

# The Impacts of Supply Chain Disruptions on Containerized U.S. Export Volumes

Jake Wagner, Mengshan Zhao, Eric Jessup

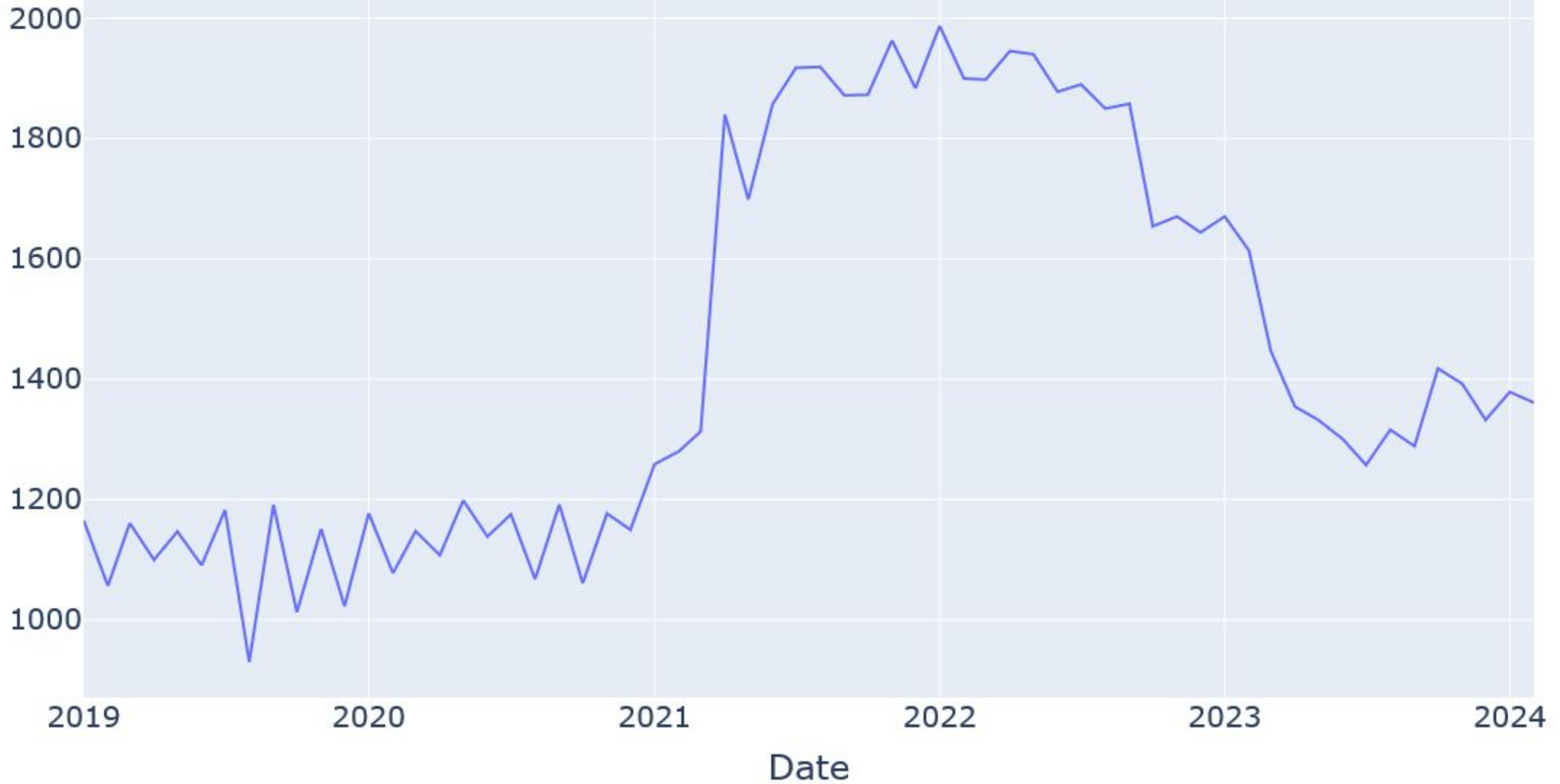
This research was supported by the U.S. Department of Agriculture, Economic Research Service. The findings and conclusions in this publication are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

# Real Imports of Goods

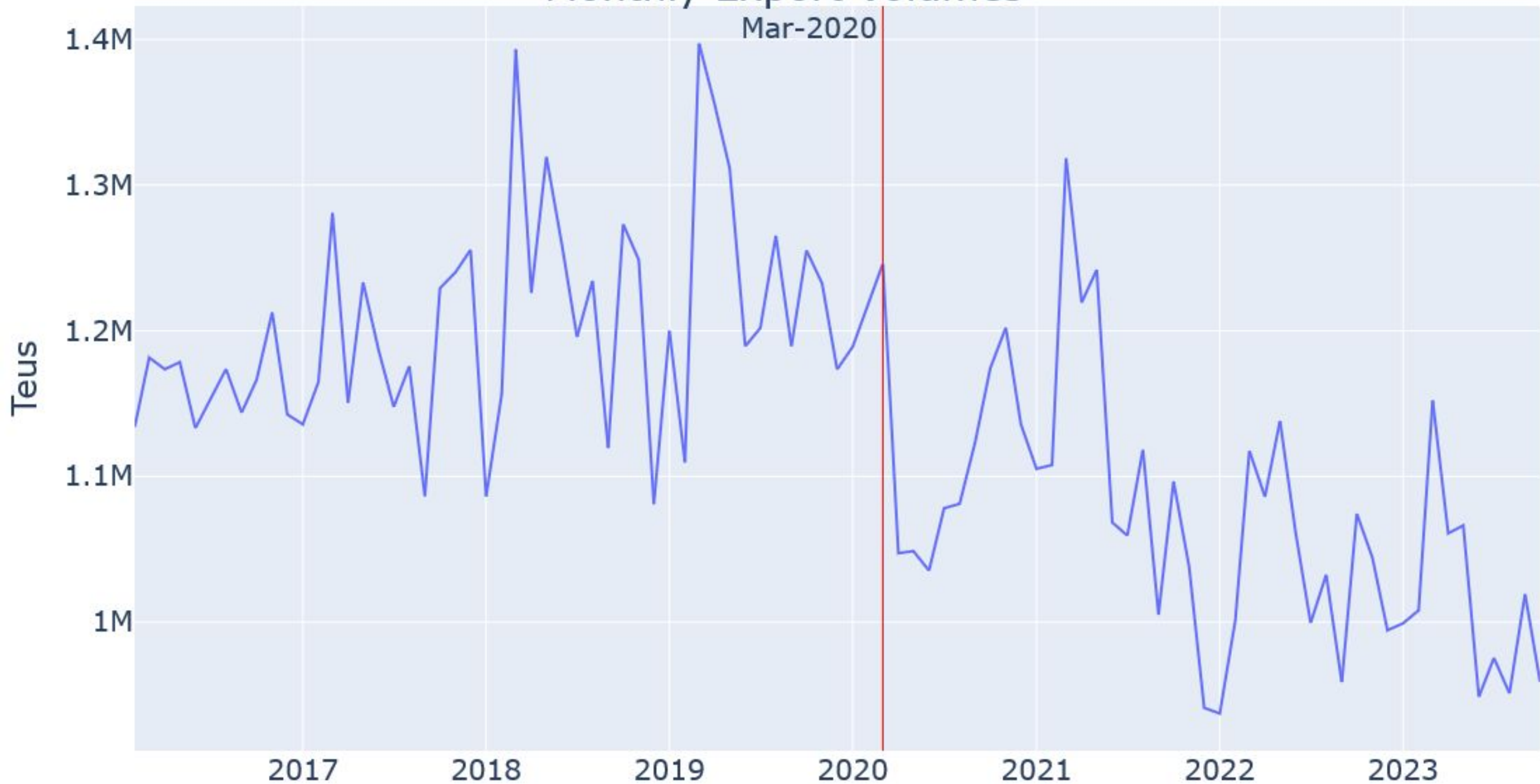
Billions of Dollars (chained 2016)



