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Working Group on Longer-term Issues and Structural Change

Productivity Puzzle in Germany?

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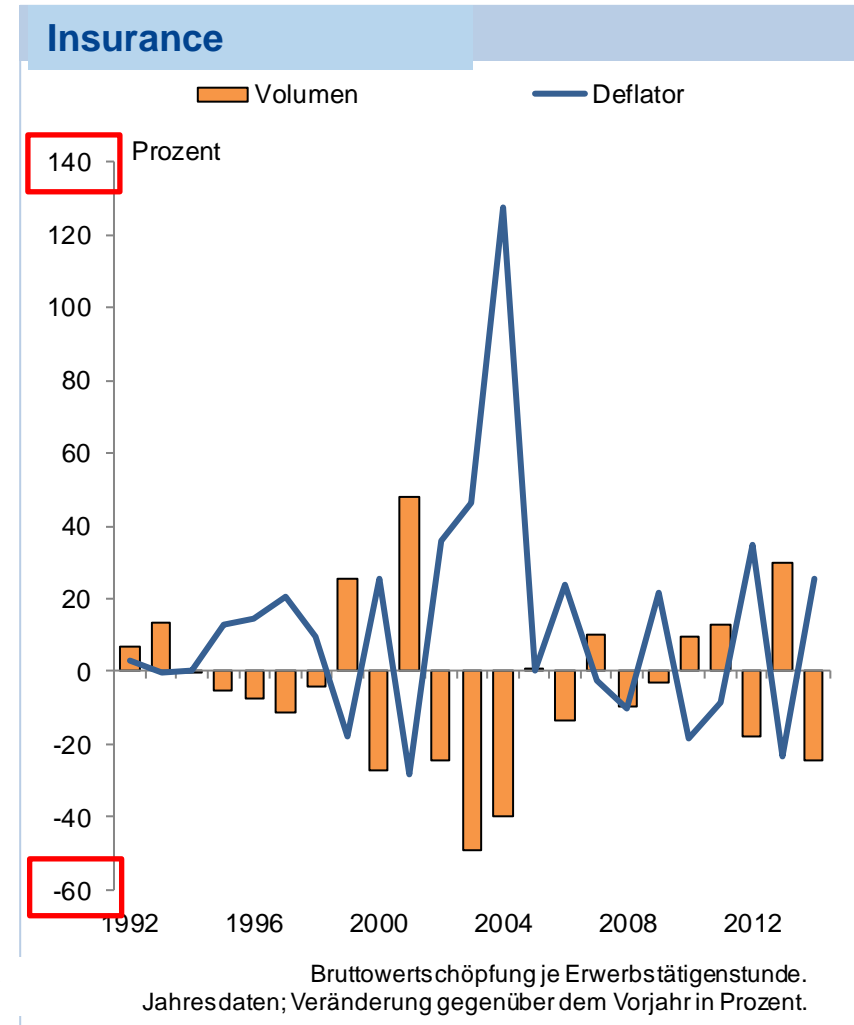
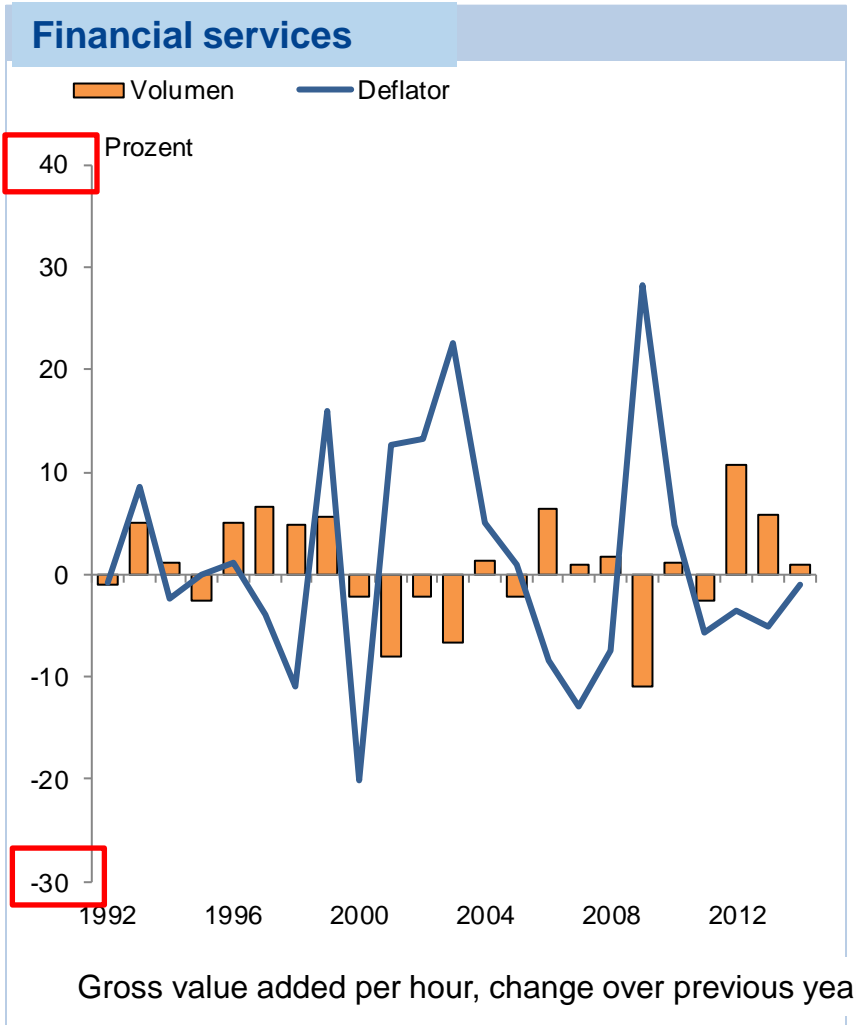


- Jointly commissioned by BMWi and BMF
- Analysis of measurement issues and productivity developments in Germany in a longer-term perspective – not only the most recent years
- Whole economy and sectorally disaggregated analysis
- Trends over time and international comparison
- Focus on labour productivity

- German national accounts statistics (Destatis), (91-15; no capital services)
- Eurostat data (00-13, no consumed inputs)
- EU KLEMS (2 datasets, sectorally disaggregated, major countries, capital services, labour by qualification, only to 2007 or 2009/10)
- OECD (STAN) and Productivity Statistics have limitations or original data are not available
- Note: Different data sets sometimes give different results
- Aggregation of sector productivities not completely matching figures derived at the macro level

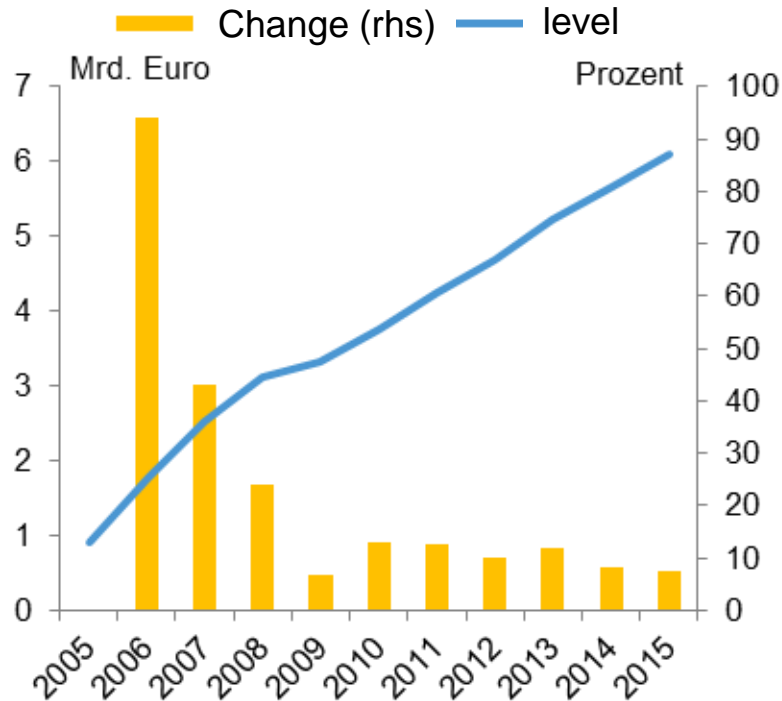
- Measured productivity developments can be statistical artefacts
 - » Problem of estimating value added (especially in services); exclude housing sector, government ⇨ Market sector
 - » Problem of quality adjustment (new goods, esp. ICT)
- Digital goods
 - » Cross subsidization is increasing but quantitatively still not a big issue
- Measurement of factor inputs
 - » Insufficient and internationally diverse measurement of human capital, no adequate quality adjustment of labour inputs
 - » Measurement of flow of services from physical capital: lack of original data, estimated using strong assumptions
- Large Revisions in the national accounts data over time
- Problems relate mainly to levels, less to the profile of developments

Problem of imputed value added shows up in „crazy“ development of deflators in parts of the service sector



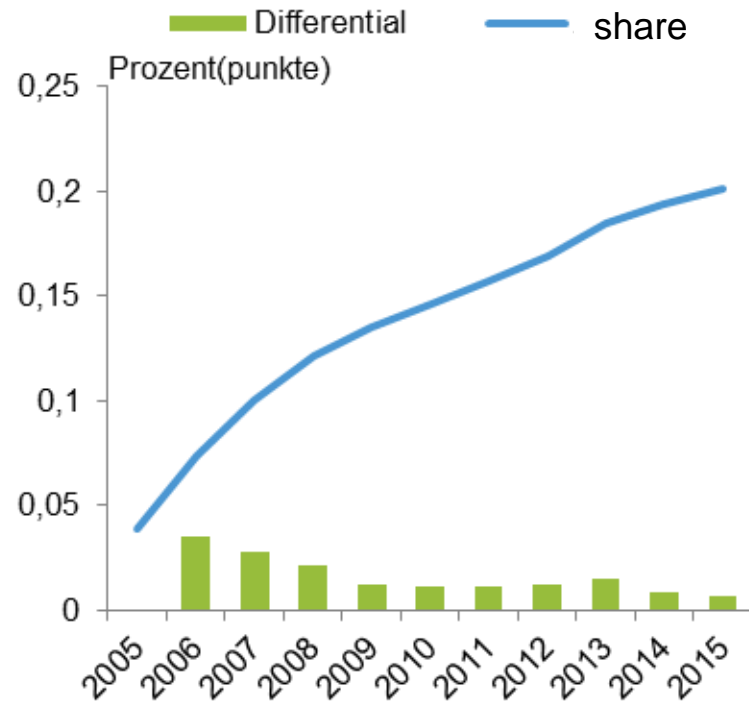
Cross subsidization (digital goods): Market for online advertisement in Germany

Turnover



Jahresdaten.
Veränderung: gegenüber Vorjahr in Prozent (rechte Skala).
Quelle: PWC via statista; eigene Berechnungen.

