



Harmonizing BEA's Measures of GDP, GDI, and Value Added

Update Session

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Three approaches to measuring GDP

- Final expenditures: $C + I + G + (X - M)$
 - *Gross domestic product* in BEA accounts

- Income: (Compensation, taxes on production and imports less subsidies, gross operating surplus)
 - *Gross domestic income* in BEA accounts
 - $GDP - GDI = \textit{Statistical discrepancy}$

- Production: Gross output less intermediate inputs
 - In BEA accounts, constrained to equal GDP

- In principle, all three approaches should produce identical results with complete information

Overview

- Review past research and BEA Advisory Committee discussions
- Discuss approaches for dealing with the discrepancy:
 - Improving source data and estimating methods
 - Averaging
 - Balancing and benchmarking
- Present BEA's proposed plan to address these approaches
 - Request Committee's feedback and advice

Statistical discrepancy: Past discussions

- May 2010
 - Nalewaik:
 - “statistical evidence strongly supports notion that GDP(I) is at least as good a measure of output as GDP(E)”
 - GDP(E) revises toward GDP(I) growth
 - GDP(I) has higher correlations with other cyclical series
 - Moulton – data timeliness and quality
 - Fixler – statistical support for weighted average
 - Nordhaus:
 - Signal extraction approach
 - Example based on Okun’s Law
 - Recent data suggest approximately equal weights

Statistical discrepancy: Past discussions

- November 2011
 - Rassier - research on sources of measurement error
 - Misreporting adjustments
 - Employee stock options
 - Capital gains and losses
 - Produced intangibles
 - Fixler – research on revisions
 - Importance of revisions to seasonal adjustment factors
 - Improvements to source data and projection methods
 - Nordhaus:
 - “Two map problem” – weights based on variances
 - Combine income, expenditure with approx. equal weights

Statistical discrepancy: Past discussions

- May 2014
 - Strassner & Wasshausen – industry accounts
 - Benchmark GDI in a balanced I-O framework (eliminating discrepancy in benchmark period)
 - Introduce third “production measure” of GDP
- November 2014
 - Fixler – research on revisions
 - Regressions indicate early estimates of both GDP and GDI are informative about revised GDP
 - Weighted average would lead to modest reduction in revisions

Sources of the statistical discrepancy

- Sampling error
- Nonsampling error
 - Nonresponse
 - Misreporting
- Components that aren't regularly benchmarked
- Timing differences
- Data gaps
- Conceptual/accounting differences
 - Adjustments to conform to national accounts concepts

Other BEA-affiliated research

- **Rassier**
 - role of profits and income in statistical discrepancy
 - *Survey of Current Business* Feb 2012
- **Rassier, Howells, Morgan, Empey, and Roesch**
 - I-O balancing and reconciliation based on data quality
 - *SCB* Dec 2007
- **Chen**
 - balanced system of industry accounts and SD
 - *J Bus and Econ Statistics* Apr 2012
- **Chen, Di Fonzo, Howells, and Marini**
 - statistical reconciliation of time series accounts after benchmark revision
 - Forthcoming, 2014 working paper
- **Grimm**
 - statistical analysis across components, vintages
 - BEA working paper, 2007
- **Parker**
 - examined quality of source data across estimation cycle
 - 2013 report

Approaches to dealing with discrepancy

- **Source Data**
 - Holdren, *SCB* June 2014 – data quality by vintage
- **Averaging**
 - Calculate *average GDP* as simple average of income, expenditure (and possibly output) measures
 - Maintain statistical discrepancies
 - Several ways to justify this approach
 - Measurement error; forecast combination; revision studies, etc.
- **Balancing/benchmarking** (supply-use integration)
 - Stone, Champernowne & Meade (1942)
 - Confront data inconsistencies and resolve them with measurement error model
 - Enforce accounting identities
 - Produce integrated, consistent estimates

