Ilya B. Voskoboynikov

# What explains the productivity slowdown in Russia?

Global Productivity Growth since 1990
(annual growth rates)

a. Labor productivity
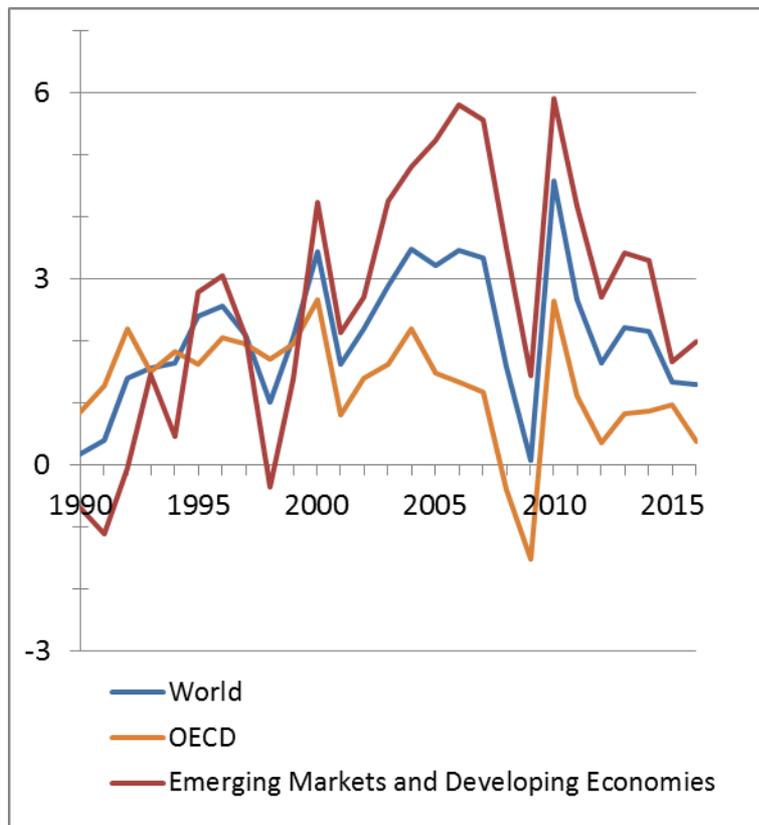
Source: TED database (adjusted version), May 2017

Global Productivity Growth since 1990
(annual growth rates)
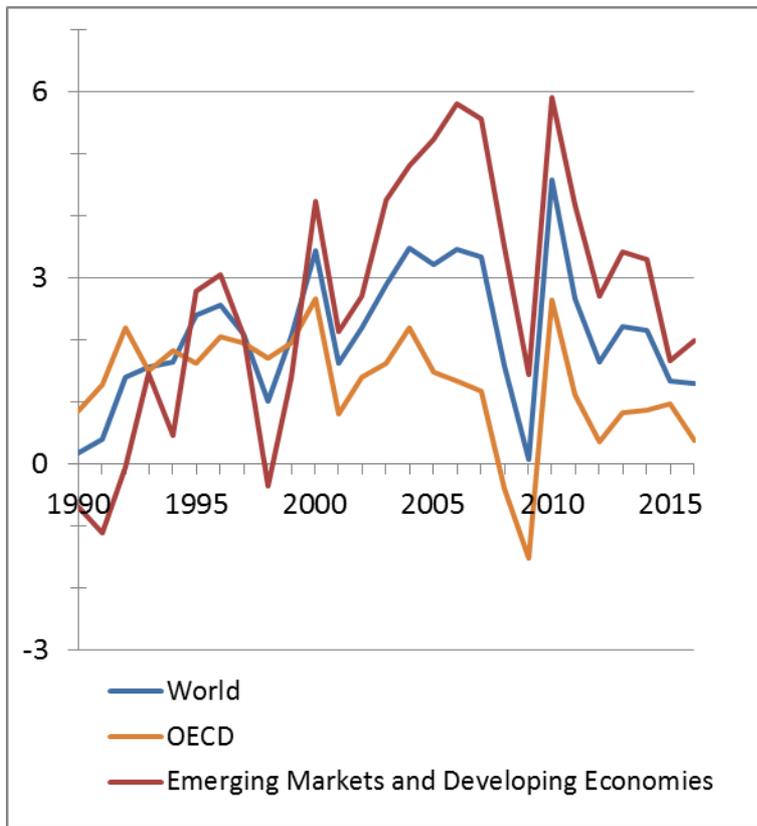
a. Labor productivity

b. Total Factor Productivity
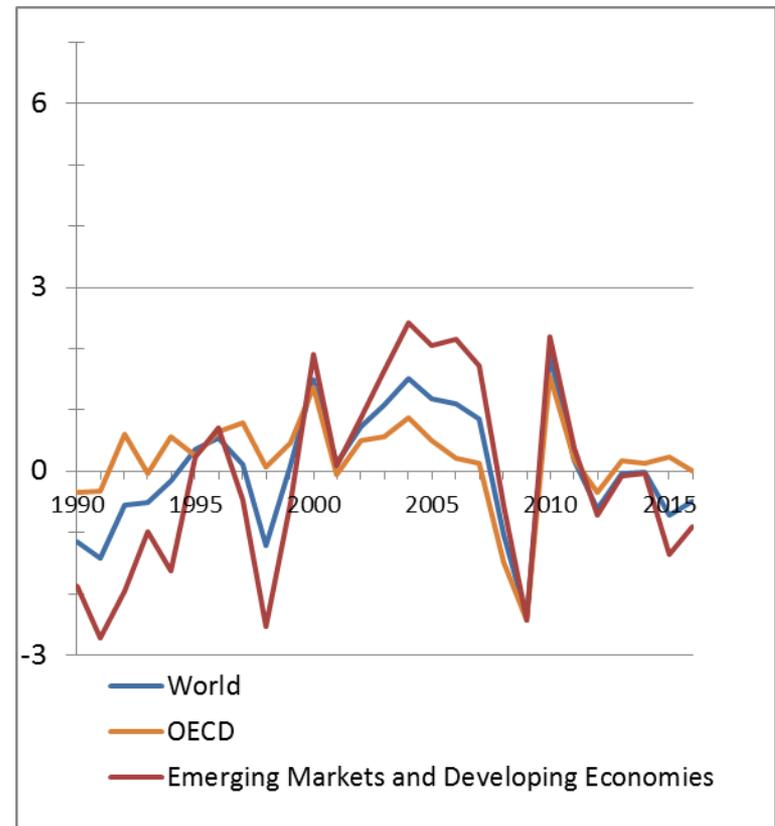
Source: TED database (adjusted version), May 2017