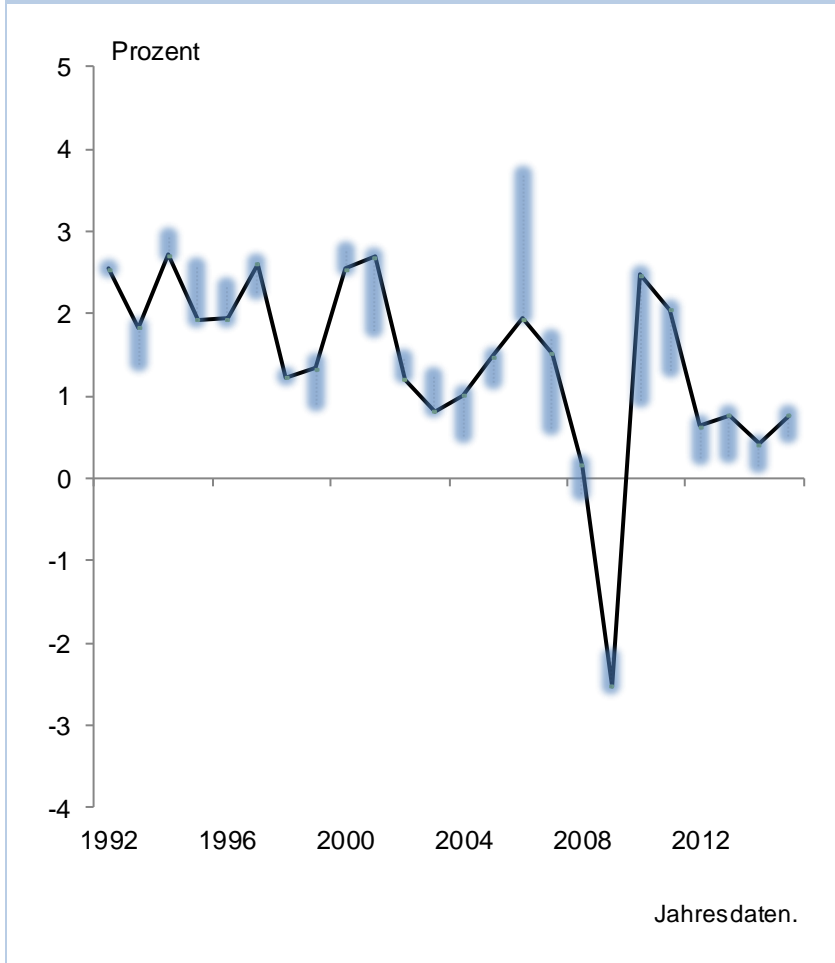
In Relation zum BIP



Jahresdaten.
Anteil: nominal; Differential: preisbereinigt, Lundberg-Komponente.
Quelle: PWC via statista; eigene Berechnungen.

Revisions of labour productivity

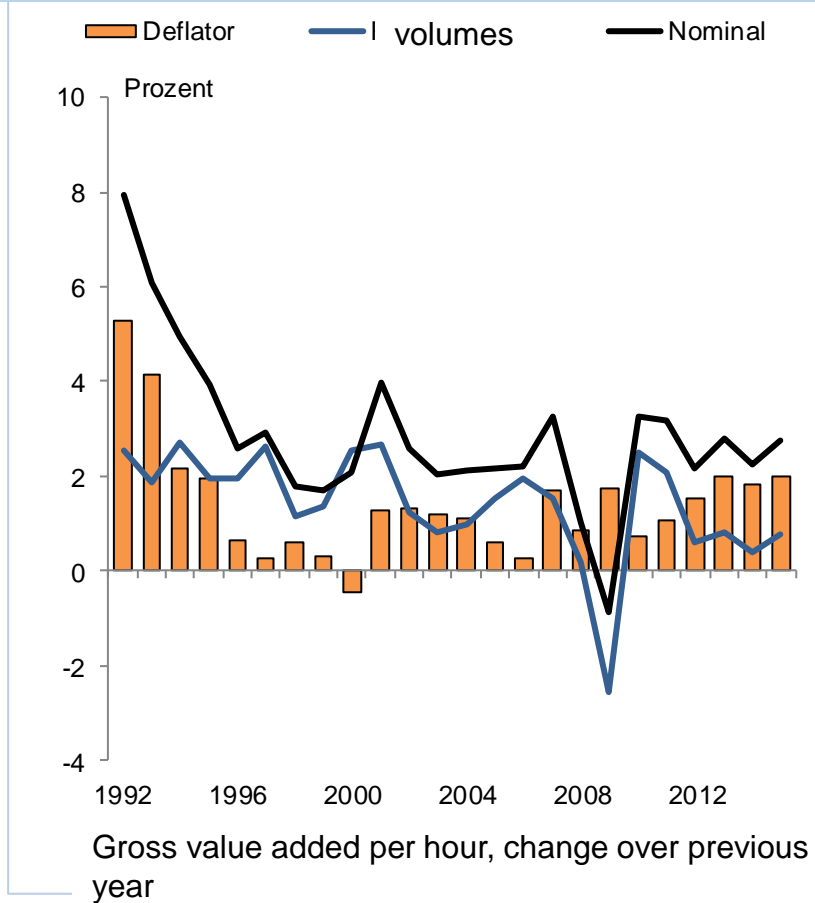
Ausmaß der Revision der AP (2007-2016)



- Analysis with real time data base of Bundesbank
- Tendency for upward revision (on average 0.5 pp after 4 revisions)
- But no reversal of trends

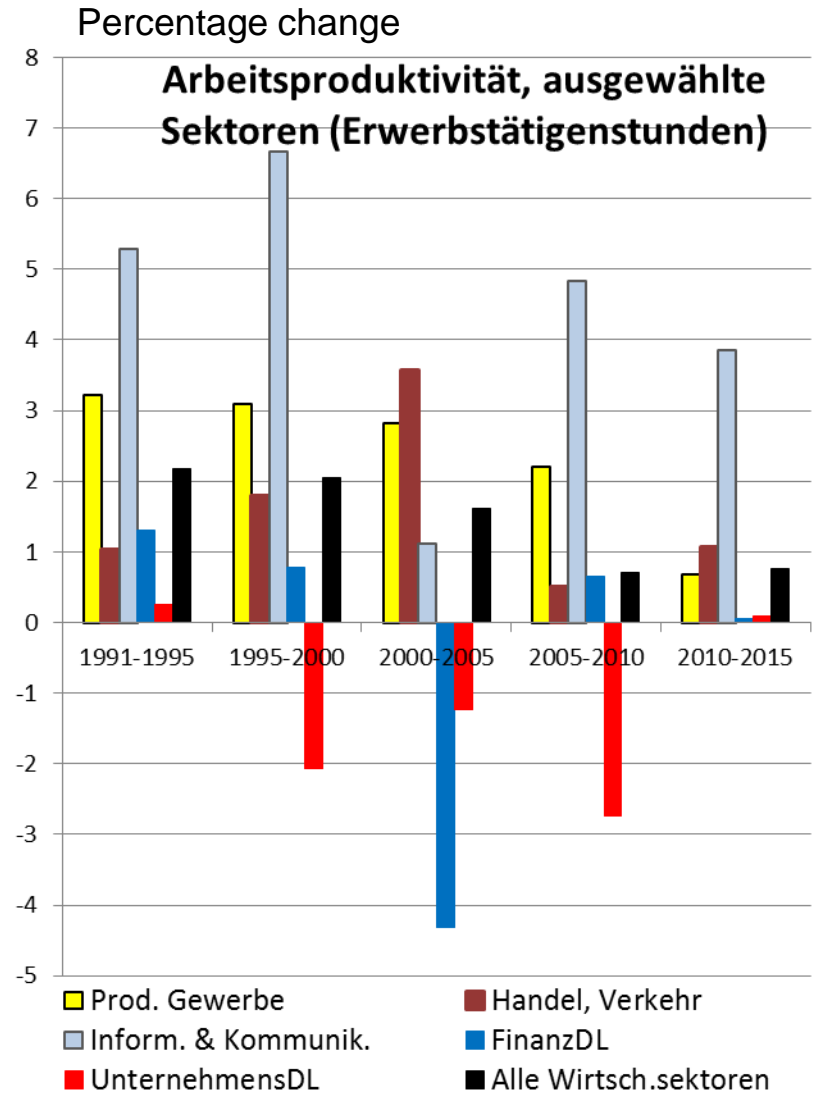
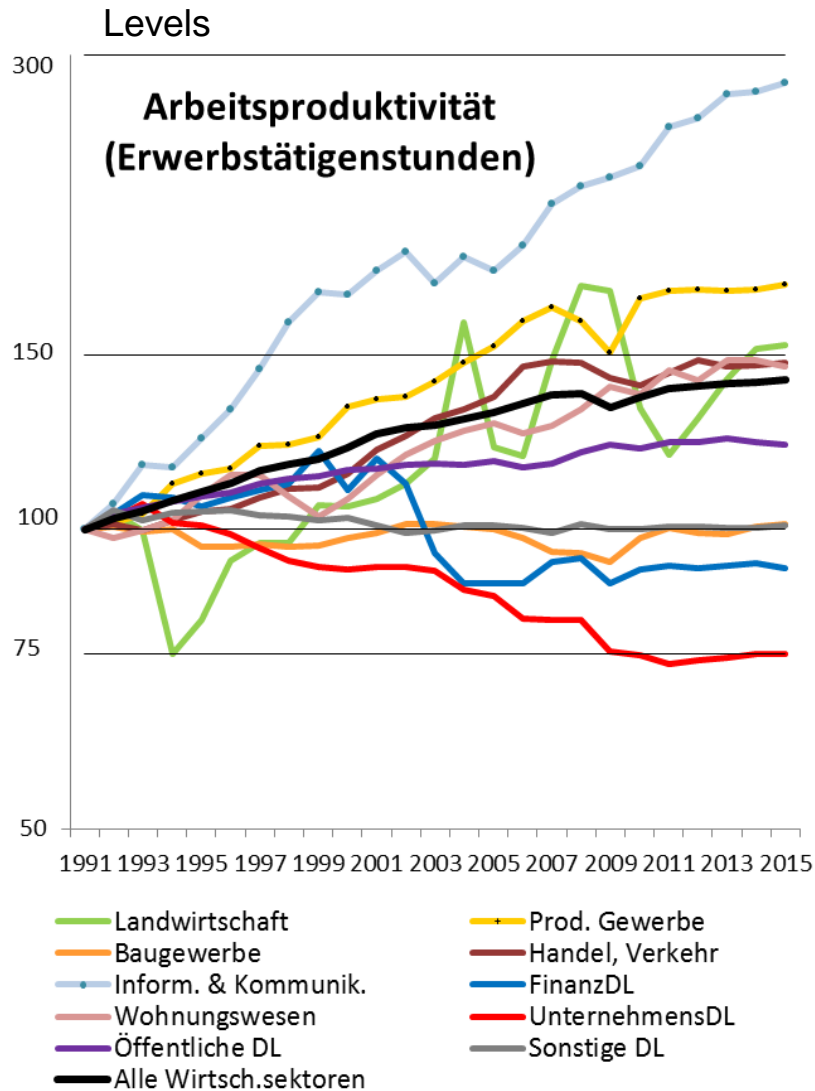
The evidence: Productivity developments at the macro level

