

Issues in Outlier Specifications of the Covid-19 Pandemic for BLS Local Area Unemployment Statistics

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**Virtual Roundtable Discussion: Time Series and Seasonal
Adjustment Estimation During the COVID-19 Pandemic,
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Covid-19 Alters SA Policy

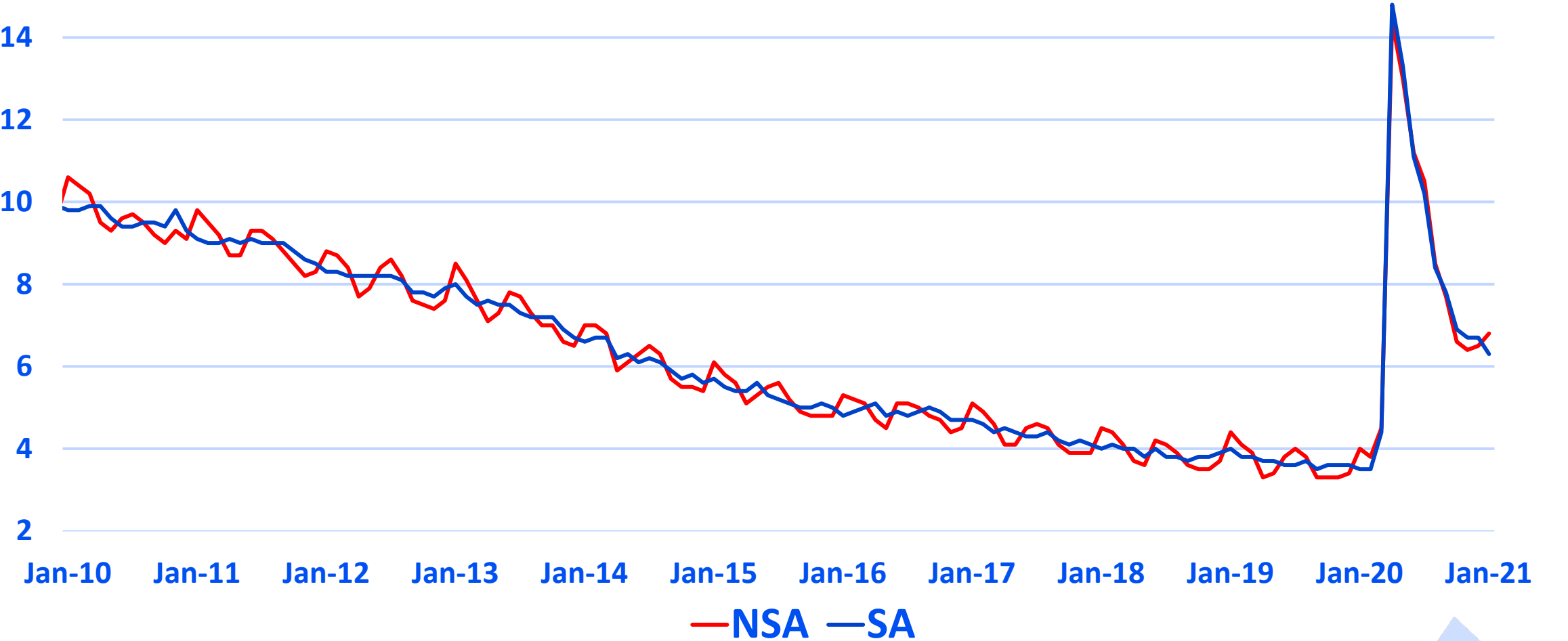
- Local Area Unemployment Statistics (LAUS) seasonally adjusts 1,000 LF series comprising States & Metro Areas
 - Normal policy concurrent seasonal adjustment
 - ▶ models, parameters, outliers fixed during the year
 - ▶ stick to concurrent filter for entire year
 - ▶ revise at end of year
 - Covid-19 required an immediate change in this policy
- Two options:
1. replace concurrent SA with projected seasonal factor method
 2. concurrent SA with real time outlier identification, holding ARIMA model constant

