



Credit-Weighted Inflation: Measuring Debt-Deflation Cycles

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January 2015

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Outline (1)

- Measuring debt-deflation pressures
 - Headline CPI is the right answer to the wrong question
 - Core CPI: getting closer, but still not there
 - GDP deflator: not practically useful in real time
- A new measure: credit-weighted inflation (CWI)
 - Does not capture more “true” inflation, but more “relevant” inflation for the study of debt-deflation
 - Matches sectoral debt-levels to deflation pressures

Outline (2)

- An application to the case of Ireland
 - Linking credit and inflation data
 - Key point 1: CWI debt-deflation pressures lasted much longer than seen by CPI
 - Key point 2: but current CPI deflationary pressures are *not* debt-deflationary according to CWI
- An application to the case of Greece
 - Qualitatively similar to core CPI, but quantitatively much deeper debt-deflation pressures for CWI

MEASURING DEBT-DEFLATION PRESSURES

Recap: debt-deflation cycle

- Deflation raises real value of debts and causes inability of **borrowers** to repay **creditors**
- Cycle: driven by fall in aggregate demand, and leading to further fall in aggregate demand
- Example: Great Depression. Propagation through banking sector
- Often concentrated in SME / credit constrained sectors

CPI: right answer, wrong question

- Well-known but often forgotten: **there is no “true” measure of price changes**
 - Every measure is the answer to a specific question
- CPI is our best answer to the question how the average consumer experiences price changes
- Very different concept than “price changes that can lead to a debt-deflation cycle”
- Nonetheless, CPI commonly used as basis for discussing debt-deflation risk

CPI leads astray: falling oil prices

- Often heard: “falling oil prices may worsen Eurozone deflationary pressures”
- Lower headline CPI. But ambiguous link to repayment ability of borrowers using oil as input (lower costs vs. 2nd round effect output price). **This is not “debt-deflation relevant deflation”.**

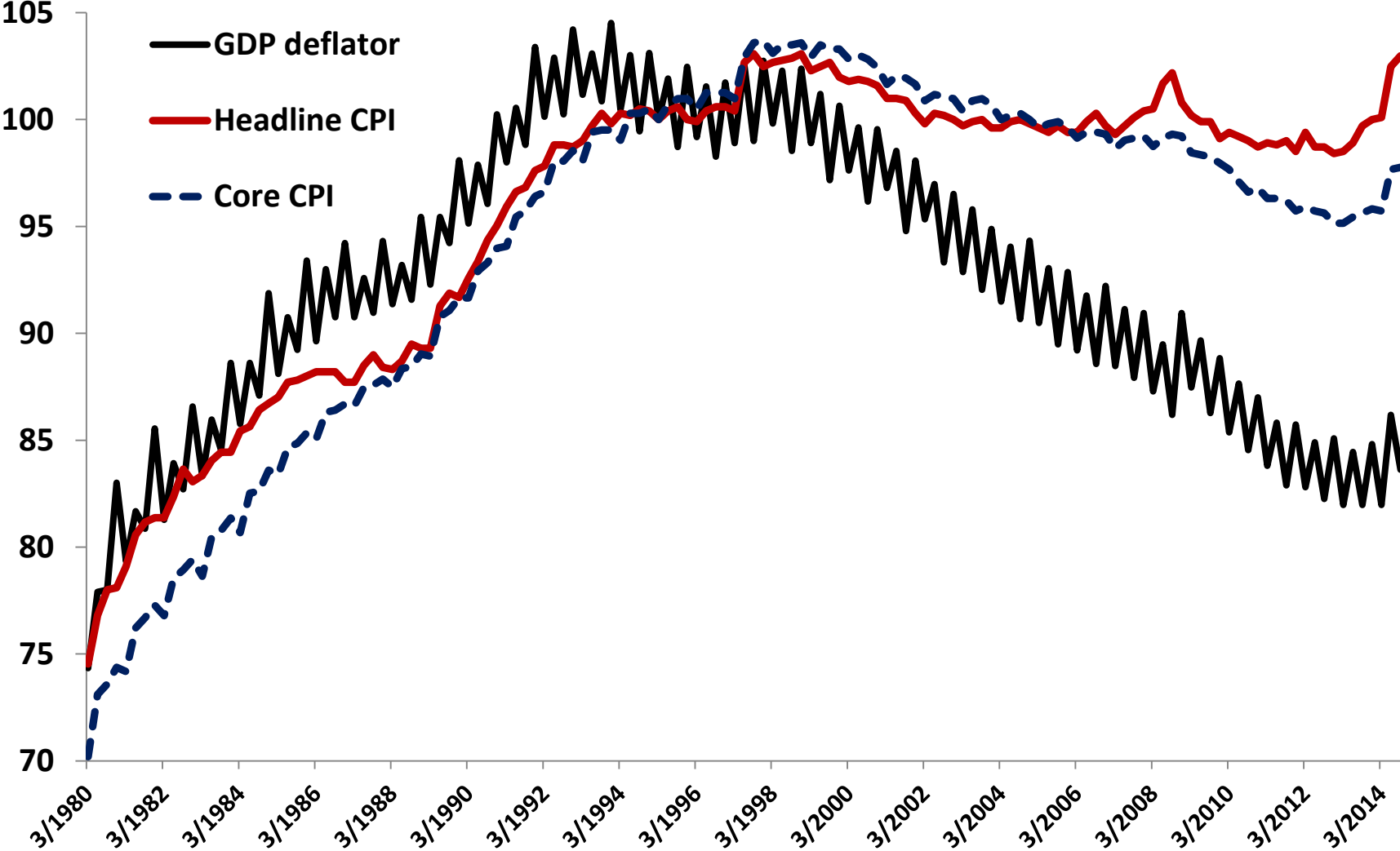
Core CPI: not there yet

- Oil price example triggers idea that core CPI is a better measure of debt-deflation pressures
- But core CPI is the answer to yet another question: what part of CPI is relatively stable?
- Of use for monetary policy, but still very different concept than debt-deflation risk
- Core “happens” to exclude oil. That does not make it capture **borrowers’ price pressures**

Why core CPI is peripheral here

- It includes imported inflation (other than oil and food) which has no direct link to the risk of debt deflation
- It excludes inflation of exported goods, which can link to firms' repayment ability.
- More fundamentally: it weighs sectors by their importance in the **consumer basket** rather than by their **relative indebtedness**