Hourly labour productivity (whole economy)



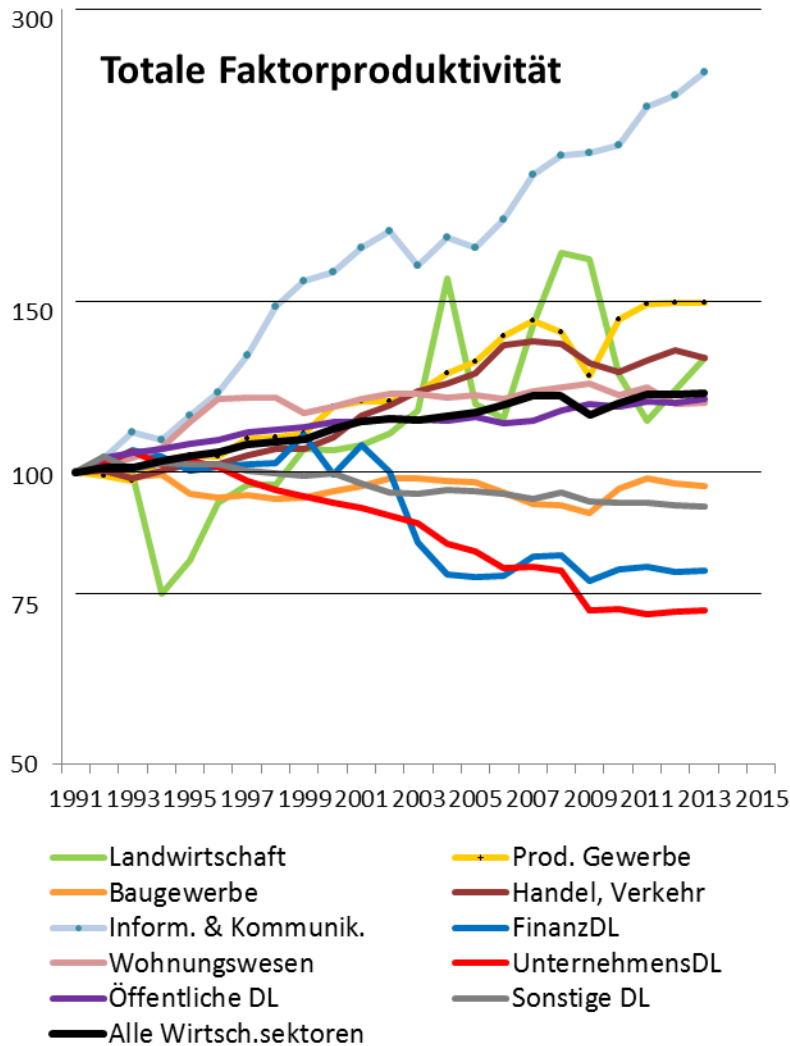
- Trend slow-down
 - » Particularly pronounced after the crisis
 - » after 1995 „only“ in real terms
- Macro-drivers
 - » Contribution from capital intensity is falling
 - » TFP-contribution stable until 2008
- Similar to other countries
 - » At the macro level
 - » ex USA, Spain