Productivity Growth since 1990 in BRIC
(annual growth rates)
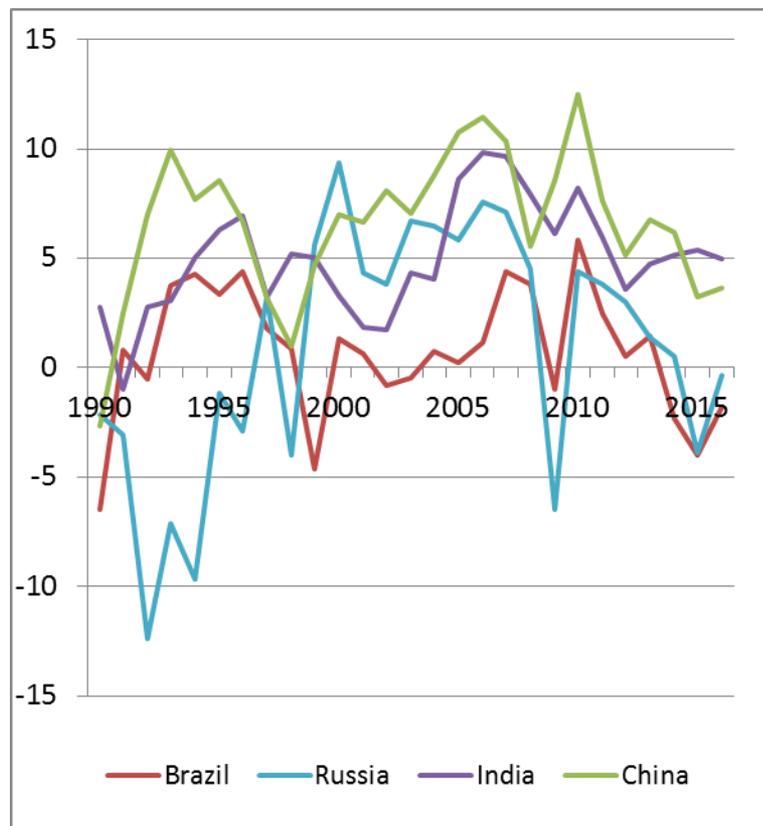
a. Labor productivity

b. Total Factor Productivity
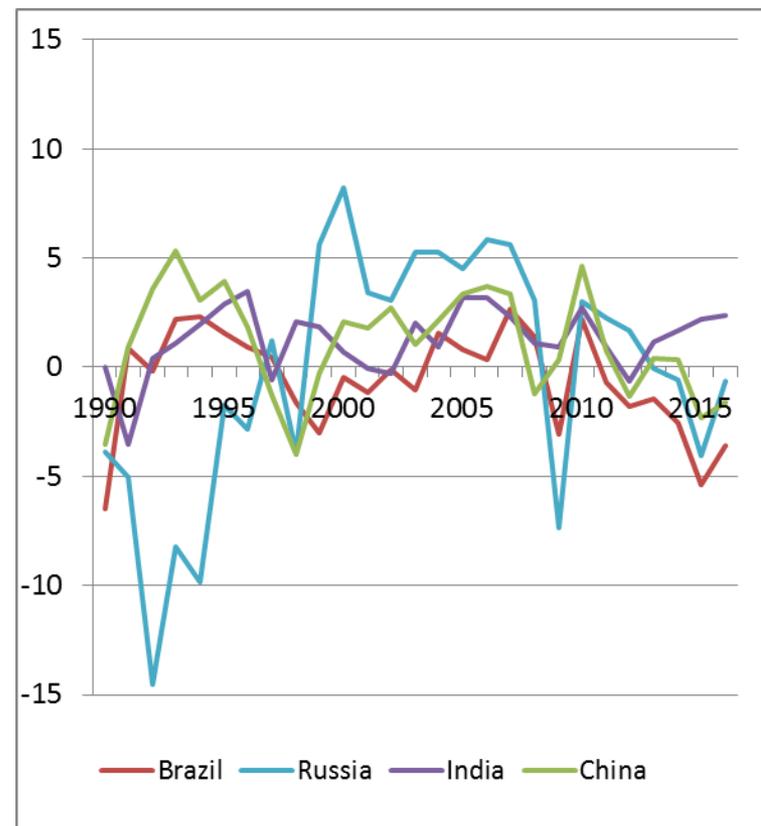
Source: TED database (adjusted version), May 2017

Productivity Growth since 1990 in Russia
(annual growth rates)
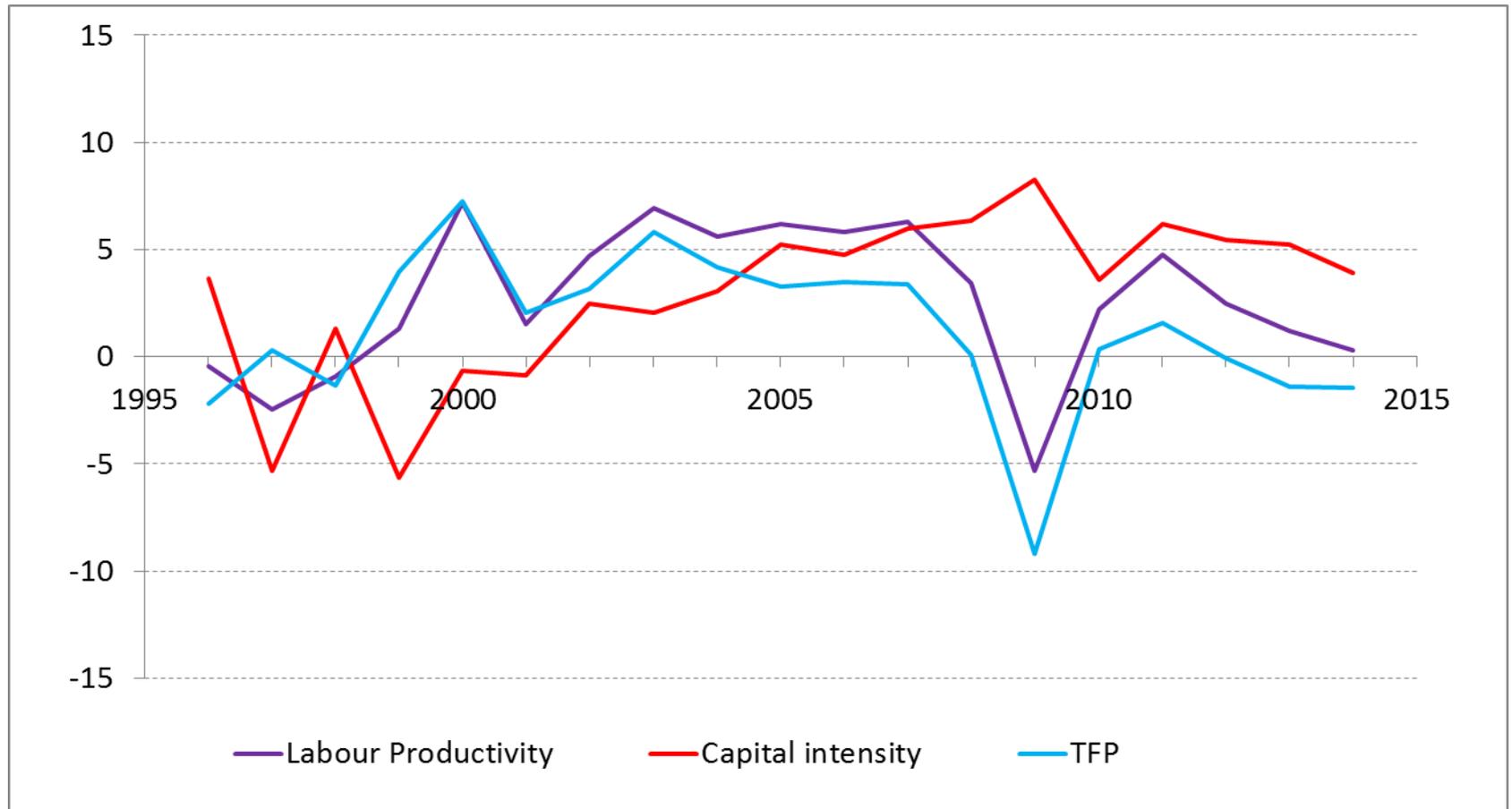
Source: Russia KLEMS, March 2017; Market economy