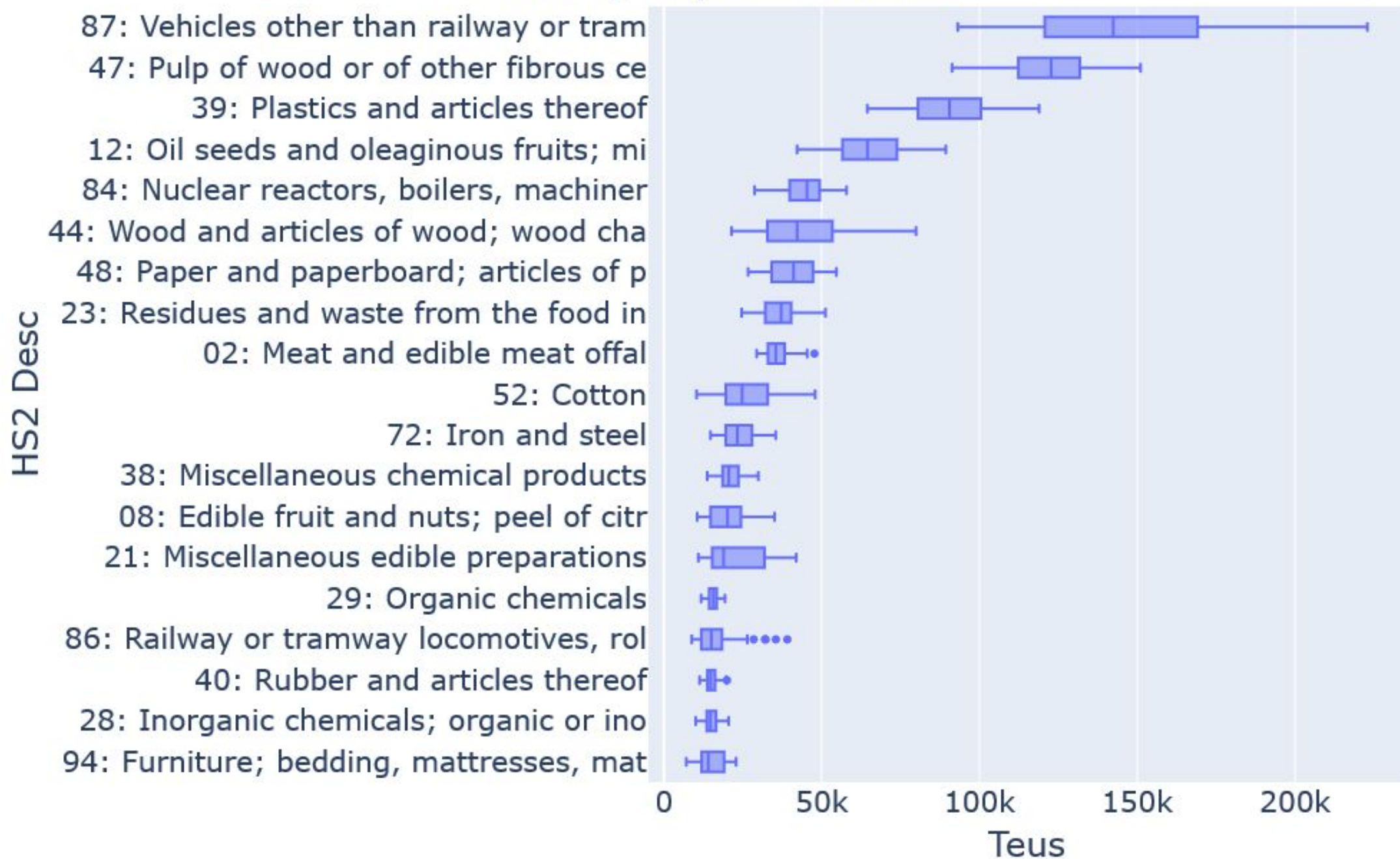
# Ocean Container Spot Rates



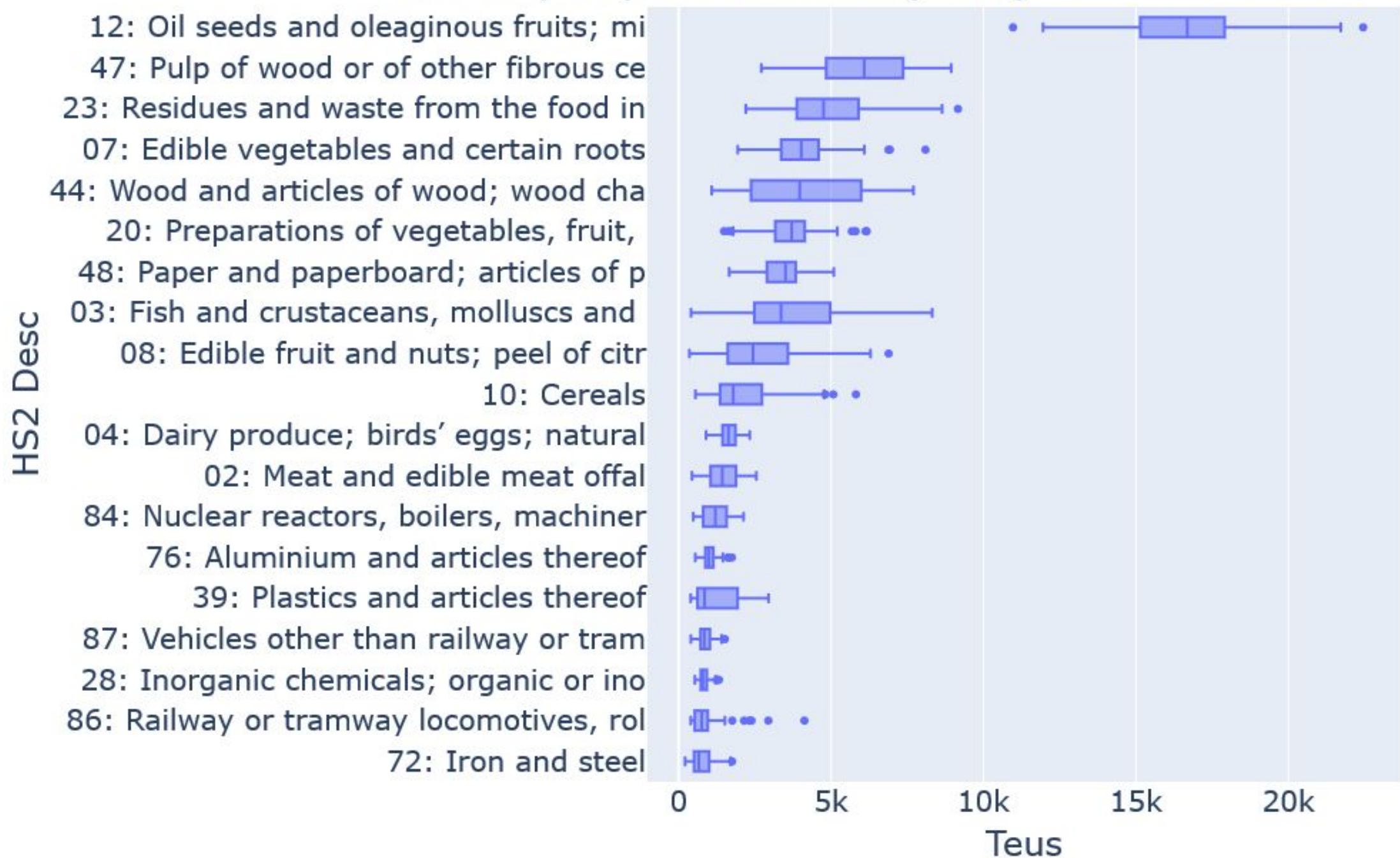
# Monthly Export Volumes



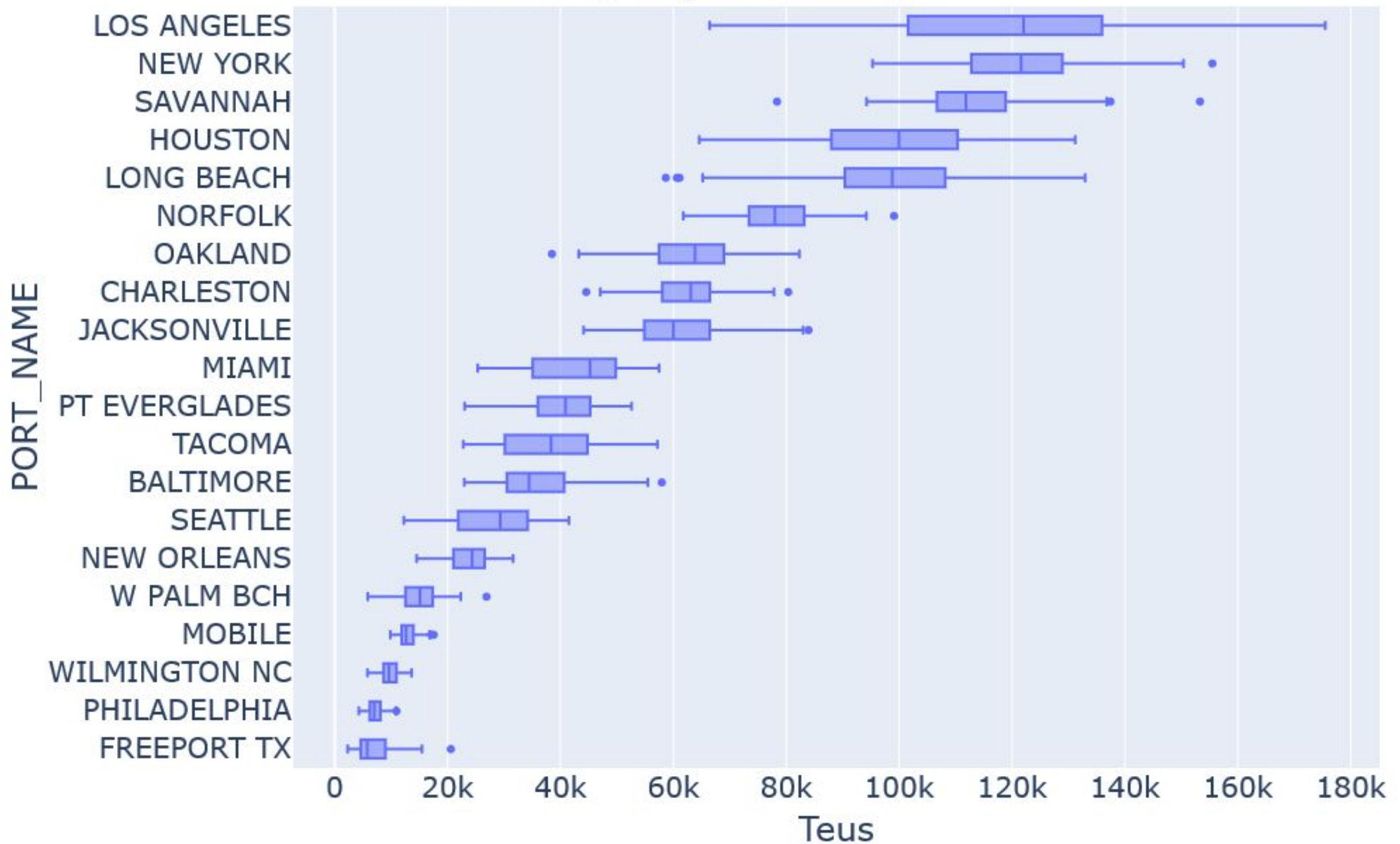
# Monthly Export Volumes



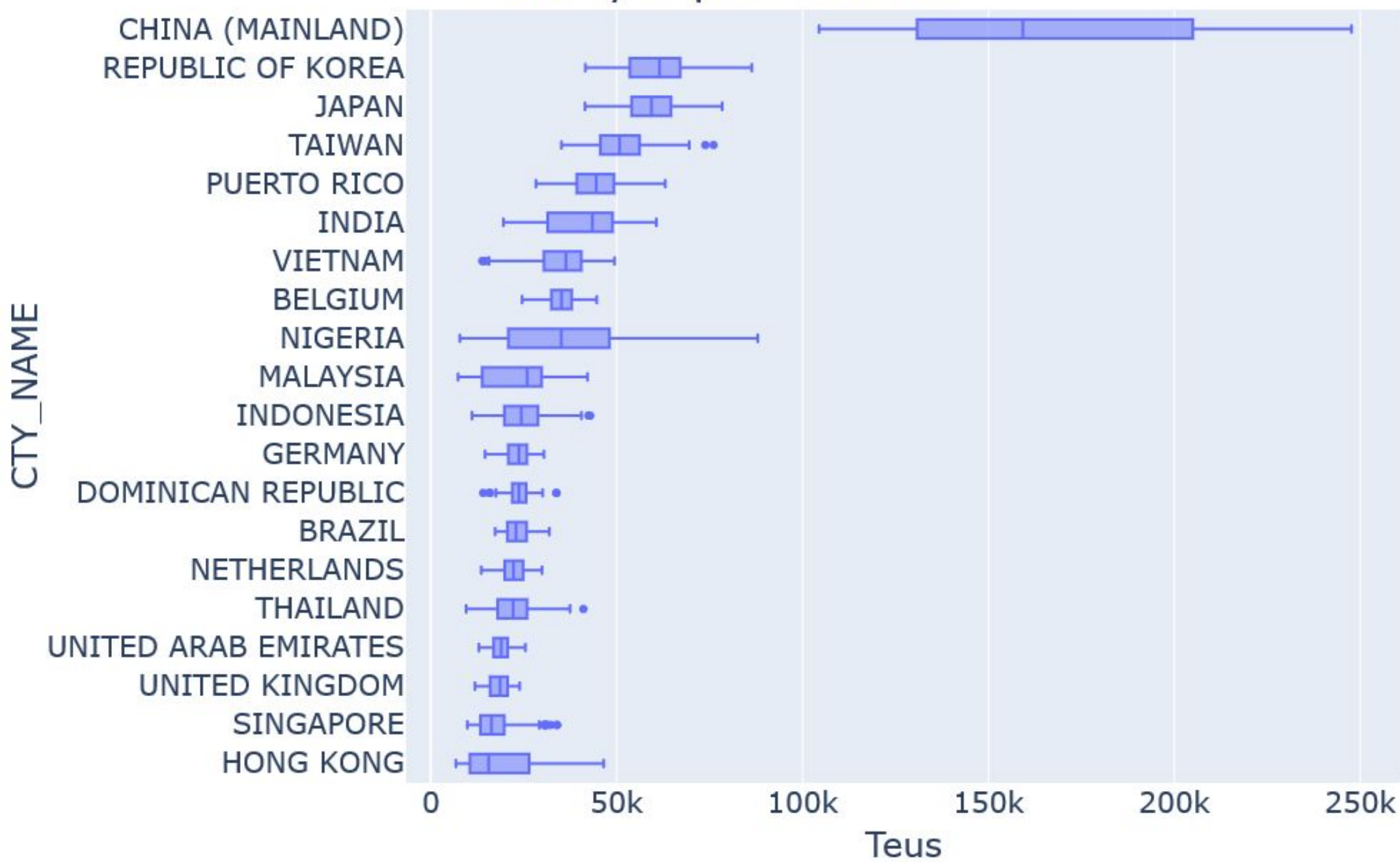
# Monthly Export Volumes (PNW)



