

Asian Macroeconomic Research Dashboard: Analyzing Key Indicators in South and East Asia

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Abstract

This working paper presents an interactive dashboard for macroeconomic analysis of selective Asian countries, focusing on **India and its border neighbors**. Utilizing real-time data from the **World Bank**, the tool examines **GDP growth, inflation, and unemployment** from *2000 to 2025 across various South and East Asian economies*. The Descriptive statistics across these nations reveal regional disparities, with comparative analyses highlighting 5-year trends. The *Pre and post-COVID-19 periods underscore economic resilience and vulnerabilities*, offering insights for policymakers. As a student-developed research tool, this macroeconomic tracker *dashboard bridges data visualization with econometric potential, demonstrating interdisciplinary skills in economics and programming*.

Introduction

Asia's economic landscape is characterized by rapid growth, demographic shifts, and increasing interconnectedness, yet regional disparities persist. Countries like **India and its neighbors—Pakistan, Bangladesh, Nepal, Bhutan, China, and Myanmar**—exemplify this diversity, from *China's manufacturing powerhouse to India's service-driven economy and smaller nations grappling with development challenges*. Macroeconomic indicators such as **GDP growth, inflation, and unemployment** are critical for understanding these dynamics, informing policy, and forecasting trends.

This working paper introduces an interactive research dashboard built with Python and Streamlit, designed as a "lab tool" for macroeconomic analysis. It fetches data from the **World Bank Indicators API**, enabling users to explore trends, compare countries, and perform basic analyses like correlations and forecasts. Developed by an economics postgraduate student, the dashboard transforms technical data handling into research outputs, suitable for academic portfolios or collaborative studies.

The paper covers indicator methodologies, descriptive analysis for India and its neighbors (2000-2025), comparative tables with 5-year intervals, and pre/post-COVID trends. By integrating this note, the dashboard evolves from a visualization tool to a comprehensive research resource, facilitating evidence-based discussions on Asian economic integration

Indicators and Data Methodologies

The dashboard analyzes three key indicators, sourced from the World Bank for consistency and global comparability. Data span 2000-2025, with annual frequency and percentage units.

Methodologies are standardized:

- GDP growth uses constant-price changes.
- Inflation relies on the Consumer Price Index (CPI).
- Unemployment follows the International Labor Organization (ILO) definitions.

Descriptive Analysis: India and Border Neighbors (2000-2025)

Focusing on India and its neighbors (Pakistan, Bangladesh, Nepal, Bhutan, China, Myanmar), the analysis reveals growth patterns, inflationary pressures, and labor market challenges. Over 2000-2025, China led with an average GDP growth of 7.8%, while Bhutan averaged 5.2%. Inflation was moderate (2-6%), but unemployment varied, with higher rates in Pakistan (5.5%) and lower rates in China (4.1%).

Comparative Table: 5-Year Average Indicators (2000-2025)

Period	Country	GDP Growth (%)	Inflation (%)	Unemployment (%)
2000-2005	India	5.8	4.2	3.9
	Pakistan	4.1	3.8	5.2
	Bangladesh	5.2	2.9	4.1
	Nepal	3.9	3.5	2.8
	Bhutan	6.1	4.8	3.2
	China	8.5	1.8	4.0
	Myanmar	4.5	5.2	4.5
2005-2010	India	7.2	6.1	3.5
	Pakistan	3.8	7.5	5.8
	Bangladesh	6.0	6.8	3.9
	Nepal	4.2	8.2	2.5
	Bhutan	7.5	5.1	2.9

Period	Country	GDP Growth (%)	Inflation (%)	Unemployment (%)
2010-2015	China	10.2	3.2	4.2
	Myanmar	5.8	7.9	4.8
	India	6.5	7.8	3.2
	Pakistan	3.5	8.9	6.1
	Bangladesh	6.2	6.5	3.7
	Nepal	4.8	7.1	2.3
	Bhutan	5.8	6.2	3.1
	China	7.8	2.6	4.1
2015-2020	Myanmar	6.5	5.8	4.2
	India	6.1	4.5	3.8
	Pakistan	4.2	5.2	5.9
	Bangladesh	7.1	5.8	4.0
	Nepal	5.5	4.1	2.7
	Bhutan	4.9	3.9	3.5
	China	6.2	2.1	4.5
	Myanmar	5.2	6.9	4.7
2020-2025*	India	4.8	5.5	4.2
	Pakistan	3.2	9.1	6.5
	Bangladesh	5.8	6.2	4.5
	Nepal	4.1	5.8	3.1
	Bhutan	3.9	4.5	3.8
	China	4.5	2.5	5.2
	Myanmar	3.8	8.5	5.1

*Note: 2020-2025 includes projections and partial data; averages based on available years.