Global Context
for Productivity Slowdown in Russia

- Catching-up (Gerschenkron 1962; Aghion et al 2006)

  - 1950-1995: catching up to technology leaders after WW2 (e.g. Crafts and Toniolo 2010)

  - 1995-2004: ICT revolution (e.g. Jorgenson et al 2005)

  - 2004- present:

    - no explicit driver of total factor productivity growth (Ark et al. 2015; Demmou et al. 2015);

    - TFP slowdown as a statistical illusion

    - If not (e.g. Byrne et al 2016), the rate of innovations could be the same, but technology diffusion could be lower

Findings: what we see in Russia after 2008

- Stagnation of 2008-2014 is
    - *more* the outcome of
        - efficiency (aggregate TFP) slowdown
        - TFP slowdown could start before 2008, following the global economy pattern
    - *less* – lack of capital
        - Partially this could be the measurement issue, but in 1995-1998 my approach could catch capital intensity slowdown (China demand shock?)
    - lower contribution of ICT capital
    - lower impact of labour reallocation on labour productivity growth

Limitations

- Similar TFP trends in Russia and in other countries do not necesseraly say for similar determinants of these trends

- Consideration of the period 2008-2014 should not be automatically extended to present.

  - E.g. the lack of capital input can be the issue in Russia now

- Labour reallocation between industries is minor in comparison with reallocation between firms within industries

Literature

- Global productivity slowgown
  - Global economy: (Ark et al 2015); OECD: (Demmou et al. 2015); US (Byrne et al. 2016; Fernald et.al. 2017)
- Growth sources before 2008 – see review in Timmer, Voskoboynikov (2014)
- TFP as main source of Russian growth: (Entov, Lugovoy 2013; Jorgenson, Vu 2013)
- TFP decline in 2000-s: (Voskoboynikov, Kapelyushnikov 2014; Voskoboynikov, Solanko 2015; Timmer, Voskoboynikov 2016; World Bank 2017), ...
- Structural changes, labour productivity growth and the impact of informality expansion
  – Voskoboynikov, Gimpelson (2017)

Approach

(Jorgenson, Ho, Stiroh 2005; Stiroh 2002):

(1) $\qquad \Delta \ln Z_j = \bar{v}_{K,j}^{Z} \Delta \ln K_j + \bar{v}_{L,j}^{Z} \Delta \ln L_j + \Delta \ln A_j$

(2) $\qquad \Delta \ln Z \equiv \sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln Z_j =$

$$= \sum_j \bar{v}_{Z,j}^{GDP} \cdot \bar{v}_{K,j}^{Z} \cdot \Delta \ln K_j + \sum_j \bar{v}_{Z,j}^{GDP} \cdot \bar{v}_{L,j}^{Z} \cdot \Delta \ln L_j + \sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln A_j,$$

(3) $\qquad \Delta \ln z = \sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln z_j + \left(\sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln H_j - \Delta \ln H \right) =$
$$= \sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln z_j + R =$$
$$= \sum_j \bar{v}_{Z,j}^{GDP} \cdot \bar{v}_{K,j}^{Z} \Delta \ln k_j + \sum_j \bar{v}_{Z,j}^{GDP} \cdot \Delta \ln A_j + R,$$

Data

"Boost labor productivity in manufacturing at least by 50%"
V. Zaitsev, N. Ignat'ev, 1956

The data of most economies are filled with apparently inconsistent series. By choosing among them, one can produce almost any estimate of productivity growth imaginable

Alwyn Young (2003)

Data: Russia KLEMS overview

Time series are longer, more detailed than available in the literature for the Russian economy

- The dataset covers 34 industries. We use the international industrial classification NACE 1.0 (Rus: ОКВЭД) starting from 1995

- We construct the series of capital services based on detailed investment time series for 8 types of assets, as well as initial stocks and investment deflators;

- Labor input covers the economy within the borders of production of the national version of the System of National Accounts, including *Non-Market Households (Rus: личные подсобные хозяйства)* in *Agriculture*;

- We develop detailed data on shares of labor and capital, which differs in time and across industries, and takes into account self-employed and the shadow economic activities

The concept of capital services is not only theoretically to be preferred, but also empirically matters, as it qualifies the previous growth accounting findings

Data sources for Russia KLEMS: Summary

|	Concept	Sources	Imputations
Output	Value Added	SNA	• 1995-2004: transformation of official nominal and real VA into NACE 1.0 (Bessonov et al 2008). • 2002-2009: official data (Rosstat 2010)
Labor	Hours worked	SNA, BLF, Regular Firm Surveys	• 1995-2004: BLF, breaking down with firm surveys. • 2003-2009: SNA data on hours worked and FTE-jobs
Capital	Capital services	Investm., BFA, firm survey F11, inv. price indices	• 1995-2004: transformation of nominal investments into NACE 1.0 with the official bridge; • Calculations of capital services according to (Jorgenson, Griliches 1967)
Share of labor compen-sation	Labor comp./ VA ratio	SNA, RLMS	• Correction on labor compensation of self-employed. • Correction on difference in wages of self-employed and employee. • Distribution of shadow wages by industries.

Data. Labor
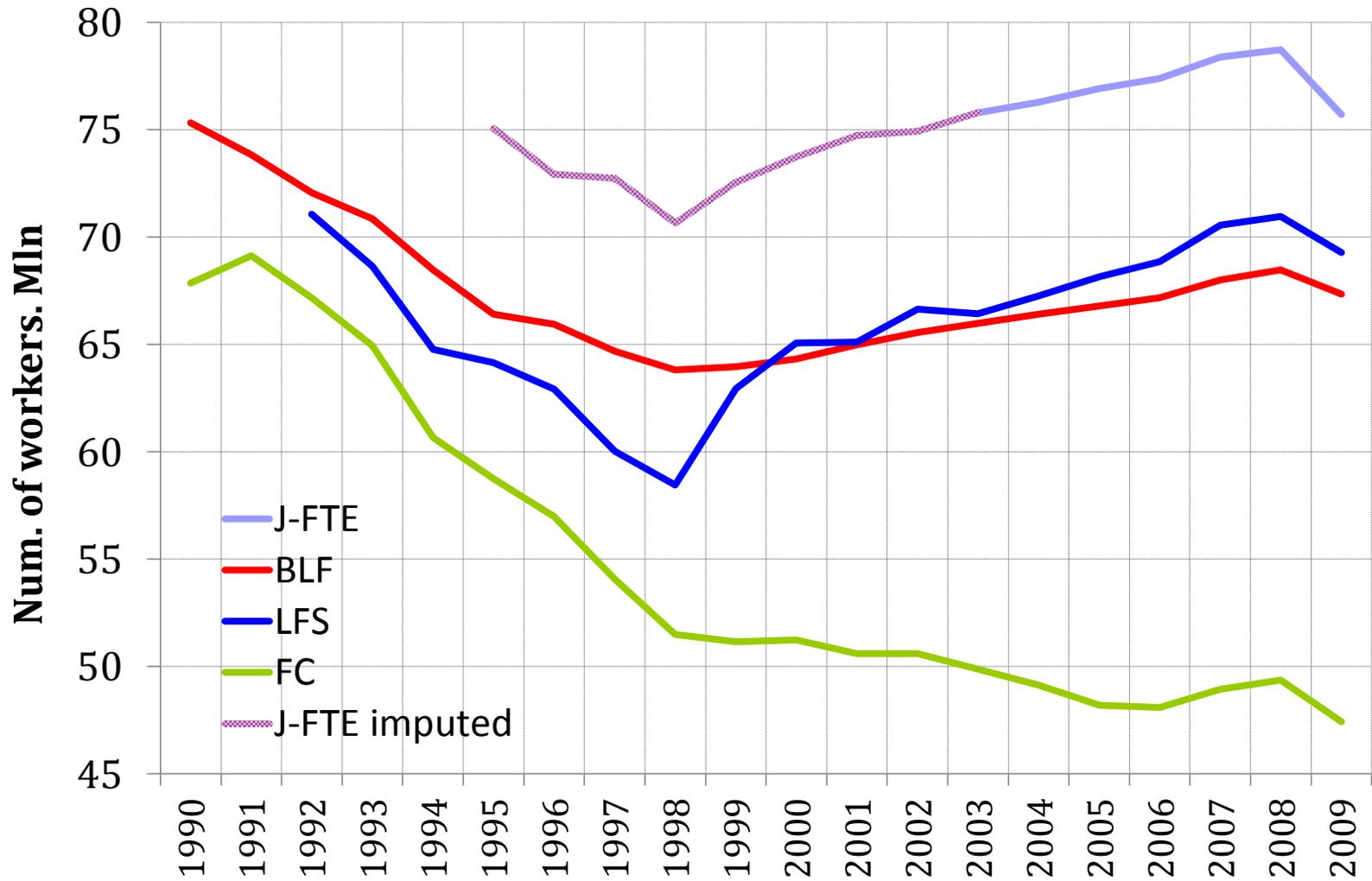
Data. Capital
Alternative Investment Deflators