# Monthly Export Volumes

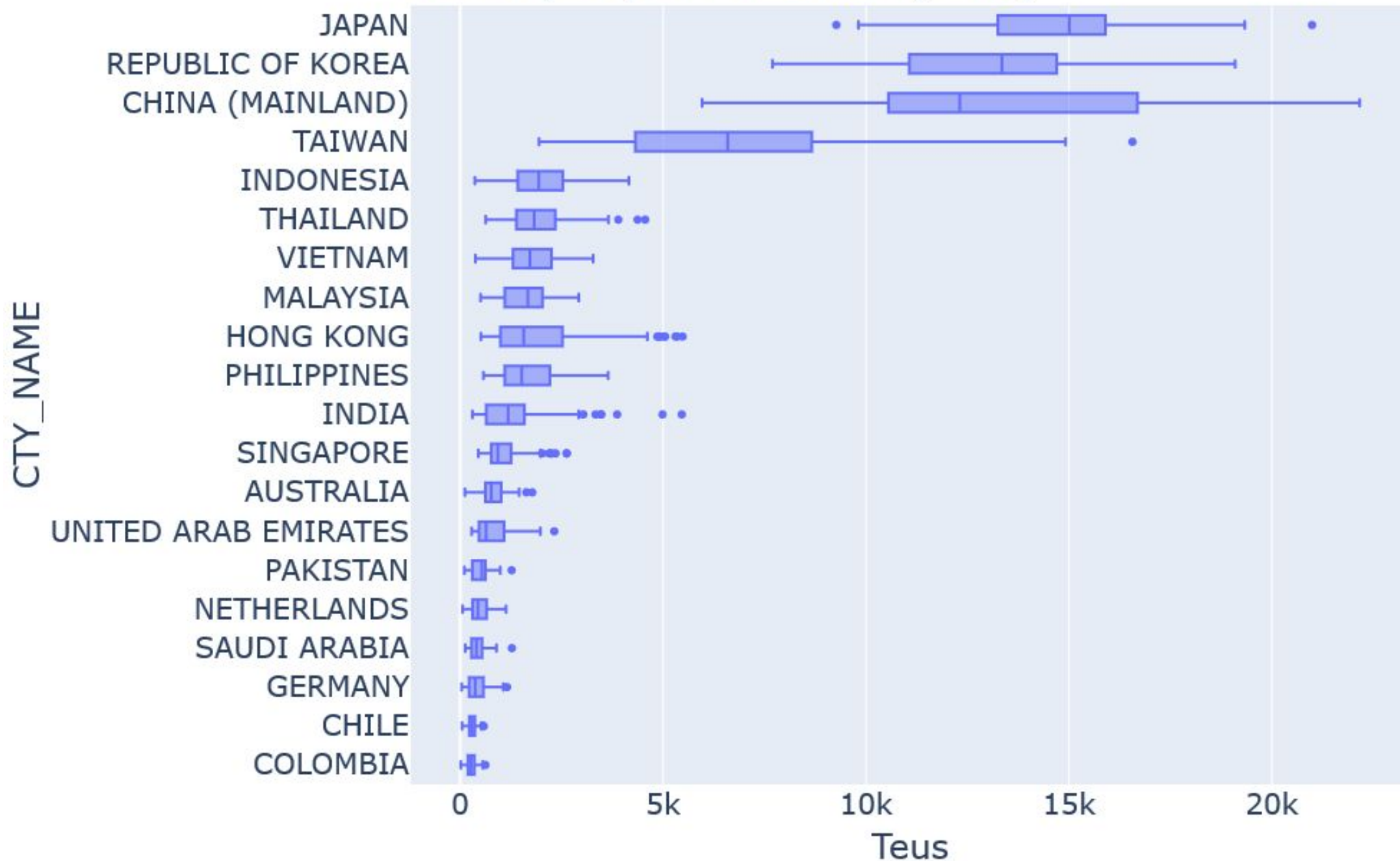


# Monthly Export Volumes





# Monthly Export Volumes (PNW)

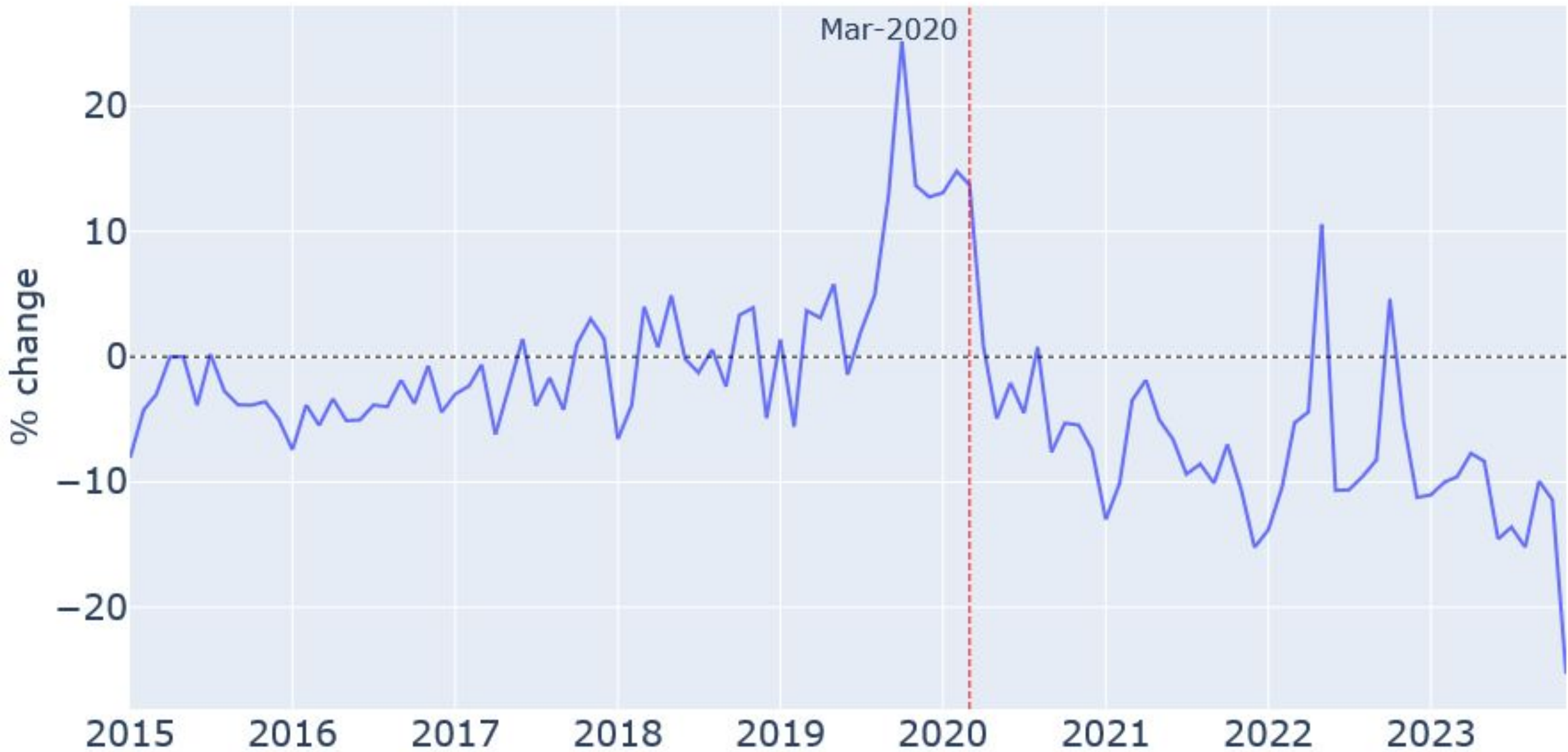


# Measuring Monthly Deviations in Containerized Export Volumes (relative to the pre-Covid trend)

...estimating the variance in export volumes  
unexplained by port-commodity-destination  
fixed effects, time trends, and seasonal  
adjustments.

$$\ln(Y_{pcdt}) = \beta_{pcd} + \theta_{pcd}T + \mu_{pcdm} + \alpha_{pct} + \epsilon_{pcdt}$$

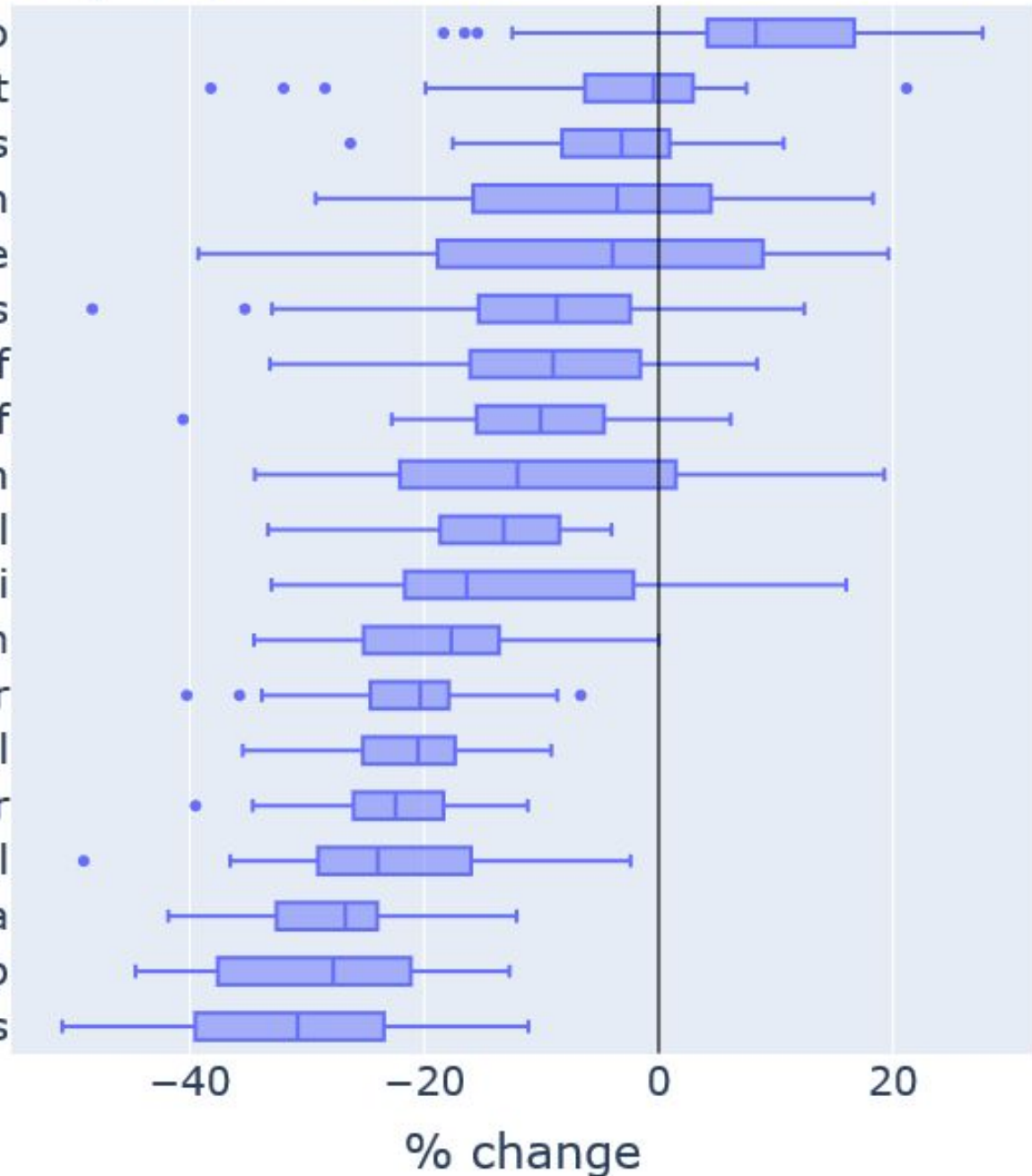
# Change in Monthly Export Volumes



# Change in Monthly Export Volumes

HS2 Desc

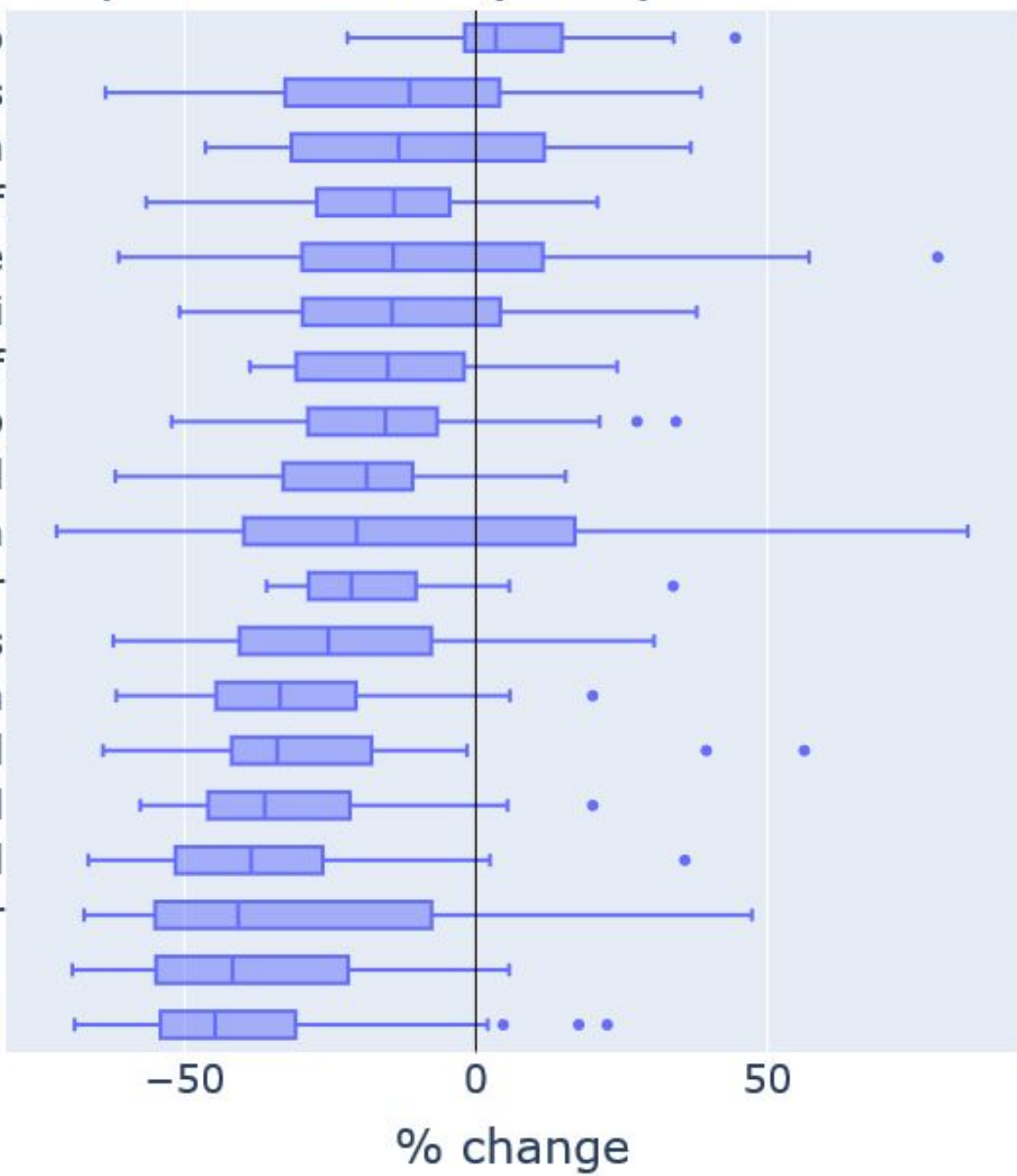
- 28: Inorganic chemicals; organic or inorganic
- 94: Furniture; bedding, mattresses, mat
- 29: Organic chemicals
- 23: Residues and waste from the food in
- 47: Pulp of wood or of other fibrous ce
- 38: Miscellaneous chemical products
- 40: Rubber and articles thereof
- 39: Plastics and articles thereof
- 52: Cotton
- 72: Iron and steel
- 12: Oil seeds and oleaginous fruits; mi
- 87: Vehicles other than railway or tram
- 84: Nuclear reactors, boilers, machiner
- 86: Railway or tramway locomotives, rol
- 08: Edible fruit and nuts; peel of citr
- 02: Meat and edible meat offal
- 44: Wood and articles of wood; wood cha
- 48: Paper and paperboard; articles of p
- 21: Miscellaneous edible preparations



