

GDP Deflators

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IGIDR Roundtable on GDP Methodology

August 5, 2016

Views are personal

GDP Controversy

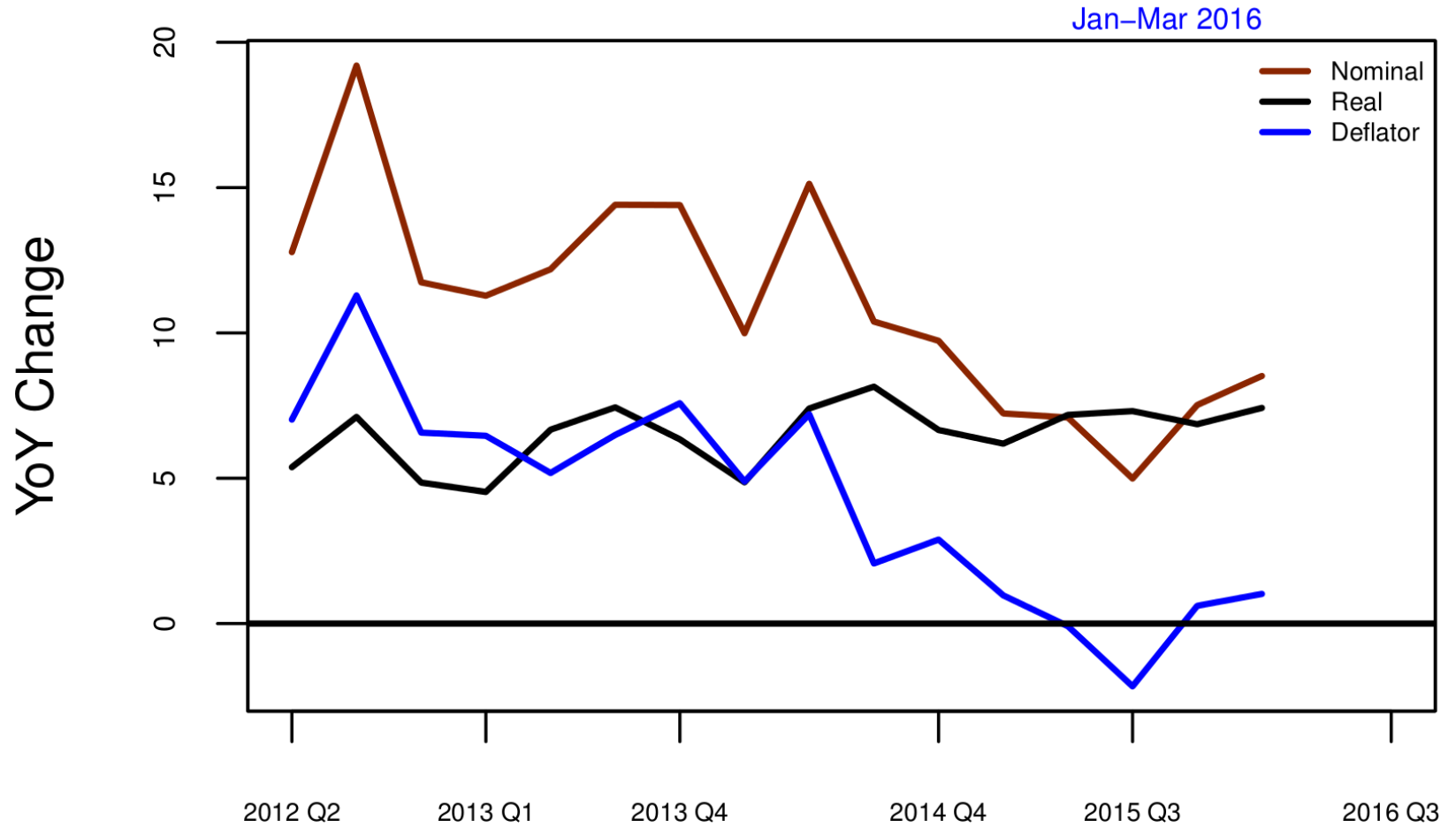
- Many have questioned the GDP data
- But few have identified specific methodological problems
- Fewer have proposed solutions

- Two puzzles

Production vs Expenditure

- Discrepancy issue

Nominal vs Real GVA



Source of the problem

- Which side?
 - Expenditure
 - Production
- Which step?
 - Nominal
 - Deflator
- Traditional view
 - Production more reliable
 - Prices better measured

Argument

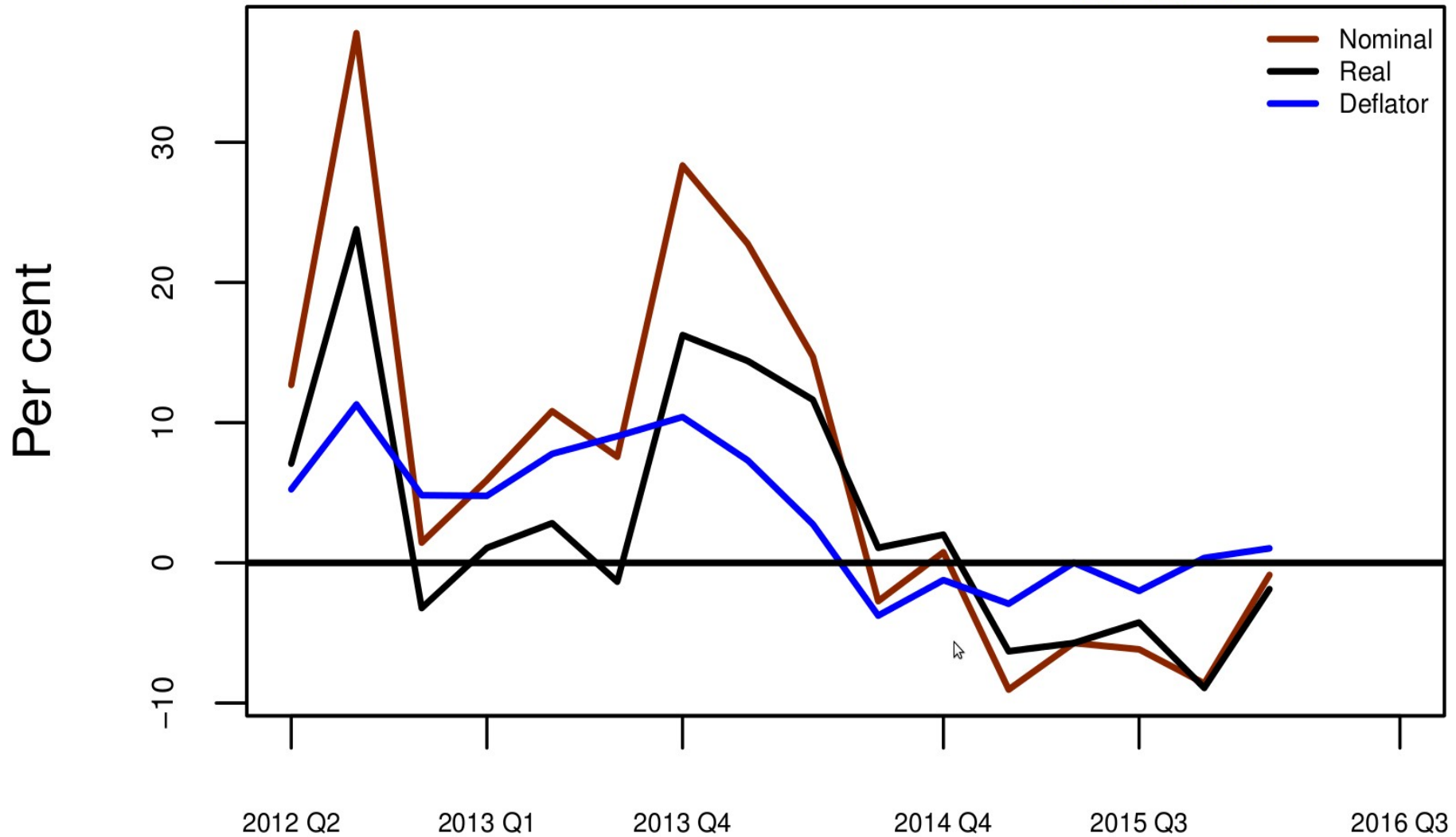
- Expenditure numbers actually seem reasonable
- Production numbers bedeviled by deflation problems
- Problems will not (entirely) go away
- Methodology will need to be refined

Expenditure side

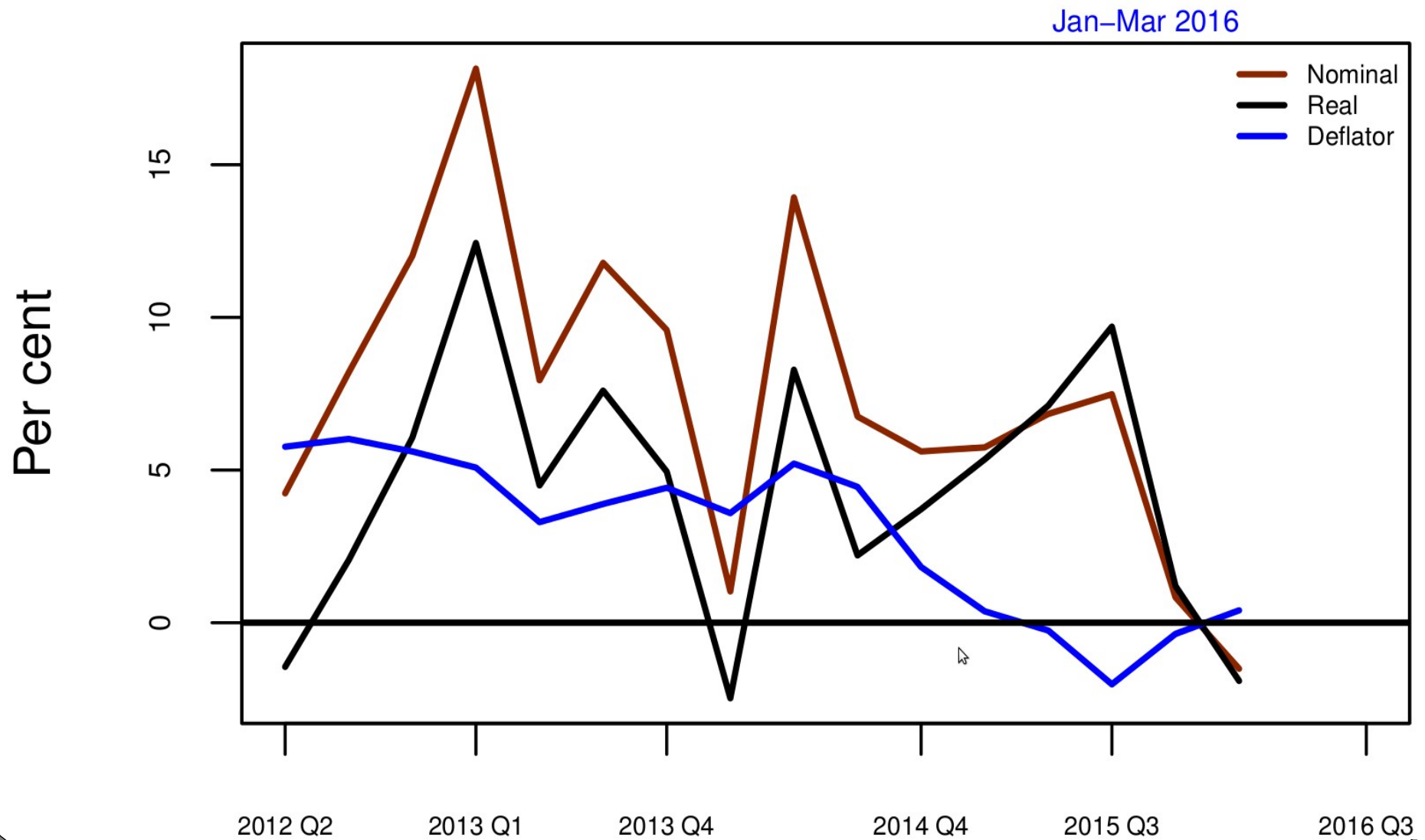
- Are figures consistent with other indicators?
- Do deflators make sense?