Legend:
1. Investment deflator
2. PPI in C, D and E
3. CPI
4. Deflator of Mach. & Eq.
5. Deflator of imported Mach. & Eq.
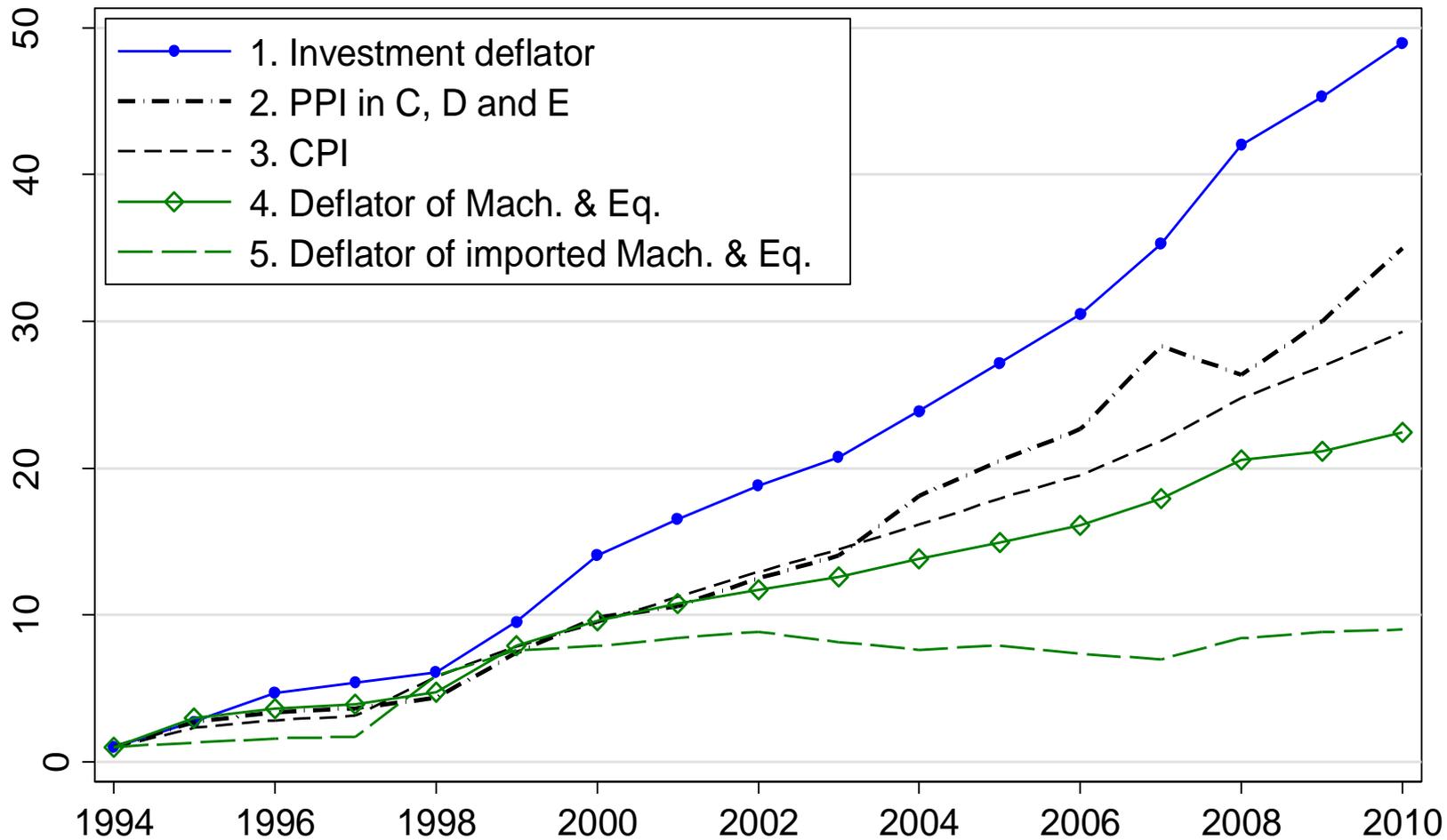
Data. Capital. Alternative Series
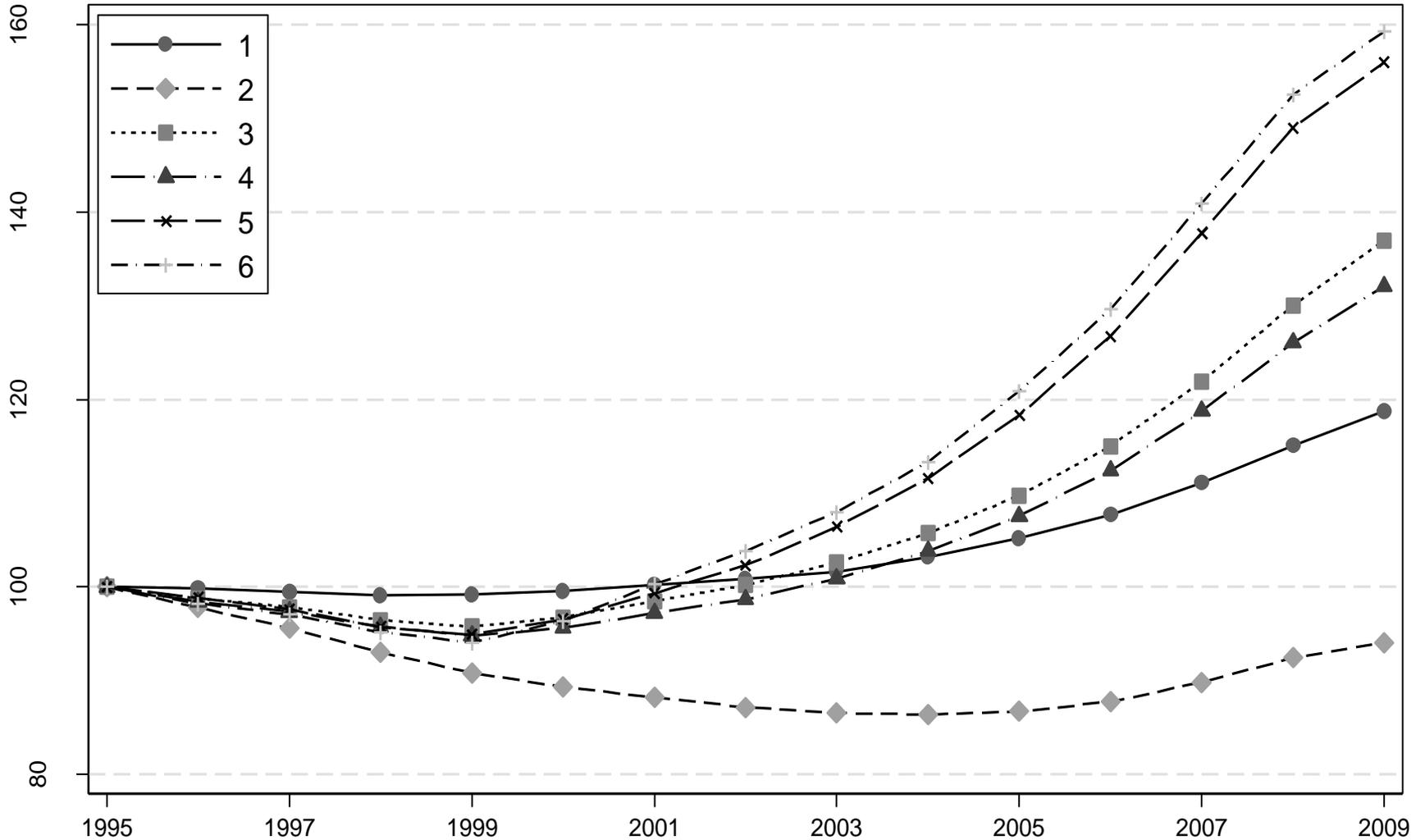
Data, Approach, Results - Overview