Labour productivity per hour at the sector level

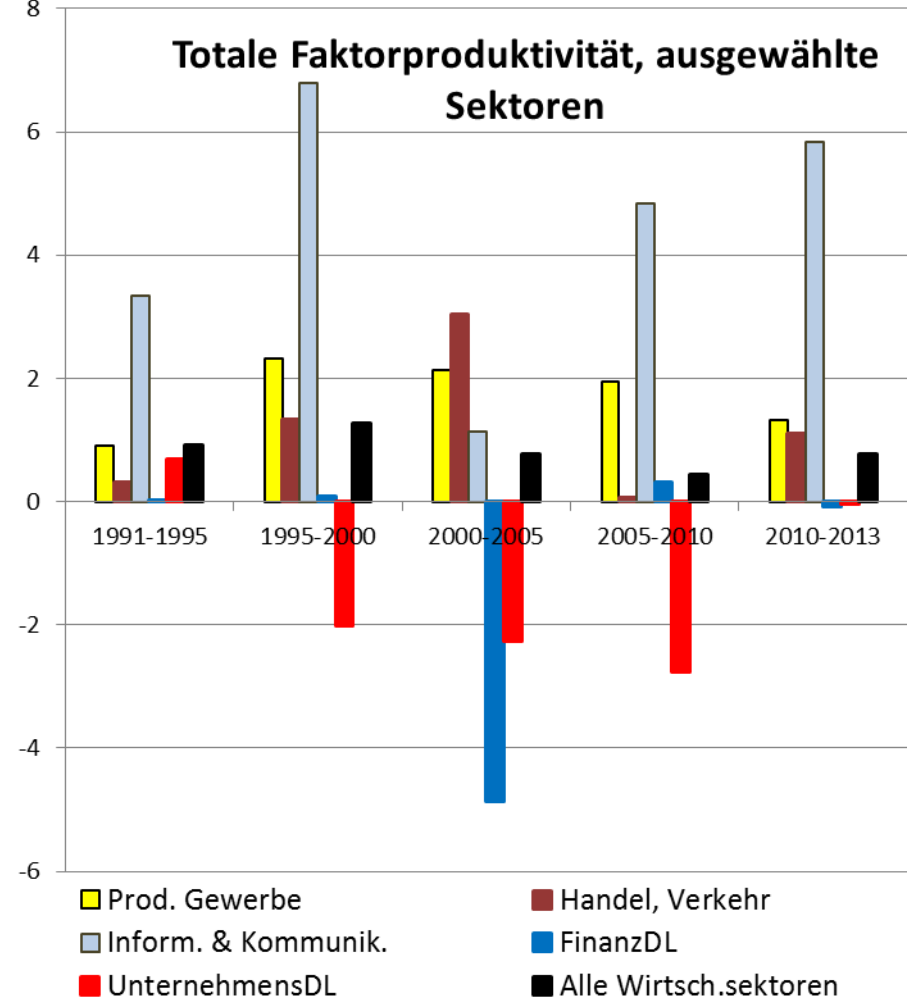


TFP at the sector level

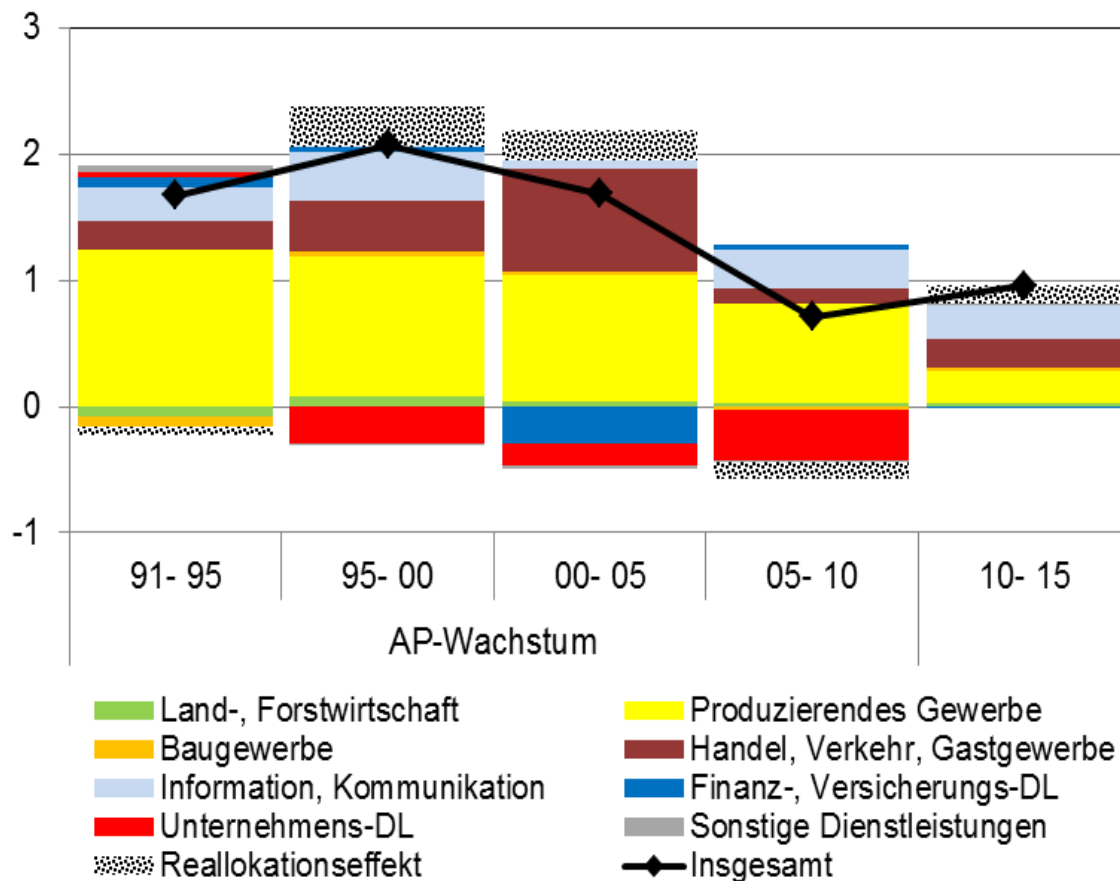
Levels



Percentage change



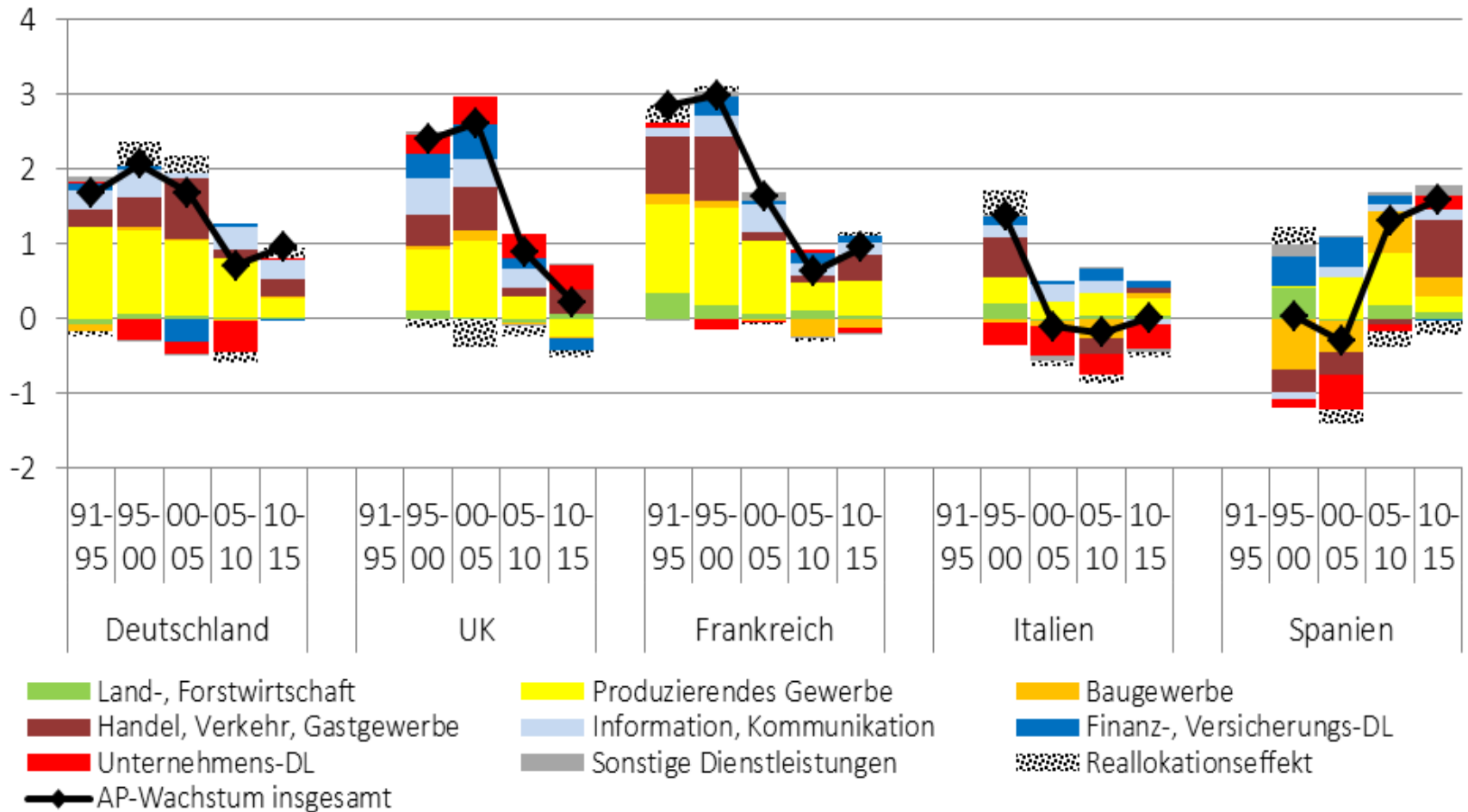
Sector contributions to LP-growth (8 Sectors = Market sector)



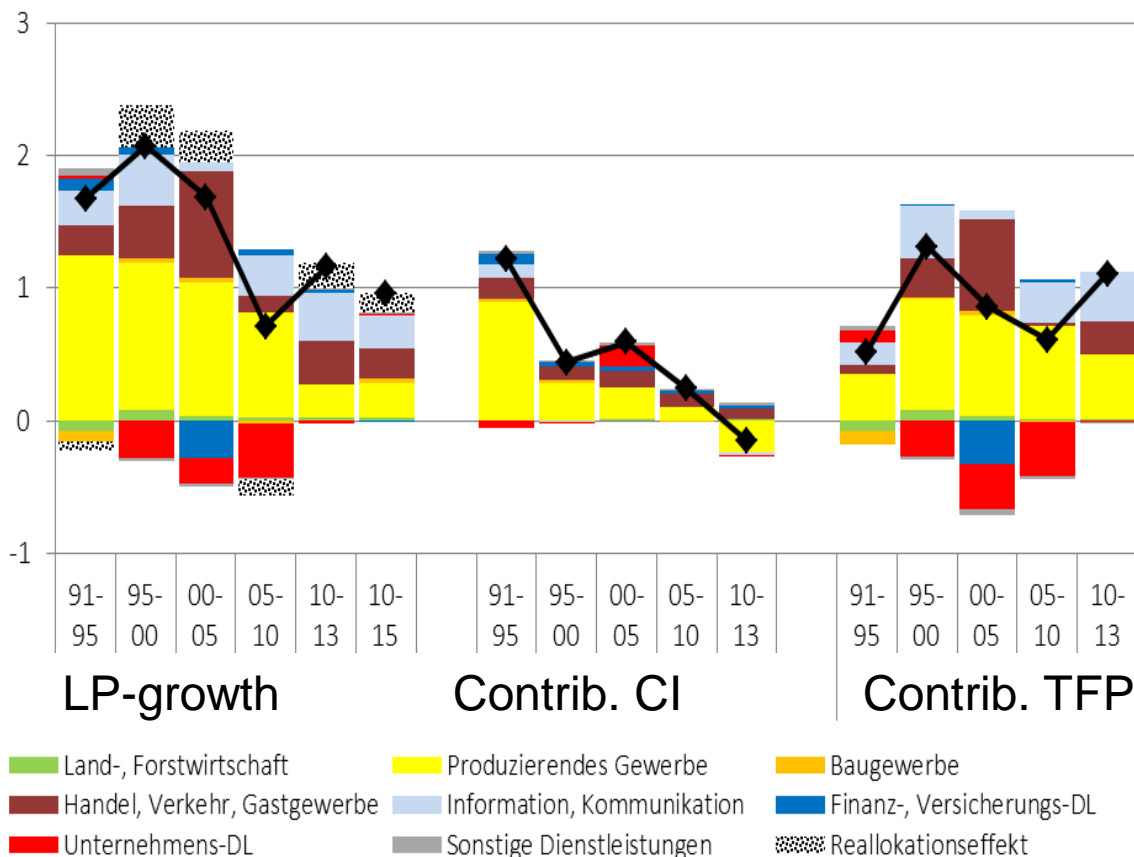
- Pre crisis: no clear trend
- After 2005: AP-Wachstum deutlich niedriger
- Only 3 sectors with significant positive contributions (manufacturing, trade, IT)
- Negative contribution of professional services (95-10)
- Specific development in financial services (00-05)
- after 2010: diminishing differences across sectors

$$\Delta \ln AP^Z = \sum_j \bar{s}_{Z,j}^Z \Delta \ln AP_j^Z + R^H \leftarrow \text{Reallocation effect}$$

Sector contributions to LP-growth (market sector) international comparison (Eurostat data)