Averaging approach - Canada

Income component	2014 Q4	Expenditure component	2014 Q4
Compensation of employees	1,004.3	Final consumption expenditure	1,536.0
Gross operating surplus	561.6	Household	1,087.3
Gross mixed income	228.3	NPISH	28.4
Taxes less subsidies on production	77.4	General government	420.3
Taxes less subsidies on products and imports	122.4	Gross fixed capital formation	475.6
Statistical discrepancy	-1.4	Inventory investment	9.8
		Exports of goods & services	623.3
		Less: Imports of goods & services	653.4
		Statistical discrepancy	1.4
GDP at market prices	1,992.6	GDP at market prices	1,992.6

Averaging – international examples

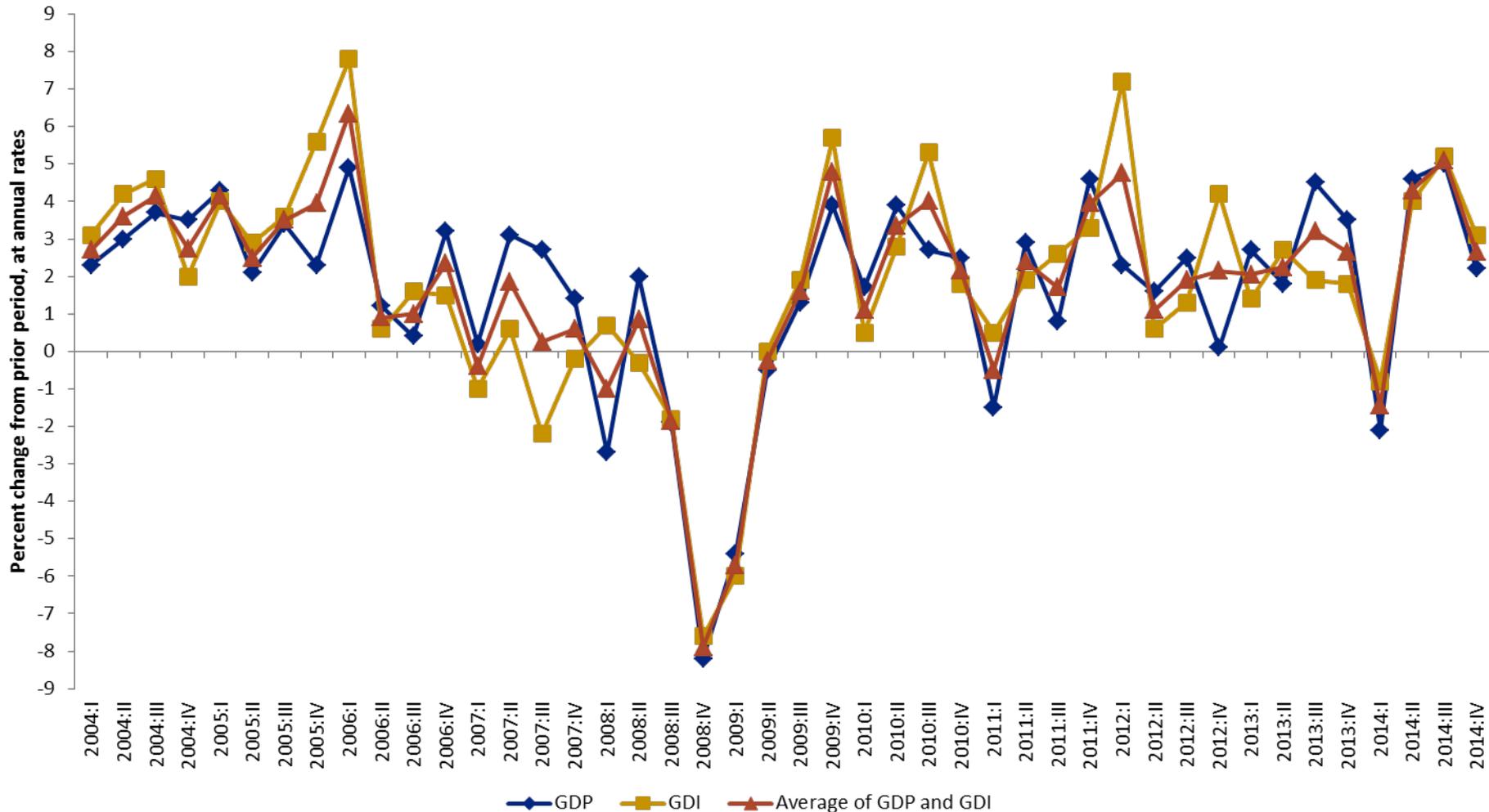
- Canada
 - GDP is average of income & expenditure methods
 - Statistical discrepancy on both sides
 - Annual fully balanced supply-use tables, but aren't fully benchmarked to eliminate statistical discrepancy
- UK
 - Annual supply-use balancing eliminates discrepancy
 - Prior to balancing, GDP is based on output approach; discrepancies shown for income, expenditures
- Australia
 - Annual supply-use balancing eliminates discrepancy
 - Quarterly real GDP is average of three approaches