Exports

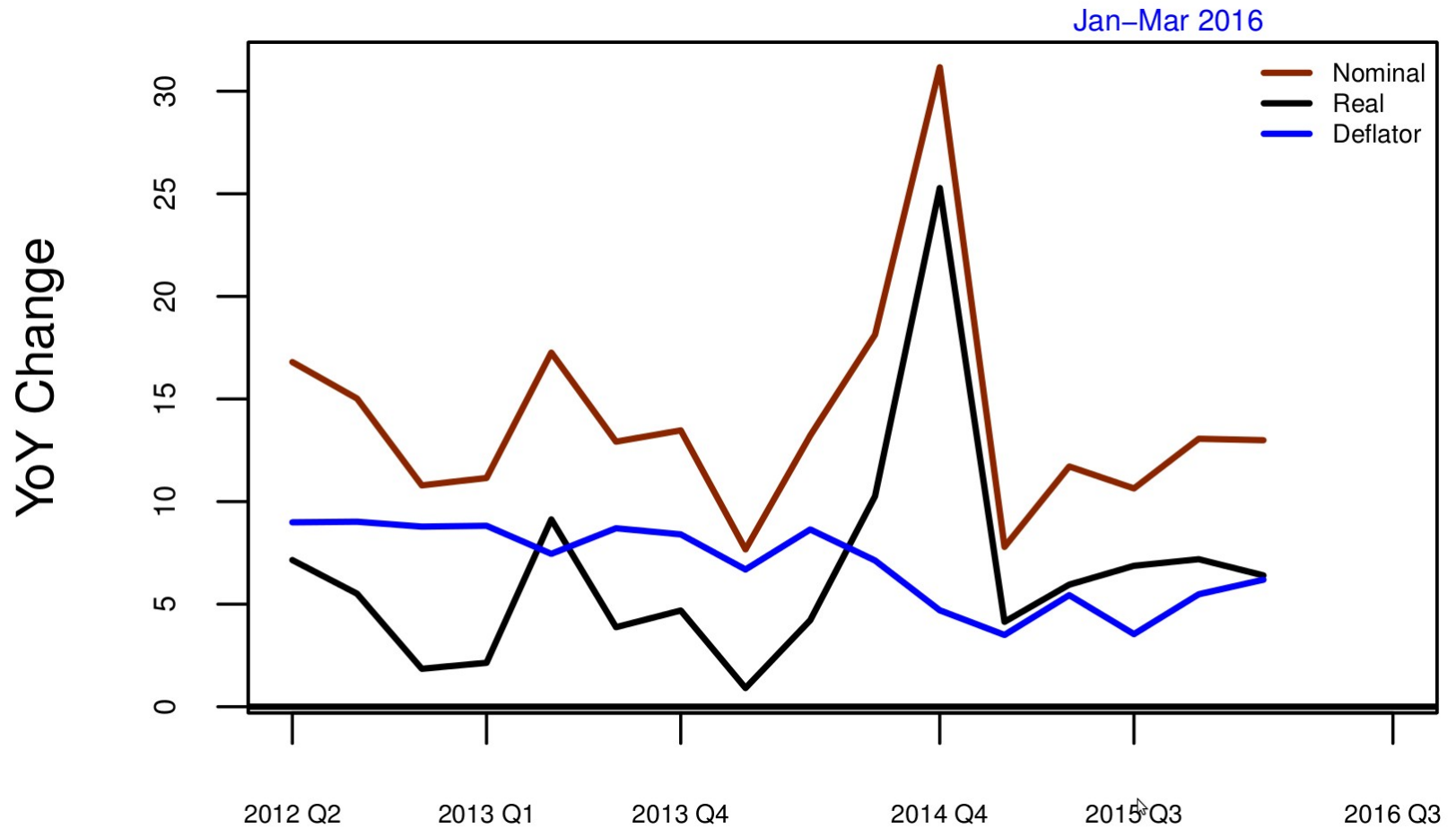
Jan-Mar 2016



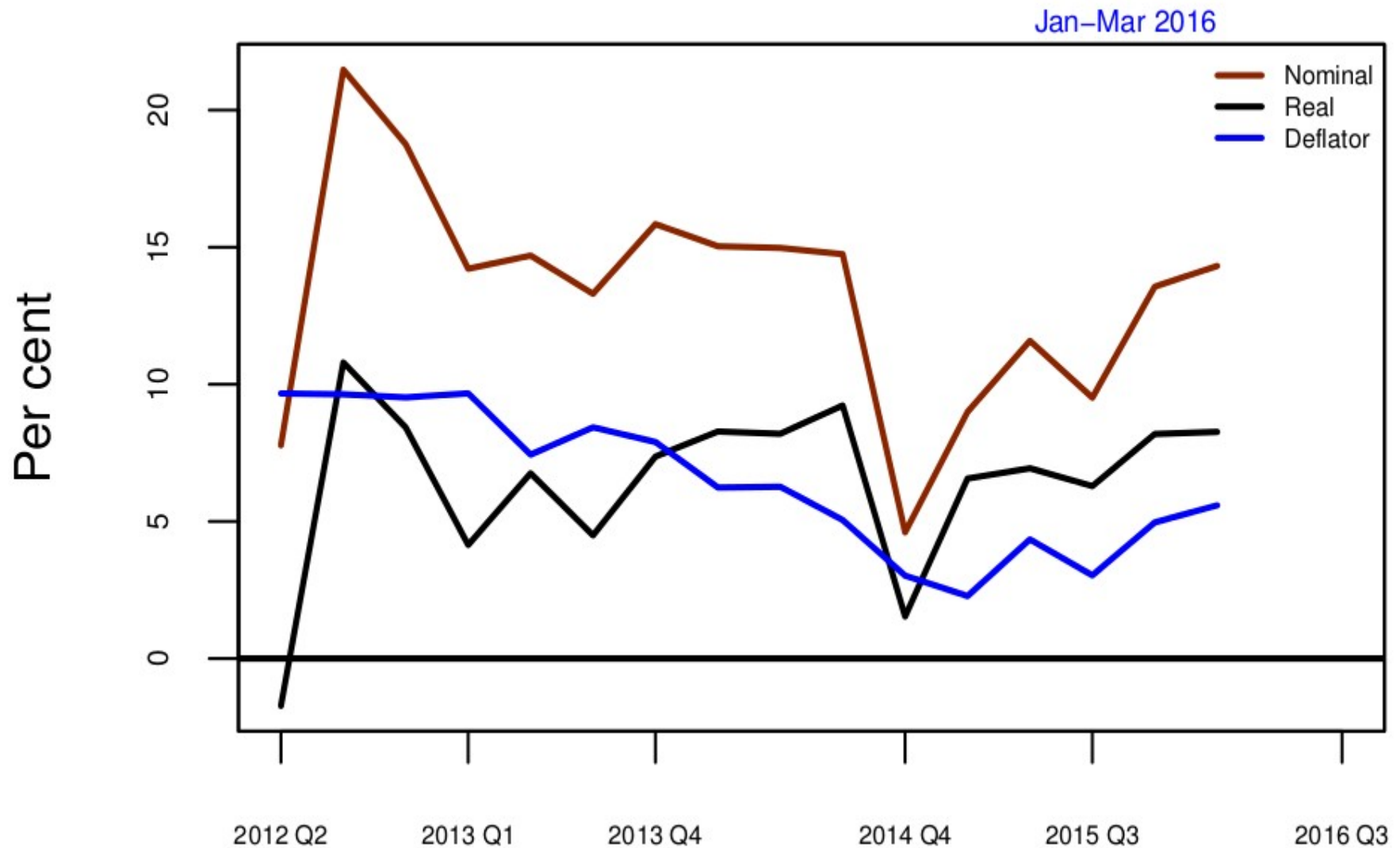
Investment



Government (community services)



Private final consumption



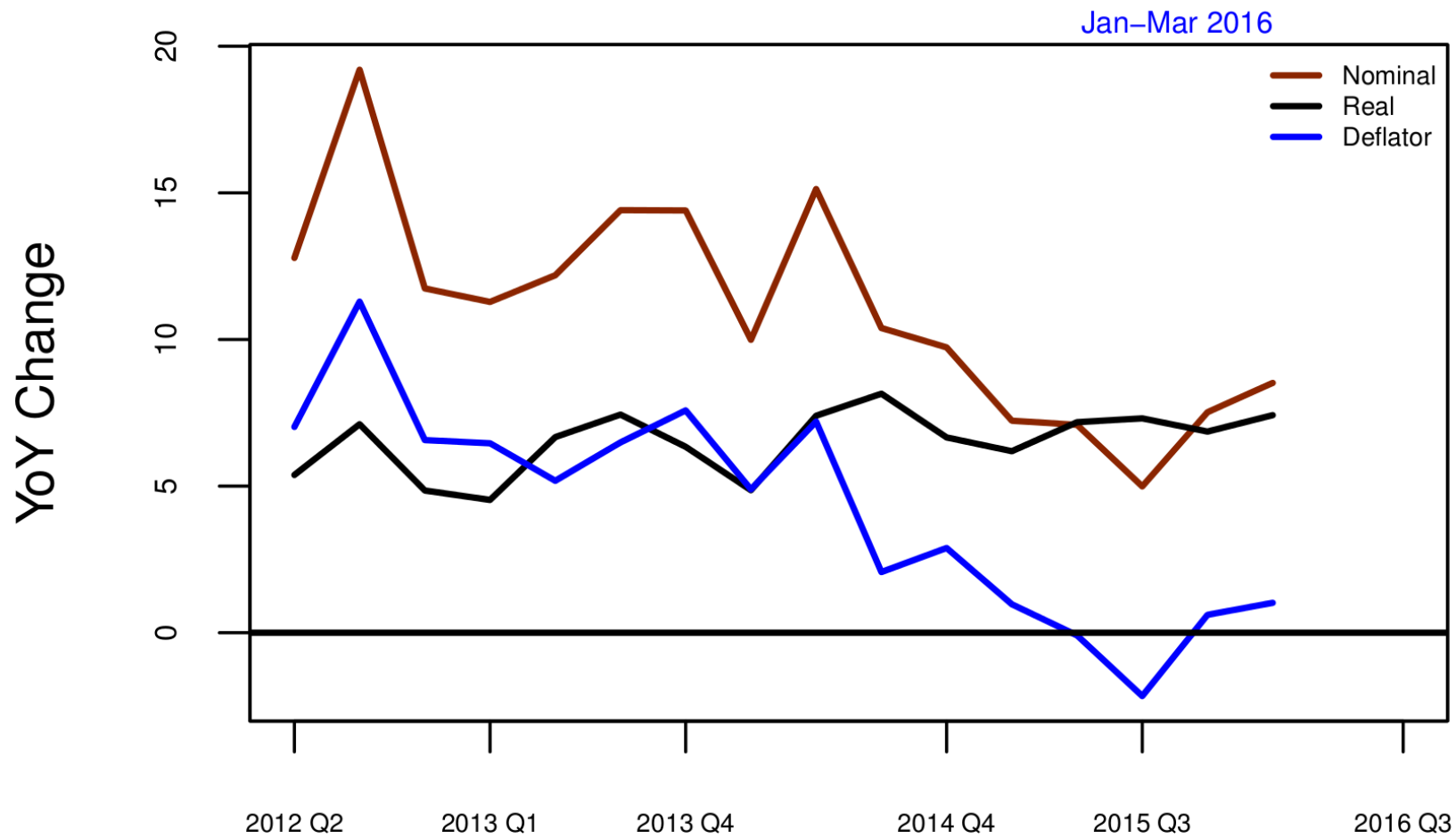
Expenditure side

- Are figures consistent with other indicators?
 - No reason to question nominal numbers
- Do deflators make sense?
 - No reason to question deflators

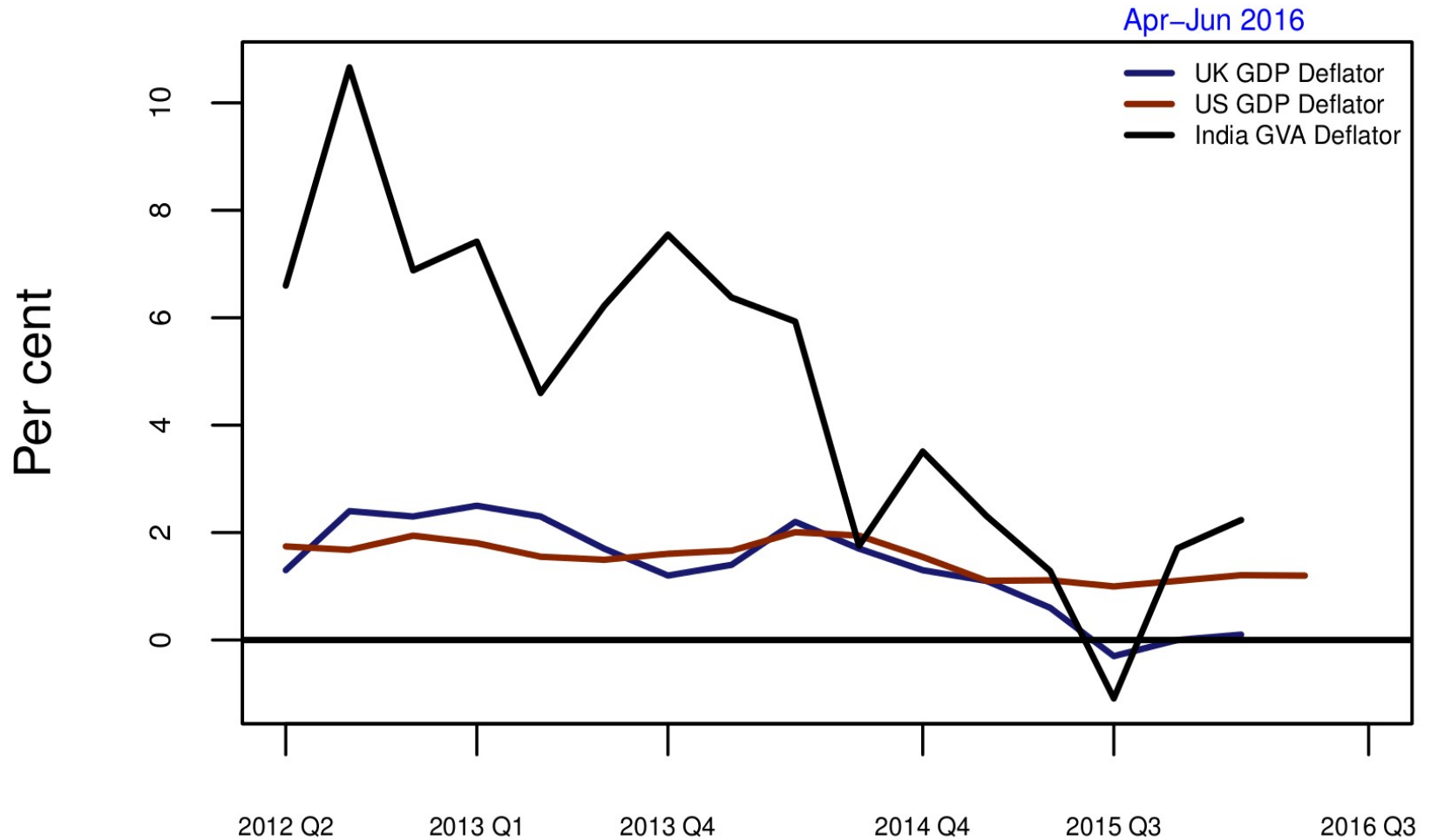
Production side

- Are figures consistent with other indicators?
- Do deflators make sense?

GVA growth



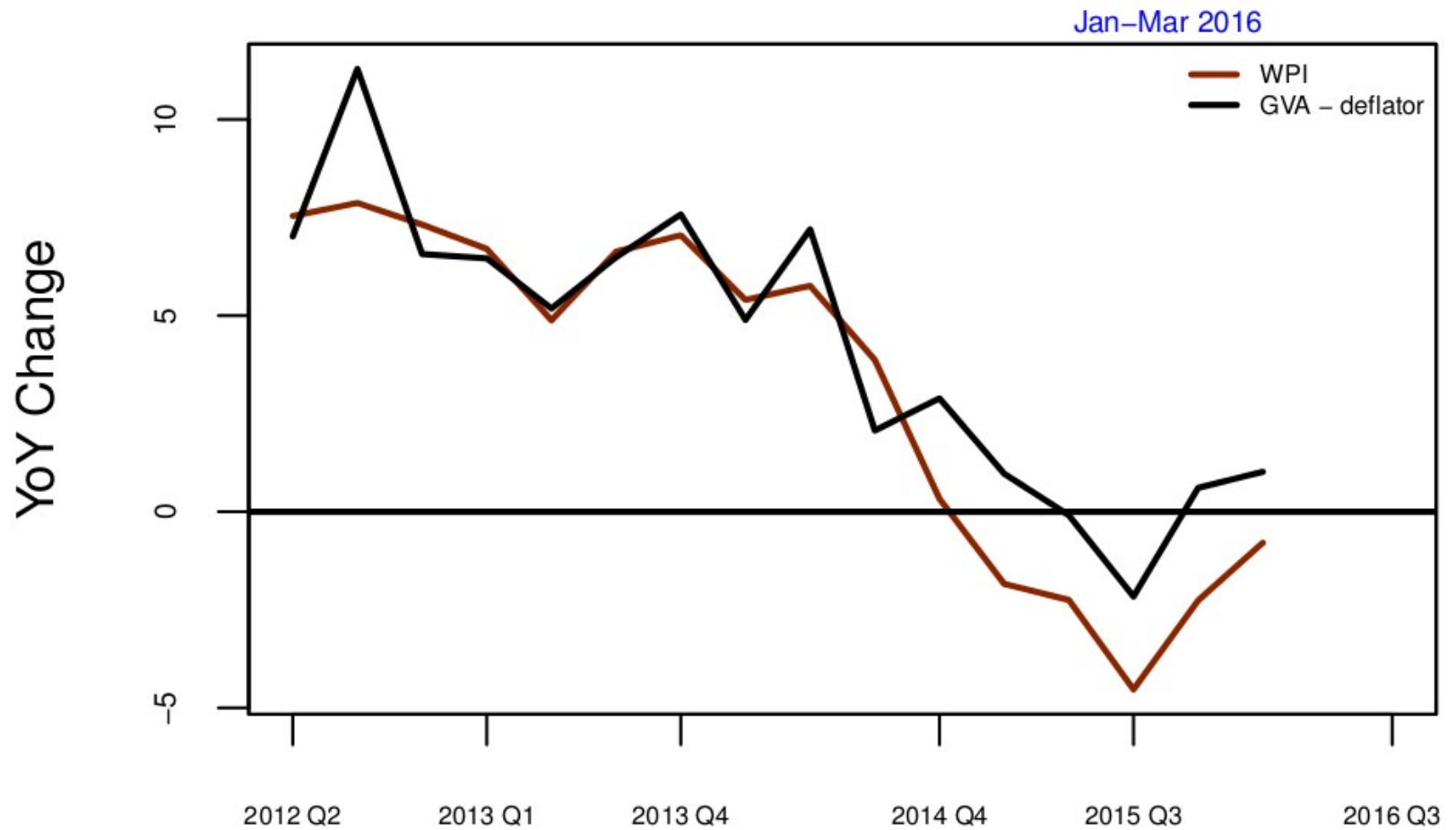
Deflationary India?



