Quantitative Tools for Monitoring Macroeconomic and Financial Conditions

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Disclaimer

The views expressed in this presentation are those of the speaker and do not necessarily reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.

Overview

- A brief history of data and analysis used in monitoring macroeconomic conditions
- What we do here at the New York Fed
  - The data we collect
  - The analysis we do
- Looking ahead

A brief history

Monitoring Macroeconomic Conditions: A Brief History

- Data collection
  - Started in the 19th century, data collection intensified during the Great Depression and WWII
- Data analysis
  - Accounting principles (Kuznets, 1930s)
  - Pattern recognition (Burns and Mitchell, 1930s)
- Econometric modeling (1930s and onward)
  - Methodologies to analyze data, of increasing complexity and sophistication
- Expanding data collection and analysis (through today)
  - New sources and forms of data, including large micro data sets, surveys, unstructured data, “big data”

Data Collection and Analysis

- Accounting principles (Kuznets, 1930s)
  - National System of Accounts (NIPA)
  - GDP: most comprehensive measure of economic activity
  - “[O]ne of the great inventions of the twentieth century” (Bureau of Economic Analysis)

- Pattern Recognition (Burns and Mitchell, 1930s)
  - Business cycles (NBER)
  - “[O]nly by analyzing numerous time series, each of restricted significance, can business cycles be made to reveal themselves definitely enough to permit close observation.” (Burns and Mitchell, 1946, “Measuring Business Cycles”)

Econometric Modeling

- Starting in the 1930s, economists developed and refined increasingly sophisticated methods to analyze troves of information to assess and make predictions about the state of the economy.
  - Structural models: from Cowles Foundation to today's dynamic stochastic general equilibrium models
  - Time series models: from small to high dimension time series models
- Many uses: forecasting, nowcasting, story telling, risk assessment, scenario analysis, policy analysis
- Cross-fertilization of theory and empirics ("virtuous circle"):
  - Development and empirical evaluation of theories
  - New empirical facts lead to new theories
  - New theoretical developments lead to new empirical models
  - And so on…

Expanded Data Collection and Analysis

- Traditional macro data: “hard” data on a wide range of economic activities
  - Numerical time series, consistently collected and regularly reported (“structured data”)
  - Releases (sometimes) make front-page news and move asset prices
  - Challenges: revisions (“who knew what when?”) and re-benchmarking (“do we know what we thought we knew?”)
- A growing number of surveys collect “soft” data intended to understand expectations and “sentiment” of professional forecasters, firms and households
  - Also expressed as numerical time series, consistently collected and reported
  - Cross-sectional aspects can be important – the distribution of underlying micro responses
- Growing use of “unstructured” data and very large micro data sets
  - Unstructured data: web searches, textual analyses, verbal commentary
  - Micro data sets, such as consumer debt, electronic transactions, loan applications

Macroeconomic Monitoring at FRBNY

FRBNY's Approach to Assessing the Macroeconomy

- Three-pronged Approach that mirrors the history:
  - Monitoring Data Releases
  - Collecting Data
  - Econometric Analysis

Monitoring Data Releases

- Research economists write evaluative commentary of dozens of data releases in real time (on the day of the release)
  - Major macro data (GDP, price indices, activity indices, survey data…)
  - U.S. data and data from other major economies
  - Described in Steindel (2018)
- Commentary includes:
  - Summary of the headline and major detail results, including revisions
  - Placing the latest figures in context, both recent history and longer-term, as well as relative to private sector expectations
  - How the release may affect views about current economic conditions
- Commentaries have been circulated within the New York Fed and across the System since the advent of email
  - We now report on about 30 individual releases every month
- Benefits to FRBNY Research Group:
  - Research economists keep informed about current conditions
  - Junior economists learn about data and implications real economy