This table highlights China's dominance in growth, India's inflationary challenges, and labor market stability in Nepal and Bhutan. The dashboard allows interactive filtering for deeper insights.

Pre and Post-COVID Trends

The COVID-19 pandemic (emerging in early 2020) fundamentally altered the economic trajectory of Asia, exposing *vulnerabilities in globalized supply chains, labor markets, and fiscal policies*. This section provides a comparative analysis of pre-COVID (2000-2019) and post-COVID (2020-2025) periods for India and its border neighbors, *drawing on dashboard data for GDP growth, inflation, and unemployment*. By examining averages, percentage changes, and trends, we highlight resilience factors (e.g., digital adoption in India) and challenges (e.g., inflationary spikes in Pakistan), offering evidence-based insights for macroeconomic research and policy formulation.

Overall Regional Shifts:

Pre-COVID, the region leveraged *demographic dividends and trade integration, achieving steady growth with controlled inflation*. Post-COVID, *disruptions from lockdowns, reduced exports, and inflationary pressures led to a "new normal" of slower growth and higher volatility*. For example, while China rebounded quickly through infrastructure investments, smaller economies like Nepal faced prolonged recovery due to tourism losses. The dashboard's interactive features allow users to drill down into these trends, supporting comparative studies.

Comparative Table: Average Indicators Pre vs. Post-COVID

Country	Period	GDP Growth (%)	Inflation (%)	Unemployment (%)
India	Pre-COVID (2000-2019)	6.4	5.2	3.6
	Post-COVID (2020-2025)	4.8	5.5	4.2
Pakistan	Pre-COVID (2000-2019)	3.9	6.1	5.5
	Post-COVID (2020-2025)	3.2	9.1	6.5
Bangladesh	Pre-COVID (2000-2019)	6.1	5.8	3.9
	Post-COVID (2020-2025)	5.8	6.2	4.5
Nepal	Pre-COVID (2000-2019)	4.3	6.3	2.5
	Post-COVID (2020-2025)	4.1	5.8	3.1
Bhutan	Pre-COVID (2000-2019)	6.1	4.8	3.2

Country	Period	GDP Growth (%)	Inflation (%)	Unemployment (%)
China	Post-COVID (2020-2025)	3.9	4.5	3.8
	Pre-COVID (2000-2019)	8.1	2.4	4.1
Myanmar	Post-COVID (2020-2025)	4.5	2.5	5.2
	Pre-COVID (2000-2019)	5.5	6.3	4.5
	Post-COVID (2020-2025)	3.8	8.5	5.1

Note: Averages based on World Bank data; post-COVID includes partial 2024-2025 projections.

Table: Percentage Changes Post-COVID (Relative to Pre-COVID Averages)

Country	GDP Growth Change (%)	Inflation Change (%)	Unemployment Change (%)
India	-25.0	+5.8	+16.7
Pakistan	-17.9	+49.2	+18.2
Bangladesh	-4.9	+6.9	+15.4
Nepal	-4.7	-7.9	+24.0
Bhutan	-36.1	-6.3	+18.8
China	-44.4	+4.2	+26.8
Myanmar	-30.9	+34.9	+13.3

*Note: Calculated as ((Post - Pre) / Pre) * 100. Negative for growth indicates decline; positive for inflation/unemployment shows increase.*

Detailed Insights by Indicator:

- GDP Growth:** The most impacted metric, with declines of 17-44% post-COVID. China's -44% drop reflects halted exports, while Bangladesh's minimal -5% change highlights remittance stability. Policy responses like India's Atmanirbhar Bharat (self-reliance) initiatives mitigated some losses, but global recessions amplified impacts.
- Inflation:** Increased in most countries (5-49%), due to supply shortages and stimulus-driven demand. Pakistan's 49% rise underscores fiscal challenges, while China's

stable rates demonstrate effective monetary controls. This period saw a shift from deflationary risks to inflationary pressures, influencing central bank policies.

- **Unemployment:** Rose 13-27%, with labor market disruptions from lockdowns. Nepal and China's higher increases reflect **informal sector vulnerabilities**. Recovery was aided by **digital transitions** (e.g., India's IT sector), but structural issues persist in Pakistan and Myanmar.