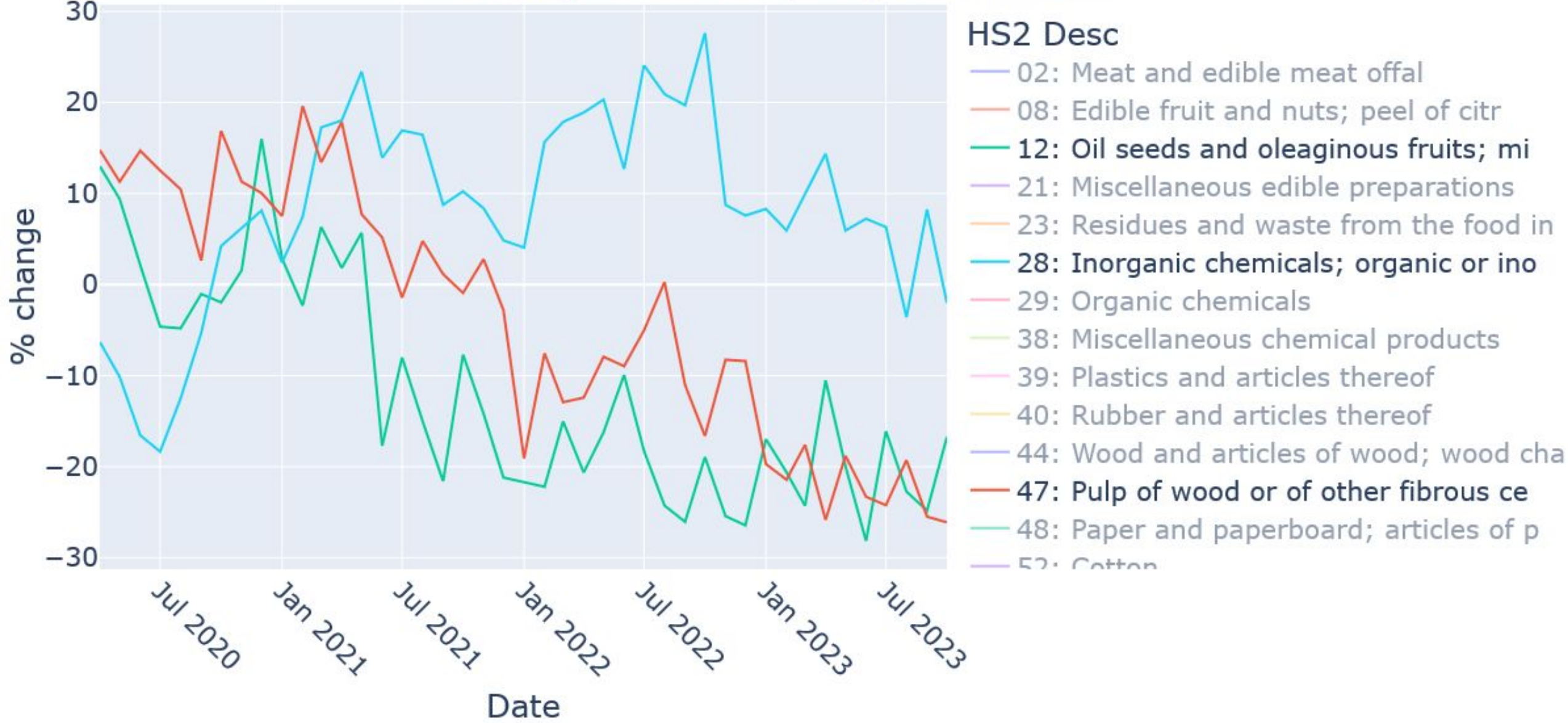
# Change in Monthly Export Volumes (PNW)

HS2 Desc

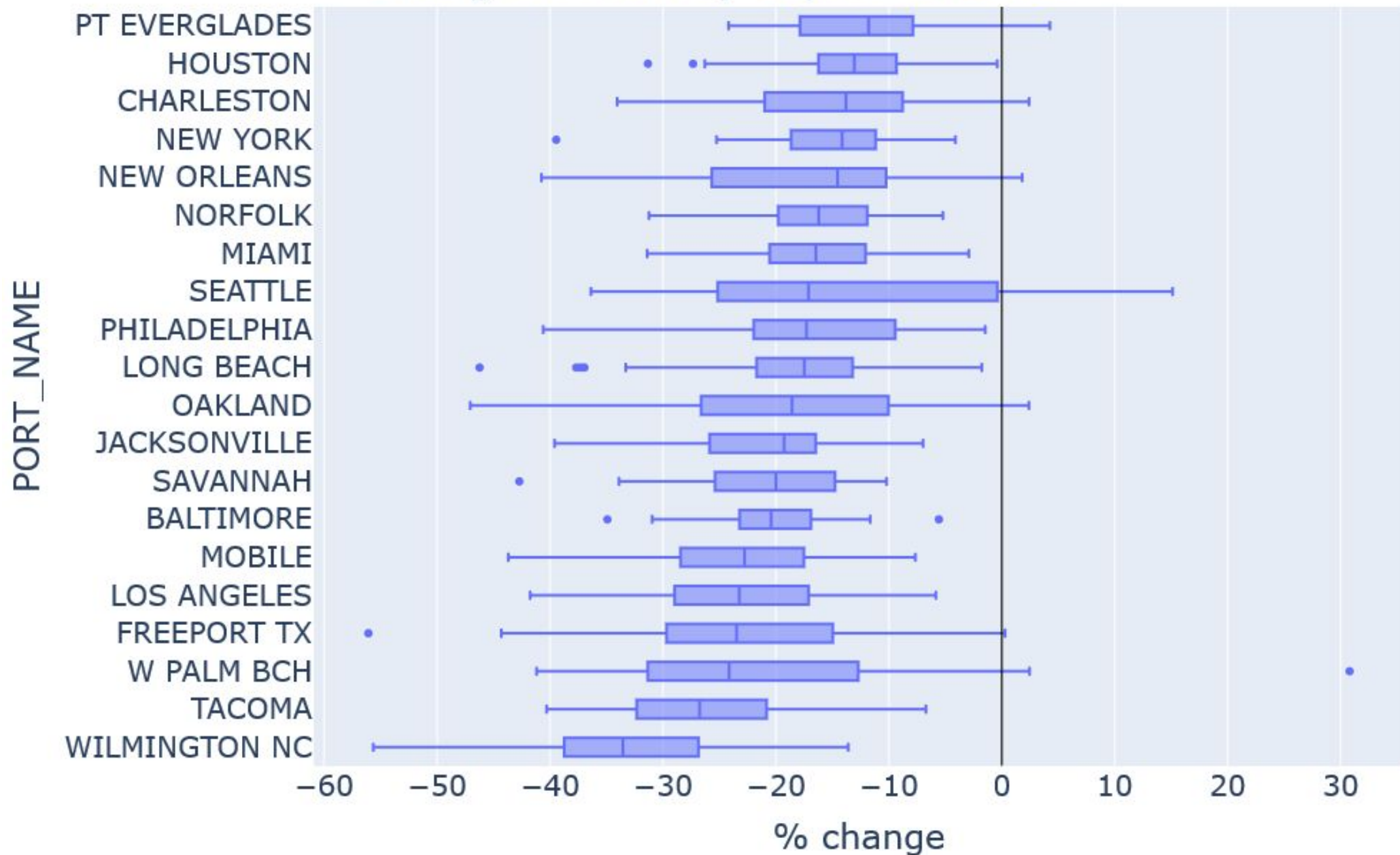
- 28: Inorganic chemicals; organic or inorganic
- 10: Cereals
- 87: Vehicles other than railway or tram
- 39: Plastics and articles thereof
- 47: Pulp of wood or of other fibrous cellulose
- 12: Oil seeds and oleaginous fruits; miscellaneous
- 76: Aluminium and articles thereof
- 48: Paper and paperboard; articles of paper
- 04: Dairy produce; birds' eggs; natural honey
- 23: Residues and waste from the food industries
- 84: Nuclear reactors, boilers, machinery and transport
- 07: Edible vegetables and certain roots
- 44: Wood and articles of wood; wood charcoal
- 86: Railway or tramway locomotives, rolling stock
- 02: Meat and edible meat offal
- 72: Iron and steel
- 08: Edible fruit and nuts; peel of citrus
- 20: Preparations of vegetables, fruit, cereals
- 03: Fish and crustaceans, molluscs and