Collecting Data – Part 1

- Like other regional Feds, FRBNY has developed business surveys and produces indices of business activity and business sentiment in our District
  - Empire State Manufacturing Survey
  - Second District Business Leaders Survey
  - Surveys such as these are valuable for their timeliness and for the insights into regional economic conditions

- Center for Microeconomic Data: Significant effort to collect very large sets of microeconomic data to provide insights about consumers and households.
  - Consumer Credit Panel (CCP): quarterly credit report data on a longitudinal sample of households
  - Survey of Consumer Expectations (SCE): monthly survey of consumer expectations about inflation, the labor market and household finance
  - More detailed discussion by Gizem Kosar this afternoon

Collecting Data – Part 2

- Markets surveys: Survey of Primary Dealers and Survey of Market Participants conducted by the FRBNY Markets Group
  - Intended to understand market expectations about a variety of outcomes, including macroeconomic, market prices and rates, official sector actions
  - Detailed discussion by Giorgio Topa later this afternoon

Econometric Analysis

- The New York Fed and the Federal Reserve System have invested significant resources in developing and implementing econometric methods at the frontier of macroeconomic analysis
  - Forecasting, scenario analysis, balance of risks, understanding current conditions
  - Address specific policy questions, interpretation of releases

- At FRBNY, a (partial) list:
  - Nowcasting: automated real-time processing of the data flow
  - DSGE modeling: structural analysis of current conditions and policy simulations
  - Time series models of R-star, both domestic and international
  - Oil price decomposition: supply and demand
  - Inflation modeling: Underlying Inflation Gauge (UIG)
  - Labor markets and firm dynamics
  - Banking industry analysis: current conditions and risk profile
  - Financial conditions and downside risk

- Our emphasis is on automation and transparency
  - Publish our products and, when possible, also the underlying codes
  - Model “validation” by sharing code and encouraging others to do the same

An Example: The FRBNY Staff Nowcast

Feb 01, 2019: New York Fed Staff Nowcast

- The GDP release scheduled for this week was postponed as a result of the partial shutdown of the federal government. The New York Fed Staff Nowcast stands at 2.6% for 2018:Q4 and 2.4% for 2019:Q1.

MORE

2019:Q1 | 2018:Q4 | 2018:Q3 | 2018:Q2 Reset to latest nowcast

Last Release 11:15am EST Feb 01, 2019

ARCHIVE LAYOUT

Expand

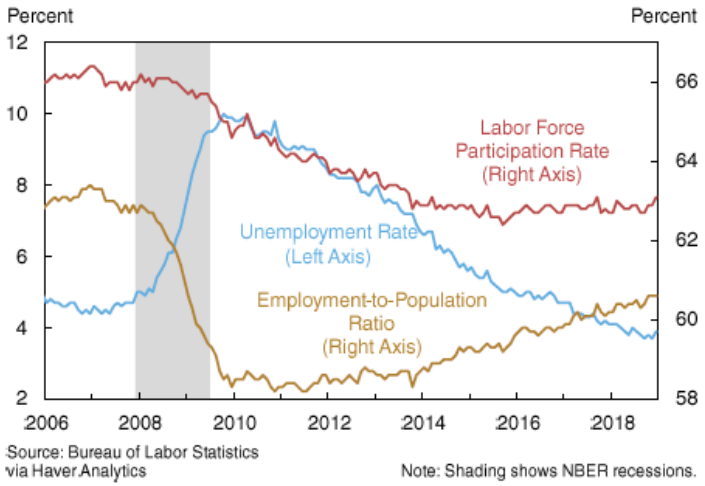
Data Flow (Feb 01, 2019)