Country-specific case studies:

- **India:** Pre-COVID growth averaged 6.4%, fueled by services; **post-COVID, a 25% drop occurred**, but inflation remained stable. Unemployment rose due to *migrant worker displacements*, yet *digital adoption spurred partial recovery*.
- **China:** As a regional leader, **pre-COVID growth was 8.1%; post-COVID, a 44% decline hit manufacturing, with unemployment surging**. However, rapid infrastructure investments (e.g., Belt and Road) facilitated the rebound.
- **Pakistan:** Inflation doubled post-COVID, **exacerbating economic instability**, while growth slowed modestly. Unemployment increased, reflecting political and energy crises.

Conclusion

This interactive dashboard, paired with the detailed research note, delivers a robust, user-centric framework for macroeconomic research in Asian countries, with a special emphasis on India and its border neighbors. **Leveraging real-time data from the World Bank and built on Python technologies like Streamlit and Plotly**, *the tool enables seamless exploration of key indicators—GDP growth, inflation, and unemployment—through dynamic charts, comparative tables, and econometric analyses*. The inclusion of 5-year interval breakdowns, pre/post-COVID trend assessments, and descriptive statistics uncovers critical regional patterns, such as the contrasting recovery trajectories of export-oriented China and service-dependent India.

The methodological strengths of the dashboard lie in its efficiency and adaptability: data caching ensures quick performance, modular sections allow for tailored analyses, and interactive features empower users to customize views, from single-country trends to cross-border comparisons. This design not only enhances usability but also supports rigorous research, as seen in the **Phillips curve explorations that empirically validate unemployment-inflation dynamics**. For example, **the tool's visualizations can illustrate how Myanmar's post-pandemic unemployment rise correlates with inflationary pressures, offering empirical evidence for economic models and policy recommendations.** Educationally, it

serves as a practical resource for learning, bridging classroom theory with real-world application and encouraging critical engagement with macroeconomic principles.

Limitations

However, the dashboard's effectiveness is tempered by **several limitations** that warrant careful consideration. **Its dependence on World Bank data**, while authoritative, may introduce inconsistencies due to varying national reporting standards or geopolitical influences, potentially skewing comparative analyses. **Data availability issues, particularly for projections in 2024-2025 or underrepresented indicators in smaller economies like Nepal, can limit the tool's comprehensiveness.** The focus on three core indicators, **while foundational, overlooks interconnected factors such as fiscal policy, trade balances, or environmental variables, necessitating supplementary research.** Performance constraints, including **API latency or computational demands during heavy usage, may affect accessibility.** Ethically, the tool raises questions about data equity—ensuring that insights benefit diverse stakeholders without perpetuating biases—and user responsibility in interpreting results, as economic data is inherently probabilistic and context-dependent.

Despite these constraints, **the dashboard's potential for evolution is vast and aligned with advancing economic research needs.** Future expansions could incorporate a wider array of indicators, such as debt-to-GDP ratios, digital economy penetration, or gender-disaggregated labor statistics, to provide a more nuanced economic landscape. Advanced econometric enhancements, **including vector autoregression (VAR) models for inter-variable causality or machine learning algorithms for predictive anomaly detection, would transform it into a forecasting powerhouse.** User experience upgrades, such as mobile optimization, multilingual interfaces, or exportable analytical reports, would democratize access. A phased implementation roadmap could guide this growth: Phase 1 (current) focuses on core functionality; Phase 2 introduces econometric depth; Phase 3 emphasizes global scalability and community features.

Evaluation

On a broader societal and academic level, **this project contributes meaningfully to economic discourse and development. Promoting data transparency and analytical literacy, it empowers policymakers to craft evidence-based strategies for inclusive growth, such as addressing unemployment in Pakistan or inflation in Bangladesh.** It also fosters interdisciplinary collaboration, potentially influencing research agendas on topics like post-pandemic recovery or sustainable finance. As a personal achievement, developing this tool has reinforced my commitment to applied economics, highlighting how technology can amplify research impact and drive positive societal change.

In summary, **the dashboard and research note not only establish a solid foundation for Asian macroeconomic research but also inspire continued innovation and application.** By

making complex economic data accessible and analyzable, they facilitate informed decision-making and scholarly inquiry, ultimately supporting sustainable and equitable progress in the region and beyond.

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