# Change in Monthly Export Volumes



# Change in Monthly Export Volumes

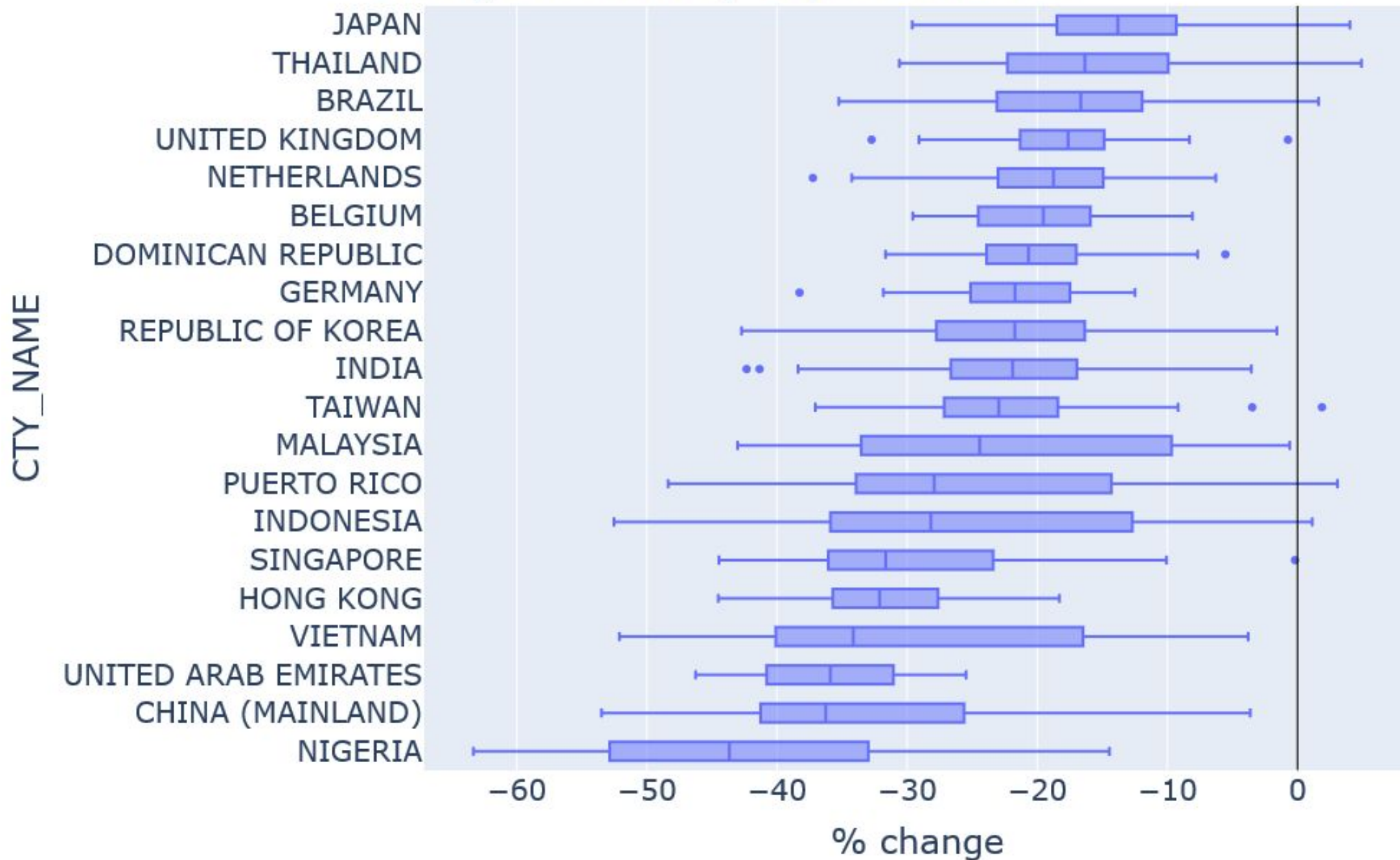


# Change in Monthly Export Volumes

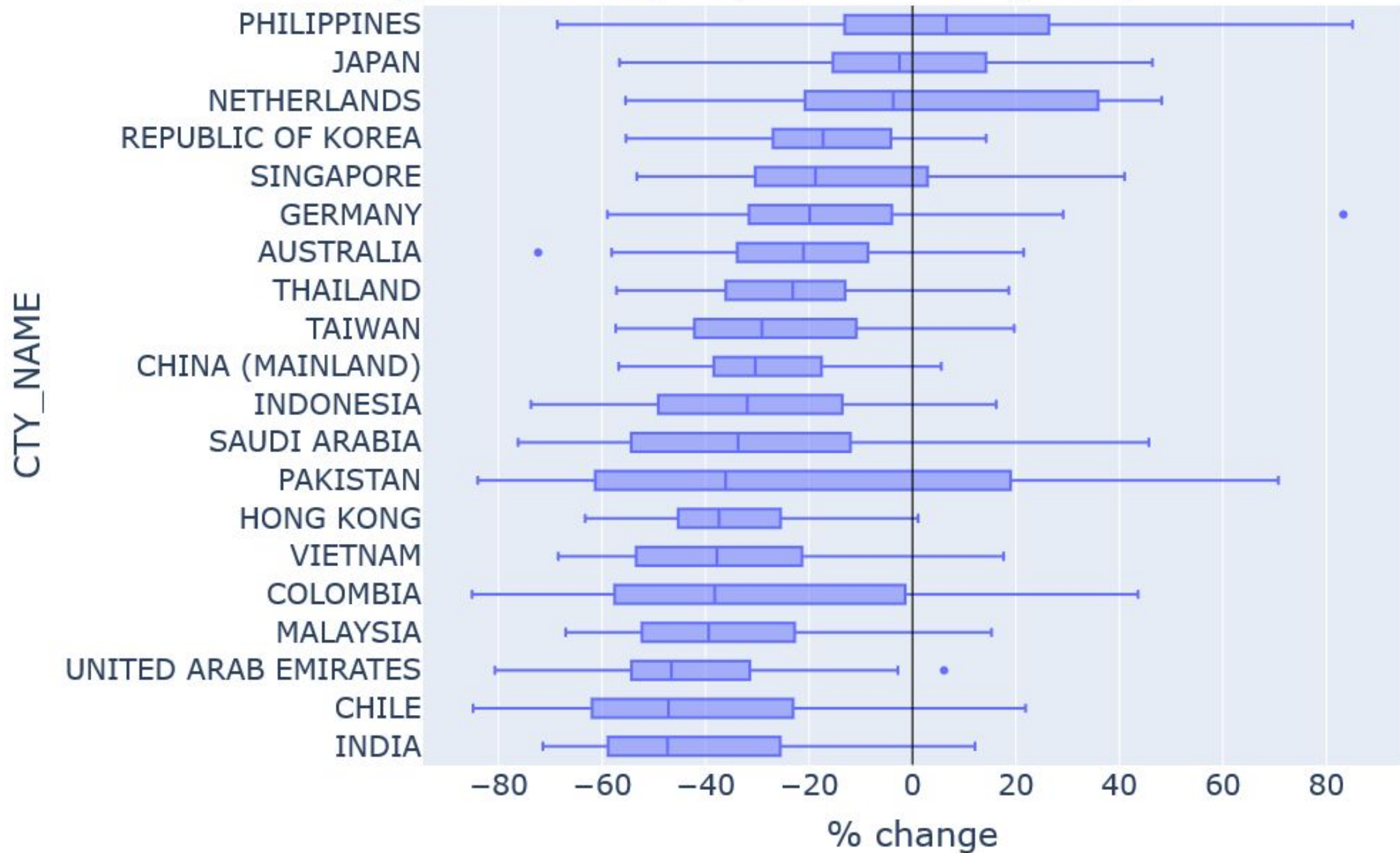




# Change in Monthly Export Volumes



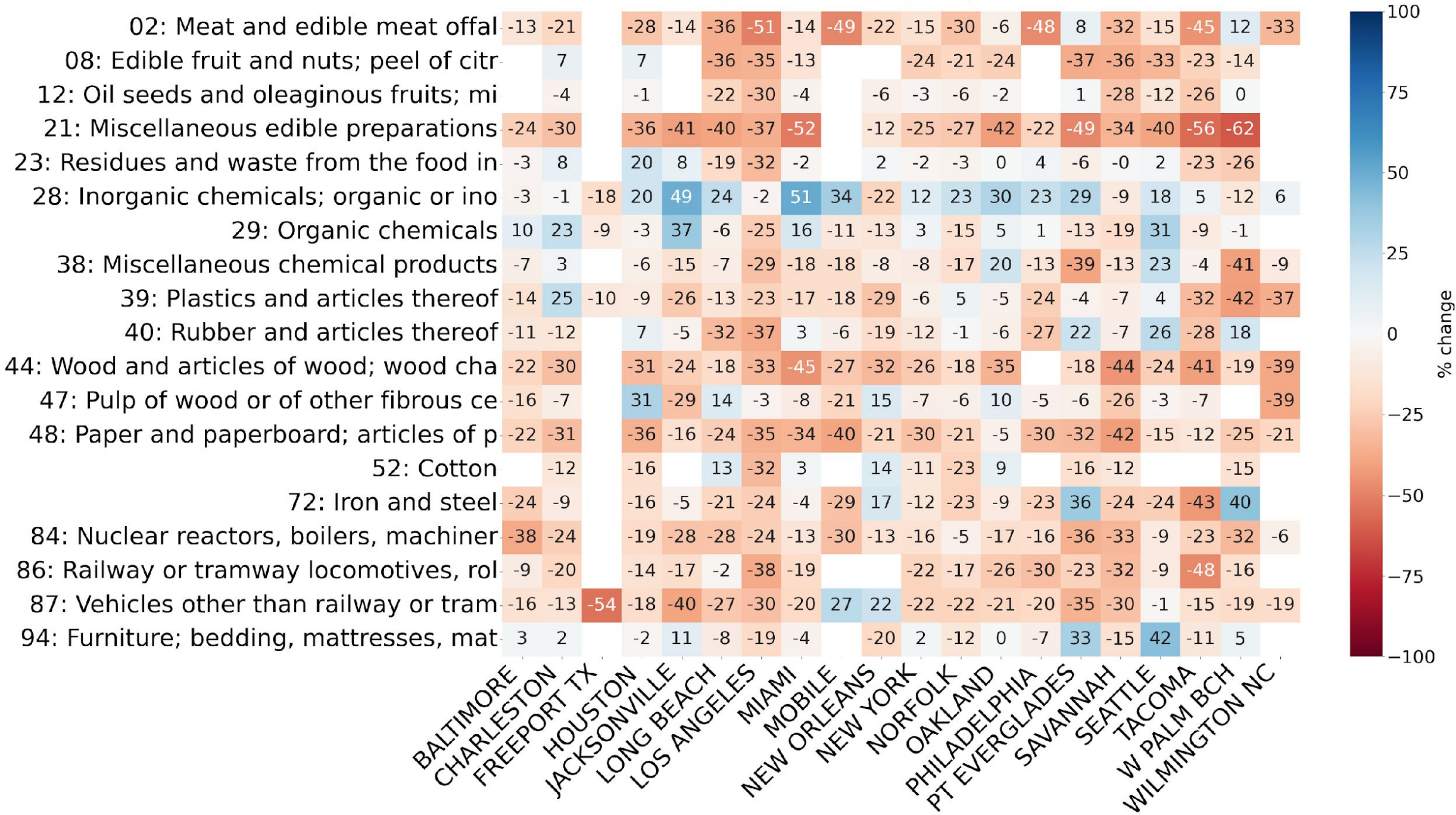
# Change in Monthly Export Volumes (PNW)