Growth accounting decomposition in 1995-2008 for alternative datasets (p.p.)
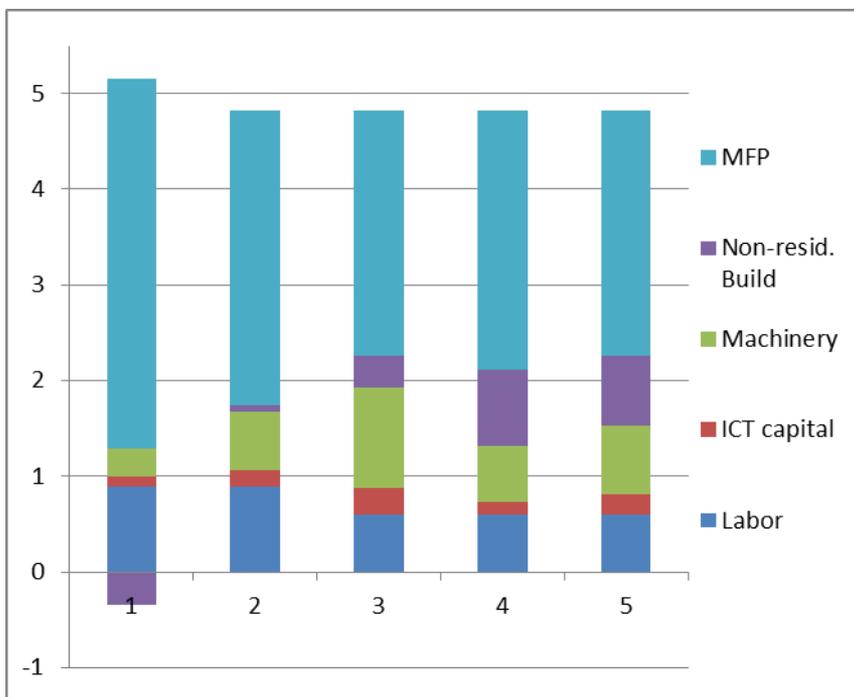
Why does the growth accounting literature overlook capital contribution?

1. Replication of the growth accounting literature

2. Different investment deflators

3. More accurate shares of factors

4. More accurate depreciations

5. <u>Capital services instead of stocks</u>

**So what?**

Is Russian growth sustainable?

Yearly average labour productivity growth rates,
Market economy (p.p.)

Legend: TFP, K/L, Reallocation

Categories: 1995-2002, 2002-2007, 2007-2014
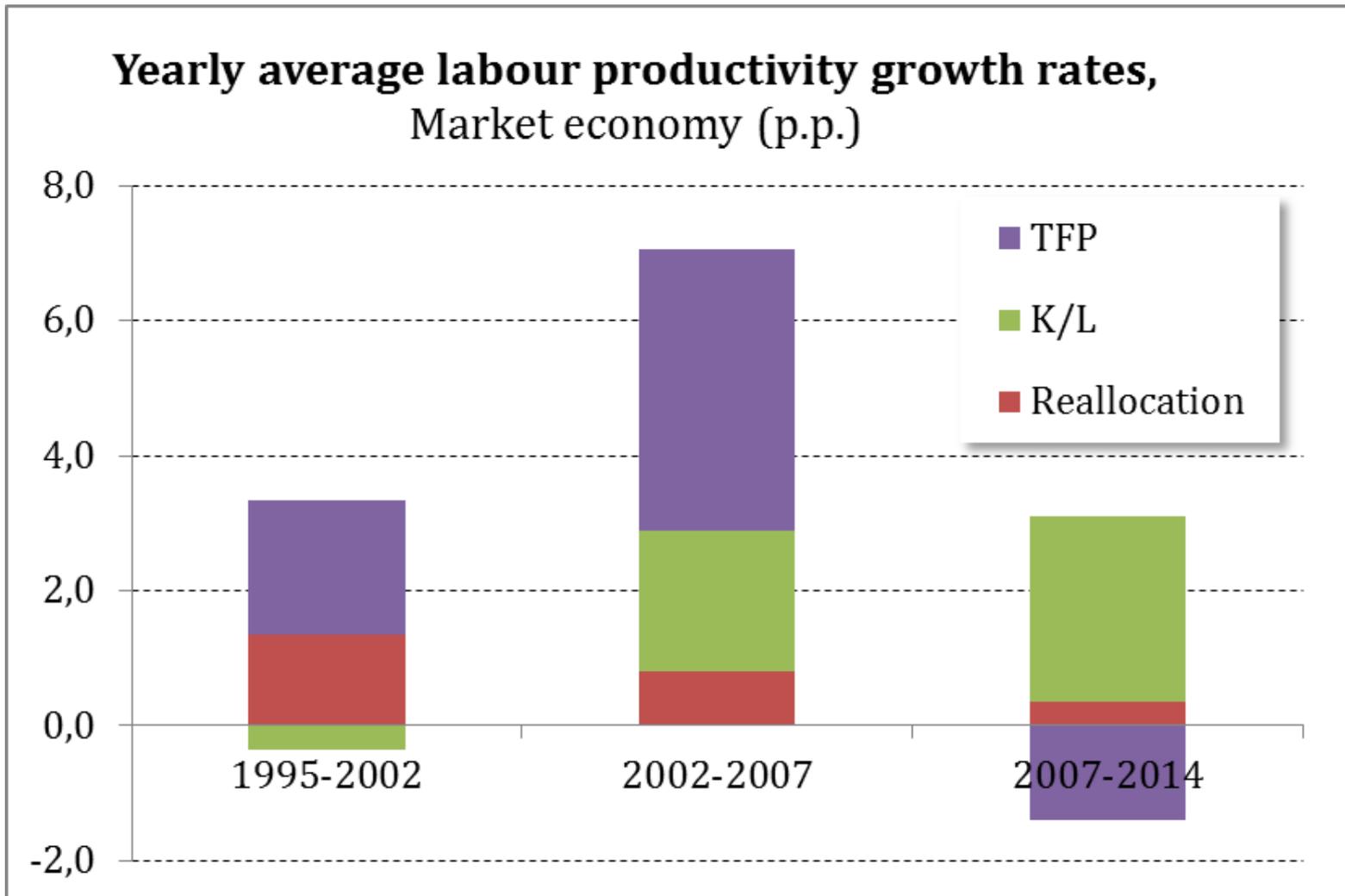
Source: Russia KLEMS, March 2017