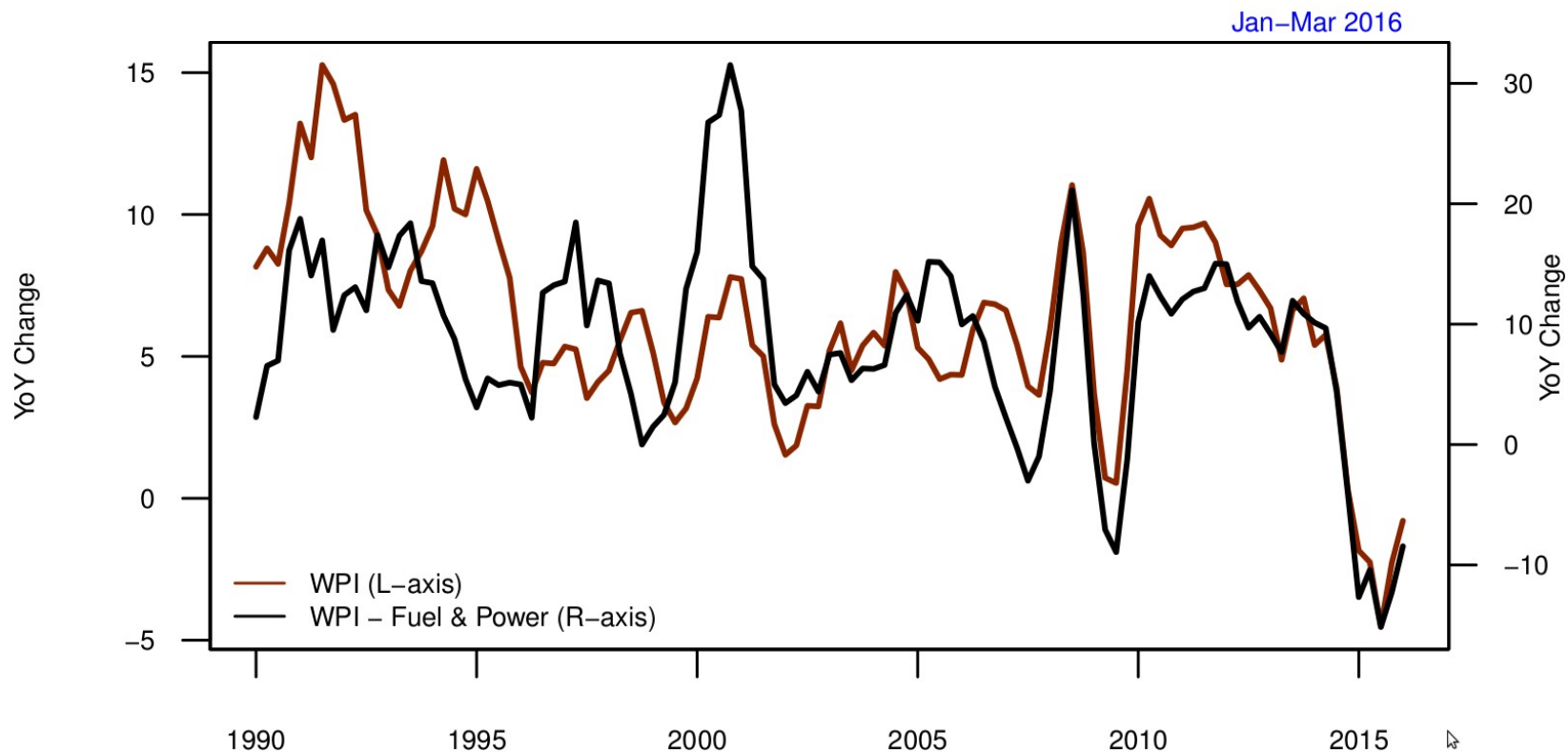
Conventional wisdom

- Deflator distorted by heavy reliance on WPI
- WPI heavily influenced by fuel prices
- When fuel inflation normalises, price indices will converge, problem will disappear
- In meantime, rely on indicators set to judge GDP

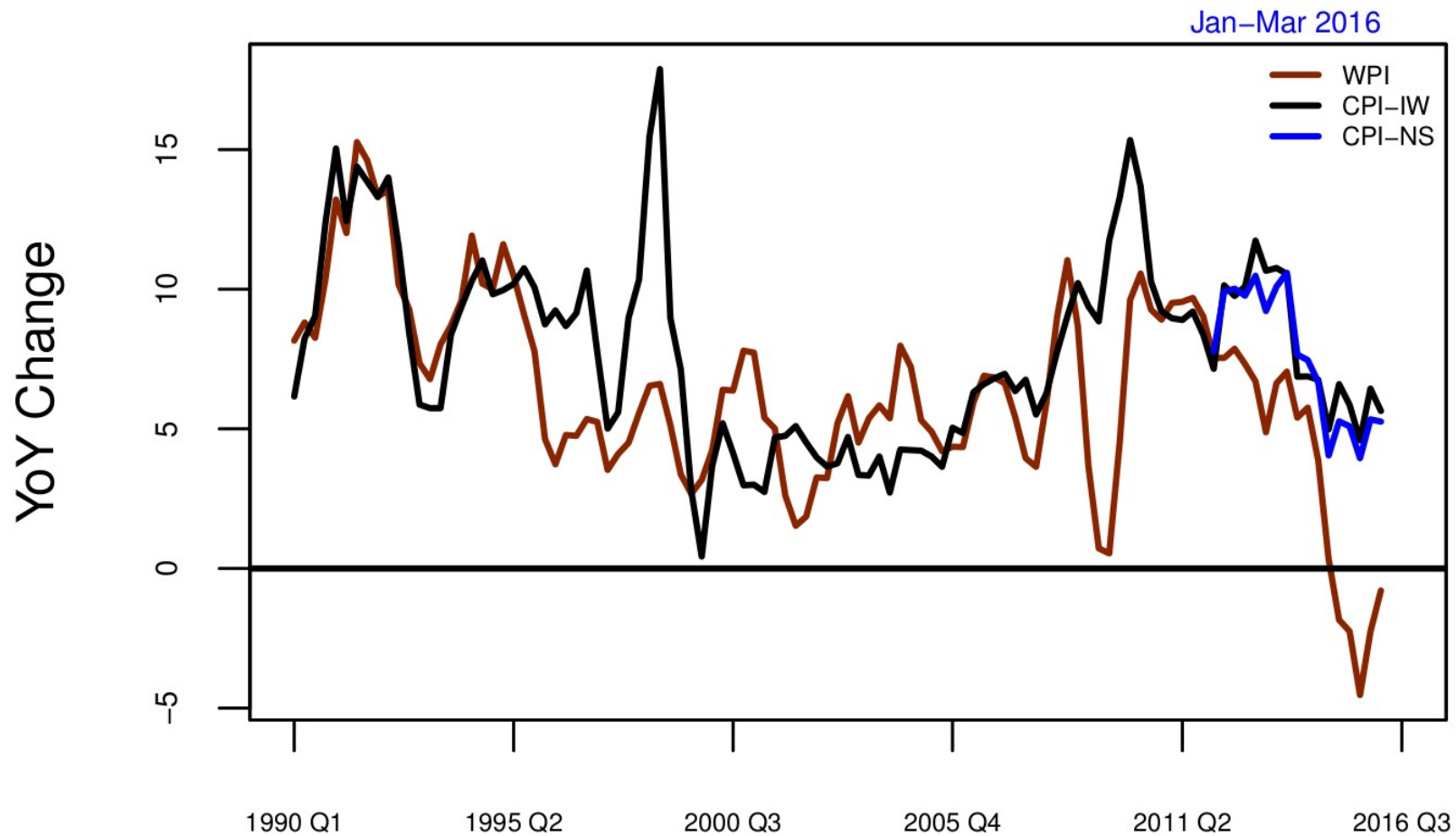
GVA deflator and WPI



WPI and Fuel



WPI and CPI



Two questions

- Convergence: is this time different?
- Indicators: does this solution work?

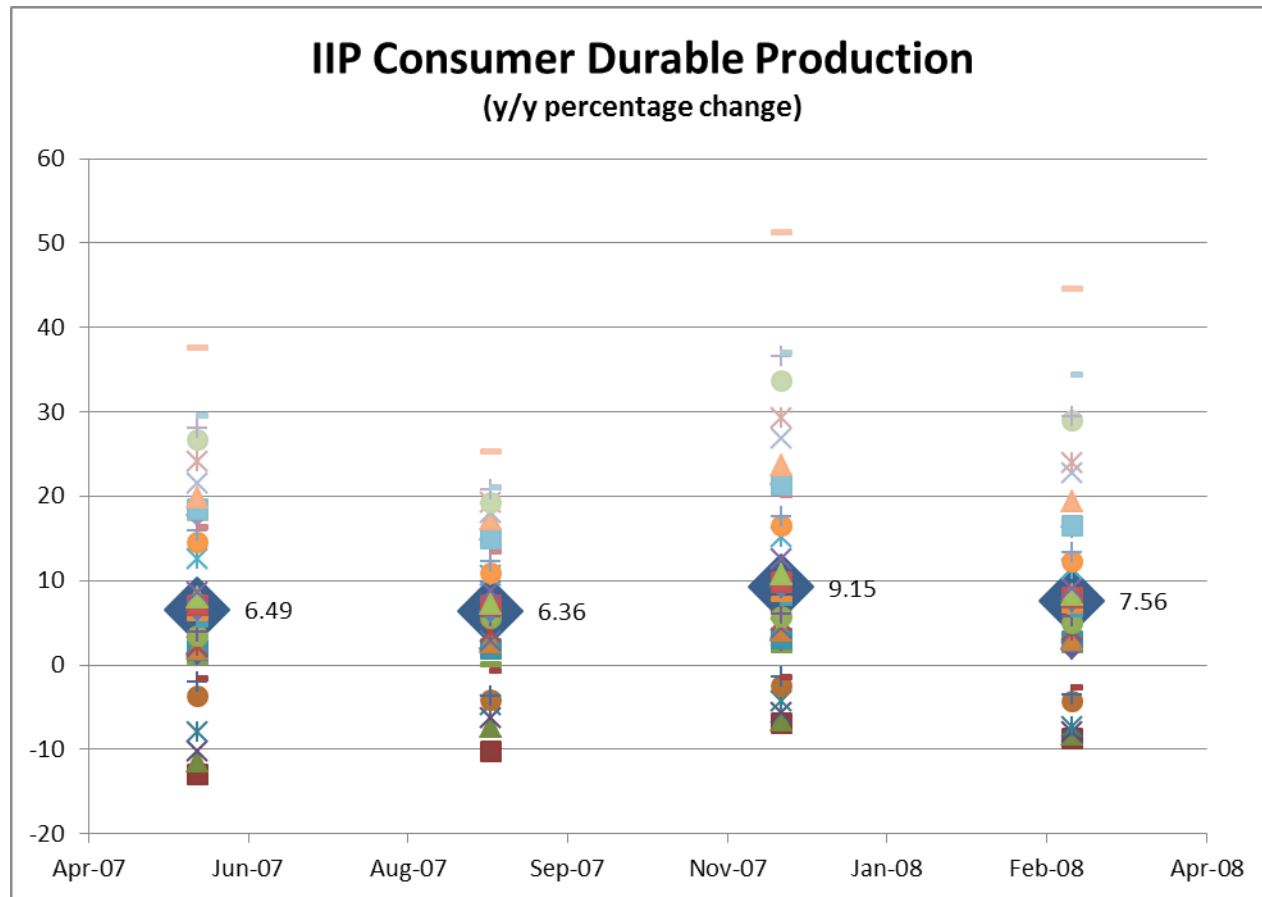
Conventional solution

- Use indicators
 - Nondurable consumption: FMCG sales
 - Durable consumption: car production
 - Investment: capital goods production
- But...
 - Volume isn't value added
 - Are indicators really better than GDP data?

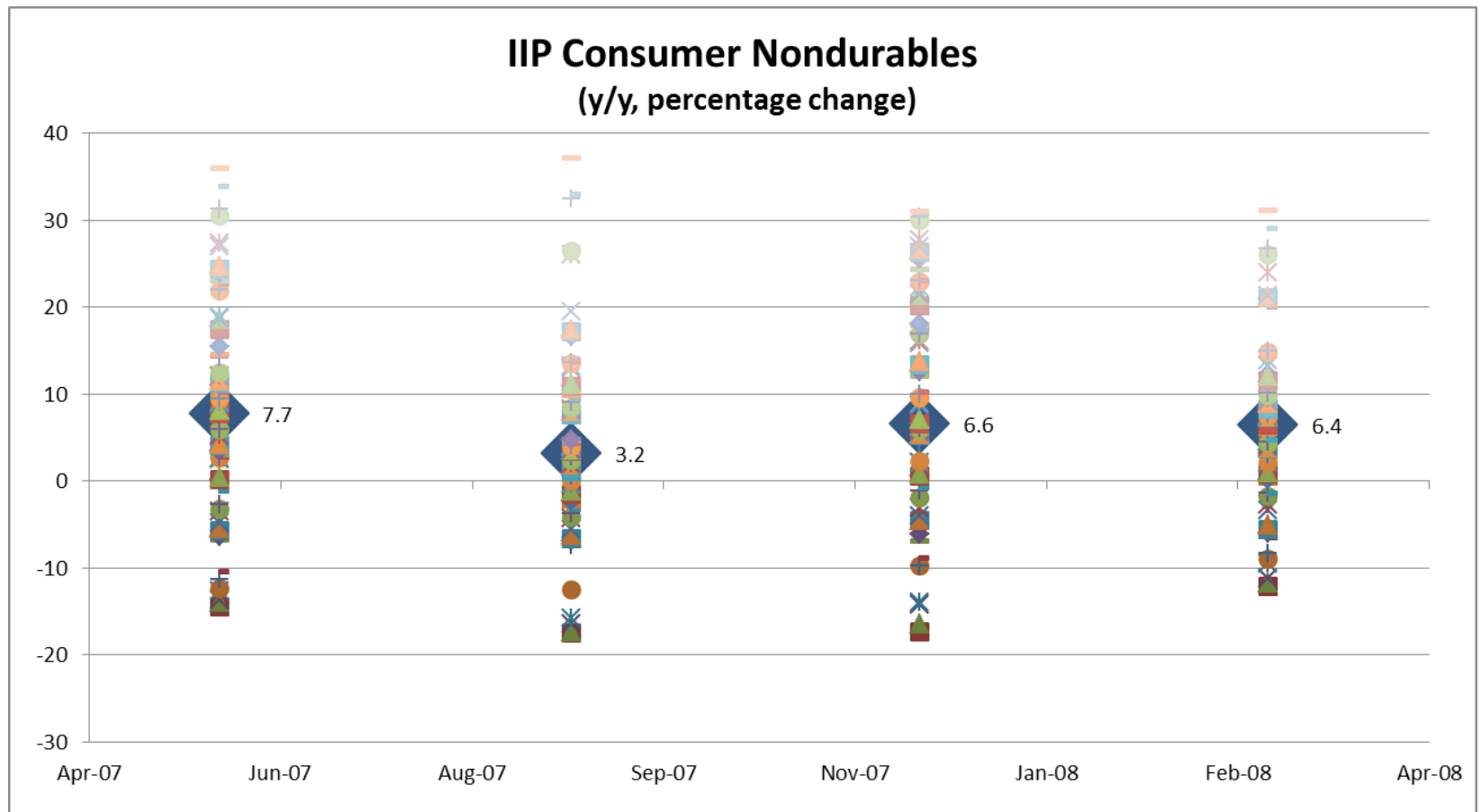
Kleiner's Law...



Doesn't hold in India!



Not even for non-durables



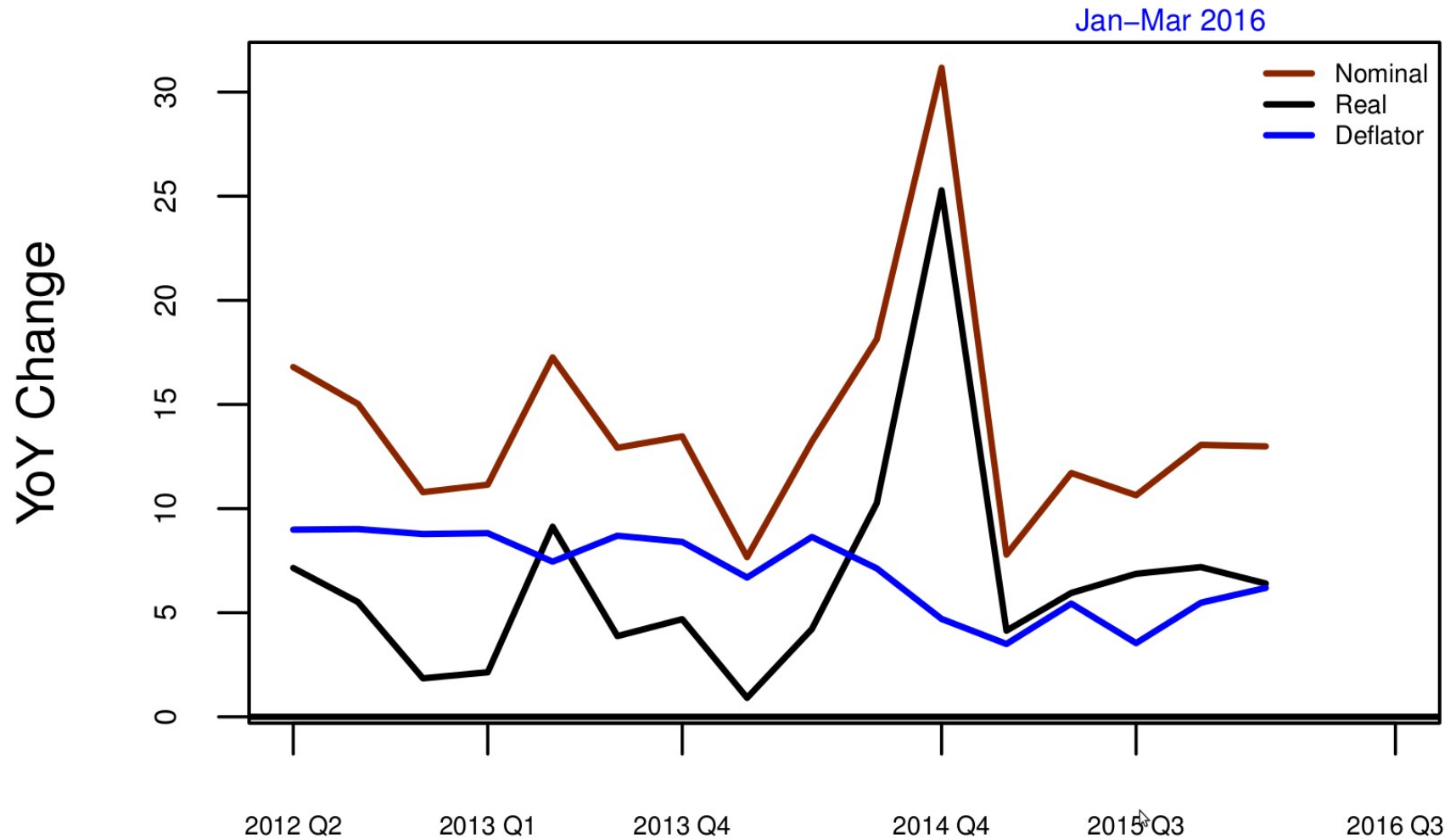
Implications

- Dangerous to generalise from indicators
- Sample set matters
- Weighting schemes matter
- So does sampling strategy