GDP deflator: the Japanese example



But GDP deflator of little practical use

- Better than core CPI in that it captures the price of **domestic production**: nearer to concept of debt deflation risk
- But: very volatile quarterly pattern + frequent large revisions. Problematic in real time policy making
- And: still does not capture relative indebtedness of sectors

A NEW MEASURE: CREDIT- WEIGHTED INFLATION (CWI)

A simple idea

- Debt deflation cycles connect: **indebtedness and price changes**
- Properly measuring debt deflation pressures in an economy requires connecting these two
- Take **sectoral credit breakdown** and use this as the weighting basket.
- Multiply each sector's weight by the inflation rate within that sector

What CWI captures

- CWI is not “better” than CPI at measuring deflation. It is just better at measuring **relevant deflation** from macro risk perspective
- Not every deflation episode needs to be problematic. Only when deflation hits indebted sectors do sparks fly
- CWI measures the extent to which deflation hits sectors that have borrowed much

Caveat: there is not one *type* of debt deflation cycle

- Debt deflation centers around how price decreases affect the repayment ability of borrowers
- Many **classes of borrowers**: firms, households, banks, governments
- Actually, each of these requires its own analytical tools and measures

Here focus on firms and banks as borrowers and creditors

- For other borrowers, different tools apply
- **Governments:** debt sustainability analysis includes inflation rate as key variable
- **Households:** wages, unemployment, house prices, borrower quality as determinants
- Within **financial sector:** stress testing should take deflation risk into account

Caveat: not all firm debt is bank credit

- National statistics on allocation of bank loans
- But other debt instruments, such as corporate bonds, not covered
- However:
 1. Less applicable to EU than US. EU is bank centric: only largest firms access other financing
 2. Credit constrained, bank-dependent SMEs - not large firms - key propagators of debt deflation cycle

AN APPLICATION TO THE CASE OF IRELAND

From CB Ireland, **credit outstanding** data by sector:

1. Primary industries
2. Manufacturing
3. Electricity and gas
4. Water supply
5. Construction
6. Wholesale and retail trade
7. Transportation and storage
8. Hotels and restaurants
9. Information and communication
10. Financial intermediation
11. Real estate and land
12. Business and administrative services
13. Other social and personal services
14. Education
15. Human health and social work

Exclusions from CWI analysis

- Intra financial sector lending & real estate lending: different types of risks that require their own tools
- Agriculture: disjoint from developments in rest of real economy. Enormously volatile, uncorrelated agricultural output prices
- So actually CWI presented here focuses on: **debt-deflation dynamics in the manufacturing and services sectors**

Credit weights of included sectors

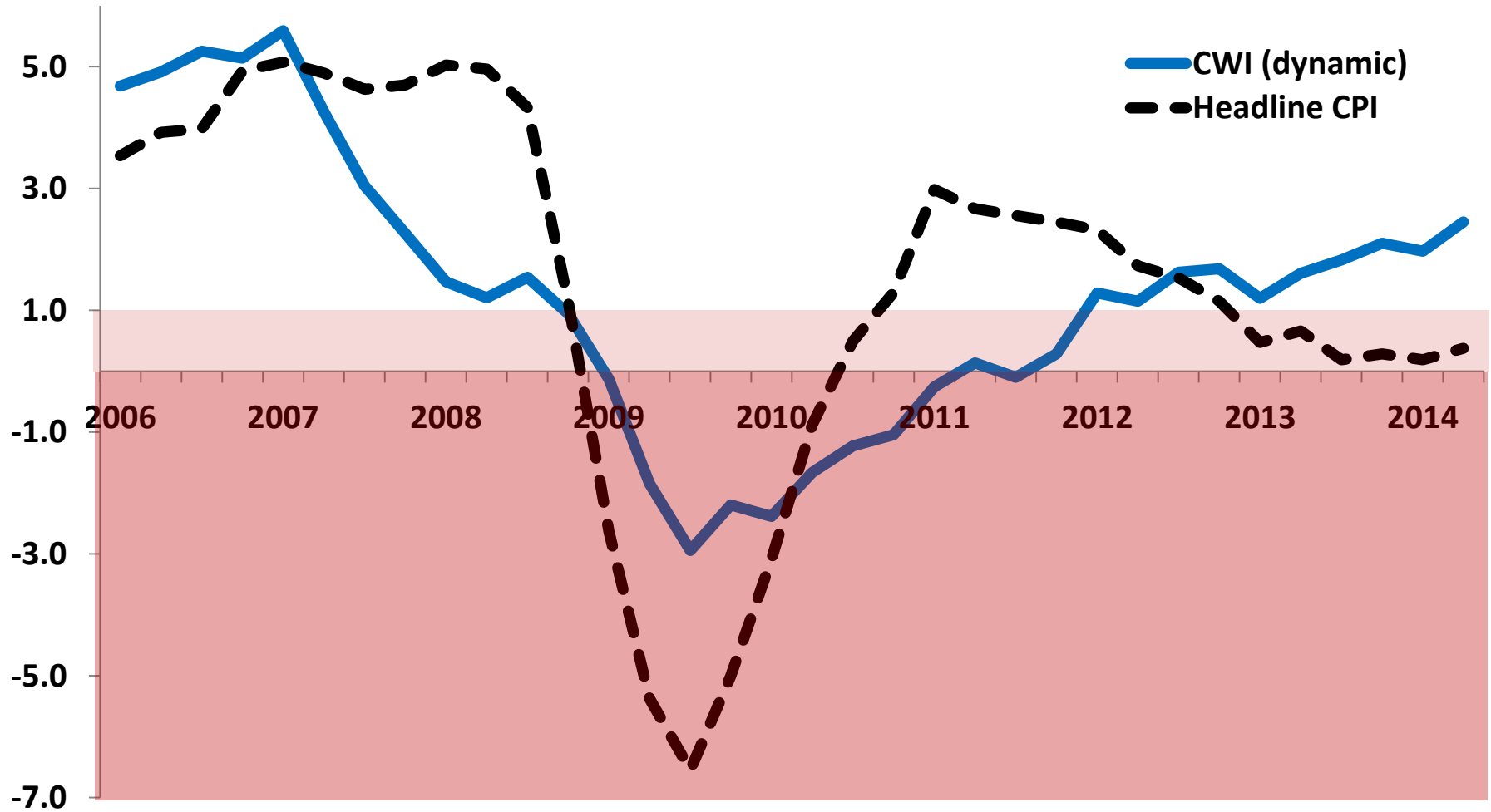
Sectors	% weights	
	Sep-08	Jun-14
2. Manufacturing	14	15
3. Electricity, Gas, Steam and Air Conditioning Supply	2	3
4. Water Supply, Sewerage	0	0
5. Construction	15	6
6. Wholesale/Retail Trade & Repairs	23	24
7. Transportation and Storage	5	4
8. Hotels and Restaurants	19	19
9. Information and Communication	1	1
12. Business and Administrative Services	11	13
13. Other Community, Social and Personal Services	5	6
14. Education	1	2
15. Human Health and Social Work	4	6

Which inflation rates?