Structural change in aggregated sectors

	VA share (%)		Growth rates (%)	Contributions (pp)
	1995	2014	1995-2014	1995-2014
Total economy	100,0	100,0	3,47	3,47
Market economy	86,1	80,9	3,60	3,00
Agriculture	7,6	4,2	1,39	0,08
Extended Oil and Gas sector	20,1	24,2	3,59	0,80
Manufacturing	22,4	14,9	2,15	0,40
Retail, construction, telecom, hotels & restaurants (RCT)	19,2	18,6	4,07	0,77
Finance & Business Services	5,1	12,0	8,41	0,72
Transport	11,7	6,9	2,55	0,24
Nonmarket services	13,9	19,1	2,79	0,46

Source: Russia KLEMS, March 2017

# Intra-industry labour productivity growth rates and reallocation in the comparative perspective (1995-2007)
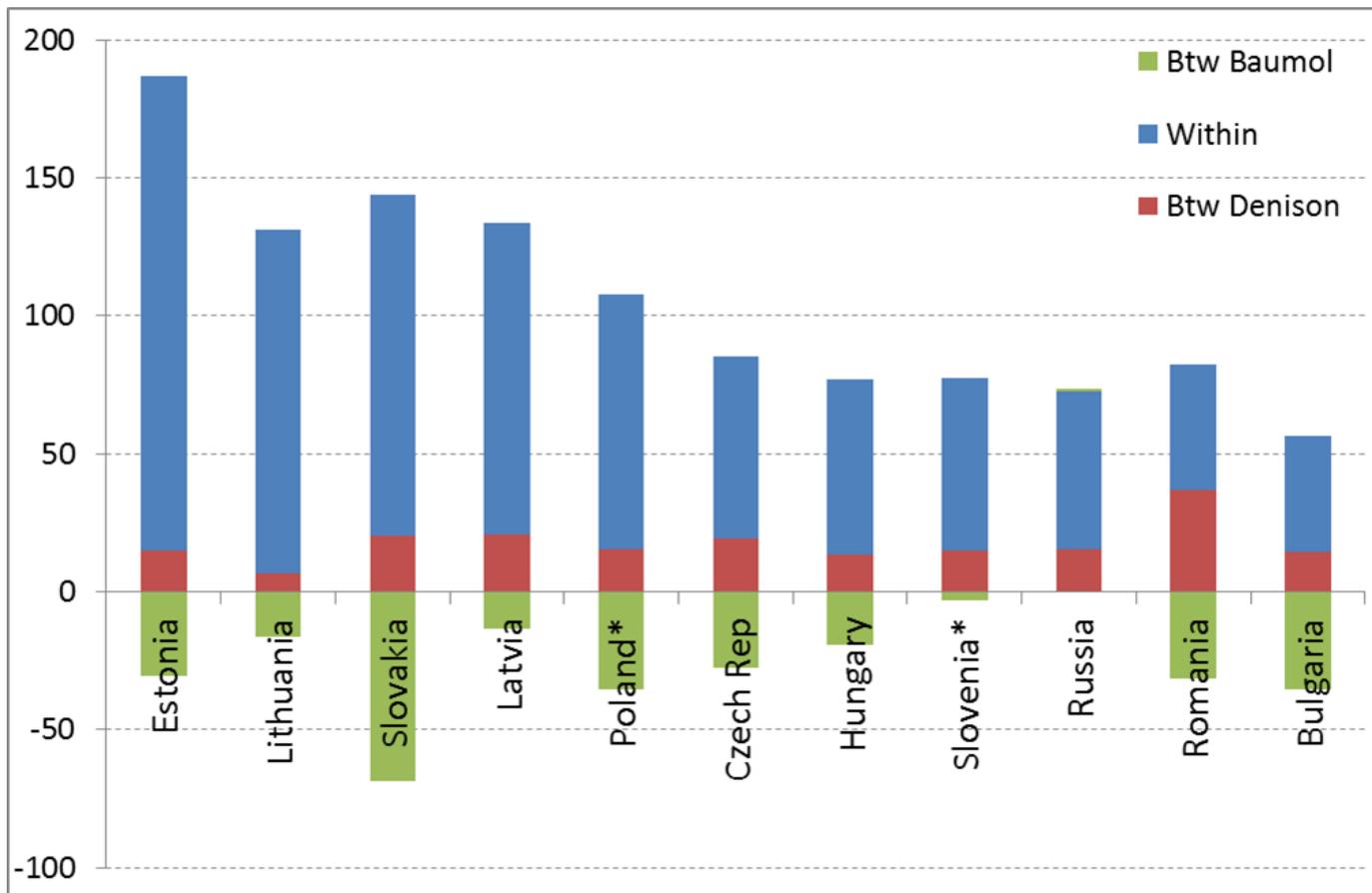
Contributions of types of assets to aggregate capital intensity growth