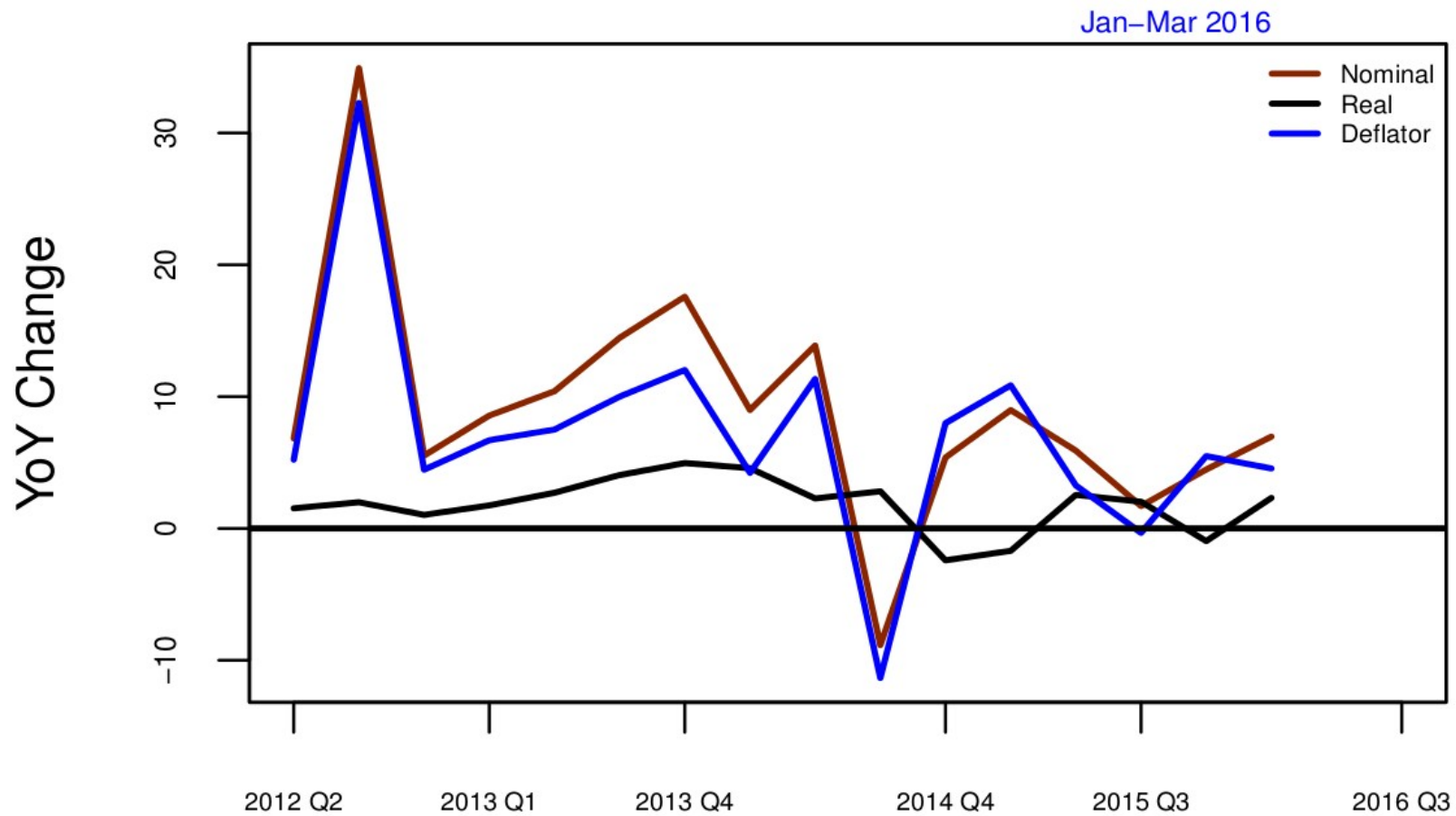
So back to deflators...

- GVA deflator looks odd
- But aggregate deflator is function of sectoral deflators
- Can we trace the problem to specific sectors?

