

Economic Data Analysis (2020-2024)

1. Overview of Dataset

This analysis examines quarterly economic indicators from Q1 2020 through Q4 2024, covering:

- Consumer Price Index (CPI)
- Gross Domestic Product (GDP in billions)
- Personal Consumption Expenditures (PCE)
- Unemployment-adjusted CPI (CPI_U)

2. Key Trends Analysis

2.1 GDP Growth

Quarter	GDP (Billions)	Quarterly Growth	Annual Growth
2020-Q1	\$14,496.23	-	-
2020-Q4	\$14,752.73	-	1.77%
2021-Q4	\$16,816.13	-	14.0%
2022-Q4	\$18,108.27	-	7.68%
2023-Q4	\$19,170.15	-	5.86%
2024-Q4	\$20,255.46	-	5.66%

- COVID Impact:** GDP dropped by 9.11% in Q2 2020 (to \$13,175.64B) before rebounding
- Recovery Period:** By Q3 2020, GDP nearly recovered to pre-pandemic levels
- Strong Growth Phase:** 2021 showed exceptional growth (14% year-over-year)
- Normalization:** Growth moderated to 5-7% in 2022-2024, suggesting economic stabilization

2.2 Inflation Trends (CPI)

Time Period	CPI Increase	Annualized Inflation
2020 (full year)	0.88%	0.88%
2021 (full year)	6.75%	6.75%
2022 (full year)	7.10%	7.10%
2023 (full year)	3.24%	3.24%
2024 (full year)	2.72%	2.72%
Overall (5 years)	22.30%	4.12% (average)

- Low Inflation:** 2020 saw minimal inflation during pandemic disruptions
- High Inflation:** 2021-2022 experienced significant inflation peaks (over 7% in 2022)
- Moderation:** Inflation gradually decreased in 2023-2024

- **Inflation Spike:** The most significant quarterly inflation occurred in Q2 2021 (1.86%)

2.3 Consumer Spending (PCE)

- **Trend Alignment:** PCE closely tracks GDP movements throughout the period
- **Spending Shock:** Q2 2020 saw a 9.11% drop in consumer spending
- **Recovery:** Consumer spending rebounded and exceeded pre-pandemic levels by Q4 2020
- **Growth Ratio:** PCE consistently represents approximately 99-100% of GDP (in billions), indicating consumer spending is the primary driver of economic activity

3. Correlation Analysis

Relationship	Correlation Coefficient
CPI vs GDP	0.97
CPI vs PCE	0.97
CPI vs CPI_U	0.998
GDP vs PCE	1.00

- Extremely strong positive correlation between all economic indicators
- Nearly perfect correlation between GDP and PCE confirms consumer spending's fundamental role
- CPI and CPI_U move almost identically, suggesting unemployment had minimal impact on inflation measures

4. Quarterly Growth Analysis

GDP Quarterly Growth Rates

2020-Q2: -9.11%	2022-Q2: 2.49%
2020-Q3: 9.88%	2022-Q3: 1.55%
2020-Q4: 1.90%	2022-Q4: 1.30%
2021-Q1: 3.43%	2023-Q1: 2.20%
2021-Q2: 4.96%	2023-Q2: 0.97%
2021-Q3: 2.17%	2023-Q3: 1.30%
2021-Q4: 2.76%	2023-Q4: 1.27%
2022-Q1: 2.13%	2024-Q1: 1.33%

- **Volatility:** Highest volatility in 2020 during pandemic disruption
- **Stabilization:** Growth rates normalized to 1-2% quarterly from late 2022 through 2024
- **Consistent Growth:** No negative quarterly GDP growth after Q2 2020, indicating sustained expansion

5. CPI vs GDP Relationship

- For each 1% increase in CPI, GDP increased by approximately \$263 billion

- Inflation and economic growth moved in tandem, suggesting demand-pull inflation dynamics
- The period demonstrates how economic recovery and expansion can drive price increases

6. Key Economic Phases Identified

1. **Pandemic Contraction** (Q2 2020): Sharp GDP and consumer spending decline
2. **Rapid Recovery** (Q3 2020 - Q4 2020): Quick rebound to pre-pandemic levels
3. **Growth & Inflation** (2021 - early 2022): Strong growth with accelerating inflation
4. **Normalization** (late 2022 - 2024): Moderate, steady growth with inflation tapering

7. Conclusion

The data reveals a U.S. economy that experienced significant disruption in early 2020 but demonstrated remarkable resilience with a V-shaped recovery. The subsequent period showed strong growth accompanied by substantial inflation, likely driven by supply chain disruptions, fiscal stimulus, and pent-up consumer demand. By 2023-2024, the economy appeared to find a more sustainable equilibrium with moderate growth and declining inflation rates.

The consistently high correlation between GDP and consumer spending throughout all phases confirms that personal consumption remained the primary driver of economic activity, even during periods of significant disruption.