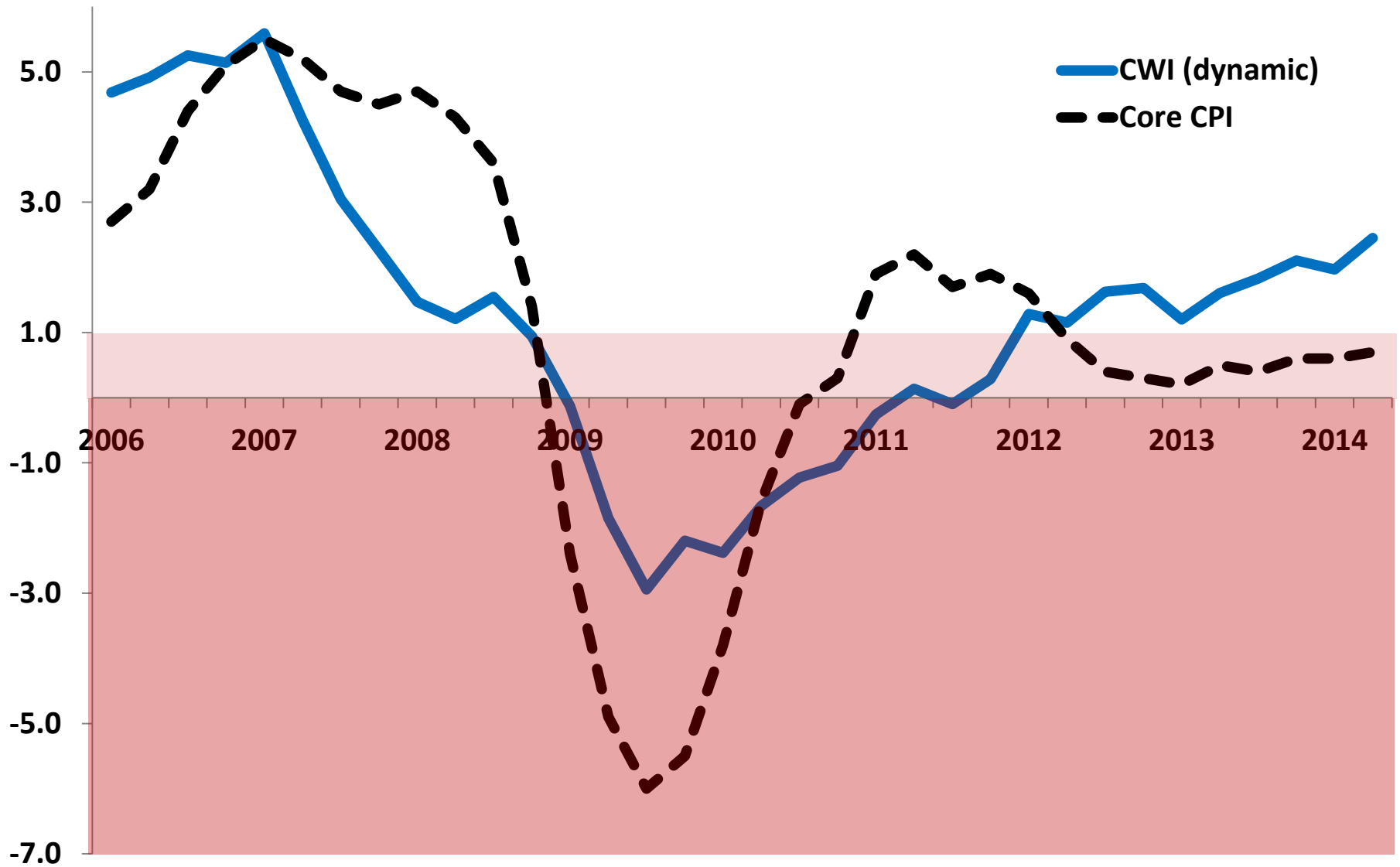
Business Activity	Relevant Inflation Rate
2. Manufacturing	PPI Manufacturing (%yoy)
3. Electricity, Gas, Steam and Air Conditioning Supply	Inflation rate on utilities (%yoy)
4. Water Supply, Sewerage	Inflation rate on services excluding mortgage interest (%yoy)
5. Construction	Residential Property Price Index (% yoy)
6. Wholesale/Retail Trade & Repairs	Inflation rate on services excluding mortgage interest (%yoy)
7. Transportation and Storage	Inflation rate on Transport (%yoy)
8. Hotels and Restaurants	Inflation rate on Hotels and Restaurants (%yoy)
9. Information and Communication	Inflation rate on Communications (%yoy)
12. Business and Administrative Services	Inflation rate on services excluding mortgage interest (%yoy)
13. Other Community, Social and Personal Services	Inflation rate on services excluding mortgage interest (%yoy)
14. Education	Inflation rate on Education (%yoy)
15. Human Health and Social Work	Inflation rate on Health (%yoy)

Sources: Ireland CB's PPI index; CPI by goods and services; and Residential property price index