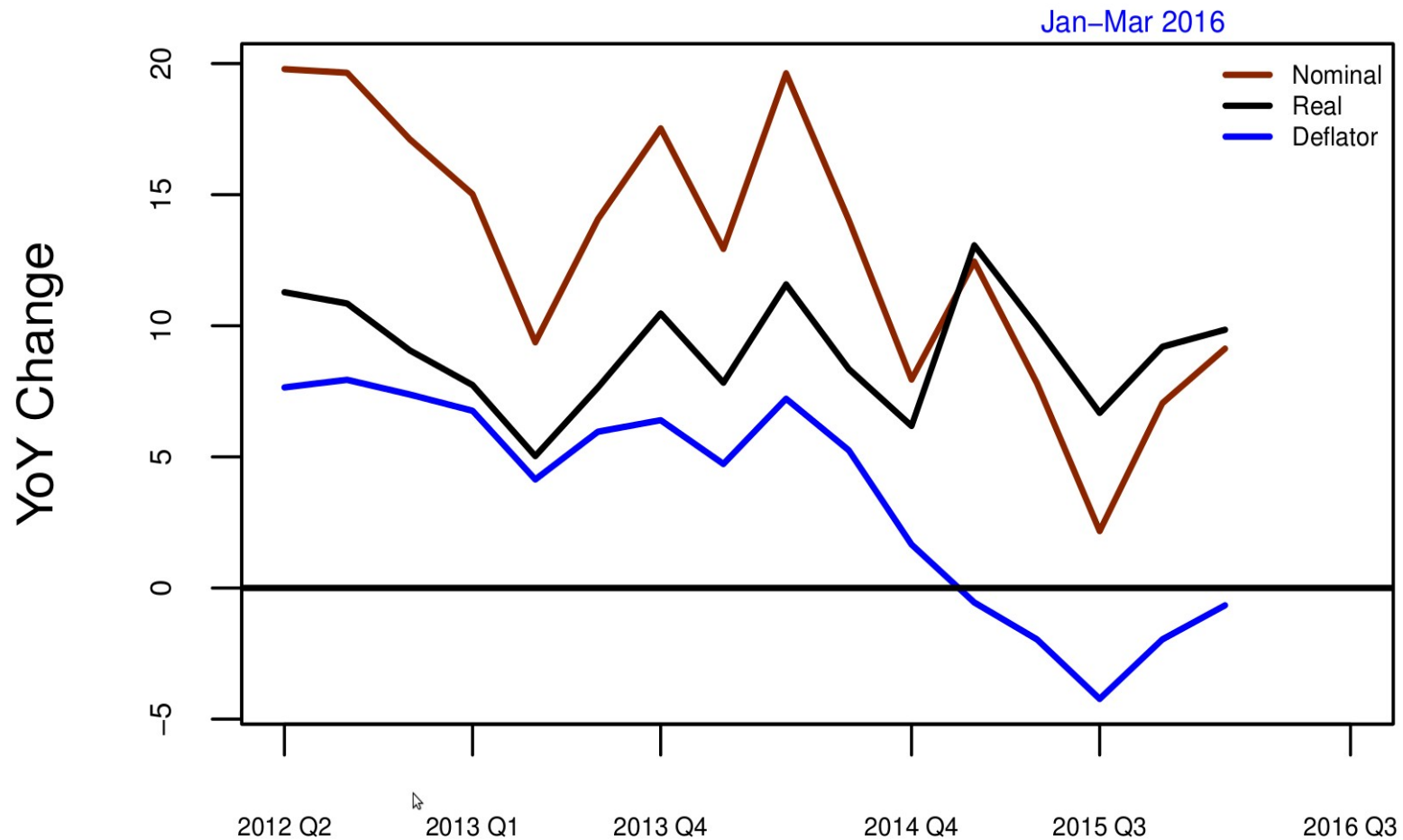
Community services



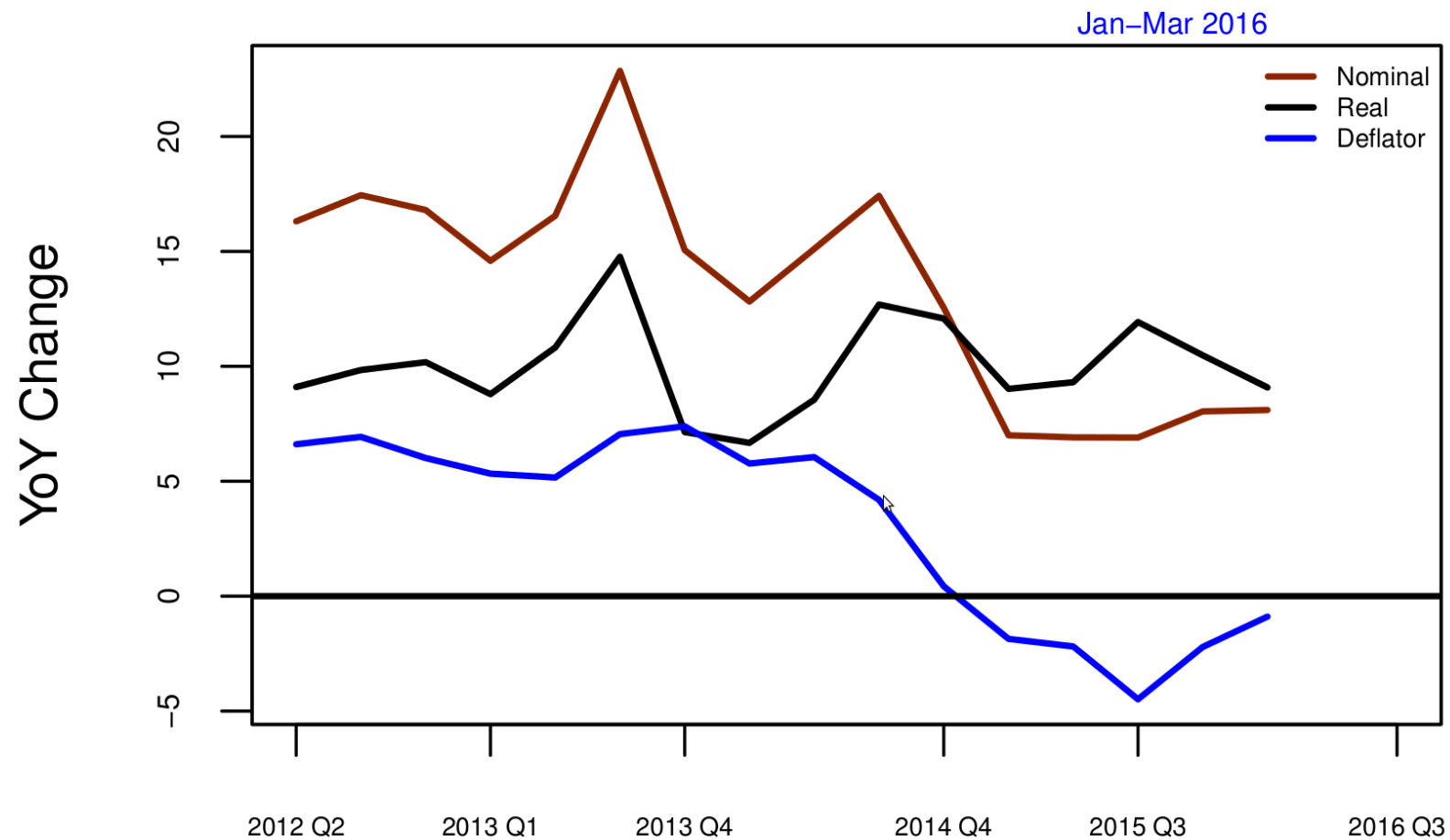
Agriculture



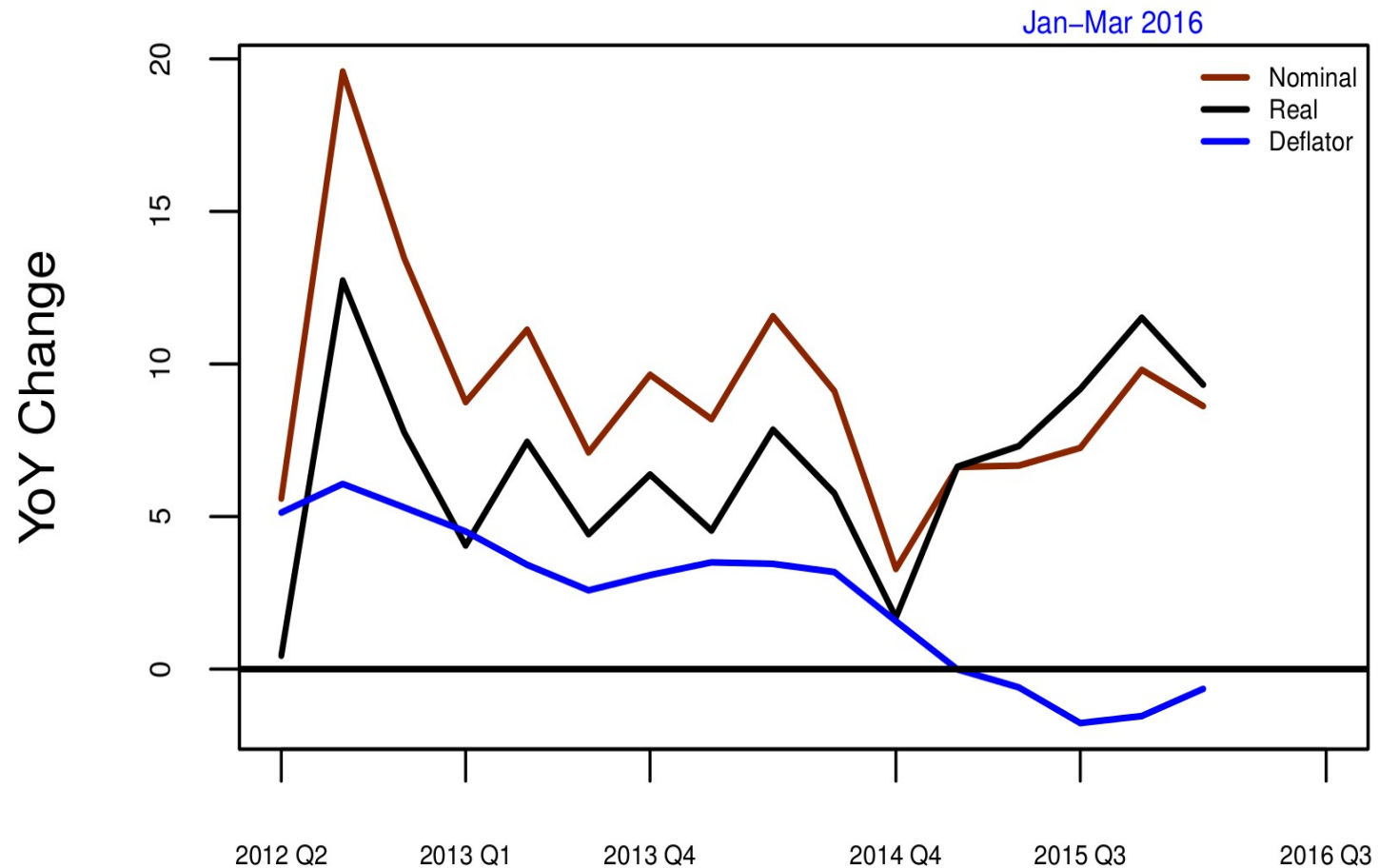
Trade



Finance



Manufacturing



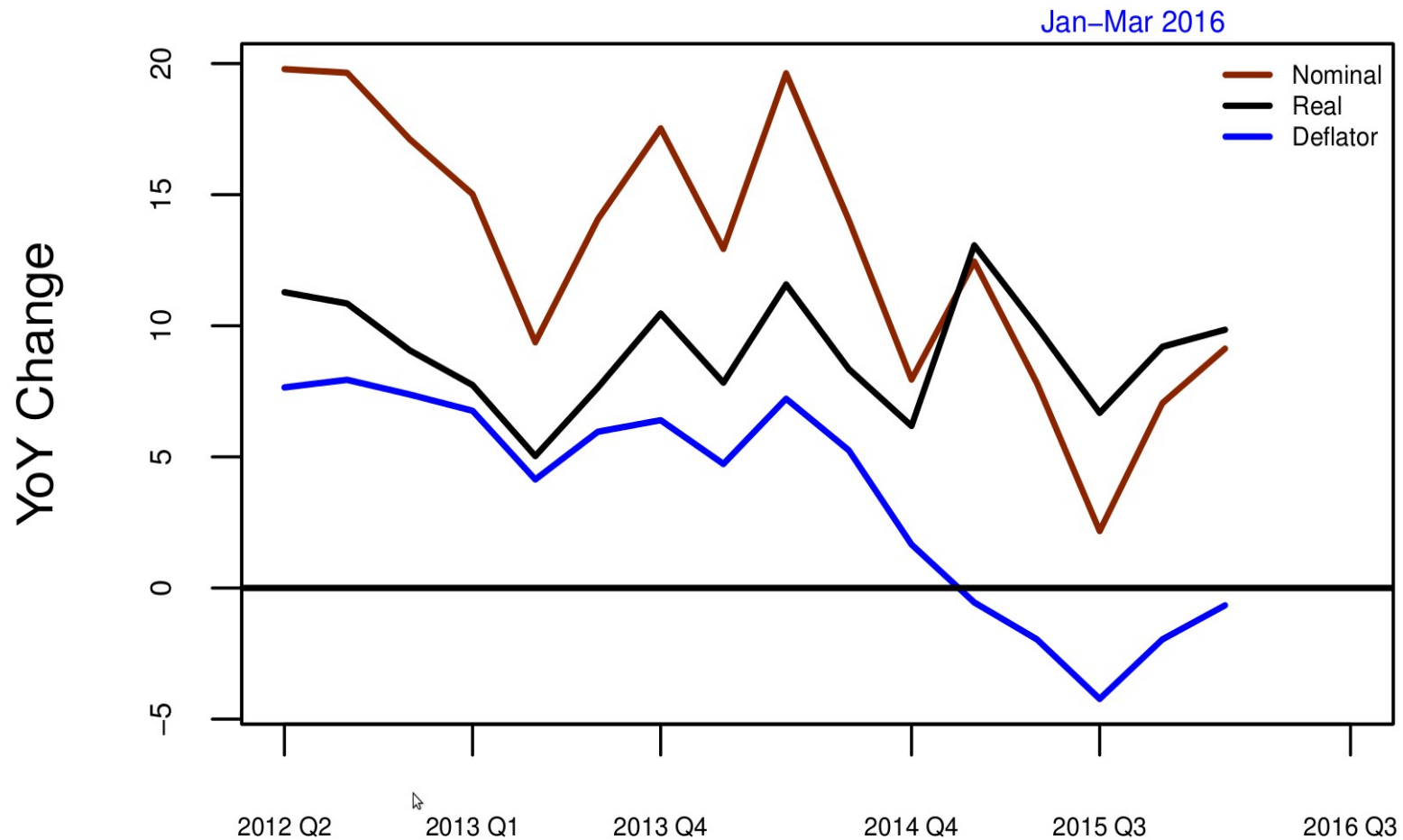
Current methodology

WPI- specific deflator	WPI- Aggregate	CPI- specific deflator	Volume extrapolation
<ul style="list-style-type: none"> Formal Manufacturing (Relevant WPI) Coal, lignite, crude & NG (Relevant WPI) 	<ul style="list-style-type: none"> Trade Hotels & Restaurants Storage Other Financial Corporations Insurance & Pension IT Services Professional, Scientific & Technical services Administrative & Support Service Real estate 	<ul style="list-style-type: none"> Water supply; & other utilities Construction Communication (CPI-Transport and communication) Ownership of Dwellings (CPI-Rural) Health & social work (CPI-Health) Education (CPI-Education) Membership organisations (CPI others) Arts, entertainment (CPI-Recreation) Personal services (CPI misc) Public Ad & defence (CPI-Combined) 	<ul style="list-style-type: none"> Agriculture and allied Electricity Gas Mining (minerals) Transport Monetary Financial Institutions Ownership of Dwellings (Urban areas) Informal Manufacturing

Trade deflators

WPI- specific deflator	WPI- Aggregate	CPI- specific deflator	Volume extrapolation
<ul style="list-style-type: none"> • Formal Manufacturing (Relevant WPI) • Coal, lignite, crude & NG (Relevant WPI) 	<ul style="list-style-type: none"> • Trade • Hotels & Restaurants • Storage • Other Financial Corporations • Insurance & Pension • IT Services • Professional, Scientific & Technical services • Administrative & Support Service • Real estate 	<ul style="list-style-type: none"> • Water supply; & other utilities • Construction • Communication (CPI-Transport and communication) • Ownership of Dwellings (CPI-Rural) • Health & social work (CPI-Health) • Education (CPI-Education) • Membership organisations (CPI others) • Arts, entertainment (CPI-Recreation) • Personal services (CPI misc) • Public Ad & defence (CPI-Combined) 	<ul style="list-style-type: none"> • Agriculture and allied • Electricity • Gas • Mining (minerals) • Transport • Monetary Financial Institutions • Ownership of Dwellings (Urban areas) • Informal Manufacturing

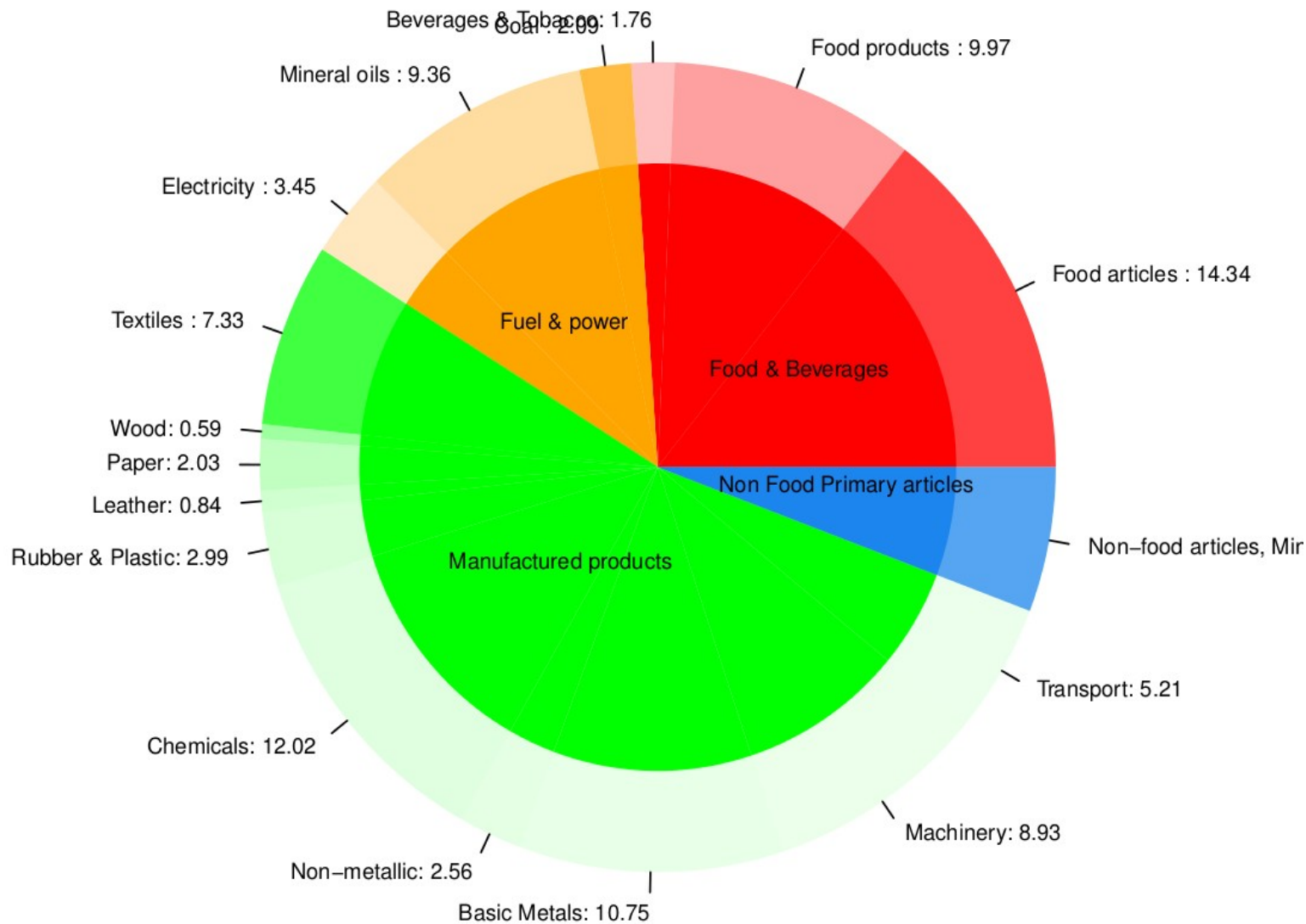
Trade deflator follows WPI



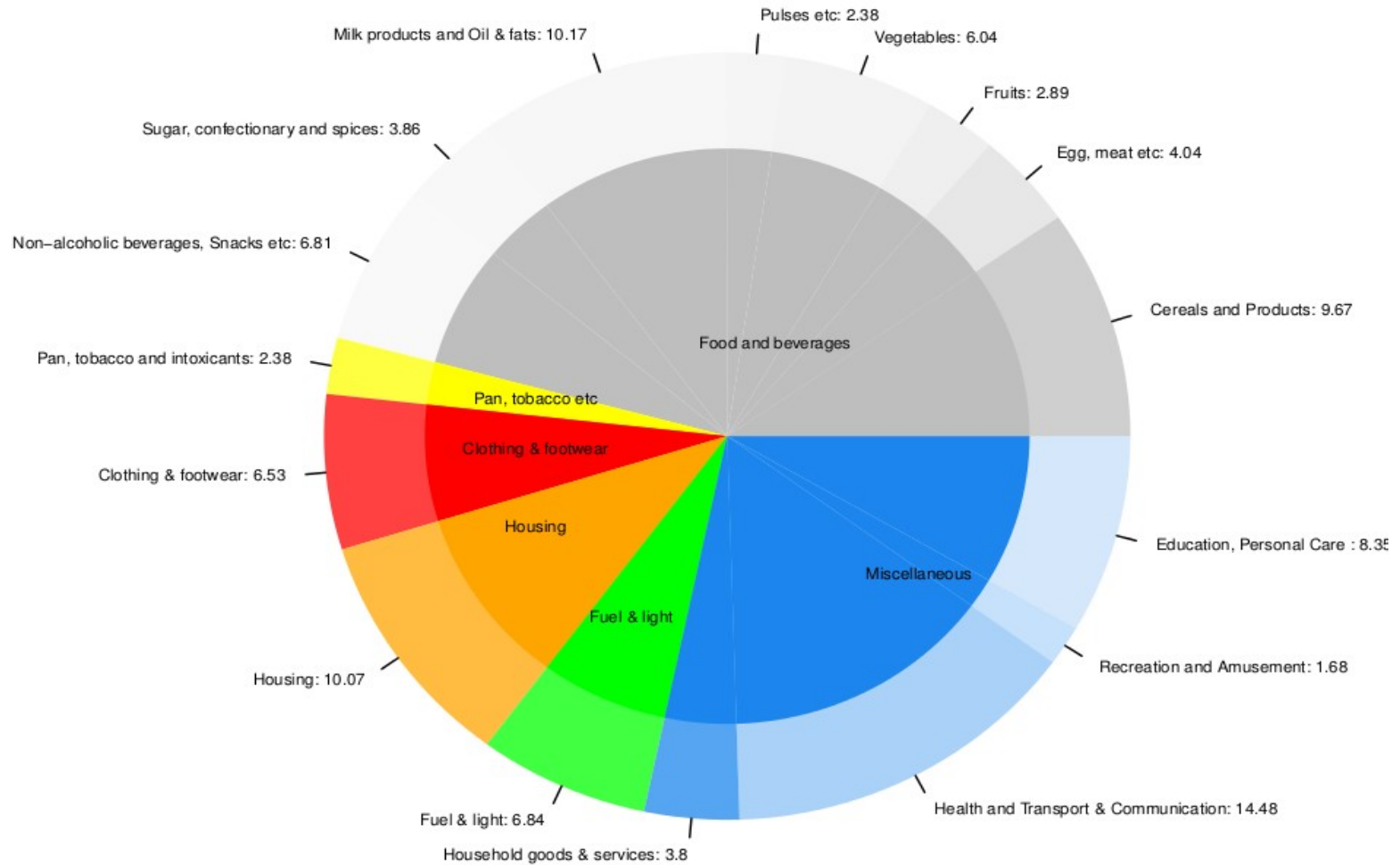
What's wrong with WPI?

- Biggest component of trade value added is wages
- Best proxy for wage costs is the cost of services
- But what is the weight of services in WPI?