BEA to introduce average measure

- This July, the NIPAs will introduce a new series, “*average of GDP and GDI*”
 - *Current dollars*: simple, equally weighted average of GDP and GDI
 - *Chained dollars*: current-dollar value deflated by the GDP price index
 - Presented as an addenda item
 - Does not replace GDP as the headline estimate
 - Gives “official” status to a number that many users have been calculating
 - Shares & contributions to growth not available

Average of real GDP and real GDI

Real GDP, Real GDI, and the Average of Real GDP and Real GDI
 2004:I to 2014:IV; Percent change, annual rate



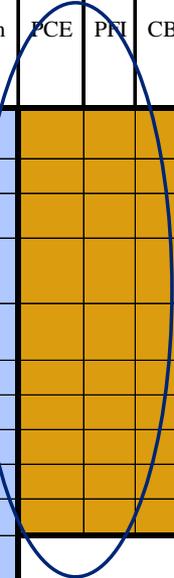
Longer term – Improve the reconciliation process

- Currently, industry accounts are fully integrated and balanced, controlling to the expenditure estimate
- Longer term, BEA would like to improve processes for reconciling the national and industry estimates
 - Reconcile & harmonize methodologies
 - Make (supply) & use tables would be balanced and reconciled confronting all three approaches
 - Balancing would reflect data quality
 - For fully reconciled estimates, GDI would be benchmarked and statistical discrepancy would be eliminated for period
 - Begin with **benchmark years**
 - Next step – *annual* estimates for year $T-2$

BEA annual feedback

		Industries										Final Uses (GDP)							Total Commodity Output
		Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Other	Total Intermediate	PCE	PII	CBI	X	M	GOV	GDP	
Commodities	Agriculture																		
	Minerals																		
	Construction																		
	Manufacturing																		
	Transportation																		
	Trade																		
	Finance																		
	Services																		
	Other																		
	Noncomp imports																		
	Total II																		
Value Added	Comp																		
	TLS																		
	GOS																		
	Total VA																		
Total Industry Output																			

ANNUAL FEEDBACK



Example of gains from feedback (benchmark years)

- For most recent NIPA benchmark revision (2007 reference year – released in 2013)
 - Overall revision to PCE for goods was small (less than 0.1 percent)
 - *but* significant revisions to some categories:
 - PCE for “Other” Video Equipment
 - Video recorders, cameras, and DVD devices
 - Revised **down** \$5.5 billion, or 23 percent
 - PCE for Therapeutic Medical Equipment
 - Revised **up** \$2.6 billion, or 12 percent

Improved annual reconciliation & benchmarking

- Motivation:
 - Improve the consistency of integrated national level data that link industry production, final demand, and income
- Keys to project:
 - More collaboration among analysts sharing information on methodologies and estimates
 - Flexibility to adapt methodologies to improve consistency
 - Improved confrontation of alternative data
- Eventually, may consider improved reconciliation of quarterly national and industry estimates
 - Allow NIPAs to benefit from industry output data
 - Industry accounts to further benefit from reconciling expenditure and income data

Questions for committee?

- Does the Committee endorse the publication of average of GDP & GDI?
- Should BEA consider eventually adopting the average of GDP & GDI as its featured quarterly GDP measure?
- Does the Committee endorse benchmarking GDI in a fully integrated I-O framework, with a resultant SD that equals zero?
- Would BEA also need to publish a pre-benchmarked version of the estimates?