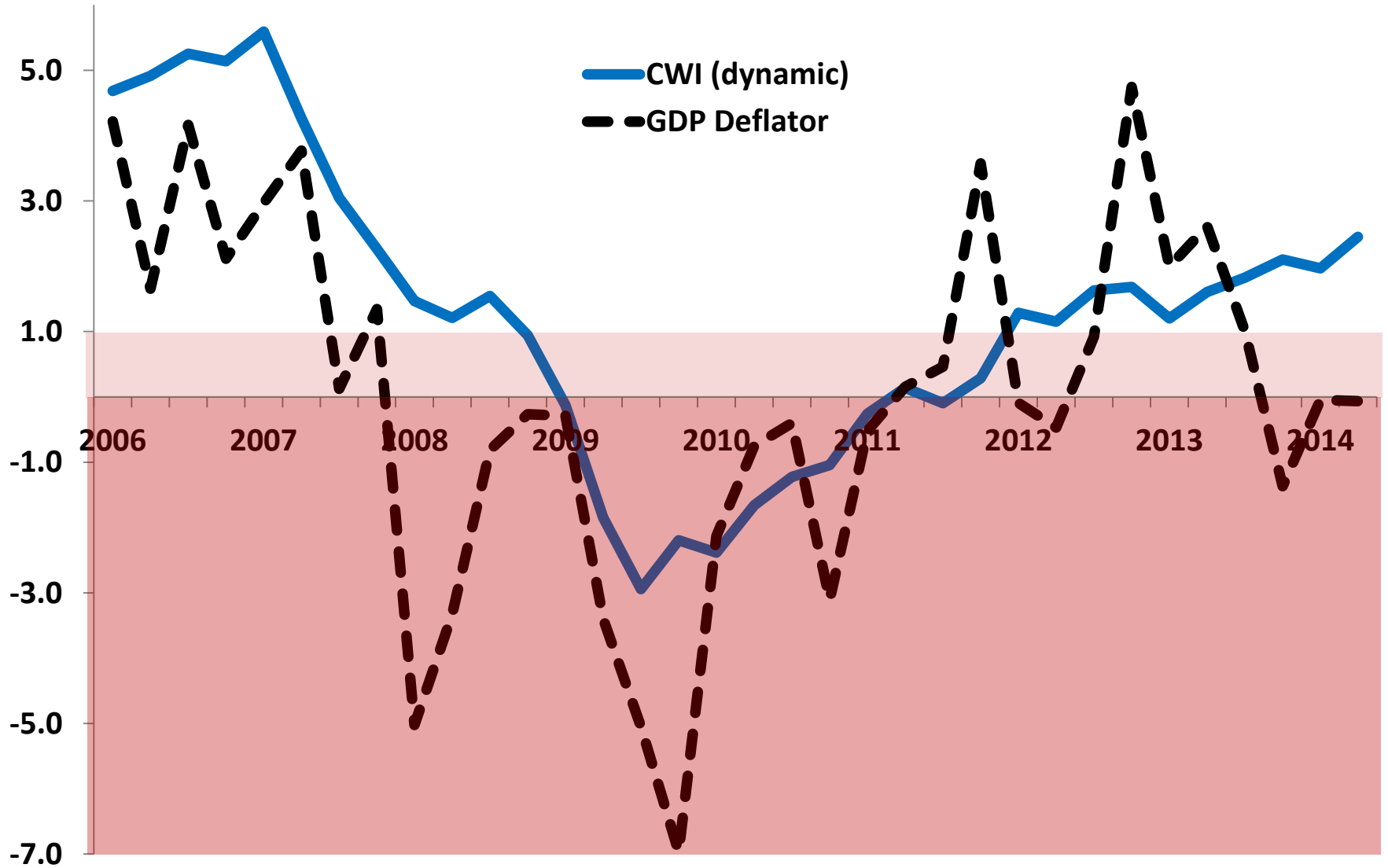
CWI: Deflation lasted much longer. But current lowflation poses little risk