Sectoral structure of aggregate capital intensity growth
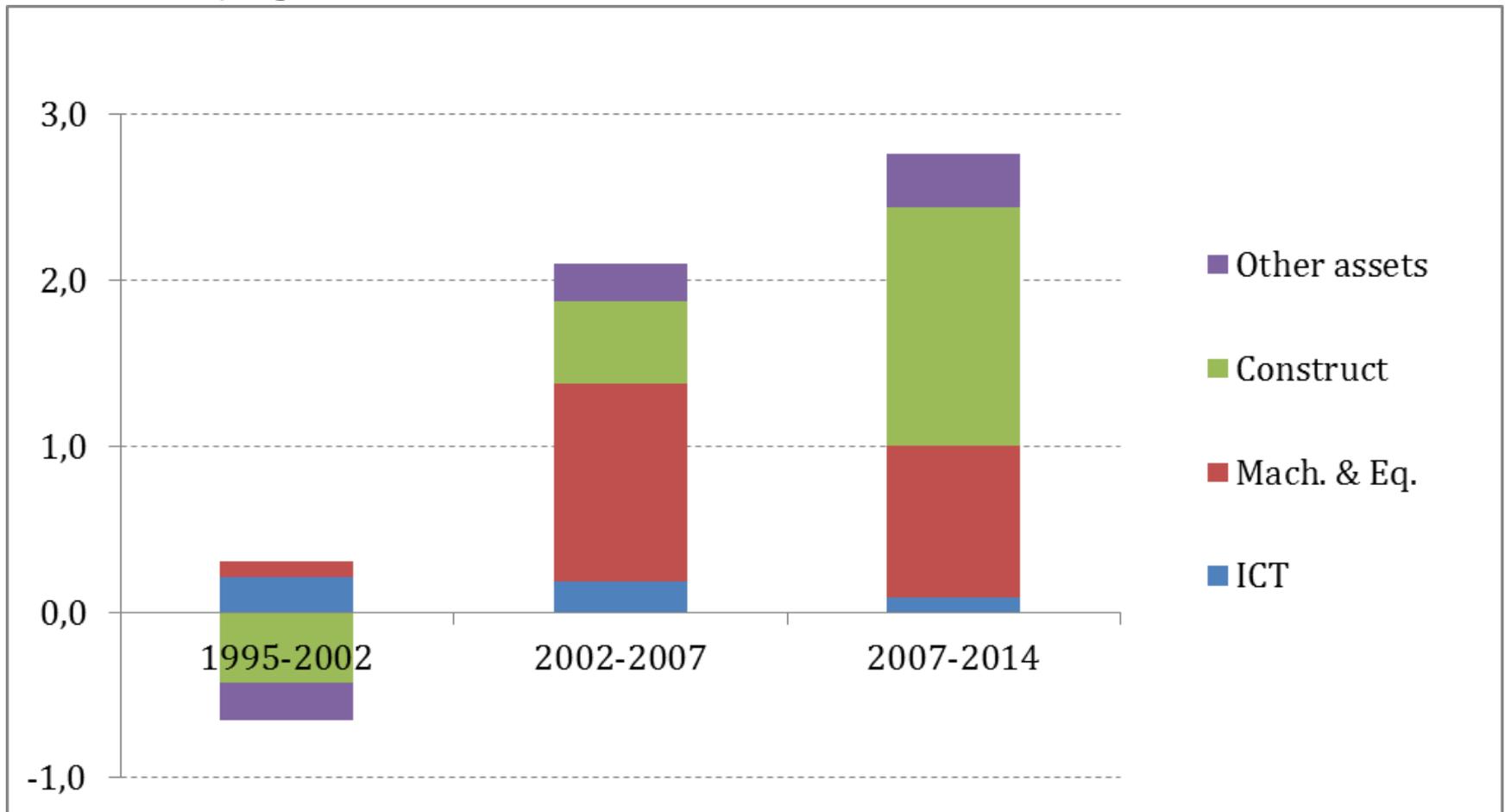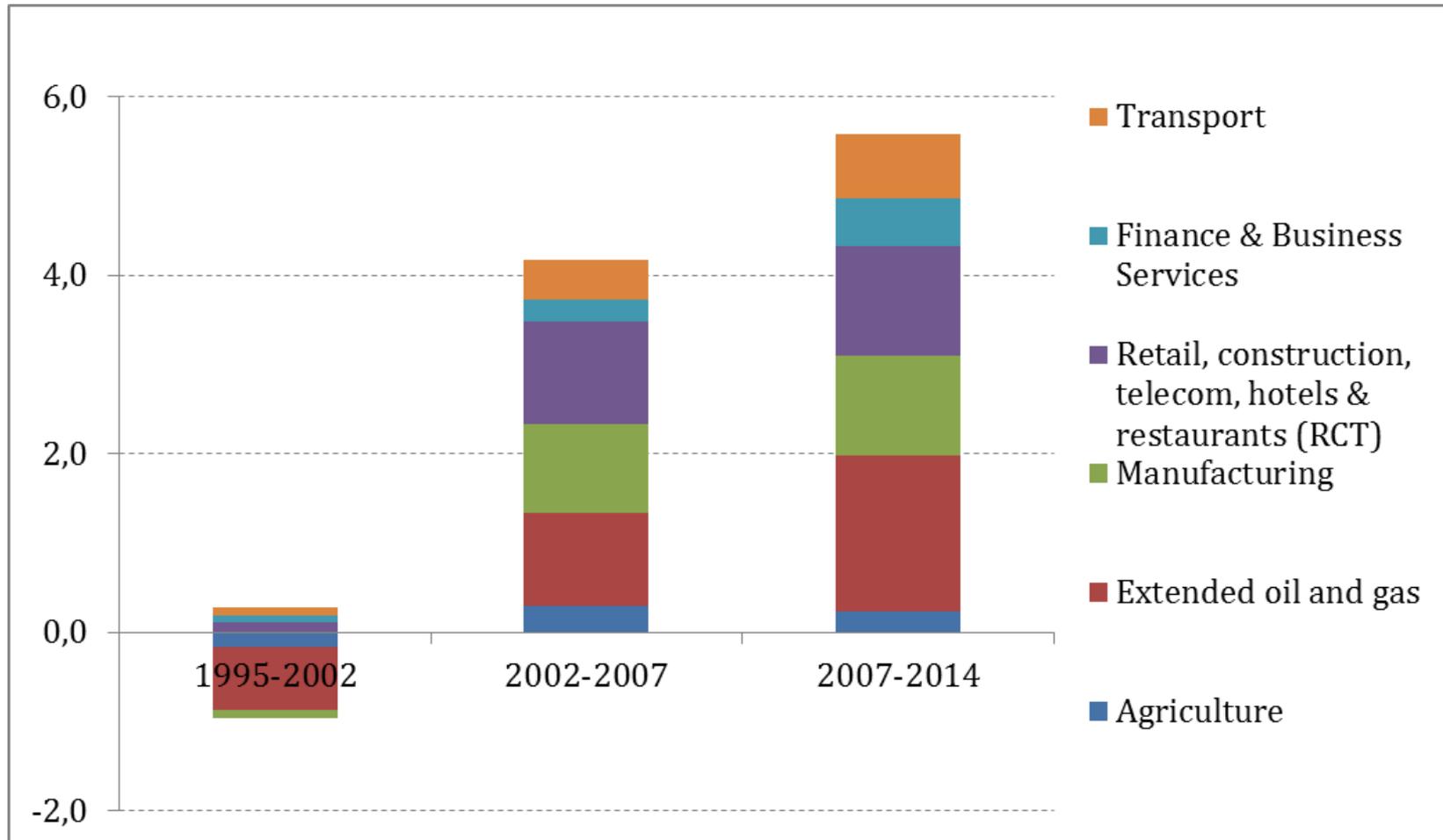
Source: Russia KLEMS, March 2017