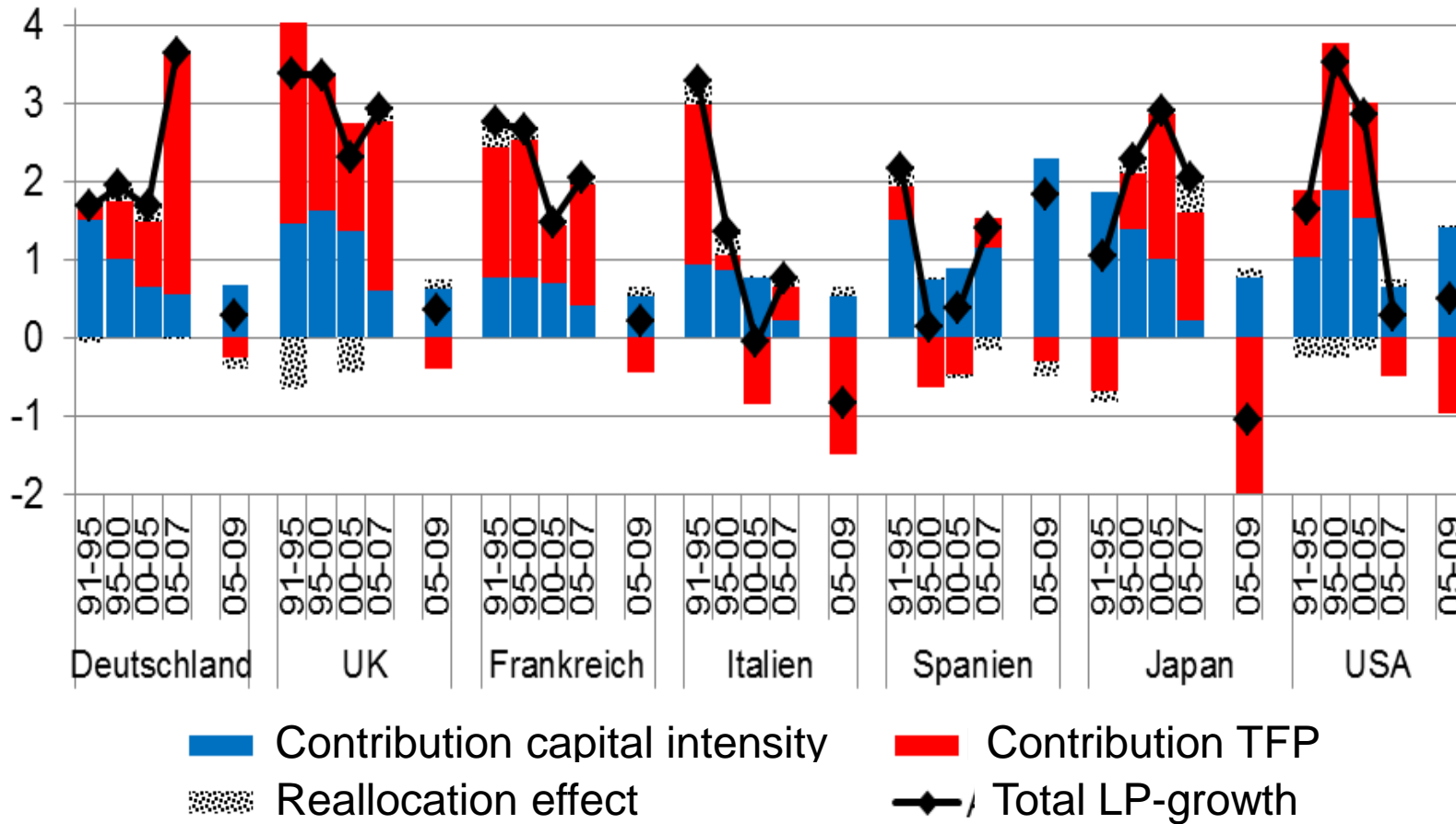


Contribution of capital intensity and TFP to LP-Growth in Germany (Market sector)



- Contribution of capital is decreasing, esp. in manufacturing (even negative recently)
- Contribution of TFP without clear trend (til 2013)
- TFP-contribution by sector similar to LP contribution
 - + Mfg, Trade, IT
 - – Business services
 - 0/– Financial services

Contribution of capital intensity and TFP to LP-growth – international comparison (EU-KLEMS)



- Significant concentration of productivity growth
 - » 3 Produktivity cores (manufacturing, trade, IT)
 - » Productivity brake professional services (after 1995)
 - different in UK and USA
 - » Special case financial and insurance services (low productivity growth, decline in 00-05)

- Pre-crisis period (1991-2005/7)
 - » No clear trend in the market sector
 - Macro decline driven by property sector and public services
 - » Manufacturing: high but declining contribution to LP (investment)
 - » Trade: trend increase in LP and TFP growth

- Post-crisis period (2011 ff)
 - » Significantly lower LP growth (same internationally; exception Spain)
 - » Manufacturing and trade slow (Mfg also internationally)
 - » Improved productivity performances of professional services

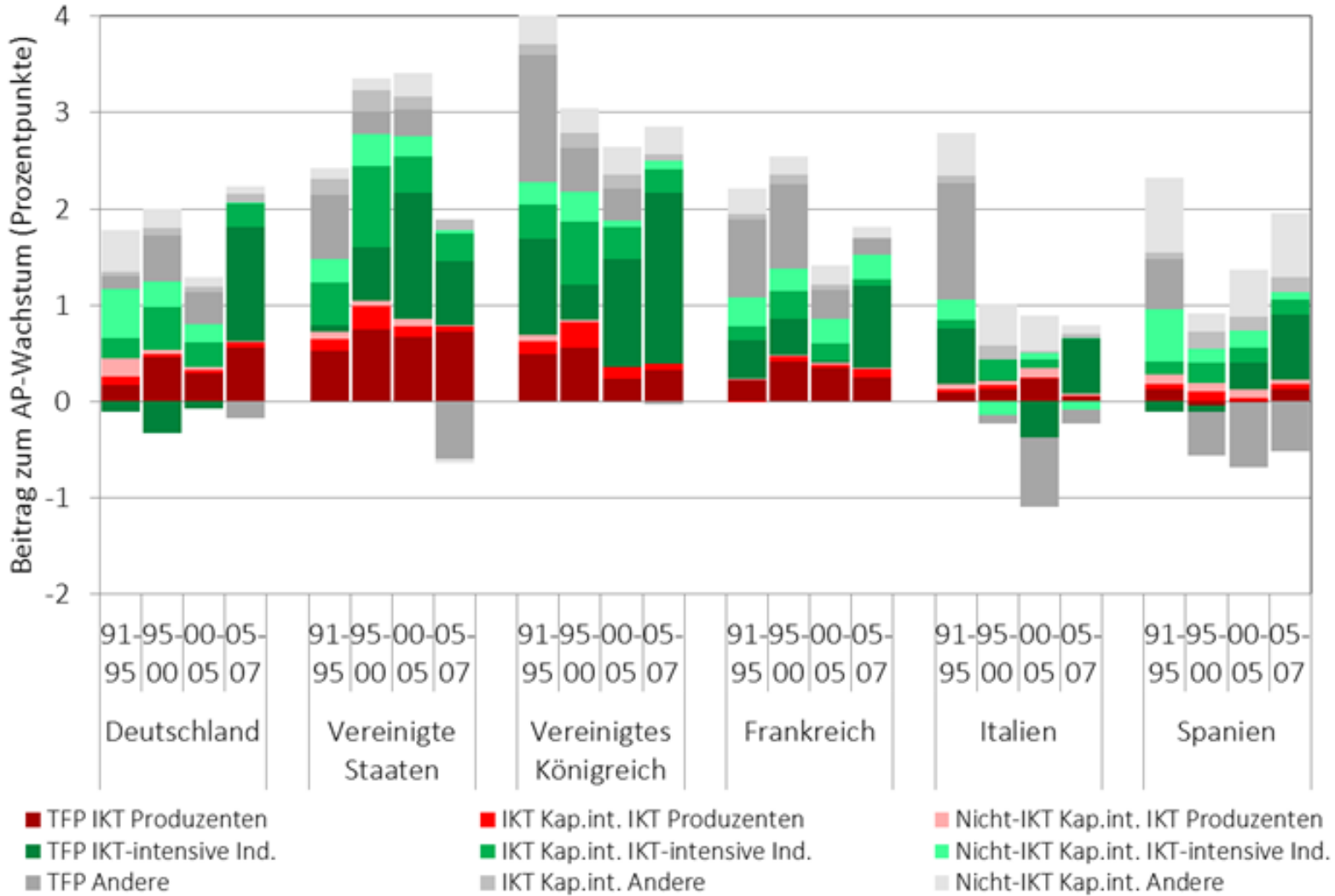
Several hypotheses

- Sectoral structural change →
 - (End of) Outsourcing →
 - **Digitization** →
 - Human capital →
 - **Demography** →
 - **Changes in the labour market**
 - Normalization after the unification boom
 - Misallocation of production factors (financial crises, low interest rates, zombification)
- No negative impact on LP, but declining positive impact of reallocation into professional services due to poor productivity performance in that sector
 - No systematic correlation, explains some of the weakness in professional services (Leasing, contract workers)
 - Weak and inconsistent evidence (data/measurement problems)

 - Explains some of the slowdown from 91-95 to 95-00

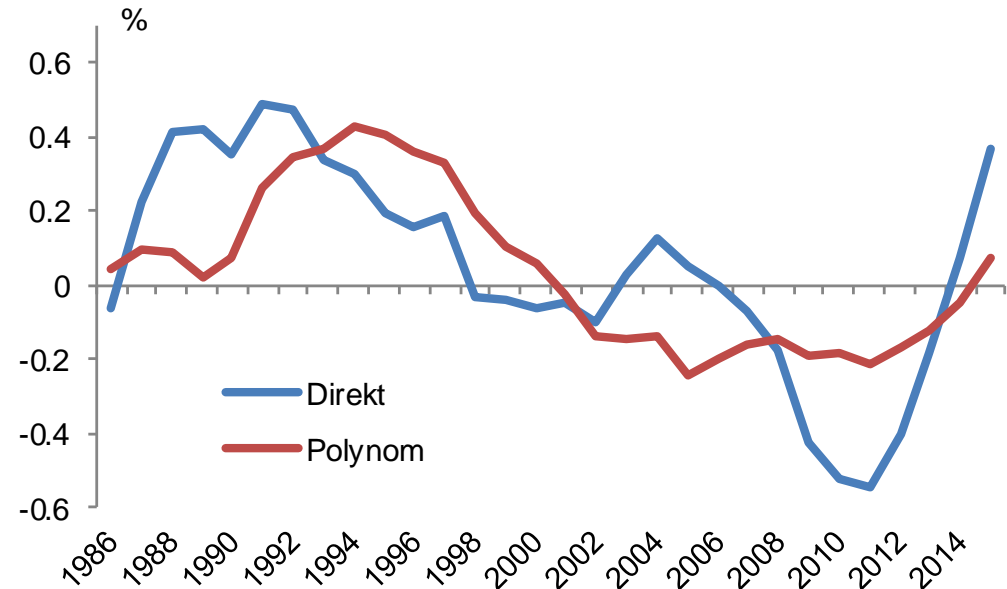
 - Effects are possible, but hard to identify and quantify

LP growth decomposition 1991–2007 (EU-KLEMS)



- 1995–2005: Weaker LP growth in Germany than in USA and UK (but not as other EU countries) partly explained by
 - » Low investment in ICT
 - » Lower „efficiency dividend“ (US after 2000)
- Potential (plausible) explanations
 - » „US Home Bias“ hypothesis:
 - More fragmented EU domestic market
 - More rigid product and labour market regulations
 - » „US Management“ Hypothesis
 - Corporate traditions less conducive to radical restructuring
 - » „Firm Size“-Hypothesis
 - European countries have more SME; SME can realize less benefits from ICT investment due to scale and scope effects

- Different age cohorts have different productivity. Estimation with 2 different methods.