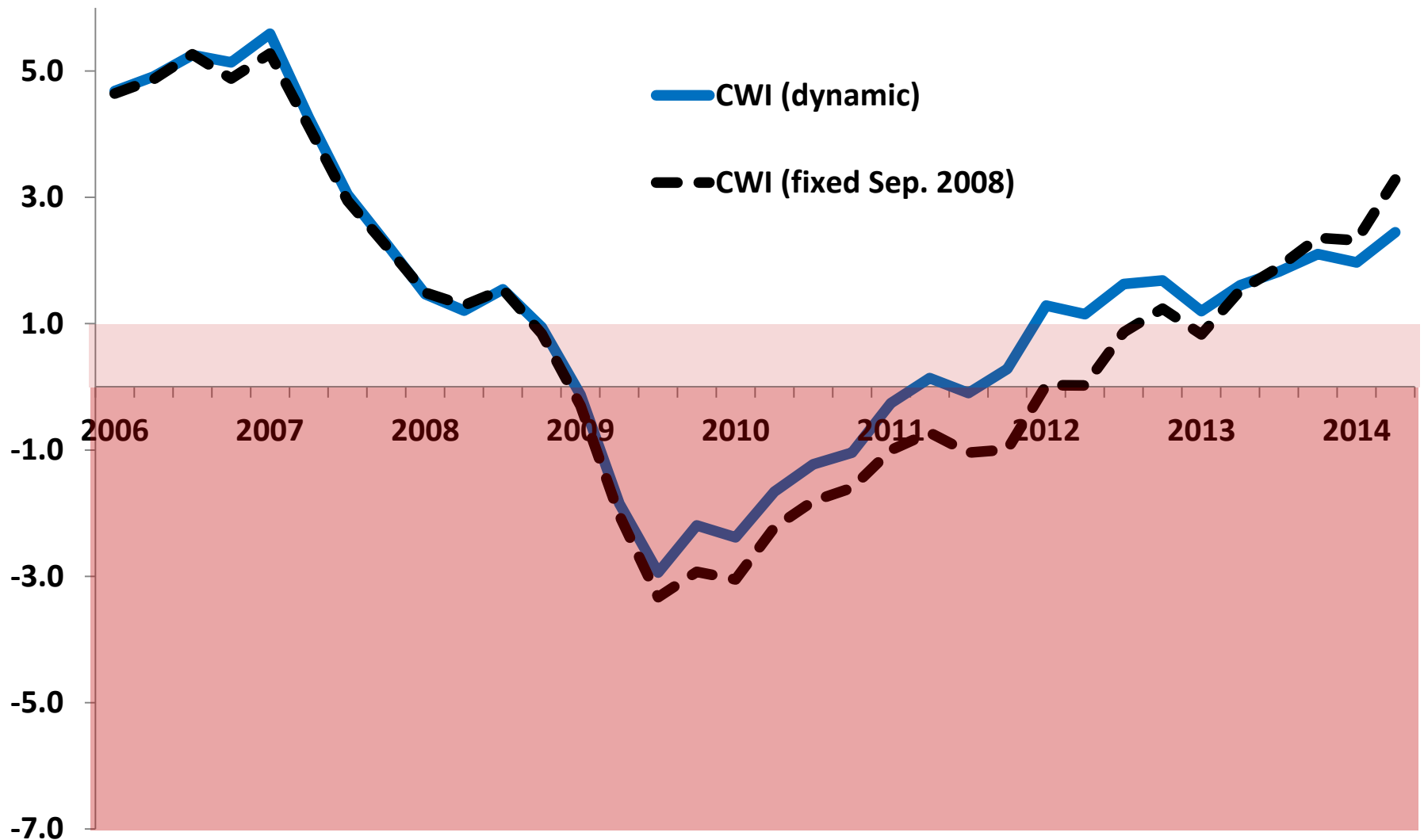
Similar story if compared to core CPI



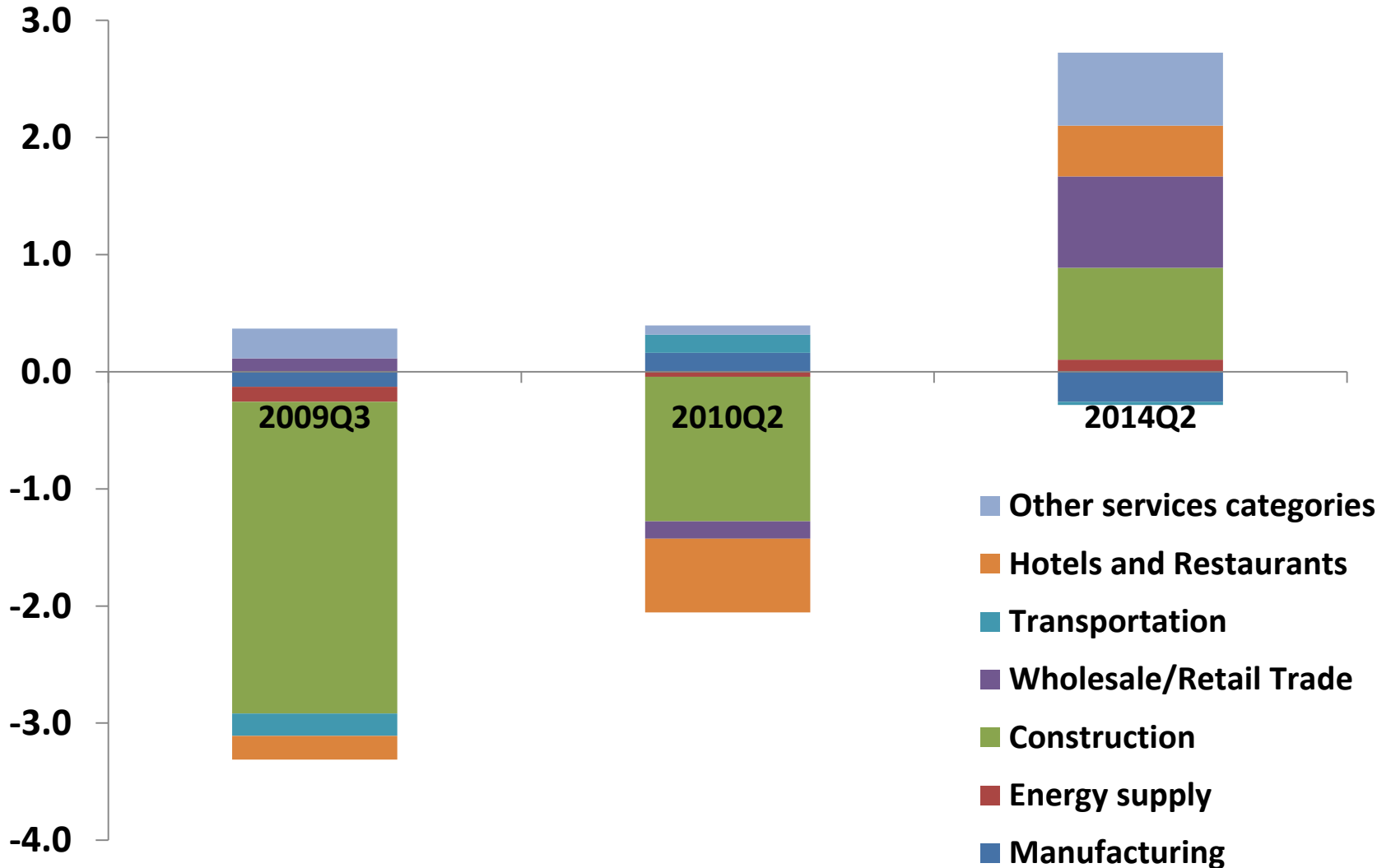
GDP deflator: close but choppy



CWI with fixed pre-crisis weights: more pronounced



CWI since 2009: from construction-driven to broad based

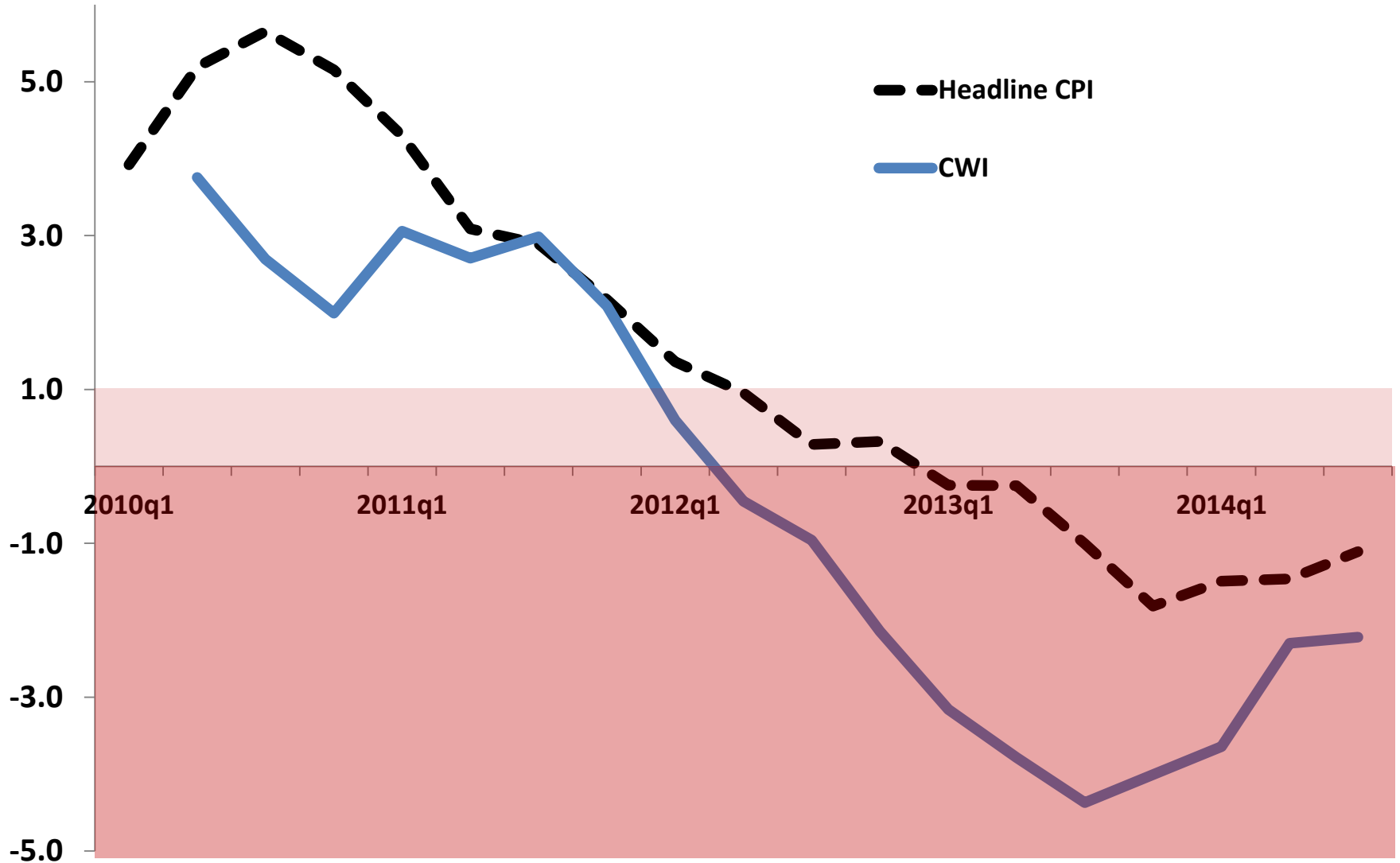


AN APPLICATION TO THE CASE OF GREECE

