'

**Difference** = Avg. Estimated Delivery Days - Avg. Actual Delivery Days

*(Both are calculated on average, grouped by Year-Month, Category)*

- If **Difference**  $\geq 0$ , delivery is **on time**.
- If **Difference**  $< 0$ , delivery is **late**.

| Orders              |            |
|---------------------|------------|
| 🔑 order_id          | linestring |
| 🔑 customer_order_id | linestring |
| order_status        | text       |
| purchase_timestamp  | timestamp  |
| approved_at         | timestamp  |
| carrier_date        | timestamp  |
| act_delivery_date   | timestamp  |
| est_delivery_date   | timestamp  |

# Delivery days in RJ

## by Category

**Difference in Home/Living products** in the Early Peak was **only 1 day**, which means many late and close-to-time orders, caused by **problems in the delivery estimating system**.



Difference between Estimated and Actual Delivery Days  
for orders in RJ in Peak Time, by Category

### Potential Solutions:

- **Modify the estimated date/estimated system** and **inform consumers clearly and concisely** about the delivery time and order processing procedure.
- Consider **delivery times in different hours** in a day.

# Conclusion

This project focuses on analyzing Olist e-commerce activities in 2017 Peak Time (November – January) in the Top 5 states with the highest numbers of orders (SP, RJ, MG, RS, PR).



## 01 By Category

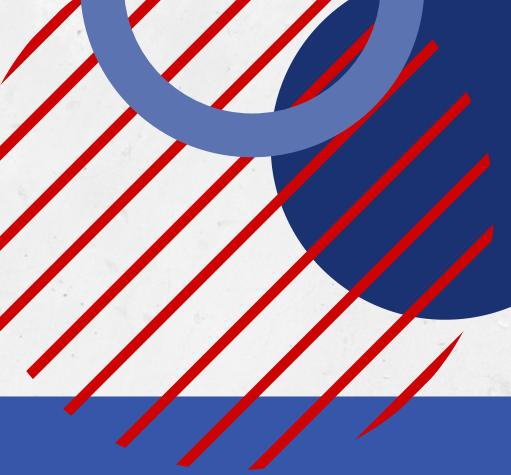
Over the Peak Time, **home/living and electrics** were the categories with the **highest demands**. Gifts/toys items were popular for ordering at Early and Mid Peak.

## 02 By Location

**SP** was **the crucial state** in ensuring the performance of Olist during Peak Time. However, **RJ had the largest Late Delivery issue**, despite its geographical proximity to SP, which was its main supply source.

## 03 Solutions

RJ's issues should be focused to reduce the over-dependence on SP, such as **improving ETD Forecast** and **supply augmentation**. Solutions can go deep into categories, by **stocking up more popular products** during Peak Time.



THANK YOU  
FOR YOUR ATTENTION!