- Results
 - » Demography contributed to the slow-down in LP since 1995
 - » Positive (from 1995 onwards declining) impact in the 1990s, negative in the 2000s, recently improving.
 - » Disclaimer: Point estimates are statistically uncertain!

- Wage moderation
 - » Since early 2000s
 - » Reflecting increased flexibility of wage contracts (opening clauses)

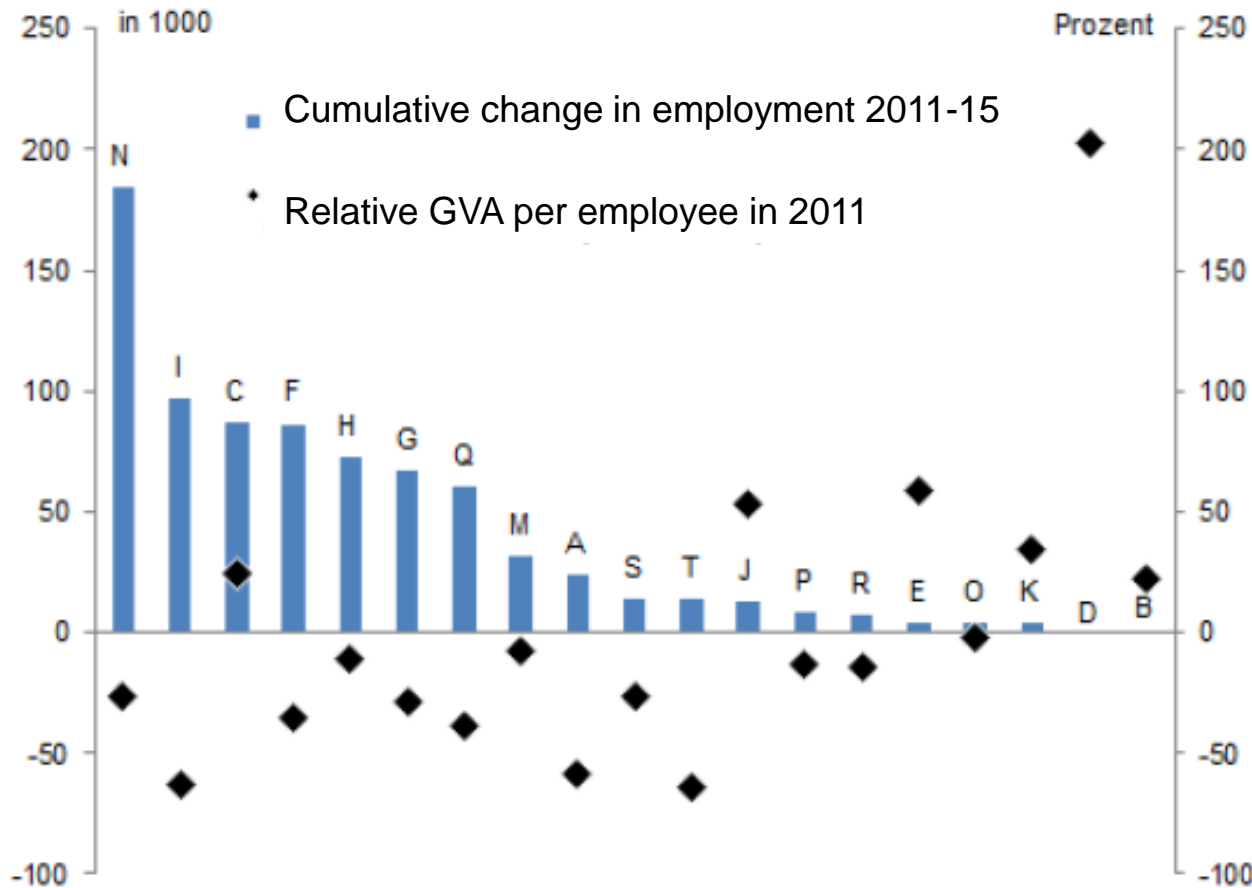
- Hartz-Reforms
 - » Implemented between 2003 und 2005
 - » Easing of labour market regulation, new labour market instruments
 - » Reduced unemployment benefits for some of the long-term unemployed
 - » Increased pressure on unemployed to take on job offers

- Increased immigration
 - » since 2011 (intra EU migration, refugees)

Immigration by branches

- Migrants predominantly work in low productivity branches

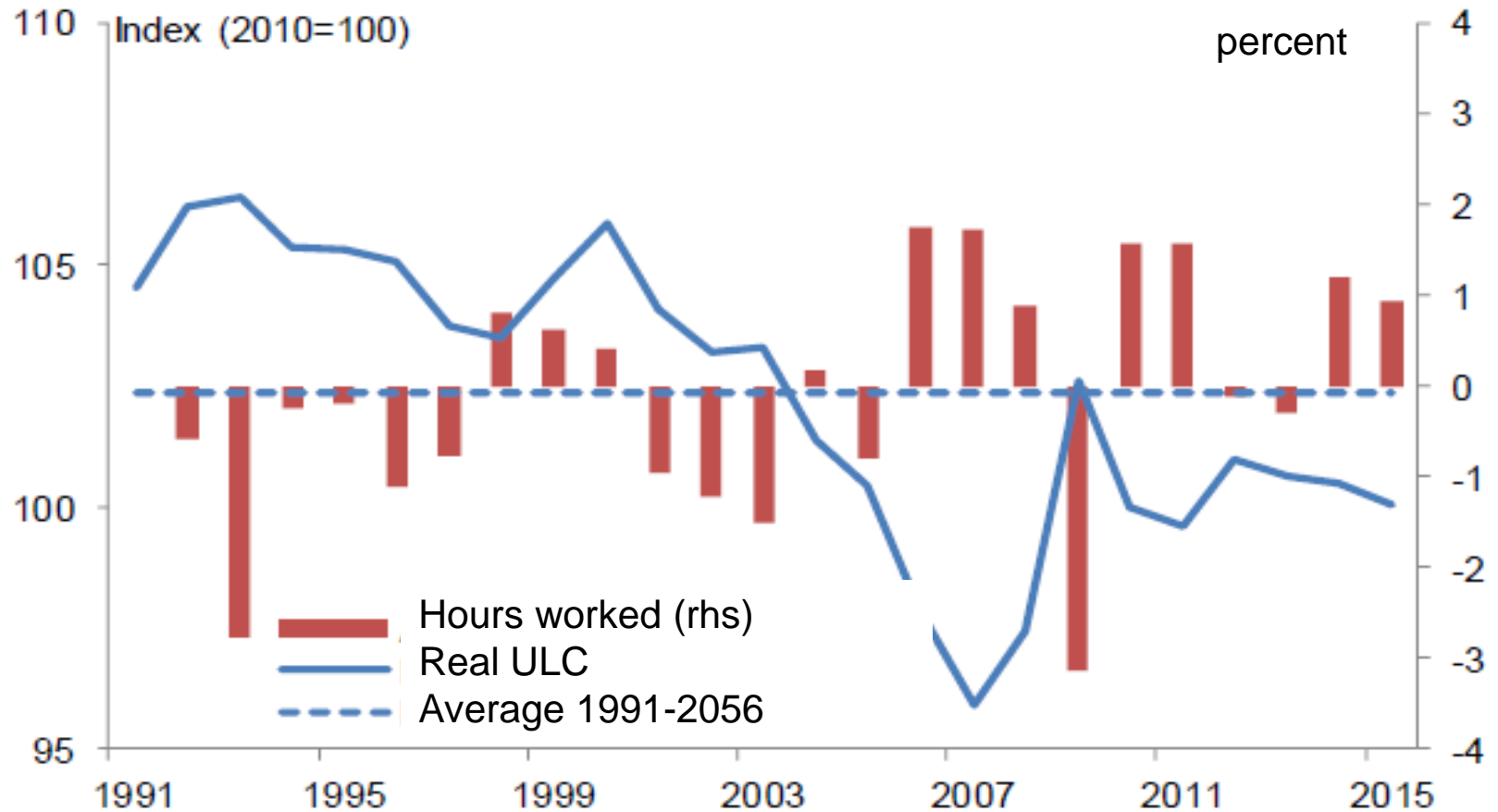
Non-national employment and LP by sector 2011



Quantitative estimates:
Migration could explain between 0.1 and 0.7 pp of productivity slowdown in recent years under different assumptions