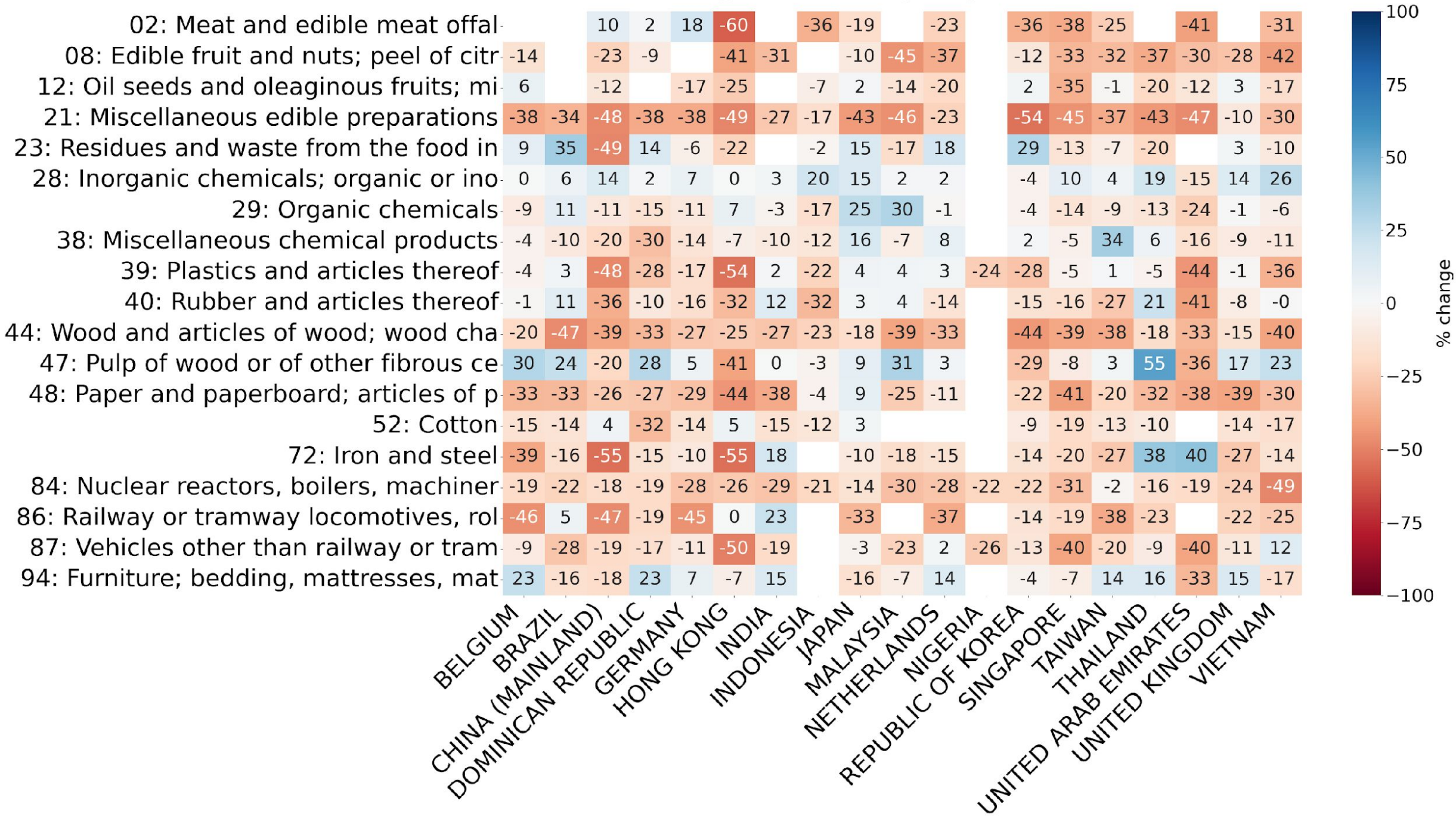
# Change in Monthly Export Volumes



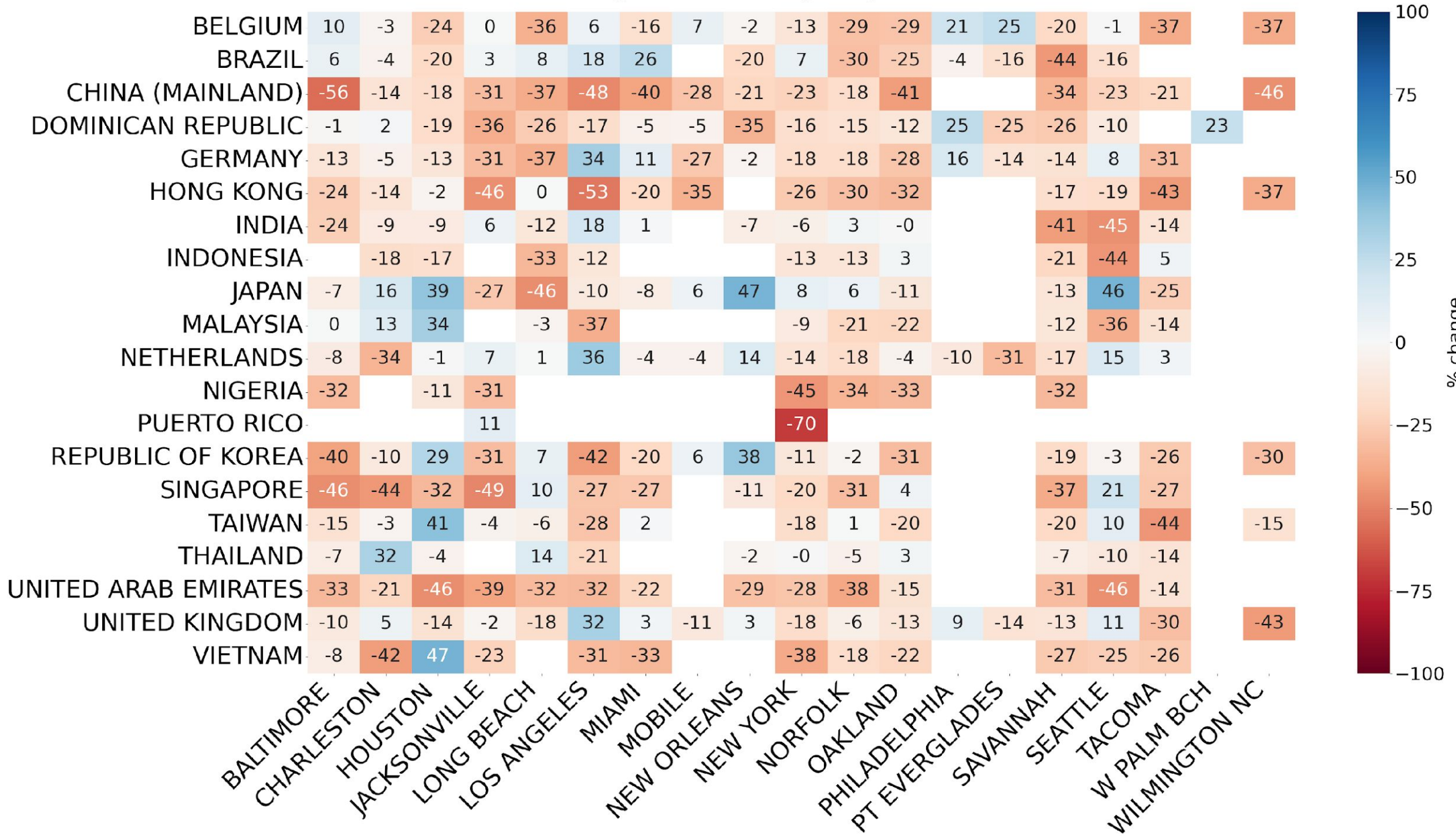
# Change in Monthly Export Volumes



# Change in Monthly Export Volumes



# Change in Monthly Export Volumes

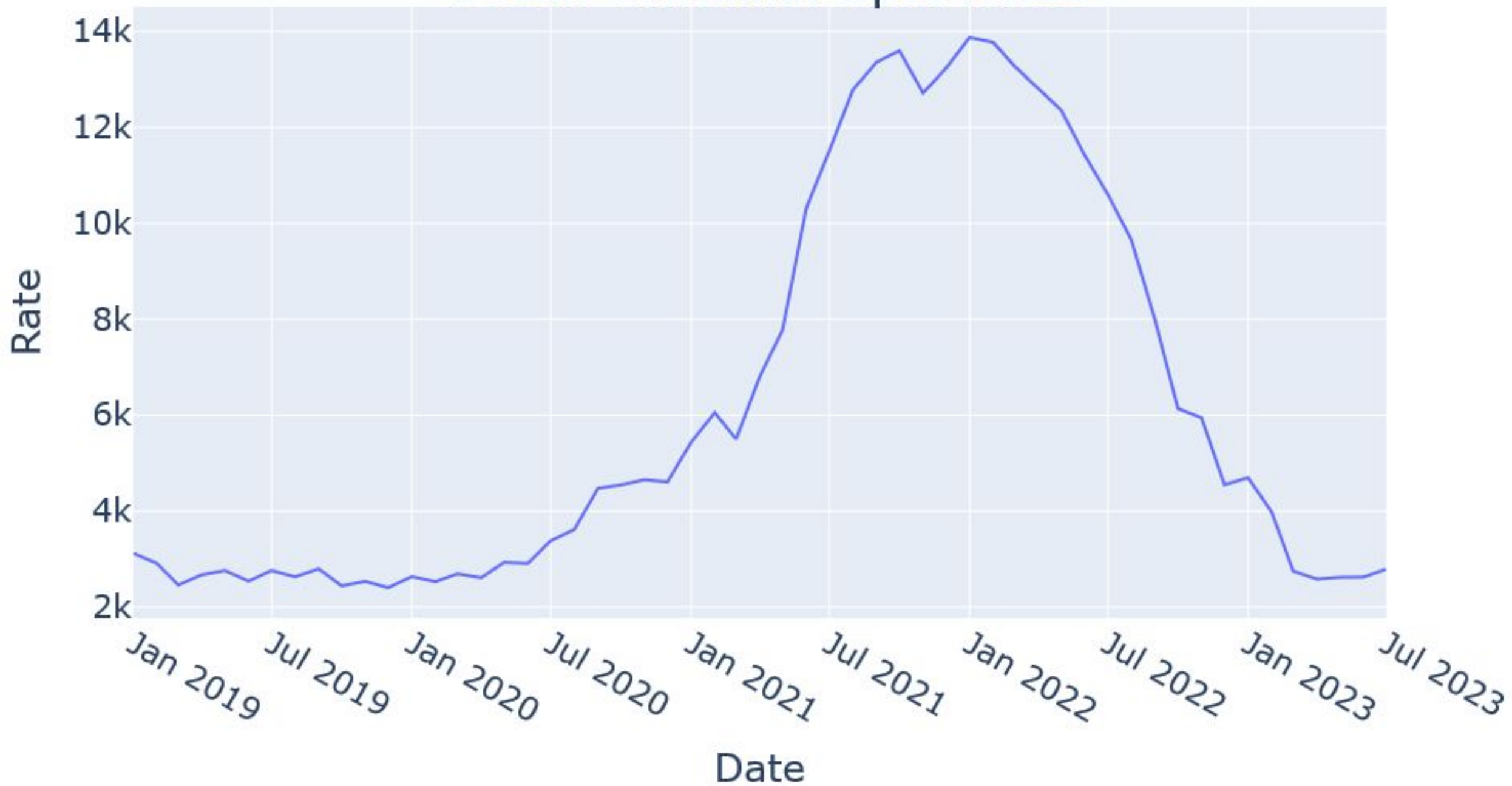


- Results broadly show reductions in containerized exports
- Impacts are heterogenous through time - monthly containerized exports fell by:
  - 8.2% in 2020
  - 13.1% in 2021
  - 14.0% in 2022
  - 18.3% in 2023
- Impacts are also heterogenous across ports, commodities and destination countries

