Measuring the Economics of a Pandemic: How People Mobility depict Economics? An Evidence of People's Mobility Data towards Economic Activities

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MEASURING THE ECONOMICS OF A PANDEMIC

OUTLINE

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Introduction

Background

• Increased need for high quality and real-time data in crisis time
• Indonesia impose social restriction, so some survey activities could not be conducted
• Need to modernize the data life cycle of compilation, production, and dissemination to make it robust to shocks, including pandemic.

Contribution

• Combining traditional and non-traditional data sources, including big data on mobility and GDP data.
• Measuring economic activities under social restriction which lead to delay on data collection
• Utilizing big data as new data source; more reliable in presence of disruptions, including social activities restriction.
Methodology:

Combining traditional and non-traditional data

- Official Statistics
  - Regional GDP
  - GDP

- Mobility
  - Google Mobility Index
  - Apple Mobility Index

- NTL
  - Night-time light (NTL)
Clustering each region
Based on Industry Contribution to Regional GDP

Estimated Regional GDP Growth
Regression interaction between Regional GDP, Mobility and cluster.

Calculate People Mobility Change
Based on Google Mobility Index and Apple Mobility Index

Estimated the GDP Change
Calculate the National GDP

Evaluation
Estimated GDP vs. Nigh-time Light (NTL)
Mobility and Level of Economic Activity

People Mobility → Economic Activities → Output → Economic Growth

BEFORE PANDEMIC (Baseline)
- pre-COVID people’s normal mobility patterns as baseline
- Economic activities in absence of shock

DURING PANDEMIC
- Social activities restrictions (less economic activities)
- Behavioural changes; e.g. work from home
- Adjustment in measuring economics of a pandemic
Mobility change

- Indonesia start social restriction since March 2020
- In Quarter 2, the decreasing of people mobility is bigger than Quarter 1

Activity increase in places of residence, while decrease in other place, such as workplace, retail, parks, recreation.
Clustering

Motivation

• Each Region has different industry contribution to regional GDP
• Mobility changes affect each industry differently
• Minimizing bias due to mobility change effects on industry

Outcome

• Increases the explanatory power of mobility for regional GDP
• Provide better fit model to estimate the regional and national GDP
Estimated and Official Regional GDP Growth

- Mobility change can explain 89% GDP Growth in 2020 Quarter 1 and 88% GDP Growth in 2020 Quarter 2
- Since Indonesia does not impose lockdown to reduce the spread of COVID-19, some industries are still operated during the pandemic.
Estimated and Official GDP Growth

2020 Quarter 1
- Official: 3.0%
- Estimated: 2.6%

2020 Quarter 2
- Official: -5.4%
- Estimated: -5.2%
Conclusion

Clustering
Each region is clustered based on industry contribution to Regional GDP to reduce the effect of some industries that are not significantly affected by mobility.

Mobility and Regional GDP
Consistently strong positive correlation between regional change of the average mobility and the percentage changes of Regional GDP

GDP
The estimated and the Official GDP growth are close.
Future Work

• How mobility differently affects GDP among underdeveloped, developing, and developed country?
• How mobility differently affects GDP among countries which impose lockdown or only social restriction
• Adjust the baseline GDP with NTL data especially for countries which have low-quality national accounts data to improve comparability across regions.
Thank You

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