Model Update	Release Date	Data Series	Actual	Impact	Nowcast GDP Growth
Feb 01					**2.39**
	10:00AM Feb 01	ISM mfg.: Employment index	55.50	0.04	
	10:00AM Feb 01	Value of construction put in place	0.79	0.01	
	10:00AM Feb 01	Merchant wholesalers: Total inventories	0.26	0.01	
	10:00AM Feb 01	ISM mfg.: Prices index	49.60	-0.05	
	10:00AM Feb 01	ISM mfg.: PMI composite index	56.60	0.12	
	8:40AM Feb 01	All Employees: Total nonfarm	304.00	0.08	
	8:30AM Feb 01	Civilian unemployment rate	0.10	-0.04	
	10:00AM Jan 31	New single-family houses sold	16.90	0.06	
	8:10AM Jan 30	ADP nonfarm private payroll employment	213.00	0.03	
		Data revisions		-0.04	
Jan 25					**2.17**

https://www.newyorkfed.org/research/policy/nowcast

An Example: The U.S. Economy in a Snapshot

Labor Market Indicators



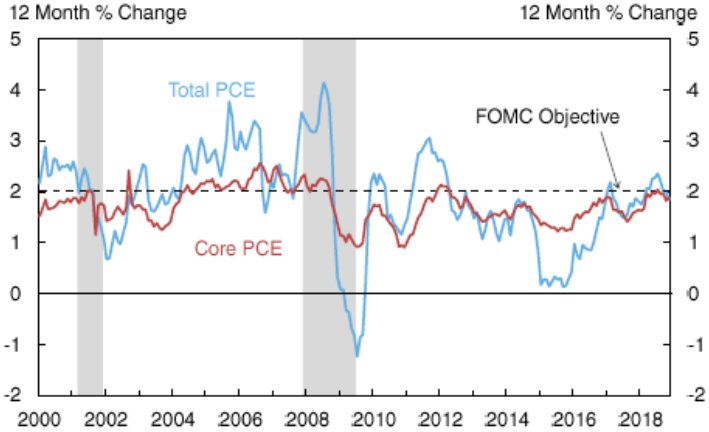
Source: Bureau of Labor Statistics via Haver Analytics

Note: Shading shows NBER recessions.

Indicators consistent with strong labor market

- The labor force participation rate increased 0.2 percentage point to 63.1% in December, matching September 2017 as the highest participation rate since 2015.
  - The prime-age (25-54) male participation rate was unchanged in December at 89.0%, which is modestly below levels seen earlier in 2018.
  - The prime-age female participation rate rose to 75.9%, a level that is slightly above the levels that prevailed just prior to the 2007-09 recession.
- The employment-to-population ratio remained at 60.6%.
- The unemployment rate increased 0.2 percentage point in December to 3.9%.
  - An alternative measure of unemployment, U6, which includes marginally attached workers and workers who hold part-time jobs but prefer full-time jobs, was unchanged in December at 7.6%.

PCE Deflator



Source: Bureau of Economic Analysis via Haver Analytics

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Inflation remains near FOMC's longer-run objective

- The total PCE price index rose 0.1% in November, lower than in October. The core PCE price index (which excludes food and energy prices) increased 0.15% in November, slightly higher than in October.
  - Energy prices declined 2.1% in November, and are up 3.4% relative to one year ago. Food prices rose 0.2%.
- The 12-month changes in the total PCE and core PCE price indices were +1.8% and +1.9%, respectively.
  - Total PCE inflation has fallen below 2% after several months at or above 2%.
  - While headline PCE inflation appears to have softened slightly, core PCE inflation remains near the FOMC's 2 percent longer-run goal.

https://www.newyorkfed.org/research/snapshot

Looking Ahead

Where are we going from here?

- Current efforts under way to advance and extend our data collection and modeling

- Data collection
  - Linking the micro data we collect to other micro data sets
    - Educational achievement/student debt; housing price data; banking data
  - Applying the data to other policy questions
    - Credit conditions relevant to banks
    - Stress test modeling
    - Heterogeneity/inequality

- Econometric Modeling
  - DSGE modeling with heterogeneous agents
  - Financial Stability: linking markets and institutions to broader conditions
  - Expectations and economic outcomes