



Seasonal Adjustment and BEA's Estimates of GDP and GDI

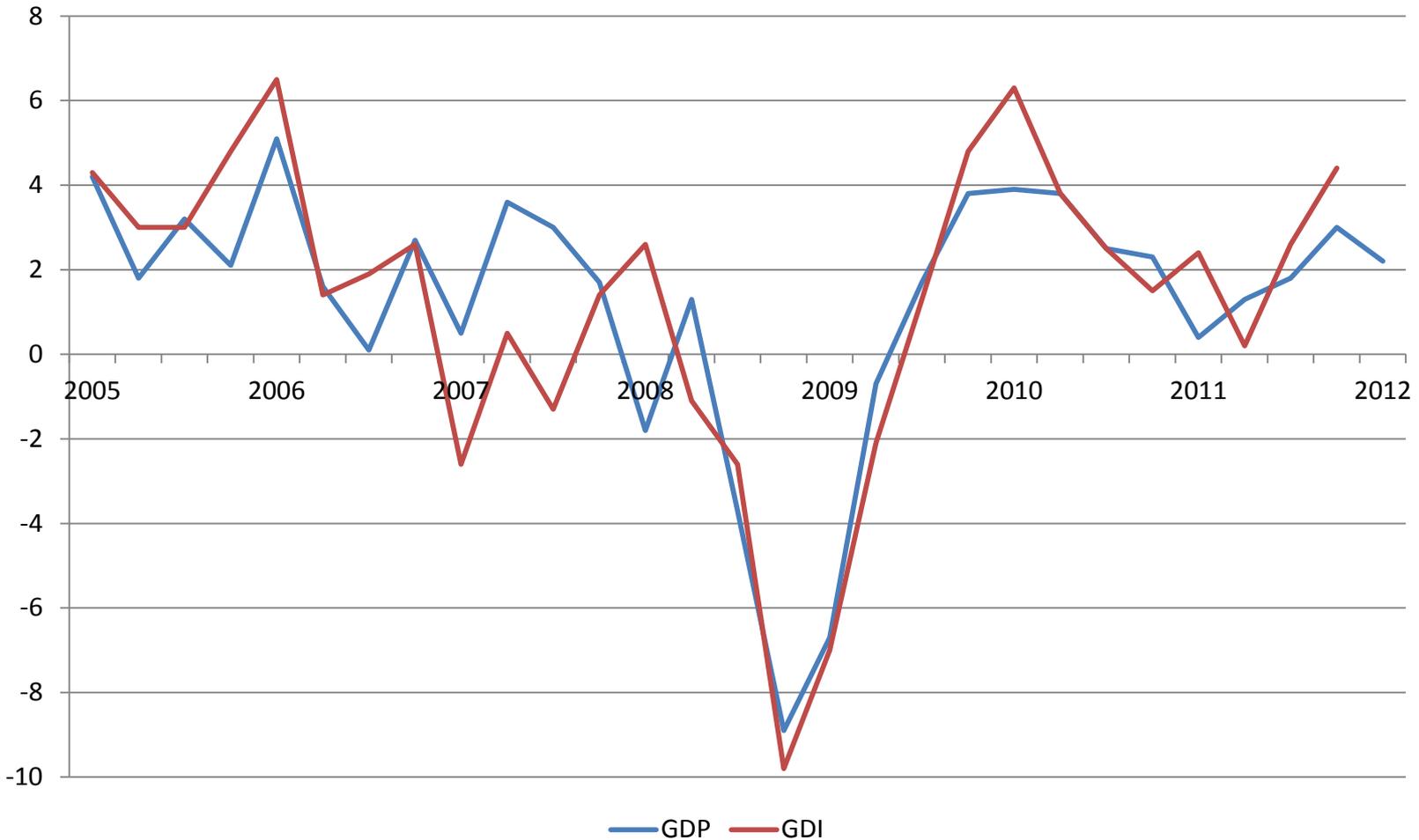
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The recent contraction...

Percent change in real GDP and GDI (SAAR)



...has complicated seasonal adjustment

- Standard seasonal adjustment methods can interpret the sharp contraction in 2008:Q4 and 2009:Q1 as a change in seasonal patterns
- Standard seasonal adjustment methods reduce but do not eliminate the effect of extreme events.
- If this contraction has an “excessive” effect on seasonal adjustment, seasonally adjusted data in later years may be
 - unrealistically strong in Q4 and Q1
 - unrealistically weak in Q2 and Q3

Perspectives on seasonal adjustment

- Several analysts have expressed concerns about excessive “drift” of seasonal factors in economic data
 - Nomura, FT/Alphaville, Goldman Sachs, others

- Federal Reserve Industrial Production Index, 2010 Annual Revision
 - Held seasonal factors constant over recession trough
 - Some series pre-adjusted to remove the recession pattern before applying Census X-12 procedure

- The “correct” way to weight 2008Q4 and 2009Q1 in seasonal adjustment is unclear
 - No one observes the “true” seasonal factors

Seasonal adjustment, why do it?