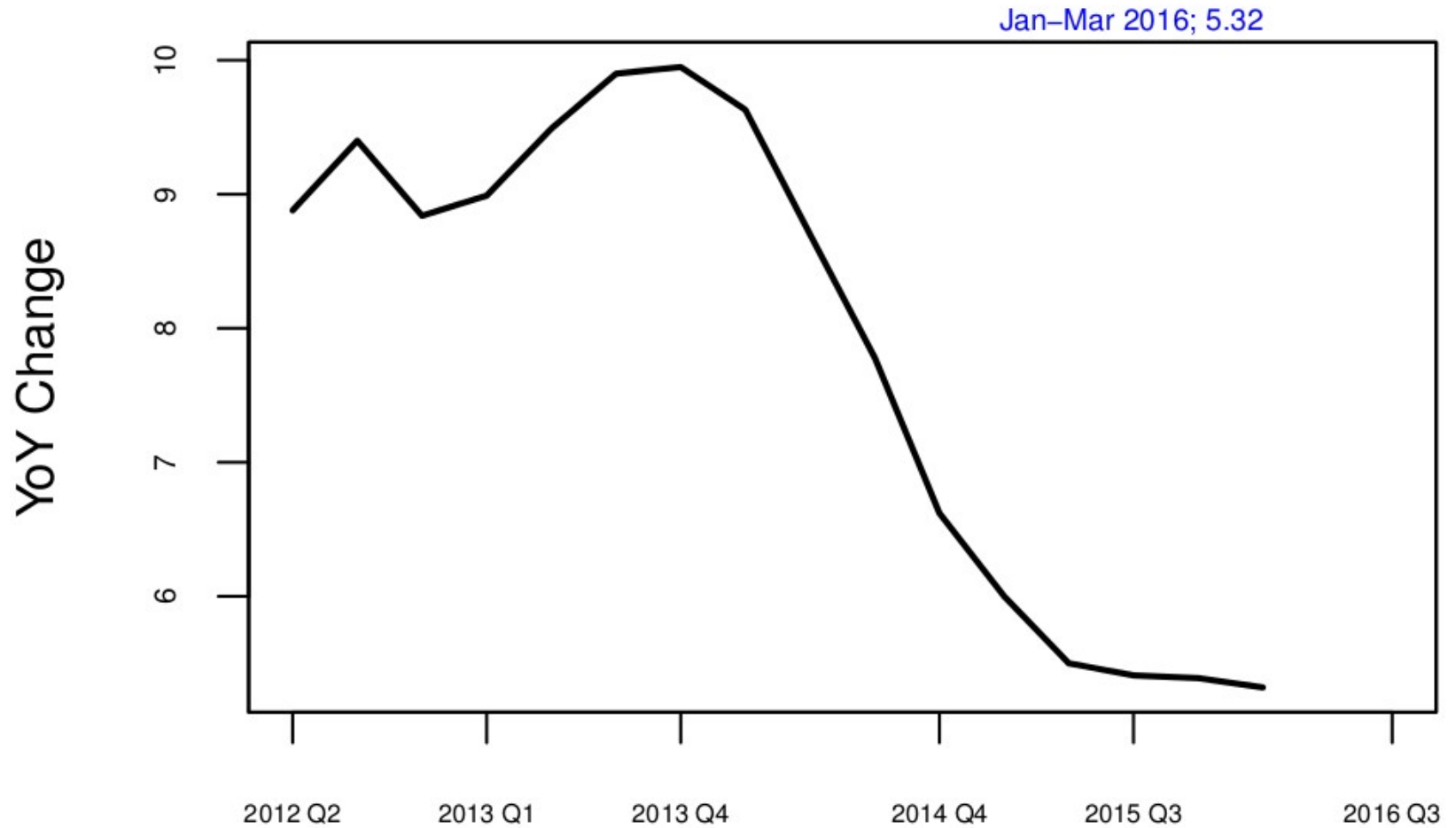
Weighting scheme for WPI



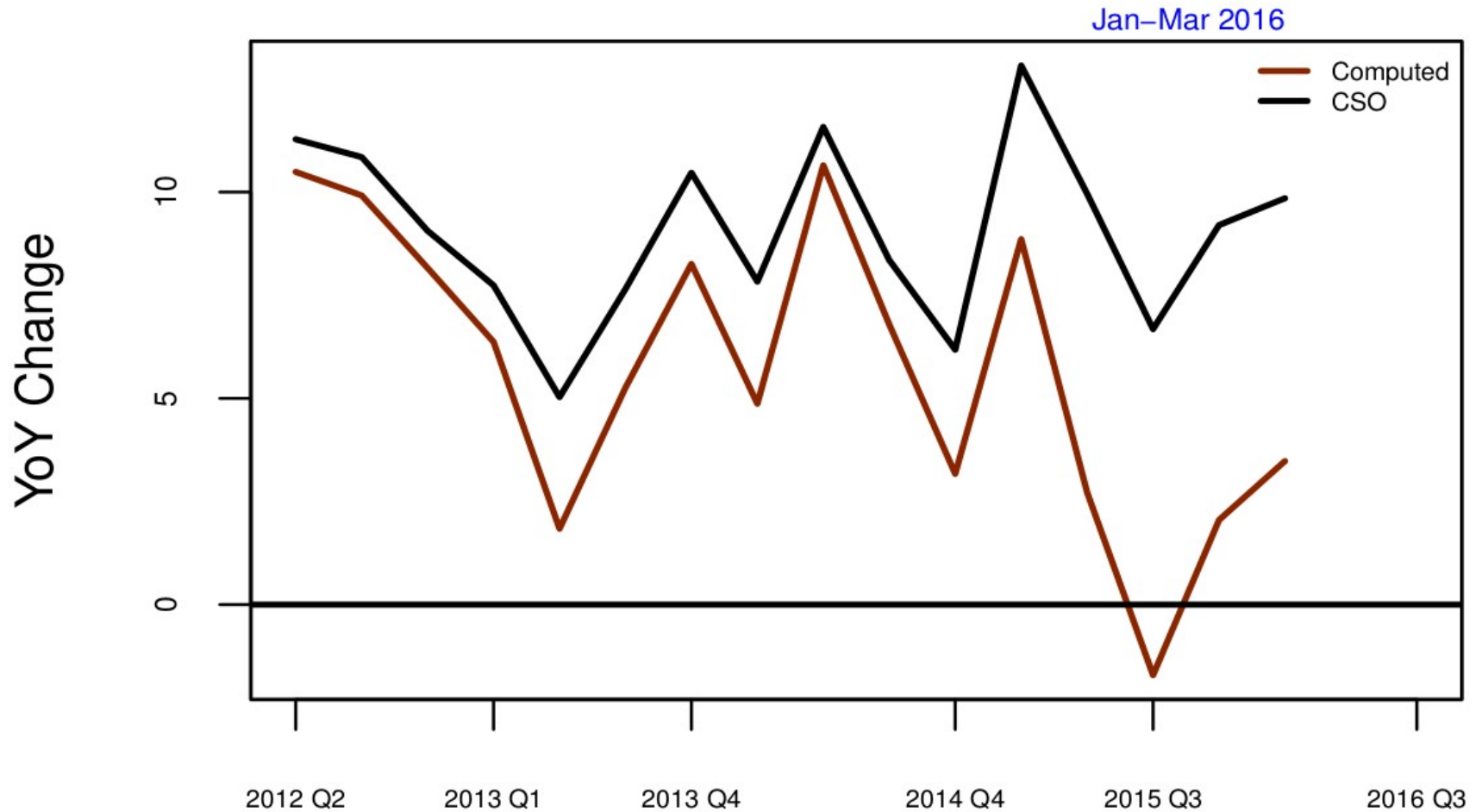
Weighting scheme for CPI



CPI services



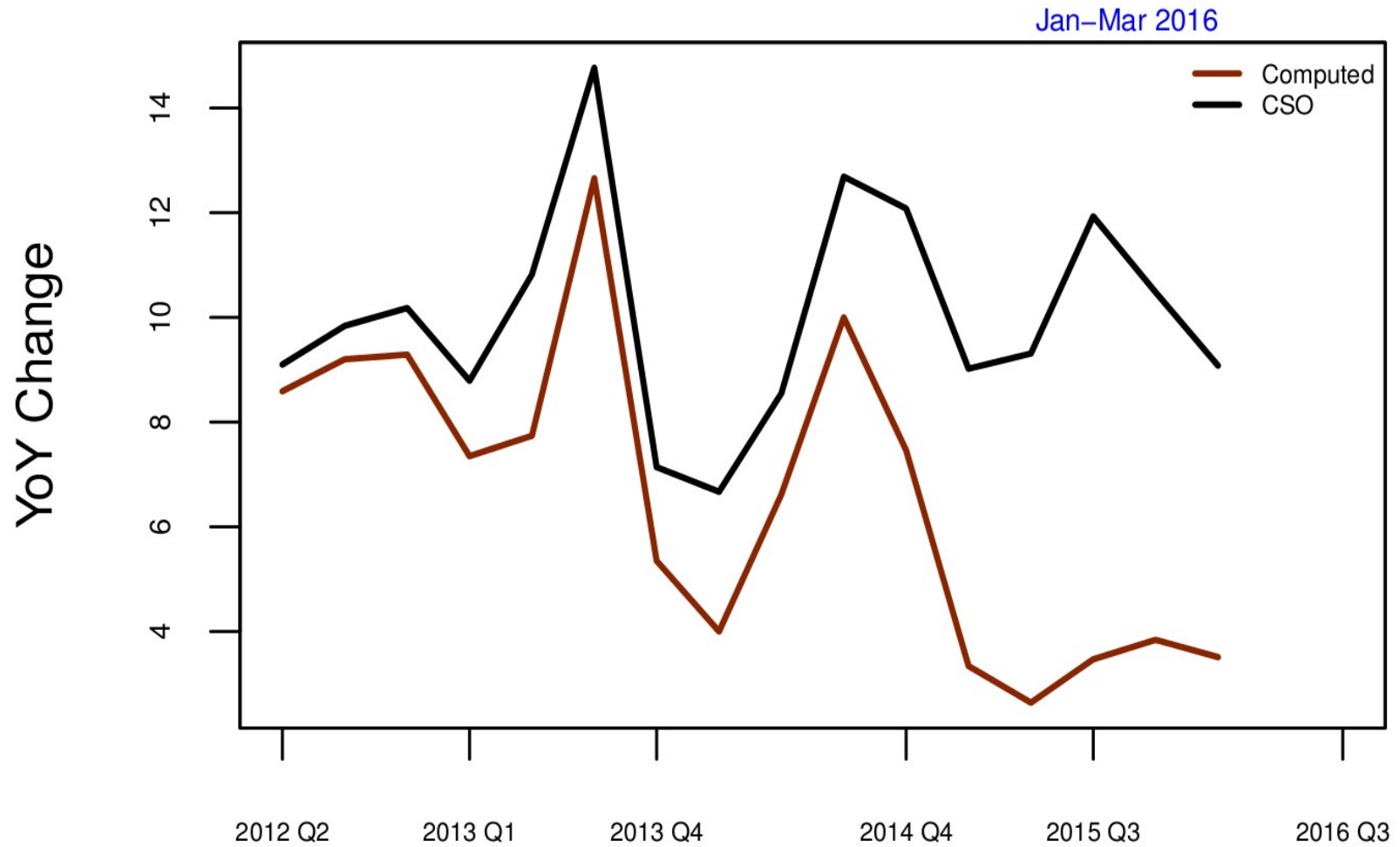
Trade GVA



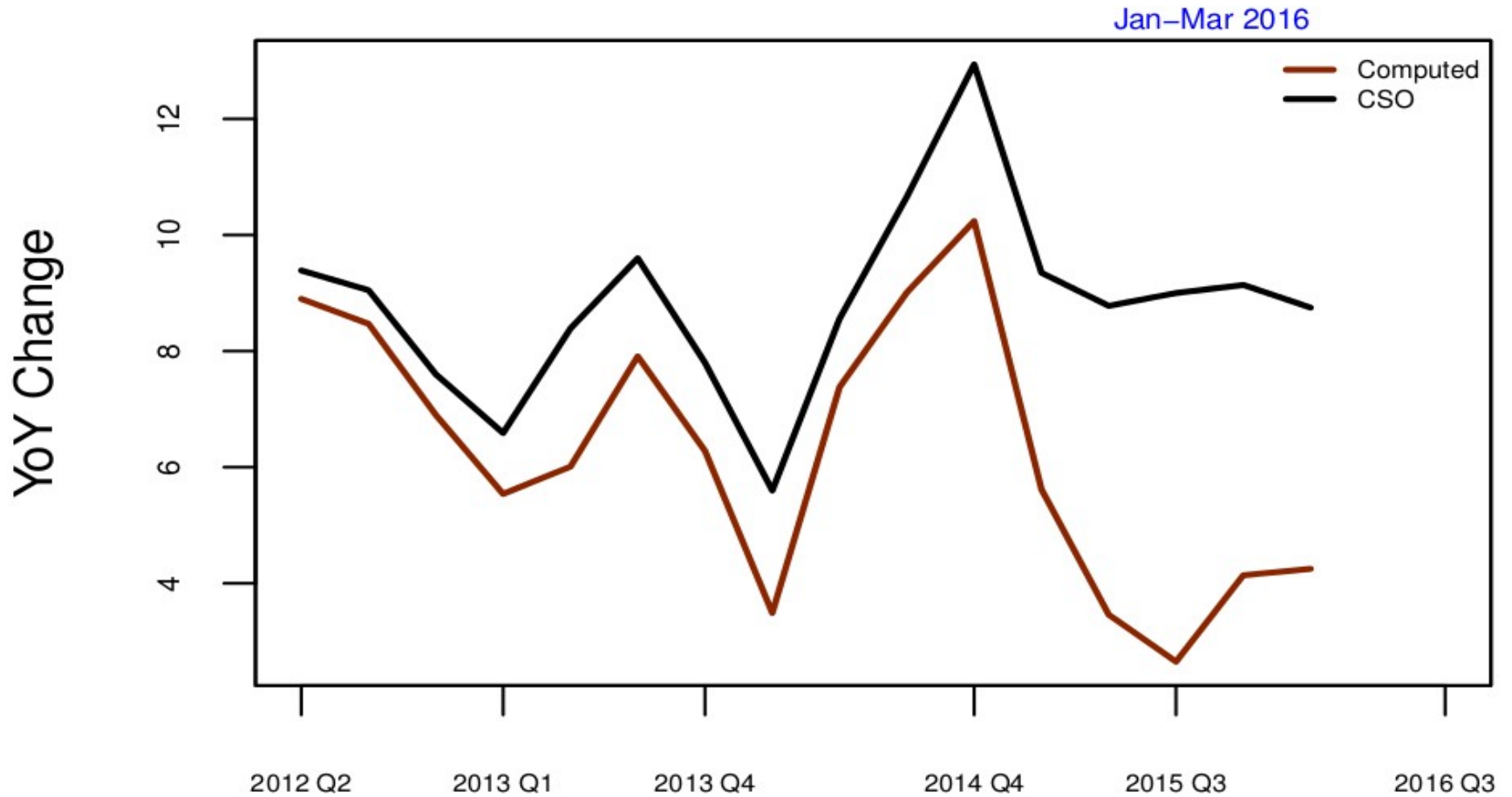
Finance deflators

WPI- specific deflator	WPI- Aggregate	CPI- specific deflator	Volume extrapolation
<ul style="list-style-type: none"> • Formal Manufacturing (Relevant WPI) • Coal, lignite, crude & NG (Relevant WPI) 	<ul style="list-style-type: none"> • Trade • Hotels & Restaurants • Storage • Other Financial Corporations • Insurance & Pension • IT Services • Professional, Scientific & Technical services • Administrative & Support Service • Real estate 	<ul style="list-style-type: none"> • Water supply; & other utilities • Construction • Communication (CPI-Transport and communication) • Ownership of Dwellings (CPI-Rural) • Health & social work (CPI-Health) • Education (CPI-Education) • Membership organisations (CPI others) • Arts, entertainment (CPI-Recreation) • Personal services (CPI misc) • Public Ad & defence 	<ul style="list-style-type: none"> • Agriculture and allied • Electricity • Gas • Mining (minerals) • Transport • Monetary Financial Institutions • Ownership of Dwellings (Urban areas) • Informal Manufacturing

Finance GVA



Overall service GVA



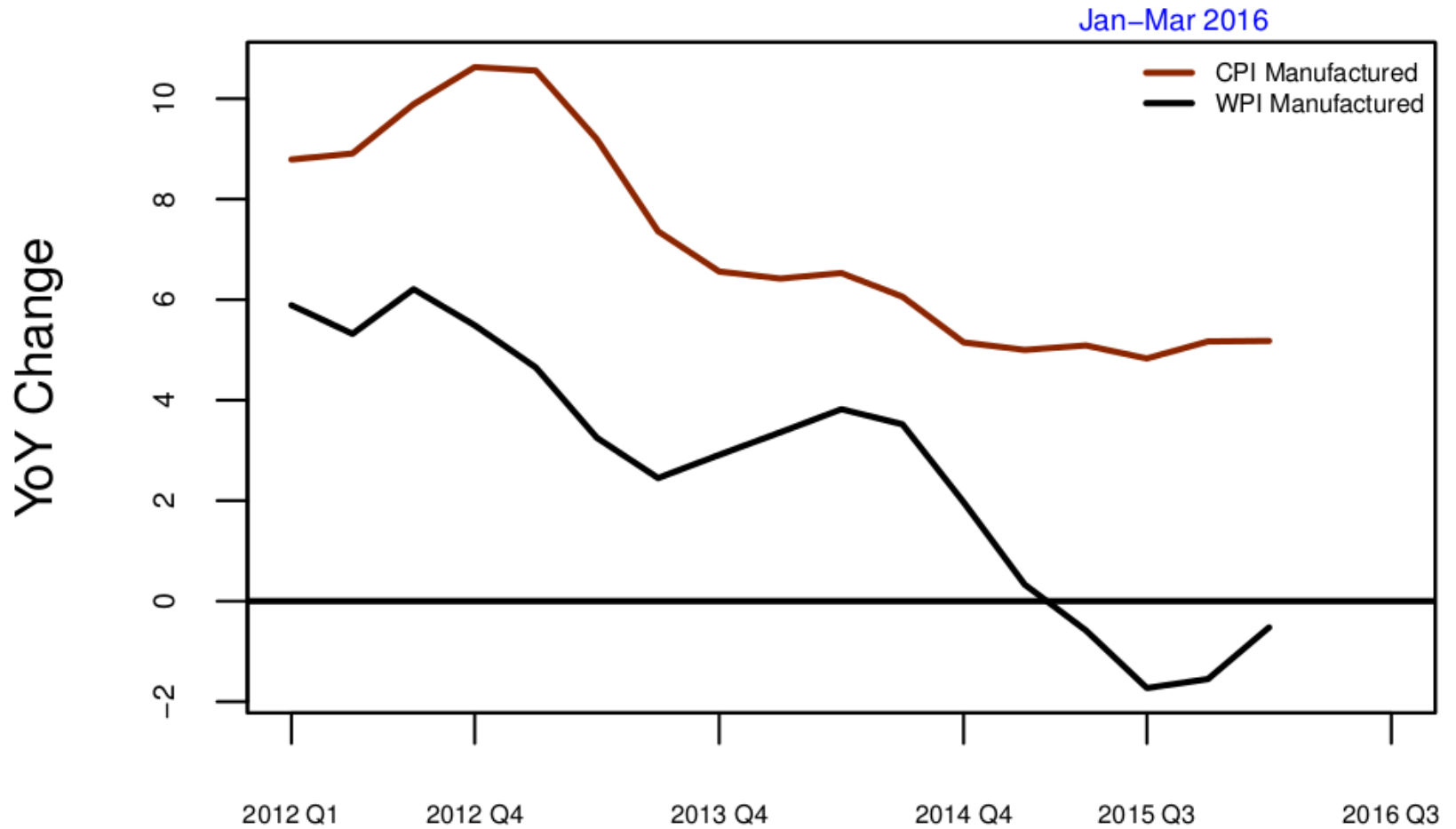
Manufacturing deflators

WPI- specific deflator	WPI- Aggregate	CPI- specific deflator	Volume extrapolation
<ul style="list-style-type: none"> • Formal Manufacturing (Relevant WPI) • Coal, lignite, crude & NG (Relevant WPI) 	<ul style="list-style-type: none"> • Trade • Hotels & Restaurants • Storage • Other Financial Corporations • Insurance & Pension • IT Services • Professional, Scientific & Technical services • Administrative & Support Service • Real estate 	<ul style="list-style-type: none"> • Water supply; & other utilities • Construction • Communication (CPI-Transport and communication) • Ownership of Dwellings (CPI-Rural) • Health & social work (CPI-Health) • Education (CPI-Education) • Membership organisations (CPI others) • Arts, entertainment (CPI-Recreation) • Personal services (CPI misc) • Public Ad & defence (CPI-Combined) 	<ul style="list-style-type: none"> • Agriculture and allied • Electricity • Gas • Mining (minerals) • Transport • Monetary Financial Institutions • Ownership of Dwellings (Urban areas) • Informal Manufacturing

