

Professional Unemployment India: 2019–2020 | COVID-19 Impact & Analysis Forecasting

Slide 2: Data & Cleaning

Key Data Cleaning Steps:

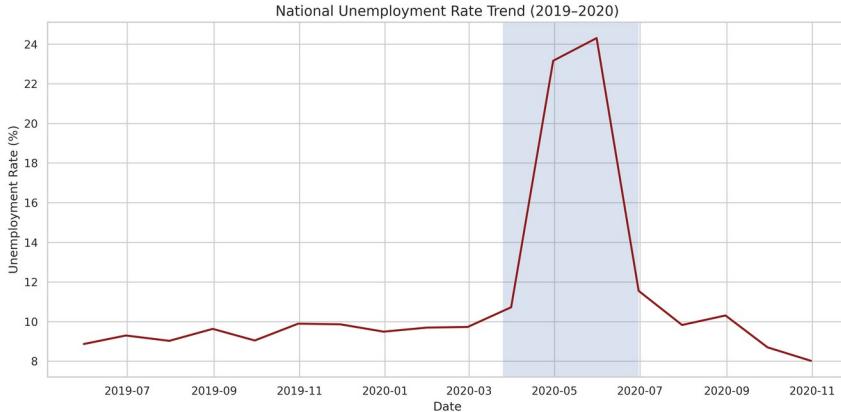
- Source files: Unemployment in India.xls, Unemployment_Rate_upto_11_2020.xls
- Inconsistent headers normalized: date, unemployment_rate, region, area
- Date parsing: day-first format (31-05-2019 → 2019-05-31)
- Numeric coercion: handled missing/non-numeric values
- Deduplication: removed duplicate records
- Result: 3,494 clean rows, 18 unique months

Slide 3: Methodology

Methodology Overview:

- Aggregation: national, state (region), area (rural/urban)
- Feature engineering: year, month, COVID periods
 - Pre-COVID: before 2020-03-01
 - Lockdown: 2020-03-01 to 2020-06-30
 - Post-Lockdown: after 2020-07-01
- Statistical test: Welch's t-test (unequal variances)
- Forecasting: SARIMA(0,1,1)×(0,1,1,12)
 - Fallbacks: ARIMA(1,1,1), AR(1) OLS

Slide 4: Key Visuals



Visualizations Generated:

- National Trend: shows unemployment spike during lockdown
- Rural vs Urban: urban more volatile than rural
- Seasonality: recurring monthly patterns (informal sector)

Slide 5: COVID Impact & Statistics

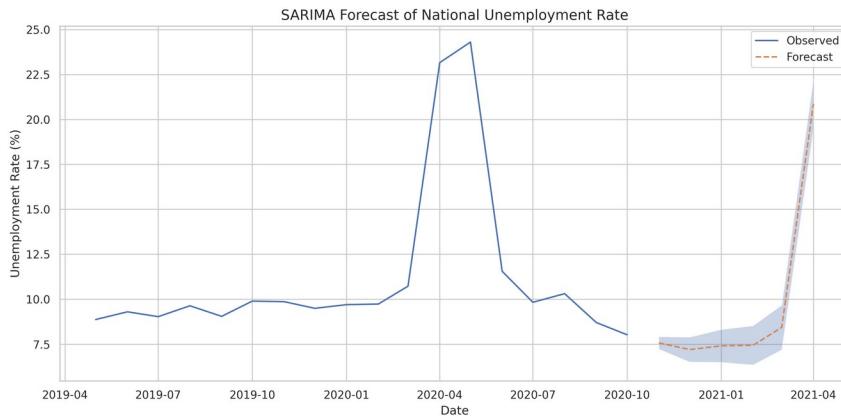
Statistical Results:

- Welch's t-test: t-statistic = -16.64, p-value = 2.1e-56
- Result: HIGHLY SIGNIFICANT ($p < 0.001$)

• COVID Impact Summary:

- All areas: +81.4% increase during lockdown
- Rural areas: +99.9% increase
- Urban areas: +77.8% increase

Slide 6: Forecast Results



Forecasting Results:

- Model: Stabilized SARIMA(0,1,1) \times (0,1,1,12)
- Forecast horizon: 6 months (Nov 2020 – Apr 2021)
- Predicted unemployment: 7–22% range
- Interpretation: gradual recovery with seasonal variations

Slide 7: Policy & Limitations

Policy Recommendations:

- ✓ Counter-cyclical urban employment programs during crises
- ✓ Expand rural employment guarantee schemes
- ✓ Digital inclusion & remote-work skills training

Limitations:

- ✗ Small sample (18 months), informal sector underreported
- ✗ Model assumes no structural breaks (pandemic violated this)
- ✗ Aggregation choices may mask state-level heterogeneity