Impact of wage moderation

Significant wage moderation since 2000



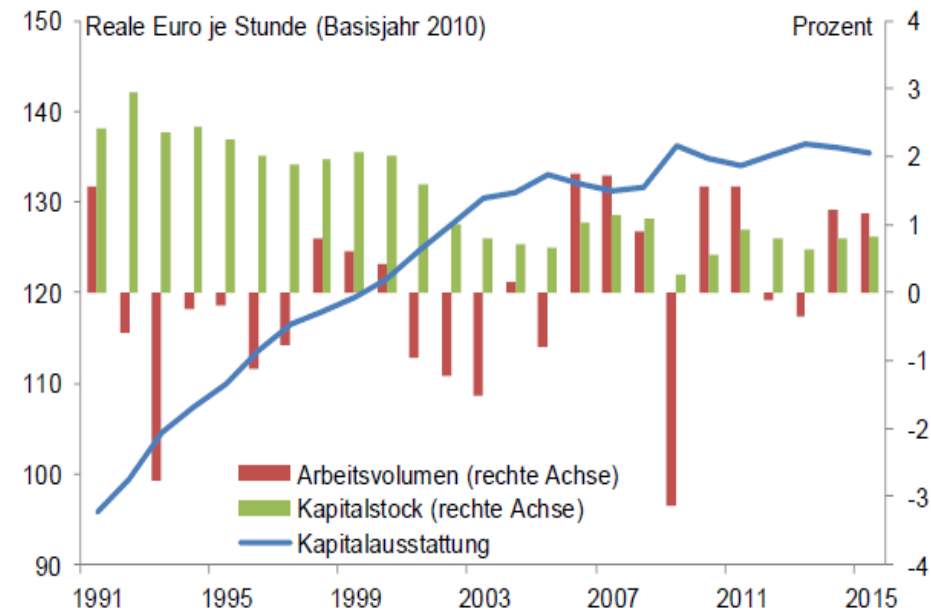
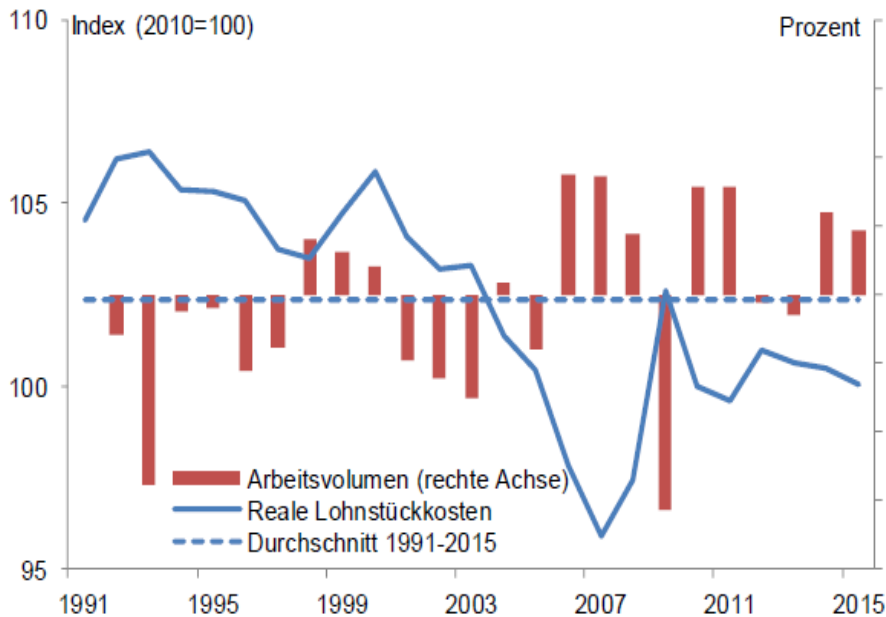
- Explanations:
 - » Decentralization/flexibilization of wage formation (decreasing relevance of collective bargaining, more opening clauses) starting around mid-1990s.
 - » Hartz-Reforms.
 - Contribute, but probably not dominant.
 - » Olprice decline since 2014.
- These explanations are exogenous. Wage moderation leads to productivity slow-down in a neo-classical theoretical framework. No reverse causality (reaction of wages to lower productivity would not result in declining real unit labour costs)

Effect of wage moderation on productivity

- Wage moderation: Wages increase by less than the sum of productivity and prices.
- Increased labour demand and higher employment.
- Capital endowment per employee (hour) decreases.
- Direct negative impact on labour productivity.
- Marginal productivity of capital rises leading to more demand for capital.
- Increasing the capital stock takes time: temporary productivity slowdown

Evidence is in line with theory

Real ULC, hours worked and capital stock



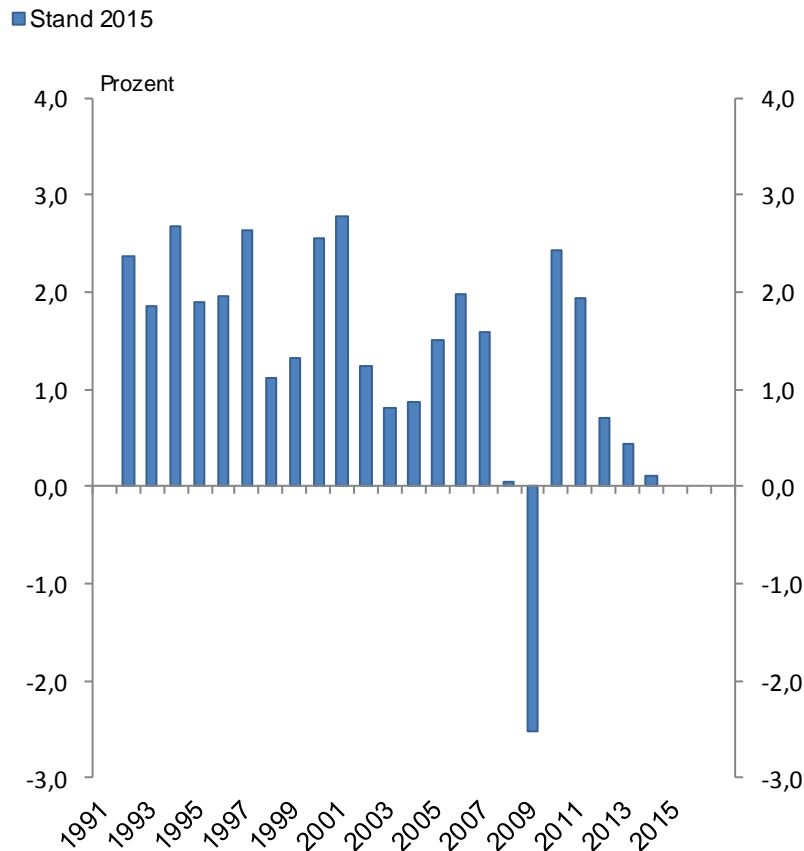
- Declining growth of the capital intensity reduced LP by 0.8 percent per year since 2004.
- Slowdown in capital intensity growth is explained by employment growth (slowing LP by 0.4 pp) and a slowdown in net investment (reducing LP growth by another 0,4 percent per year).
- The size of the effect is confirmed by simulations with an empirical labour market model

Summary: Main explanations of German productivity performance

- Confirmed
 - » Reunification (diminishing catch-up growth)
 - » Relatively weak digitization effects (compared to US/UK)
 - » Demography (cohort-specific productivity)
 - » Sectoral structural change (reallocation into professional services)
 - » Labour market conditions (wage moderation, immigration)
 - Not confirmed
 - » Weak human capital accumulation
 - » Diminishing process of Outsourcing/Offshoring
 - » Misallocation of resources (low interest rate effect)
 - *Interdependency of explanations*
 - *Temporary factors*
 - *Caveat: Measurement problems*
- ⇒ **Secular growth pessimism is not supported**

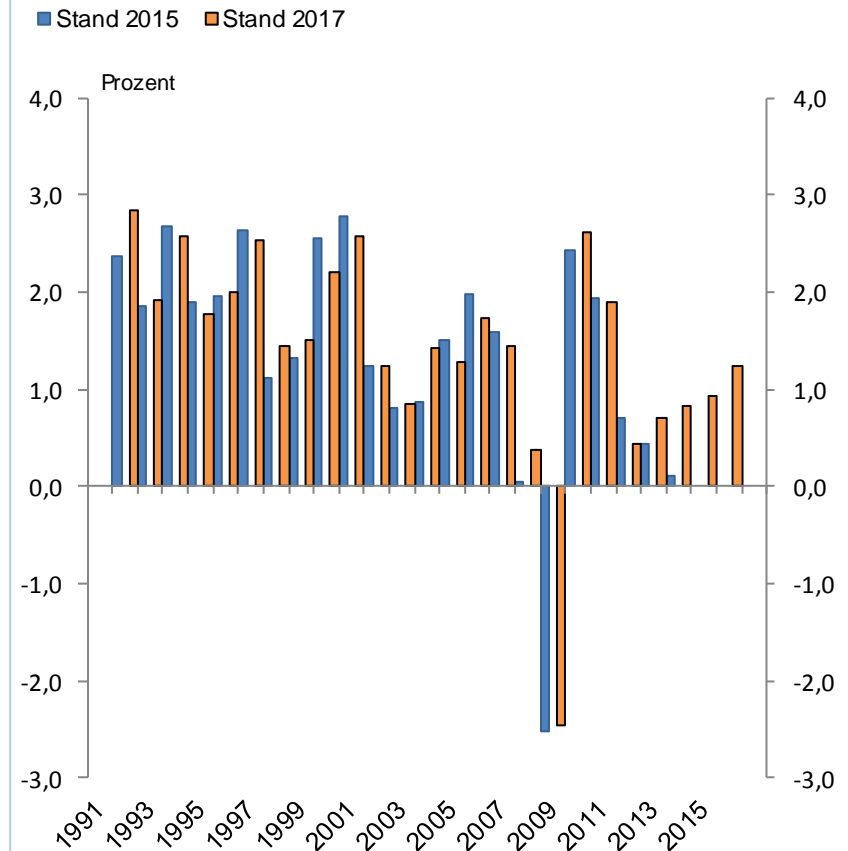
Update: Evidence 2015 vs. 2017 (new data and revisions on the macro level)

Hourly labour productivity (1991-2014)



Jahresdaten, Veränderung gegenüber Vorjahr, kalenderbereinigt.
Bruttoinlandsprodukt (preisbereinigt) je Erw erbstätigenstunde.