WPI as manufacturing deflator

- Ideal deflator is PPI
- But India doesn't have a PPI
- Closest index is WPI
- So, why not use it as deflator?
- (Ignore double deflation issue, covered earlier)

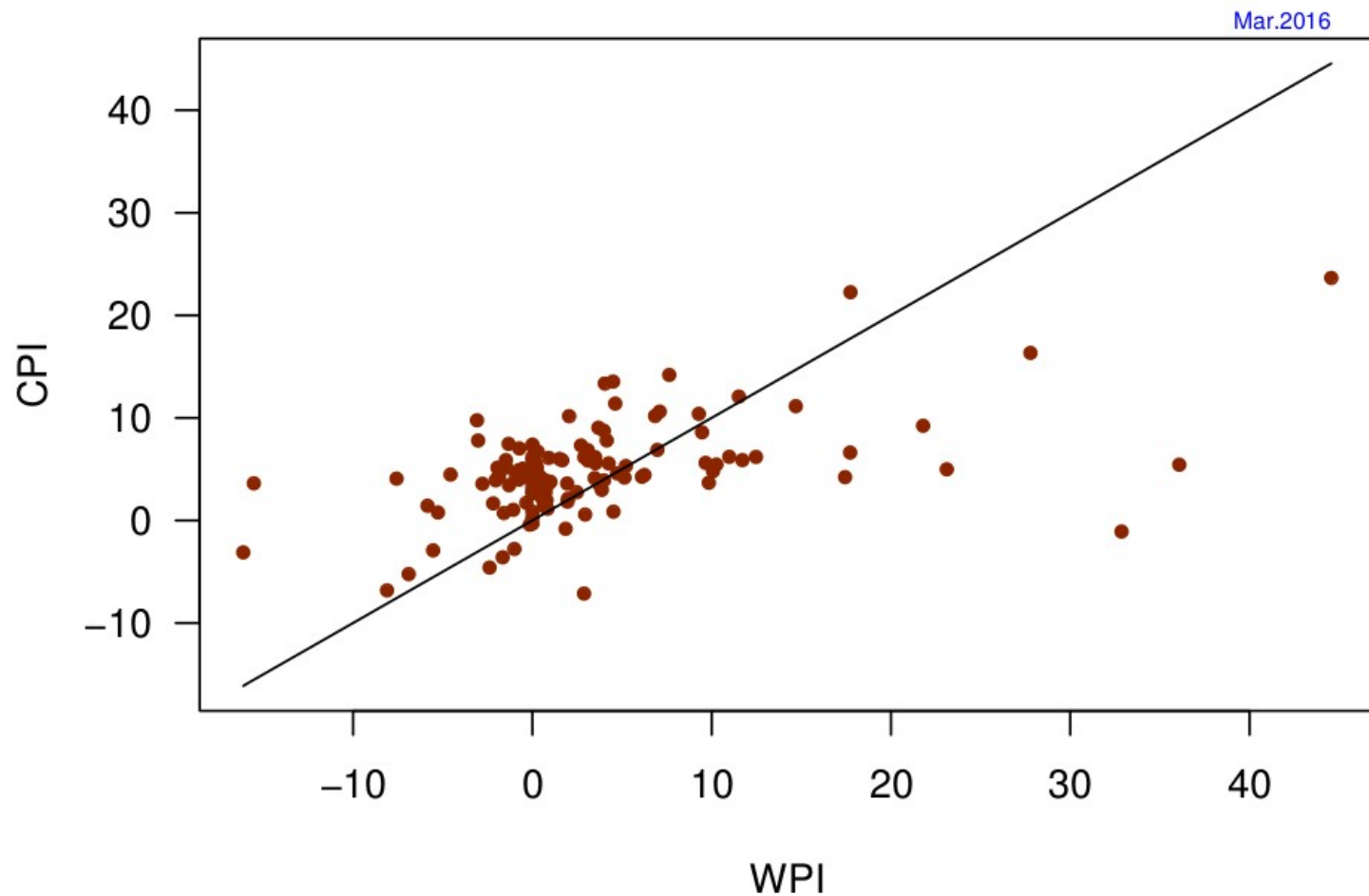
Choice matters



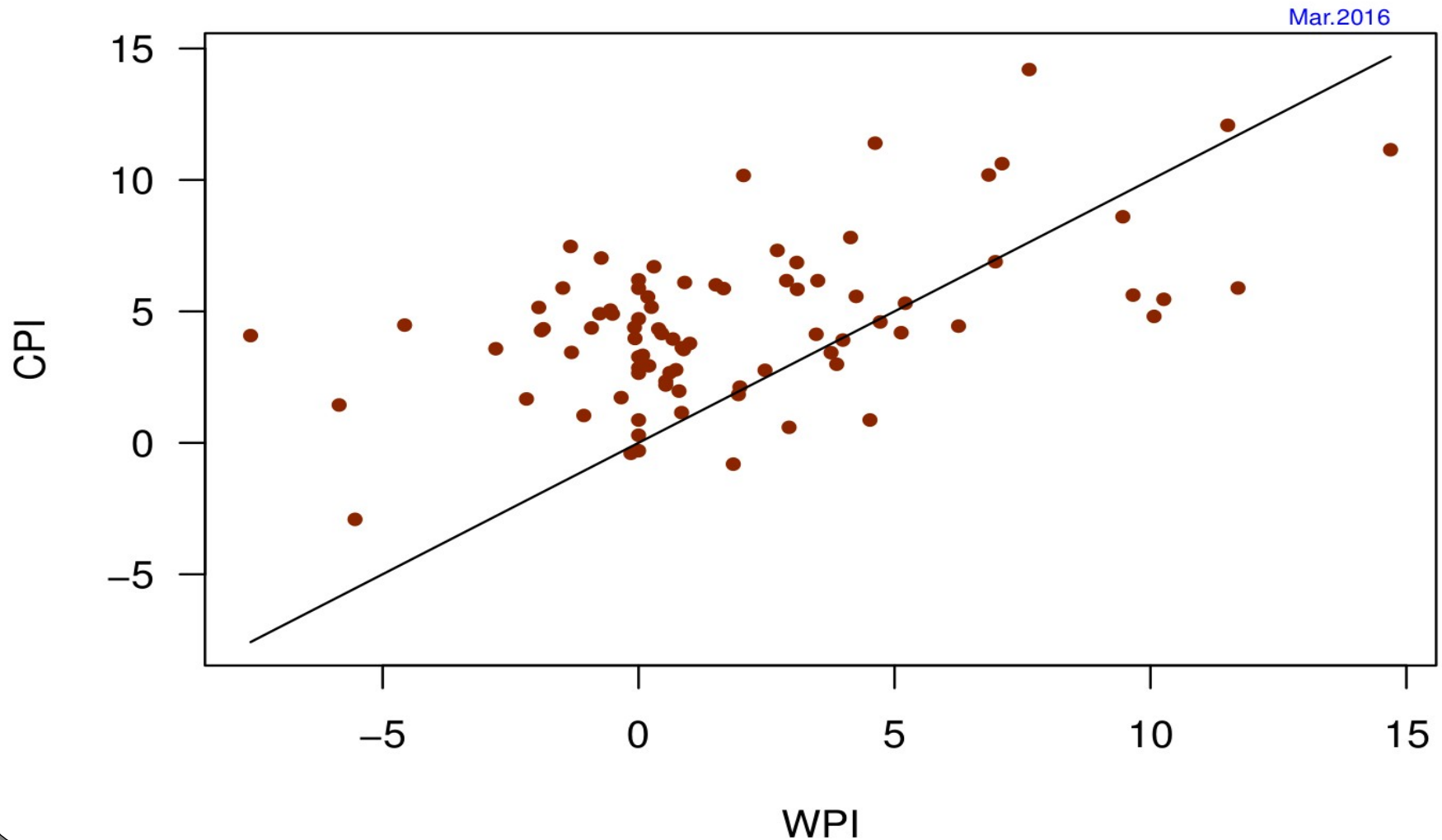
Common goods in WPI and CPI

Category	Count
Food	41
Fuel & Light	7
Manufactured	81
Total	129

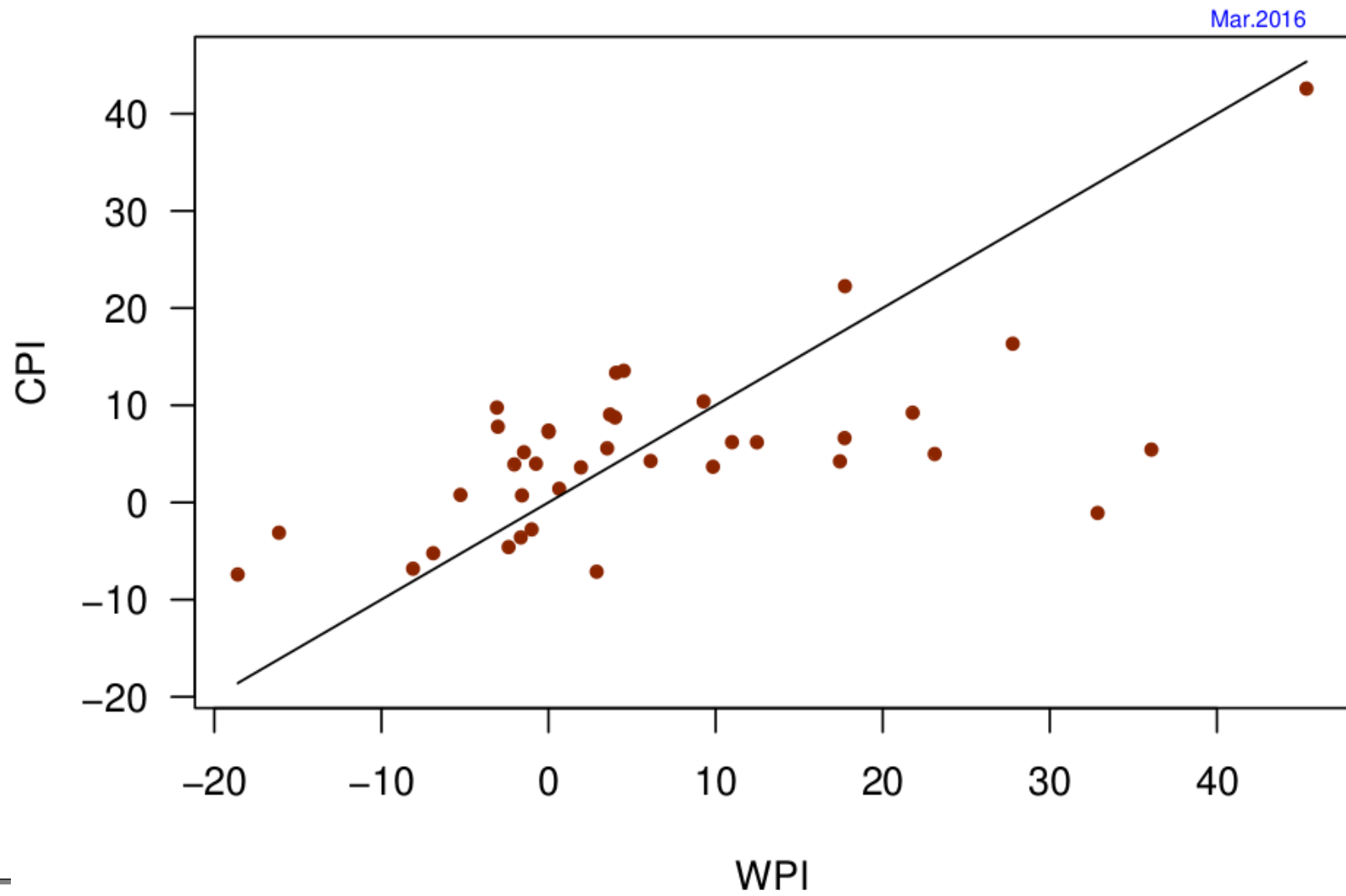
All common goods: March 2016



Manufactured goods: March 2016

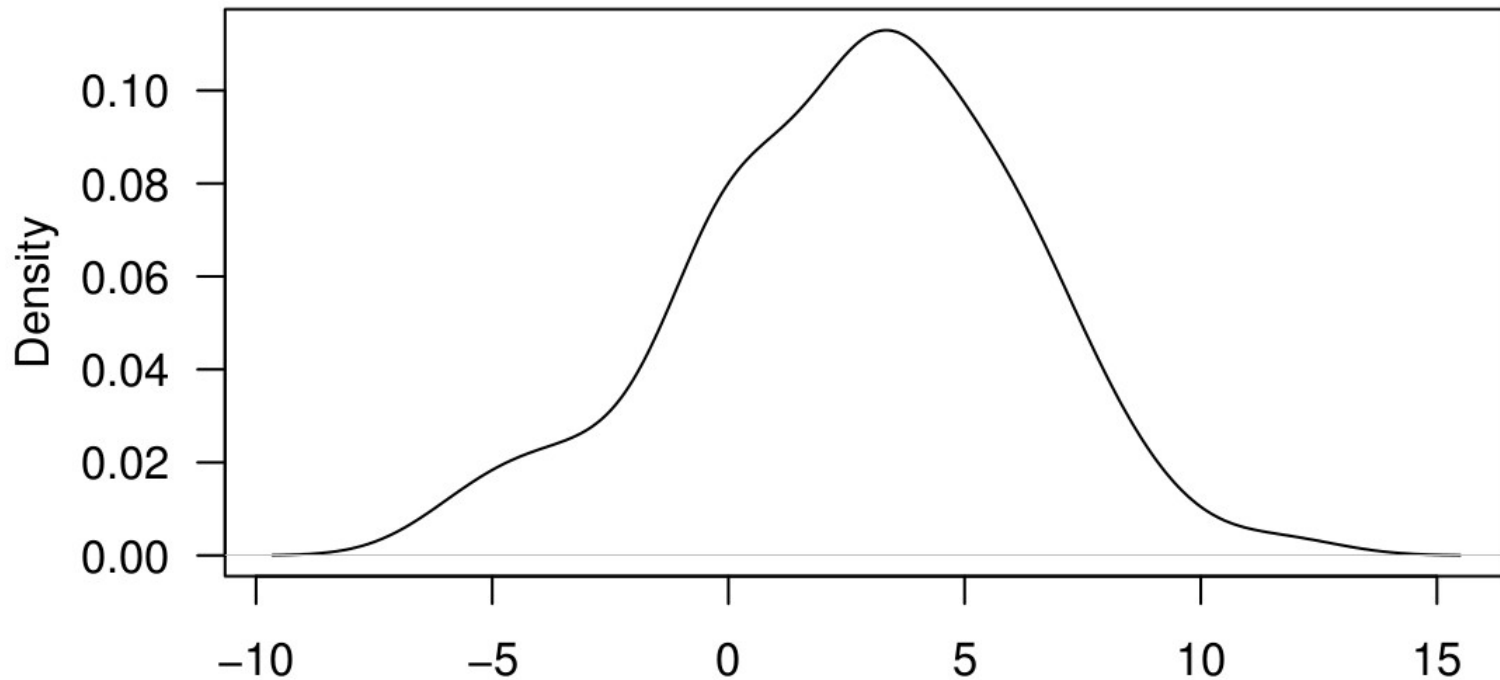


Nonmanufactured goods: March 2016



Density function: CPI less WPI

Mar 2016



N = 85 Bandwidth = 1.277

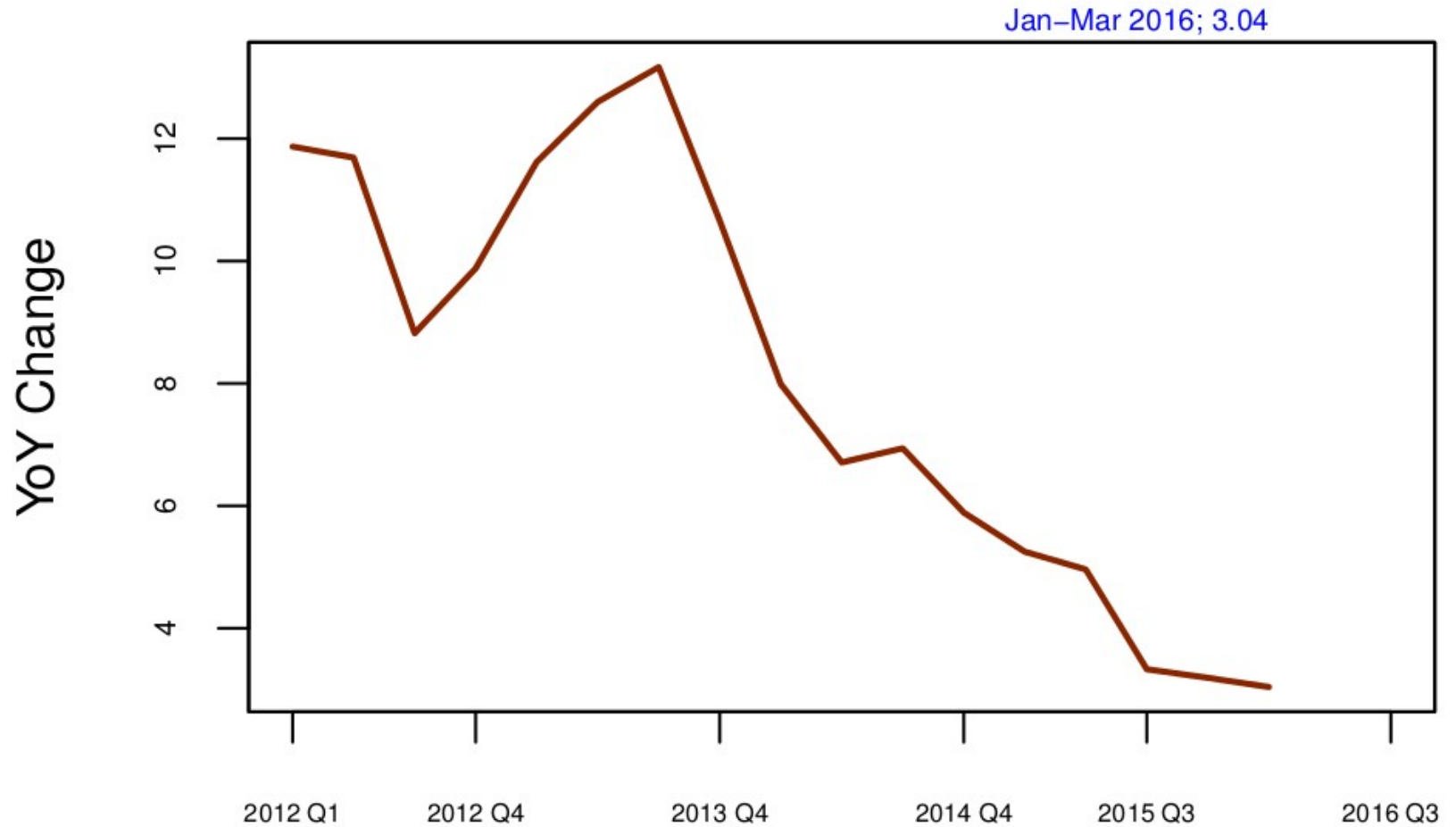
Significance tests

Period	Ttest
Mar 2015	2.43348161739968e-06
Jun 2015	3.30988922881671e-05
Sep 2015	1.33780754904523e-05
Dec 2015	1.22722345118563e-06
Mar 2016	1.19799781888371e-06

Explaining the difference

- Tax increases?
 - None during period
- Margin increases?
 - Main source would be transport costs
- Sampling differences?
 - Possible

CPI transport inflation



Explaining the difference

- Tax increases?
 - None during period
- Margin increases?
 - Fluctuations due to transport costs
- Sampling differences?
 - Possible

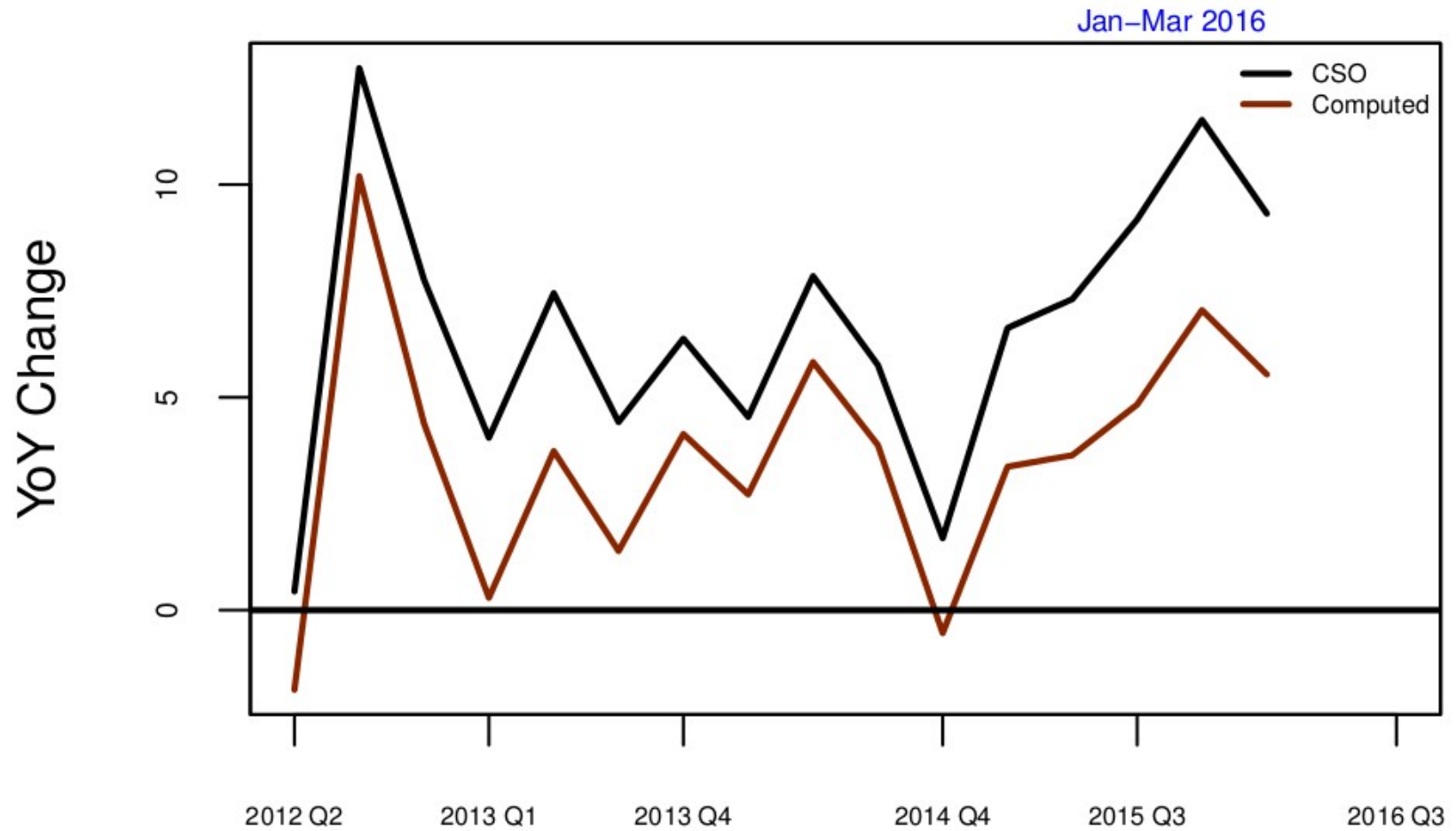
Sample set: CPI not WPI

Items
Camera and photographic equipment
CD; DVD; audio/video cassette; etc.
Coat; jacket; sweater; windcheater (no.)