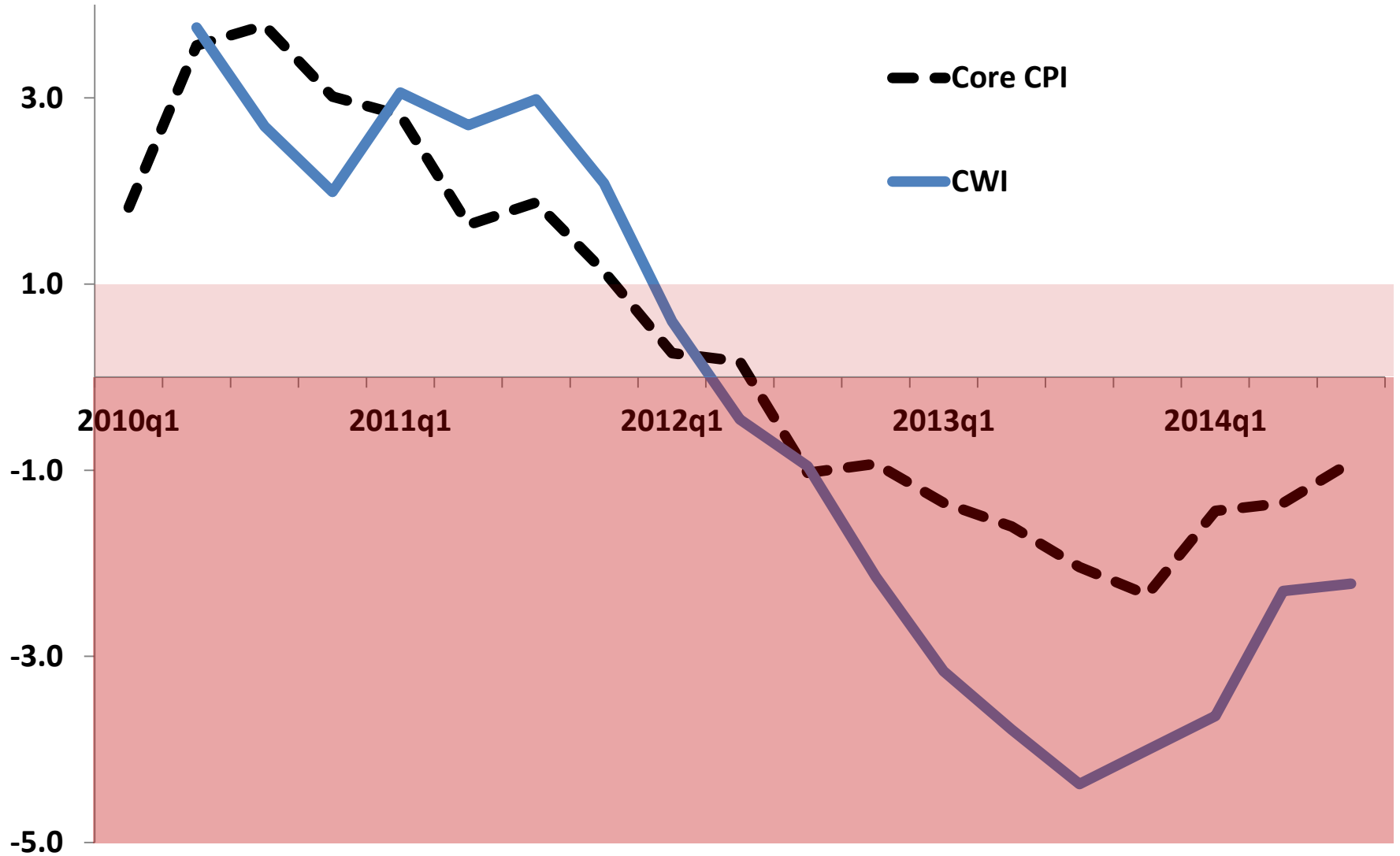
Greek credit data: less granular

Credit sector	Inflation index	Credit weights	
		2010q2	2014q3
Manufacturing	PPI	26%	27%
Construction	Housing prices	11%	13%
Trade	Services inflation	27%	25%
Tourism services	Services inflation	8%	10%
Transport	Services inflation	5%	5%
Shipping	Services inflation	20%	17%
Other services	Services inflation	4%	4%