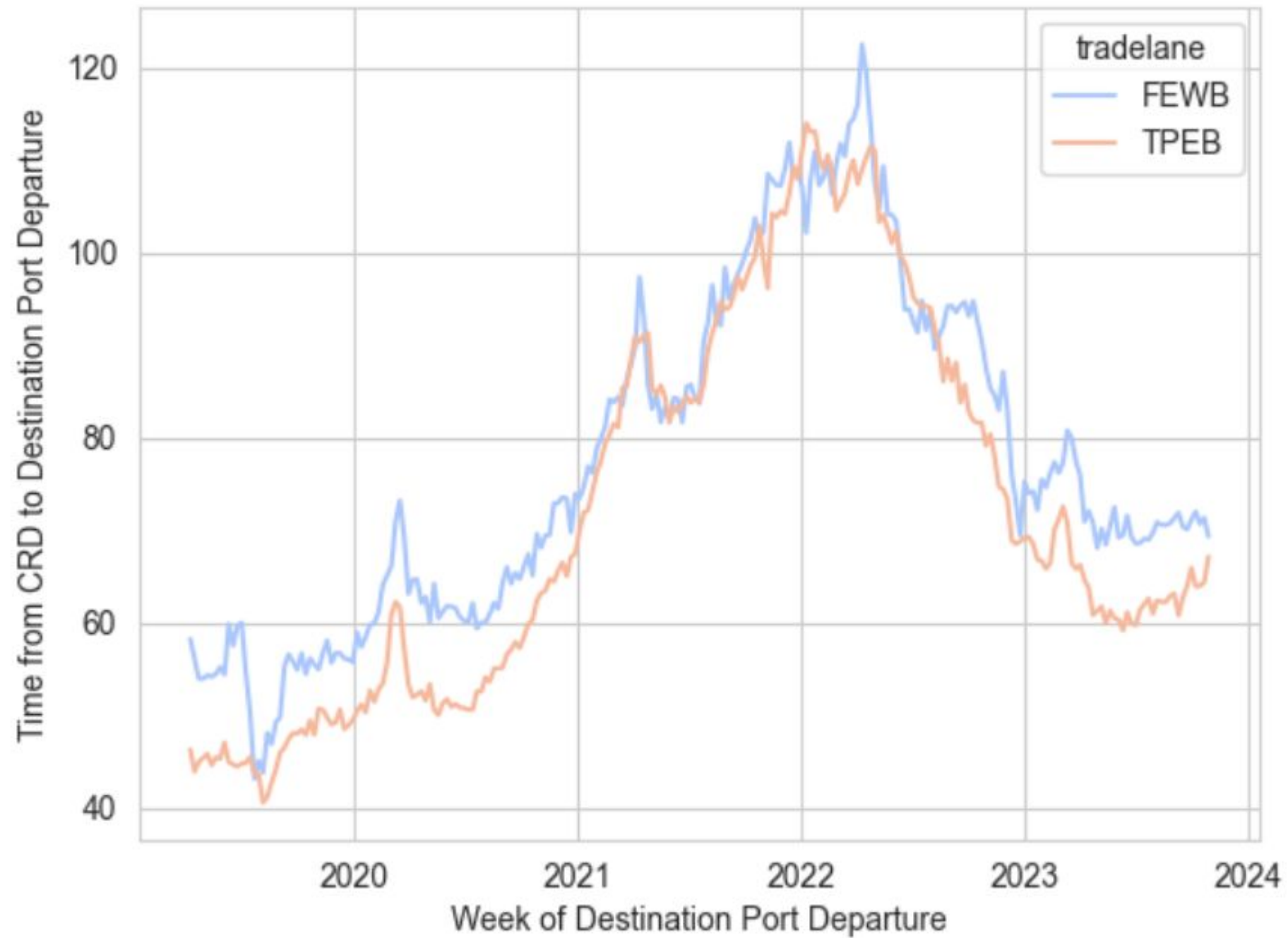
Thanks!



# Ocean Container Spot Rates



Ocean Timeliness Indicator 2023-10-31



$$\ln(Y_{pcdt}) = \beta_{pcd} + \theta_{pcd}T + \mu_{pcdm} + \alpha_{pct} + \epsilon_{pcdt}$$

$$\ln(Y_{pcdt}) = \beta_{pcd} + \theta_{pcd}T + \mu_{pcdm} + \alpha_{dct} + \epsilon_{pcdt}$$

$$\ln(Y_{pcdt}) = \beta_{pcd} + \theta_{pcd}T + \mu_{pcdm} + \alpha_{pdt} + \epsilon_{pcdt}$$

2015	-0.638901
2016	-3.291468
2017	-0.372022
2018	-0.341960
2019	2.041588
2020	-8.213481
2021	-13.114598
2022	-13.999683
2023	-18.284963