Outlier Selection

- Automated procedures available in X-13-A-S (U.S. Census Bureau, 2013)
 - ▶ **Iterative stepwise approach** (default in Outlier spec)
 - span = Mar-Dec 2020
 - outlier types = AO LS TC
 - critical value = 3.16 (default, Ljung, 1993)
 - ▶ **Sequence of AOs or LSs outliers** (Lytras & Bell, 2013)
 - method to model short term outliers, predefined in Regression spec
Regression {variables =(LSS<AOS>2020.Mar-2020.Dec), Tlimit =3.16
 - restricted to one type of outlier
 - simple decision rule based on retaining those regressors with significant t-values given a pre-specified critical value (Tlimit option)
- Goal: parsimonious fit (avoid over or under fitting)



CPS National Unemployment Rate



Approach During 2020

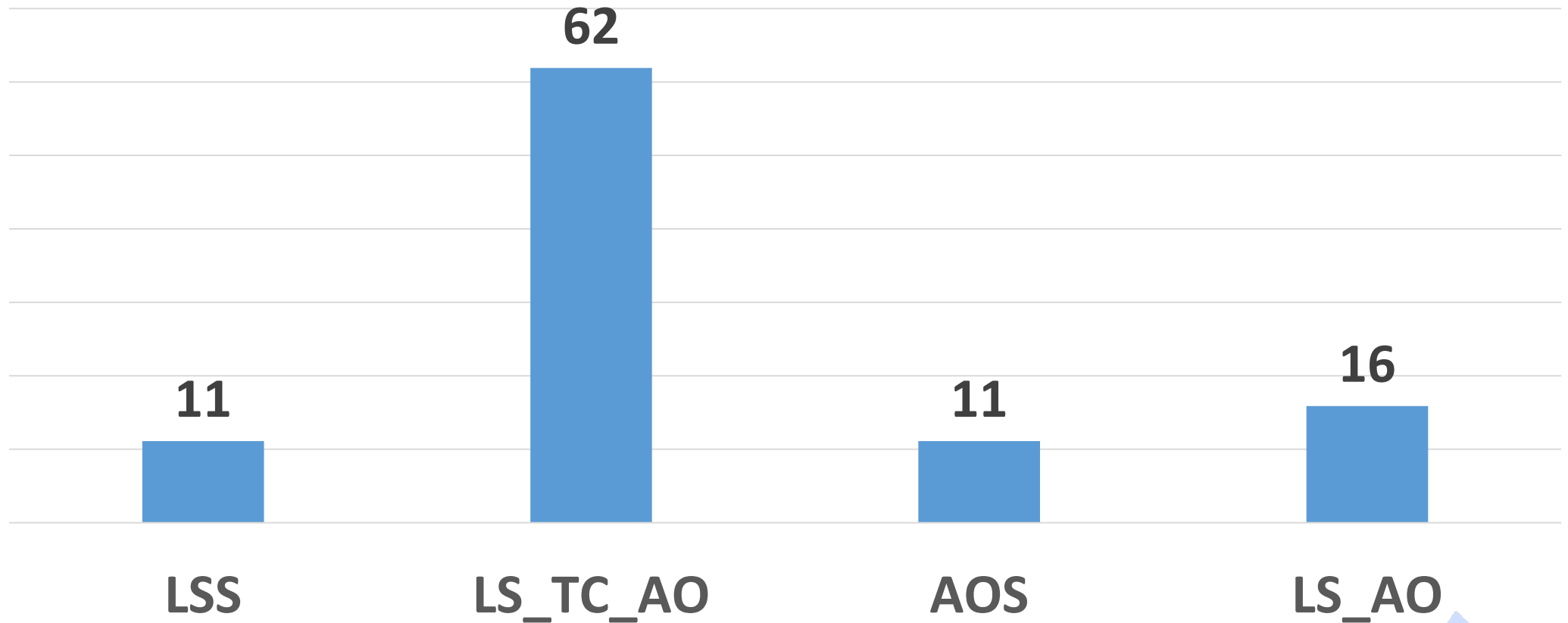
- Started with LSS
 - ▶ Little information at start for stepwise outlier detection
 - ▶ AOS potentially end discounting all of the pandemic data whereas LSS may be better if level or rate of change in series stabilize
- At end of year test alternatives, experiment with minimum AICC criterion (holding ARIMA model constant) to select the parsimonious one.