- Remove seasonal effects from a time series
 - Seasonal effects are thought to have roughly the same time, intensity, direction each year

- To better view underlying movements
 - Cycles and trends
 - Identify direction and turning points

- Without adjusting for seasonality
 - May be too difficult to view significance of movements

Seasonal adjustment and extreme events

- BEA's estimates are based on seasonal factors that are revised over time, allowing for shifts in seasonal patterns.
 - Many are revised annually, using an additional year of data
 - Others are revised each period, using concurrent seasonal factors
 - Revisions to seasonal factors occur over time; even if there are no revisions to the underlying unadjusted data

- Revisions to seasonal factors may be unusually large after an extreme event

- The effect of an extreme event on seasonal factors declines over time
 - Census X-12 gives more weight to most recent years

Seasonal adjustment in GDP/GDI

- Measuring the effect of changes in seasonal factors on trends in GDP and GDI is not straightforward
 - BEA prepares seasonally adjusted estimates of detailed components and then aggregates
 - BEA does not aggregate seasonally unadjusted data and then apply seasonal adjustment to aggregates
- BEA's estimates of detailed components of GDP and GDI rely mostly on source data that are seasonally adjusted by the Census Bureau and by BLS

Seasonal adjustment in GDP/GDI (cont d)

- BEA's estimation process does not require the estimation of seasonally unadjusted GDP and GDI
 - In the past, BEA prepared seasonally unadjusted estimates of GDP
 - BEA discontinued publication of seasonally unadjusted GDP in response to budget cuts
 - Seasonal factors for GDP, GDI are not readily available

- Past research shows that revisions to seasonal adjustment factors can play an important role in revisions to GDP
 - Fixler and Grimm (December 2003 Survey of Current Business)

- Seasonal adjustment revisions played a noticeable role in the 2011 AR
 - New seasonal adjustment procedure for imports of petroleum: BEA now directly seasonally adjusts quantities

Seasonal adjustment in GDP/GDI (cont d)

- Seasonal adjustment problems with any one data source may have only a limited effect on seasonally adjusted GDP
 - Retail sales makes up about 31 percent of PCE and 22 percent of GDP
- Seasonal adjustment for wages and salaries
 - Even minor revisions to seasonal factors may appear large in dollars
- What is the alternative to standard seasonal adjustment?
 - Remove the effect of 2008Q4 and 2009Q1?
 - Less frequent vs more frequent updates?
 - Different seasonal adjustment procedures?

Seasonal adjustment: PCE for goods

- Major data source: seasonally adjusted monthly retail sales (MRTS), Census Bureau
 - Industry sales converted to commodity sales using input-output relationships
- Motor vehicle units: Federal Reserve seasonal factors
- CPIs: seasonally adjusted by BLS
- BEA seasonally adjusts some data, including
 - Motor vehicle registration and price data (private sources)
 - Gasoline (EIA)
 - Prescription drugs (IMS Health)

Seasonal adjustment: PCE for services

- Major data source: quarterly services survey (QSS), Census Bureau
 - Limited history for seasonal adjustment
 - For the 2012 annual revision. BEA will move to seasonal adjustment using 4 qtr-moving average
- CPIs: seasonally adjusted by BLS
- BEA seasonally adjusts some series, including
 - PPIs and IPIs (BLS)
 - Electricity and natural gas (EIA)
 - Air transportation (Airlines 4 America)
 - Hotel services (Smith Travel Research)
 - Financial services (FDIC, other gov't agencies, Investment Company Institute)
 - Gambling (state agencies)

Investment, Structures

- Major data source: seasonally adjusted monthly construction spending, value put-in-place (VPIP), Census Bureau
- Petroleum and natural gas structures: data from American Petroleum Institute and Department of Energy, not seasonally adjusted
- Seasonally adjusted price index for homes: Census Bureau
- BEA seasonally adjusts PPIs, other price indexes

Investment, Equipment and Software

- Major data source: seasonally adjusted monthly survey of manufacturers' shipments, inventories, and orders (M3) Census Bureau
- Software: Seasonally adjusted QSS data, Census
- BEA seasonally adjusts PPIs, motor vehicle data, some imports and exports

Inventory Investment

- Manufacturing, merchant wholesale, and retail, current dollars: seasonally adjusted data from Census Bureau monthly surveys
 - M3, MRTS, monthly wholesale trade surveys (MWTS)
- Construction: seasonally adjusted VPIP less improvements, Census Bureau
- Mining: quarterly financial reports (QFR), Census Bureau, not seasonally adjusted
- BEA seasonally adjusts
 - PPIs, IPIs, from BLS
 - prices and quantities from EIA, for coal and gas utilities

Exports and Imports

- Major data source, goods: seasonally adjusted monthly estimates, based primarily on Census Bureau data on trade in goods.

- Major data source, services: International Transactions Accounts (ITAs) -- BEA surveys and data reported by other U.S. government agencies, seasonally adjusted by BEA

- BEA seasonally adjusts IPIs, PPIs, export prices

Government Consumption Expenditures and Gross Investment

- Compensation: employment data seasonally adjusted by BLS
- Investment in structures: VPIP data, seasonally adjusted, Census Bureau
- Other government consumption expenditures and gross investment: BEA seasonally adjusts data from government agencies when necessary
- BEA seasonally adjusts PPIs, some other price indexes

Seasonal adjustment: GDI

- Wages and salaries
 - Current Employment Statistics : seasonally adjusted by BLS
 - Quarterly Census of Employment and Wages: seasonally adjusted by BEA
- Corporate profits:
 - BEA seasonally adjusts profits data from QFR, other sources
- Nonfarm proprietors income: mainly indicators seasonally adjusted from BLS, Census Bureau

Future work

- BEA's 2012 annual revision and 2013 comprehensive revision will incorporate revisions to seasonal factors
 - BEA staff will carefully examine changes/revisions in seasonal factors

- BEA will collaborate with source data agencies
 - Census Bureau, BLS

- Suggestions?