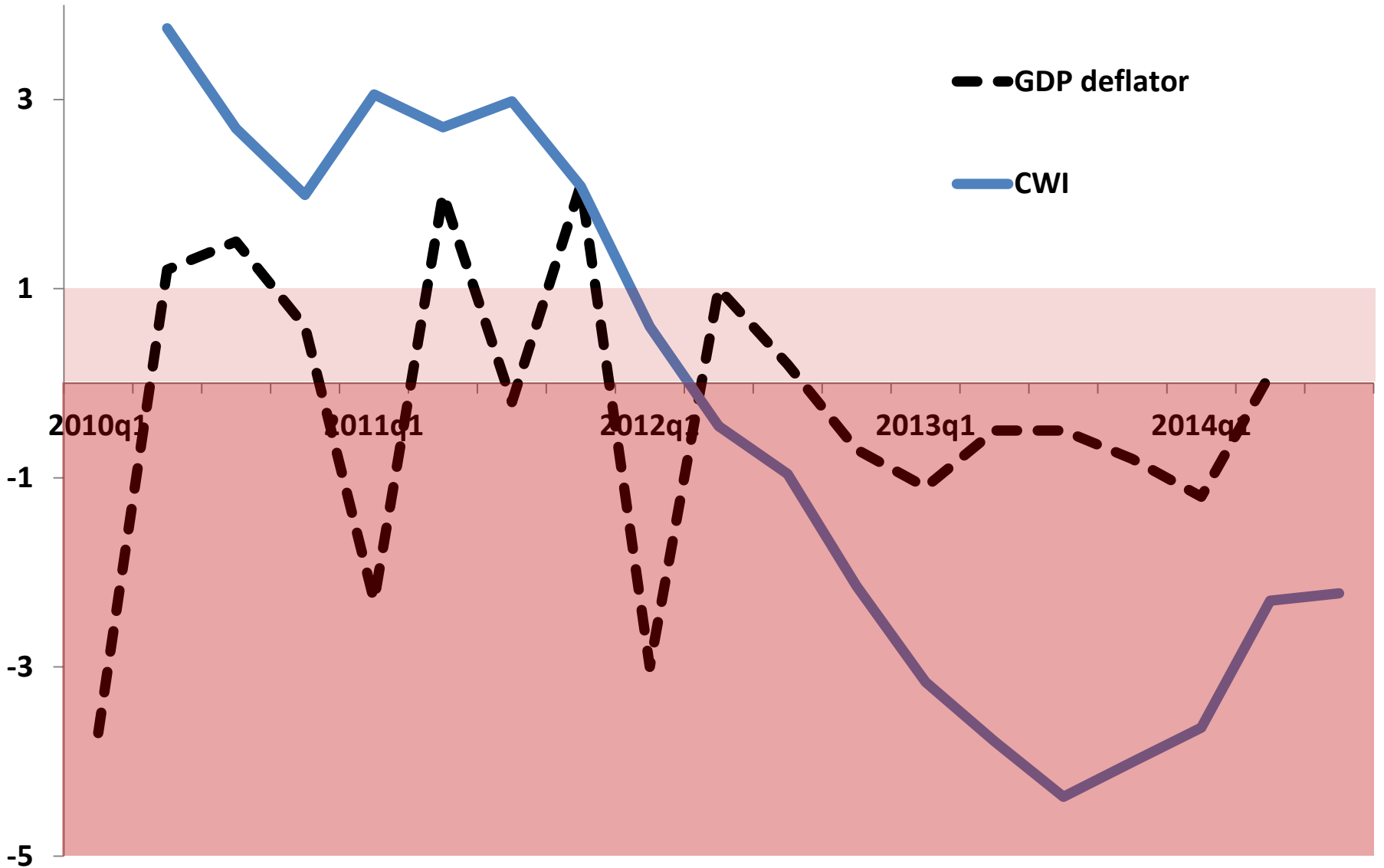
CWI: much deeper deflation episode



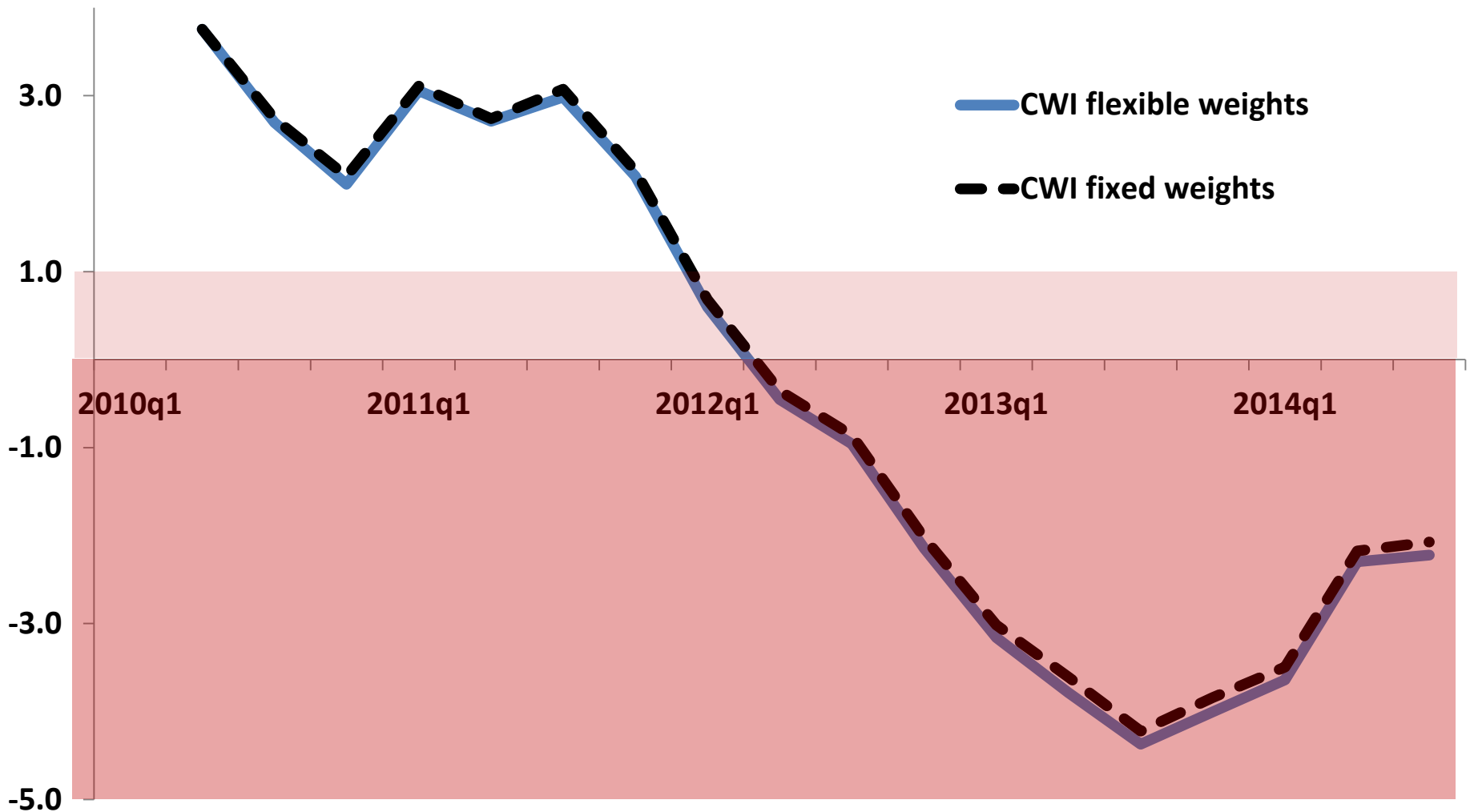
Core: same direction, but CWI deeper



GDP deflator is useless here



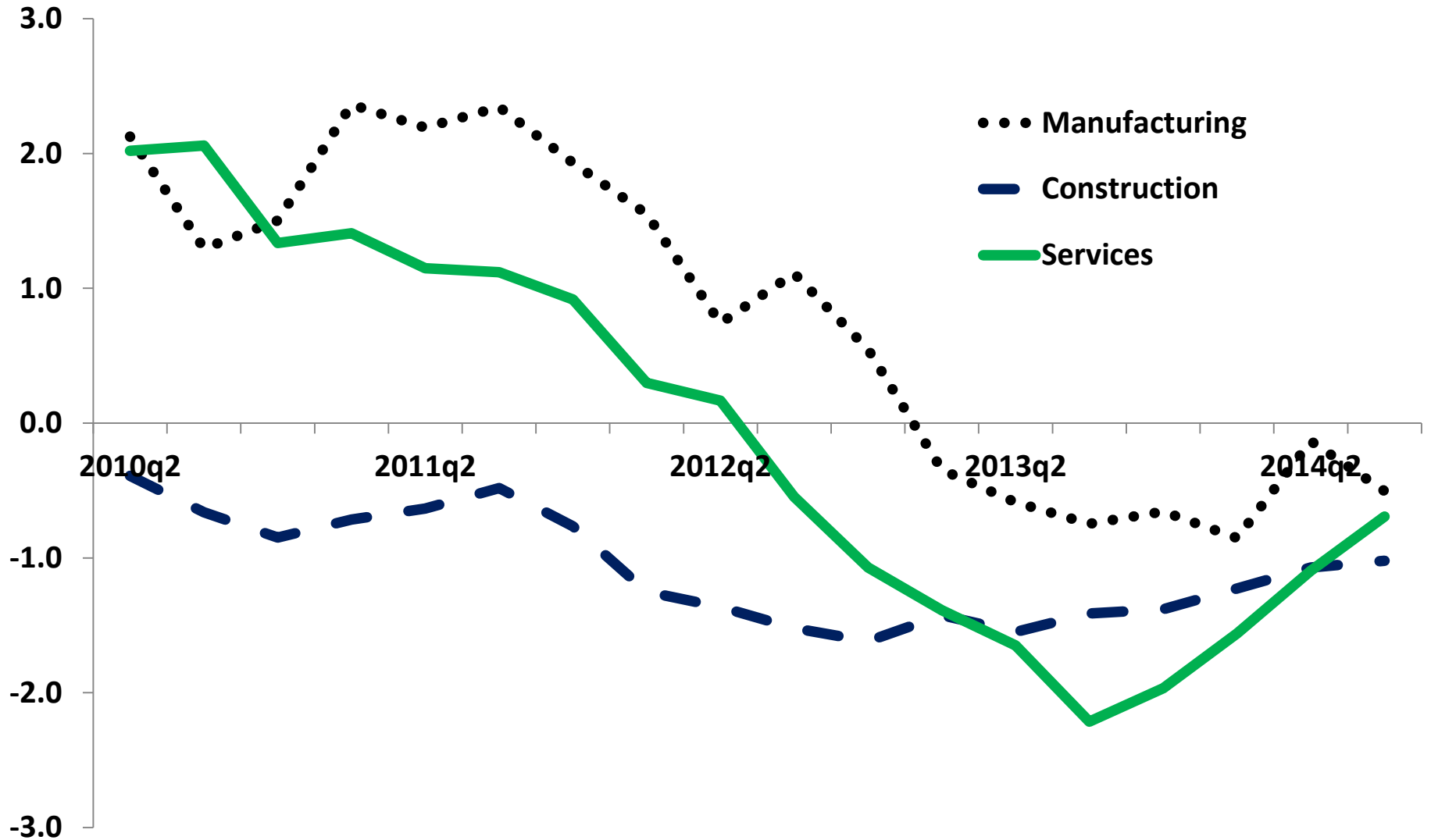
Flexible or fixed weights: no difference for Greece



Caveat: shipping services inflation

- Only have access to general services inflation
- May be decent approximation for tourism, trade and transport services
- But **shipping** is unique and important sector: price developments determined on global shipping market (but no variable for this)
- Likely less negative than domestic services sectors (CWI may be **overly negative**)

But cannot be key driver: CWI deflation is broad based



Why much more negative than CPI?

- **Services** 40% weight in Greek CPI, but over 60% weight in Greek CWI: more important for debt-deflation than for consumer price deflation
- Greek **manufacturers' prices** (in CWI) worse than goods prices (in CPI goods: many imports)
- Negative contribution **construction** sector

CONCLUSIONS

Conclusions

- To properly gauge **debt-deflation** pressures, need a measure that **links price changes to relative indebtedness** of sectors
- I propose such a measure weighted by bank credit to manufacturing and services firms
- Part of a fuller analytical toolkit to analyze deflation risks (incl. household, sovereign, financial sector risks)

Main results Irish and Greek cases

- **Ireland:** crisis resulted in more protracted debt-deflation episode than CPI suggests
- But on the upside: current CPI lowflation does not imply new debt-deflation cycle according to CWI
- **Greece:** debt-deflation pressures were and are deeper than seen from CPI