Reassessment at end of year

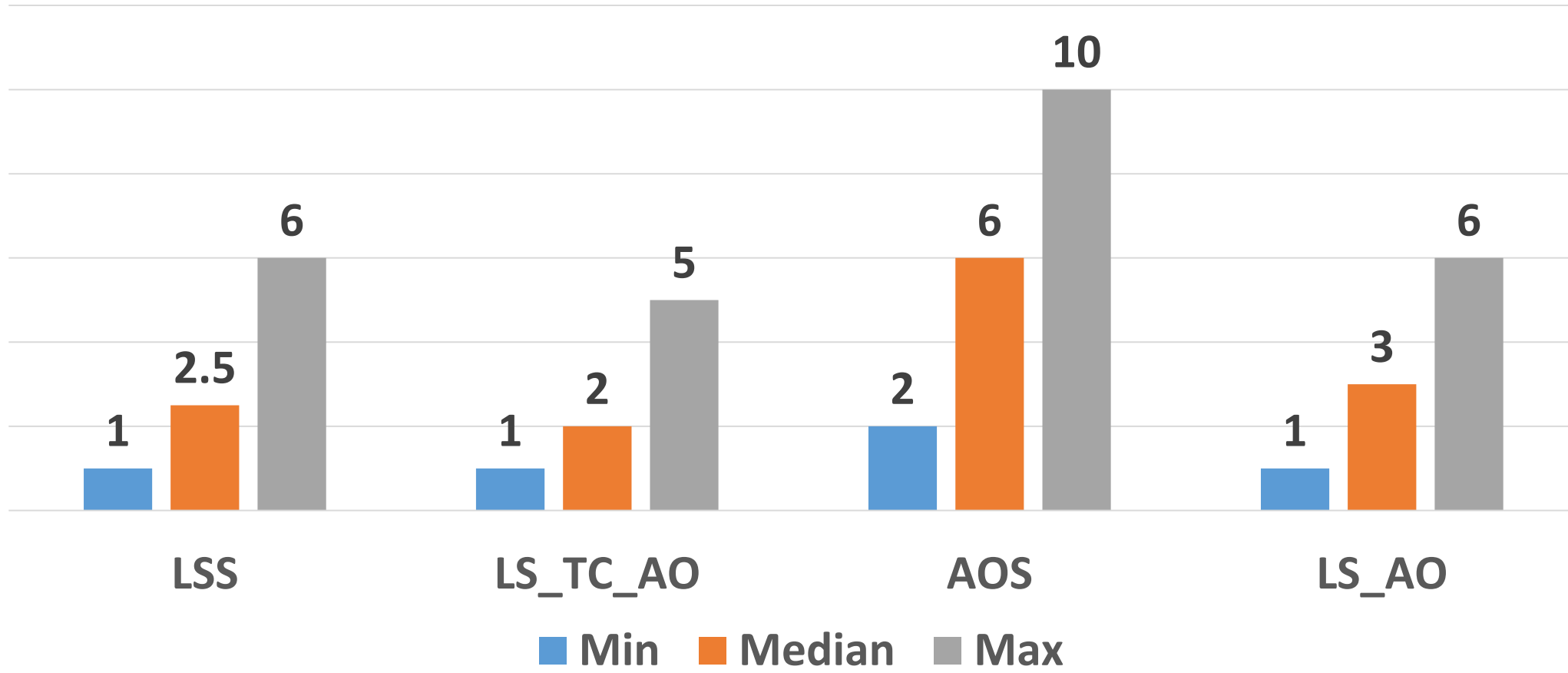
- Example: 63 CPS Unemployment series for all states & selected metro areas
 - ▶ Base period for RegArima models -- 2000-2019
 - ▶ Span for outlier detection -- Mar-Dec 2020
- Four options for selecting outlier sets:

AOS	Regression spec for Sequence of AO's
LSS	Regression spec for Sequence of LS's
LS_TC_AO	Automatic detection of AO's, LS's & TC's
LS_AO	Automatic detection of LS & AO's

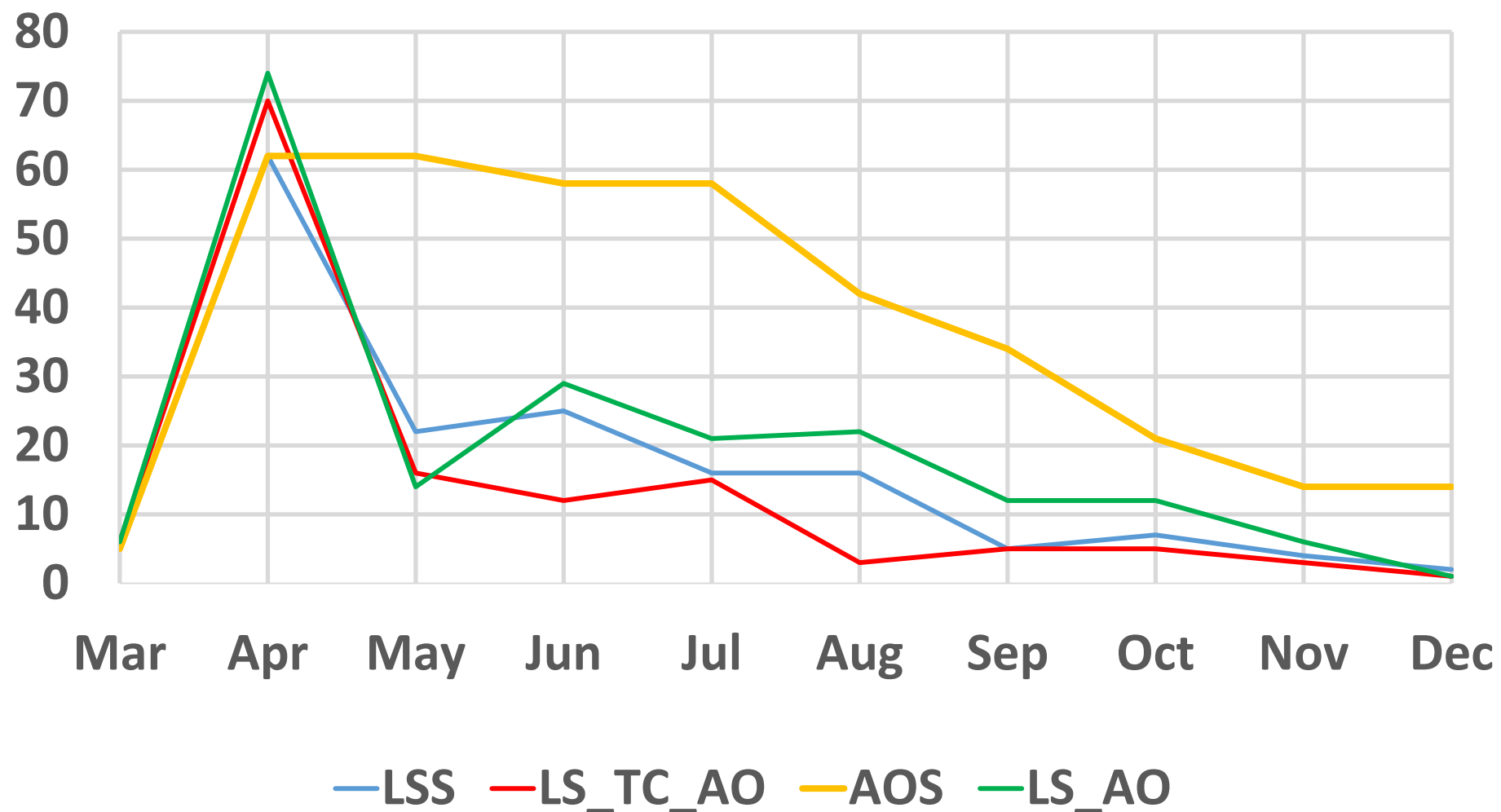
Percent of Areas with Minimum AICC



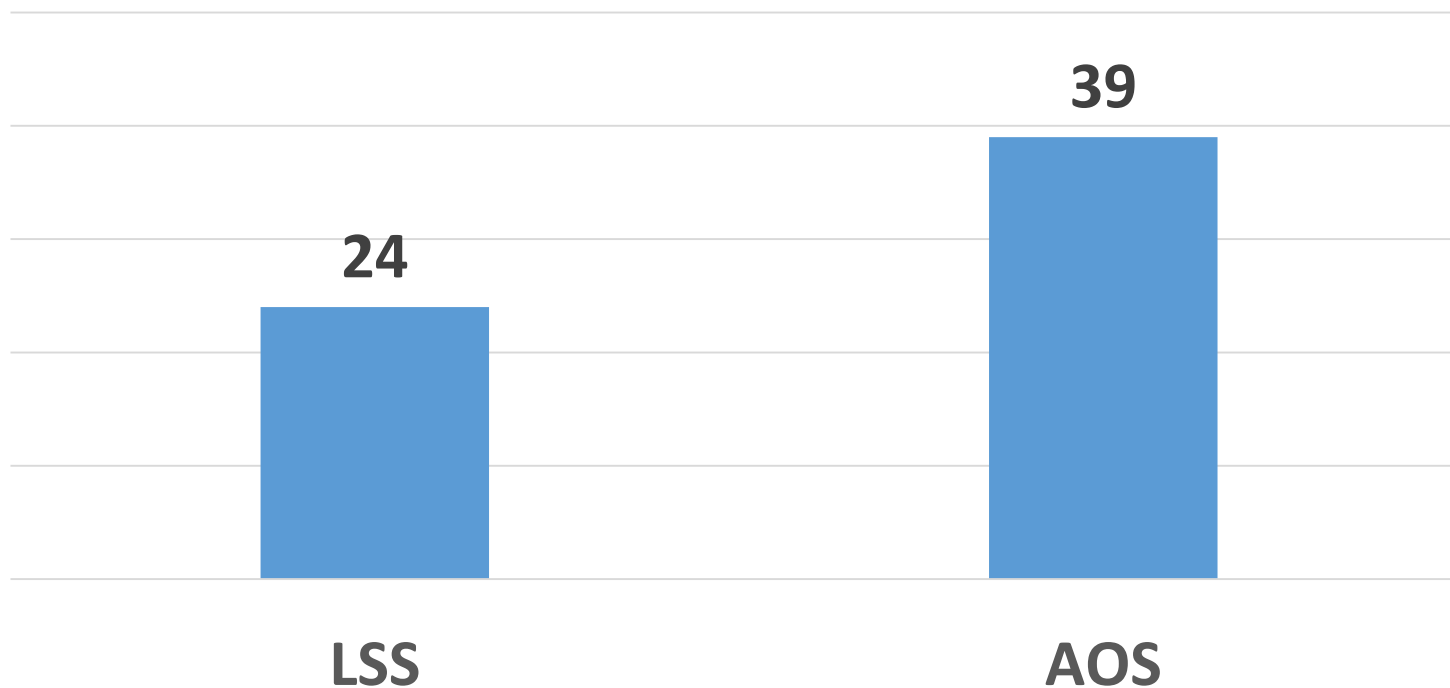
Number of Outliers



Number of Outliers in Each Month of Pandemic



Number of Areas with Minimum AIACC



2021 & Beyond

- Eventual return towards normal but how fast?
- May not be resolved until 2022



References

Lytras, D., and Bell, W.R. (2013) “Modeling Recession Effects and the Consequences on Seasonal Adjustment,” Proceedings of the Business and Economic Section of the 2013 Joint Statistical Meetings.

Ljung, G. M. (1993). On outlier detection in time series. Journal of Royal Statistical Society B 55, 559{567.

U.S. Census Bureau (2013) “X-13ARIMA Reference Manual, Version 1.1,” Time Series Research Staff, Center for Statistical Research and Methodology, Washington, DC, available at <https://www.census.gov/ts/x13as>



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