Electric bulb; tubelight
Electric iron; heater; toaster; oven and other electric heating appliances
Mobile handset
Plugs; switches and other electrical fittings
Radio; tape recorder; 2-in-1
Rubber/PVC footwear
Shaving blades; shaving stick; razor
Spectacles
Sports goods; toys; etc.
Stainless steel utensils
Stove; gas burner
Suitcase; trunk; box; handbag and other travel goods
Washing soap/soda/powder
Water purifier

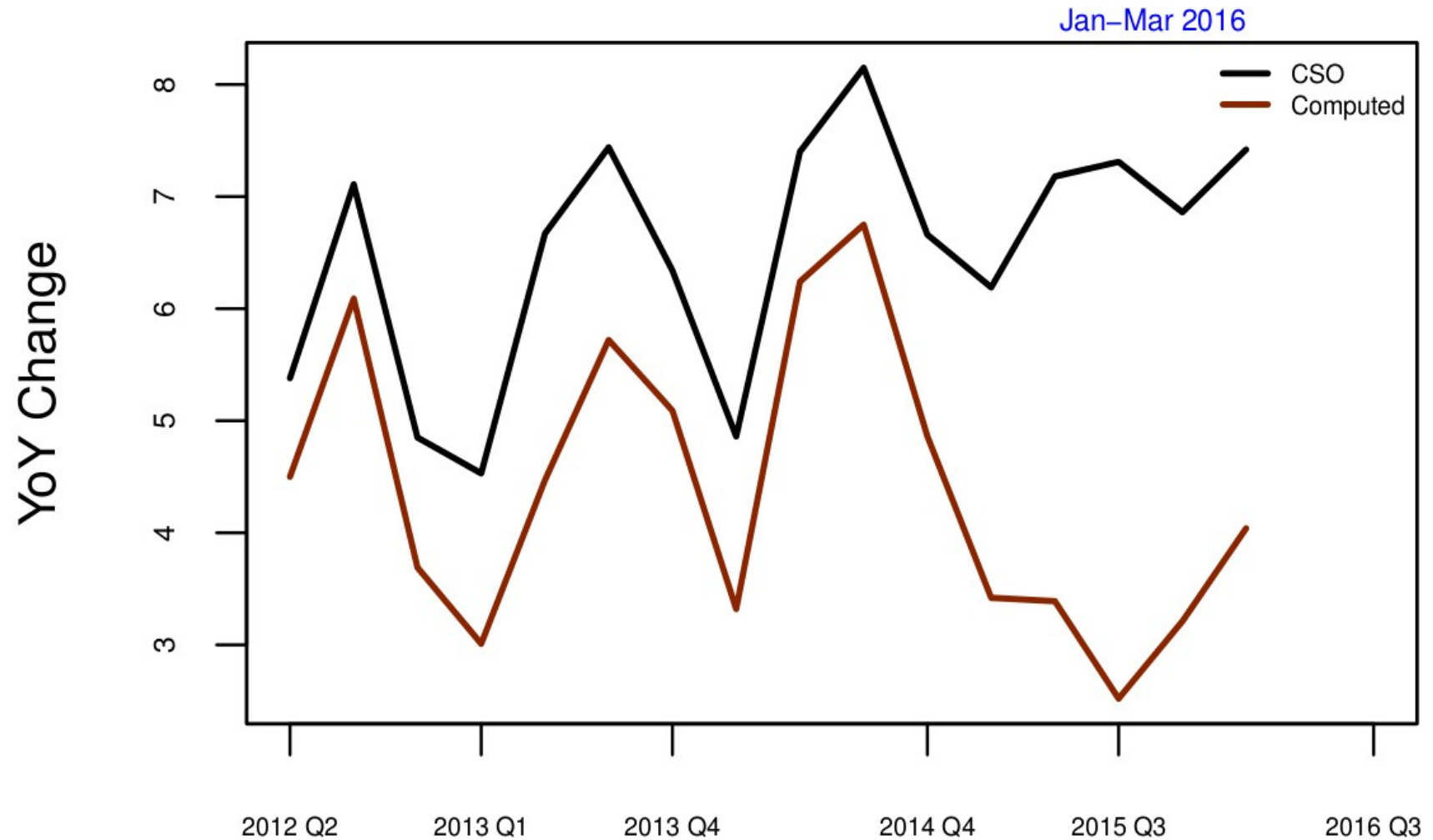
Hypothesis

- CPI is a more modern index
- Items
- Weights
 - CPI, 2012
 - WPI, 2004/05
- Sampling scheme
 - CPI, 2012
 - WPI, much older
- Scheme could affect
 - Precise goods in each category
 - Quality of goods
- Perhaps: for a given item, CPI might better reflect the actual pattern of production

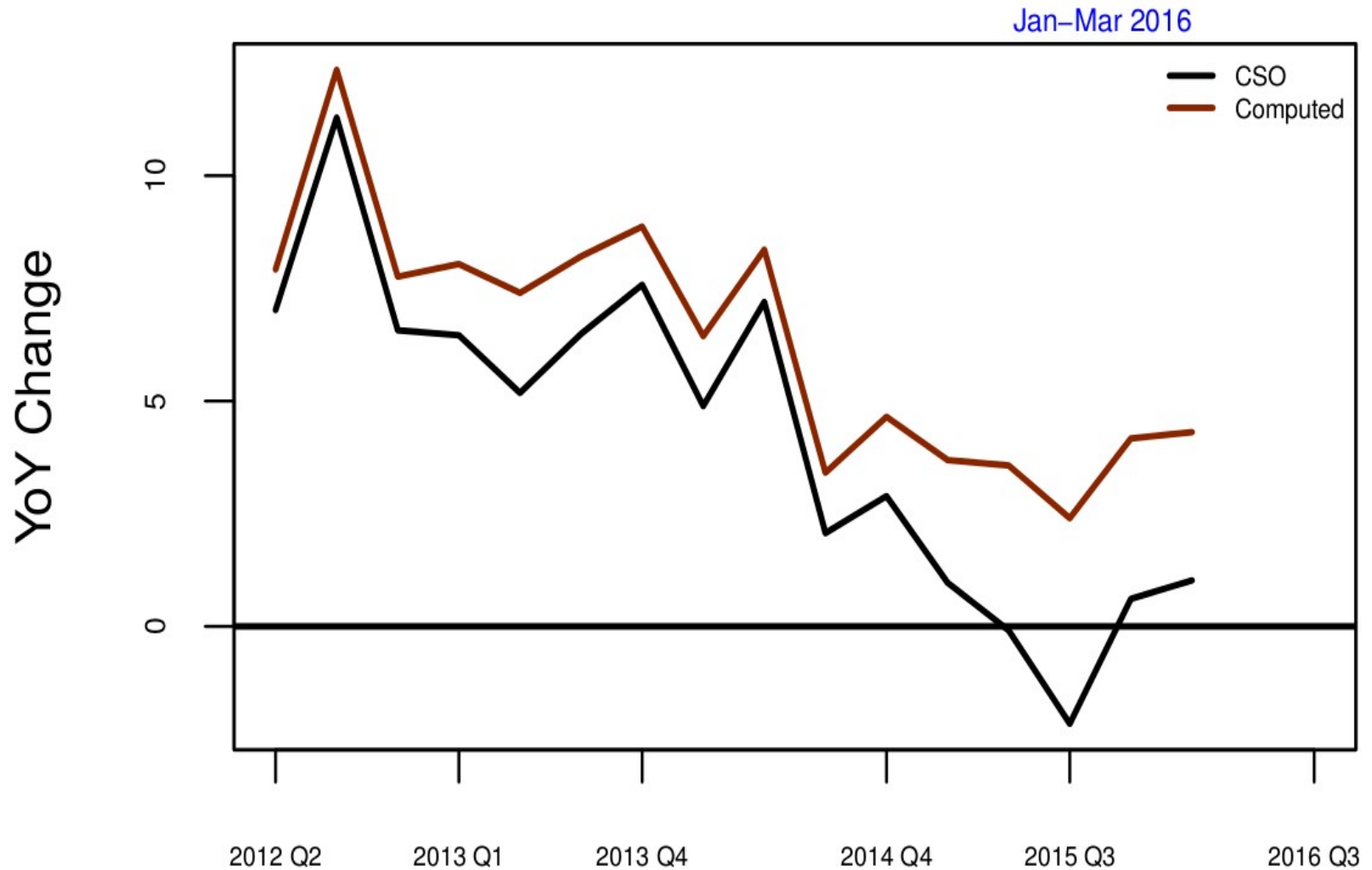
Manufacturing GVA



Overall GVA, again



GVA deflators, again



Overall GVA

Category	2013-14	2014-15	2015-16	2016 Q1
Manufacturing	1.51	1.85	2.85	3.27
Trade, hotels, Transport, storage and communication	5.42	6.48	3.53	3.48
Financial services, real estate and business services	7.33	7.70	4.51	3.51
Overall GVA	4.47	7.86	5.47	4.04

Conclusion

- Conventional wisdom
 - bias in GDP will go away as WPI normalises
 - in meantime use indicators
- Reality
 - bias may diminish, but may not go away
 - indicators are dangerous
- Conclusion
 - need to refine GDP numbers