Hourly labour productivity (1991-2016)



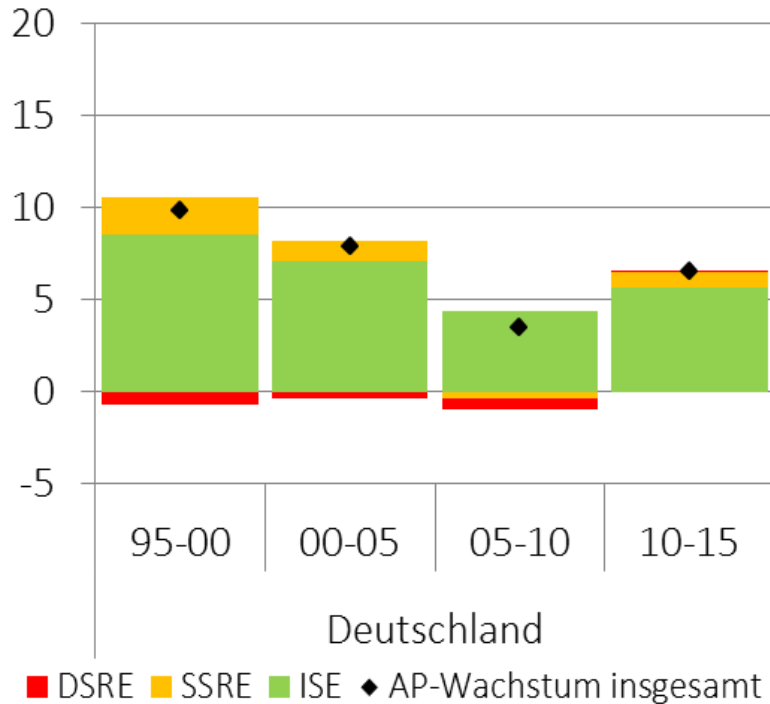
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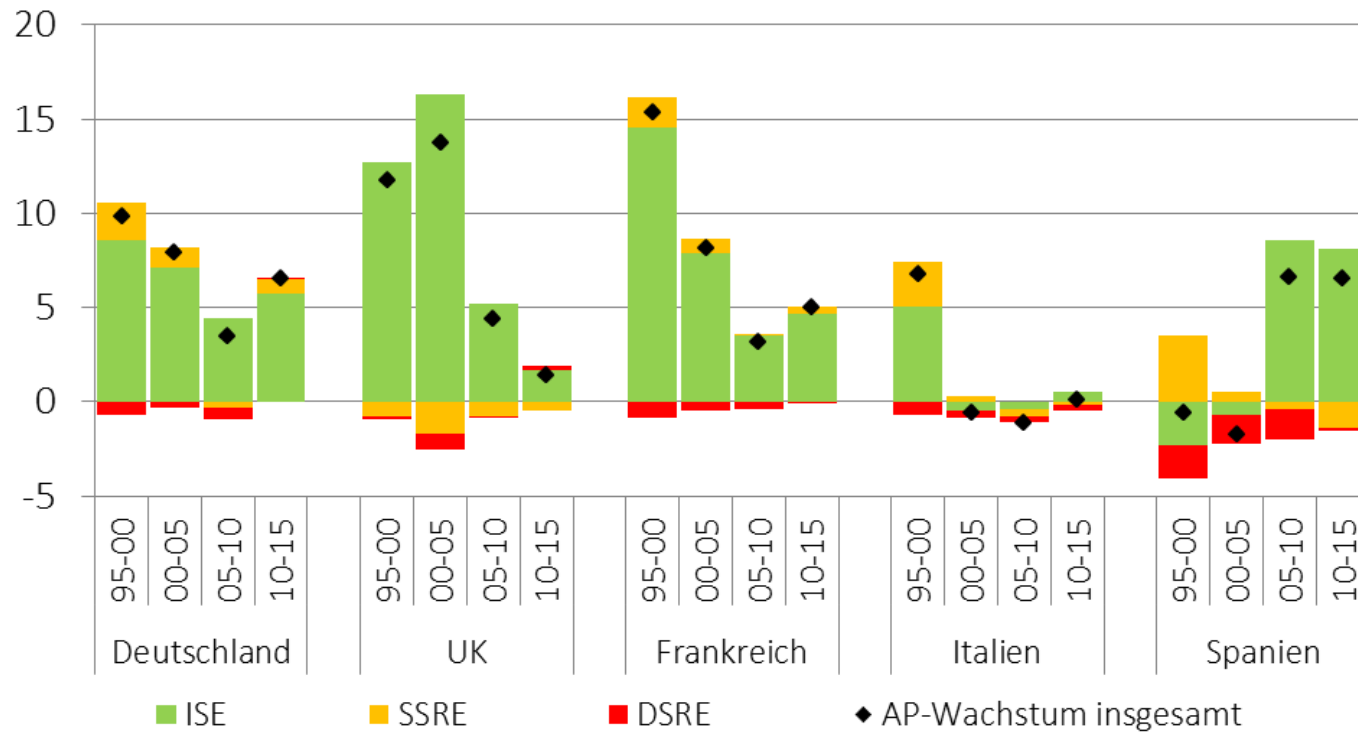
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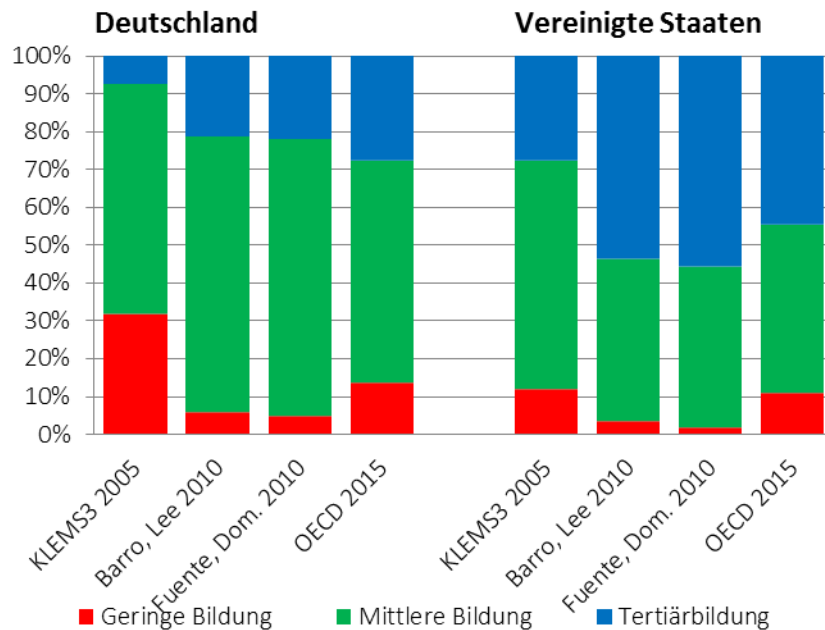
- SSRE und DSRE klein relativ zu ISE
- i.d.R.: DSRE < 0; SSRE > 0
- SRE=SSRE+DSRE i.d.R. > 0 (Beitrag zu AP-Wachstum 0,15-0,25 PP p.a.), aber < 0 in 2005-2010 (ca. -0,17 PP p.a.)
- Rückgang des AP-Wachstums von 00-05 auf 05-10 zu ca. 1/3 auf SRE zurückzuführen
- Relevante Sektoren: LW, Bau, PG, UN-DL
- Effekt von intrasektorialem Str.-Wandel innerhalb von PG und UN-DL nahezu Null

Beitrag des Strukturwandels zum AP-Wachstum



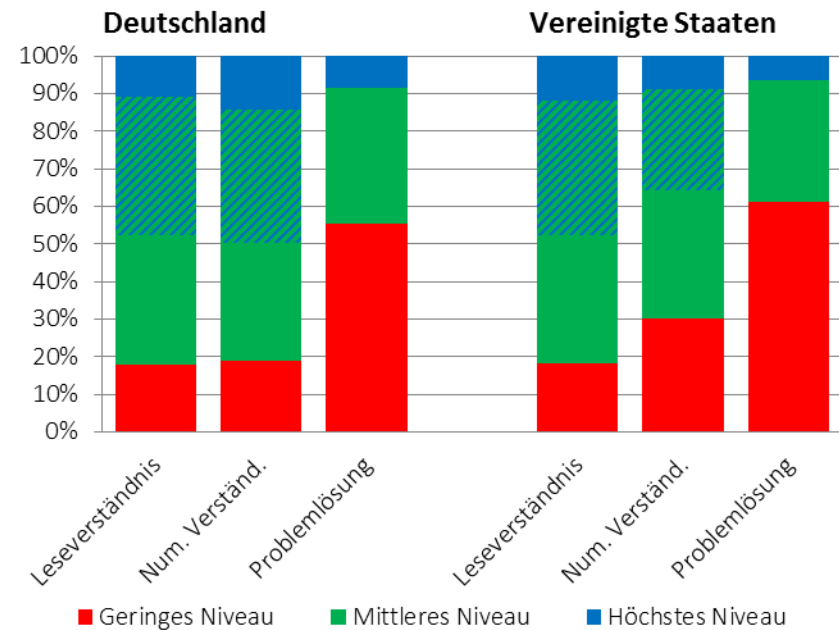
Vergleich am Beispiel Deutschland – Vereinigte Staaten

Verschiedene Quellen zu Bildungsergebnissen



- Sehr unterschiedliche Ergebnisse je nach Quelle
- Deutschland deutlich weniger qualifiziert als Vereinigte Staaten

Kompetenzmessung (PIAAC-Studie)



- Deutschland nicht weniger qualifiziert als Vereinigte Staaten
- Teilweise sogar besser