Sectoral structure of aggregate TFP growth
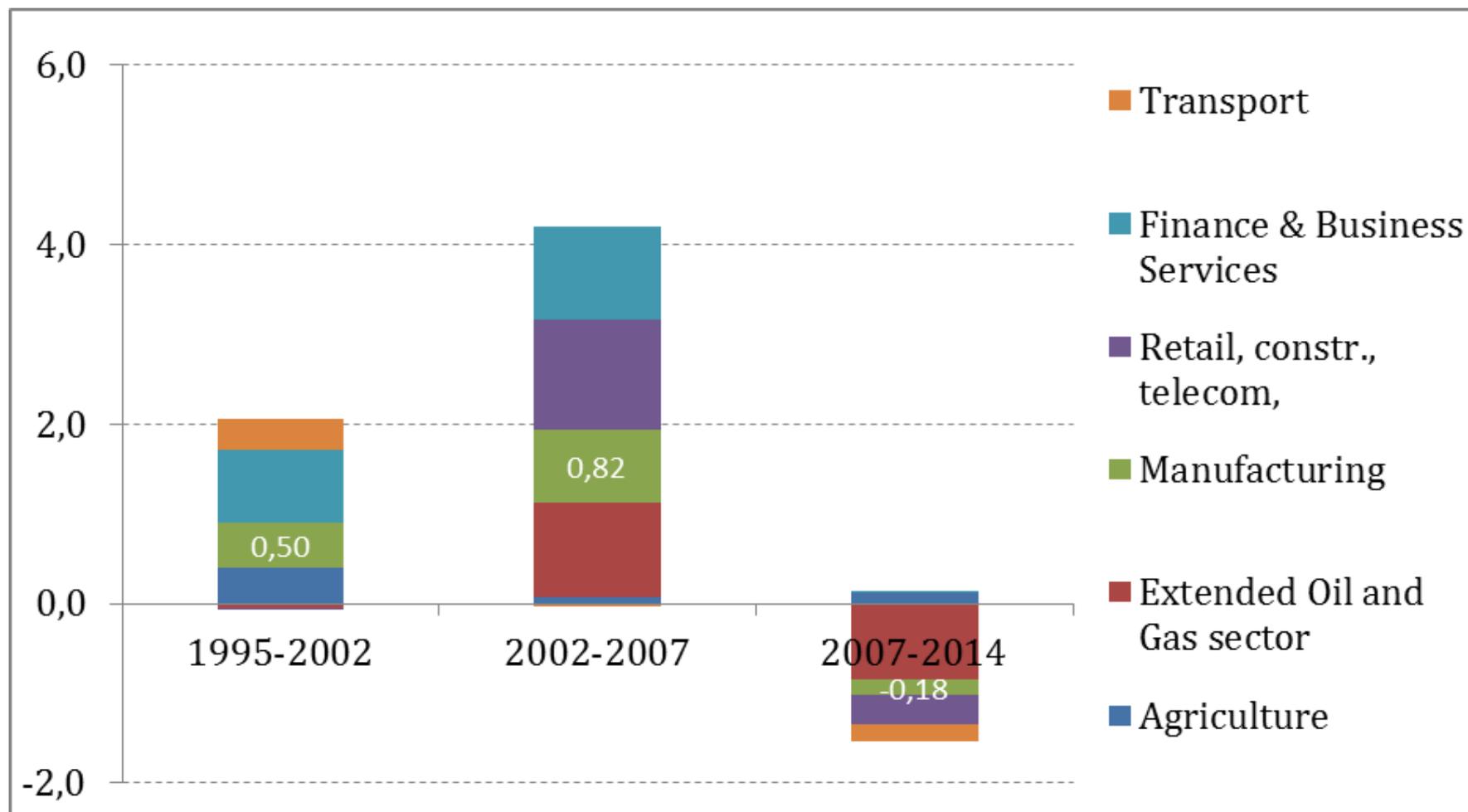
Source: Russia KLEMS, March 2017

Labour productivity growth decomposition (p.p.) 2002-2007
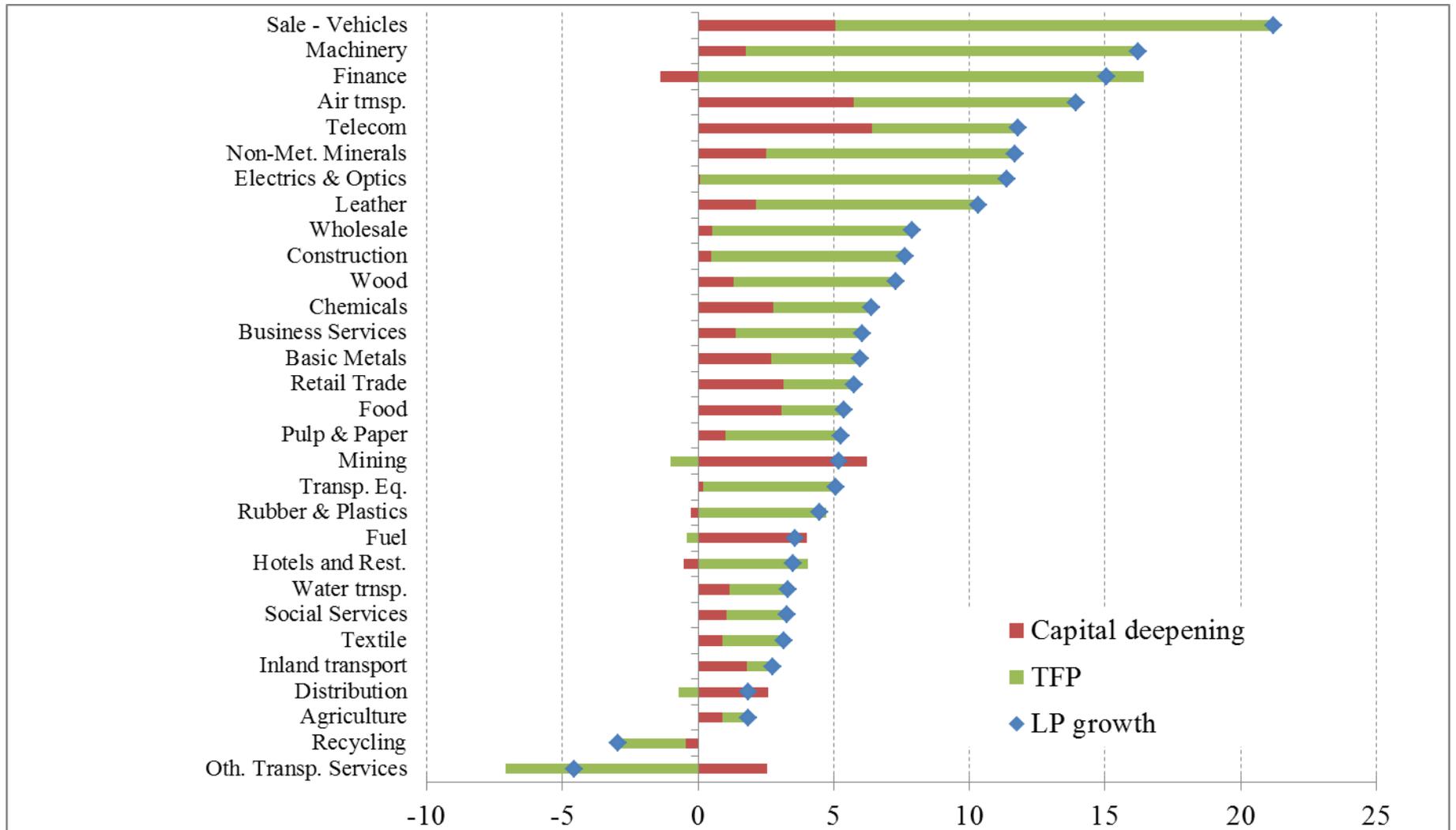
Source: Russia KLEMS, March 2017

Labour productivity growth decomposition (p.p.) 2007-2014
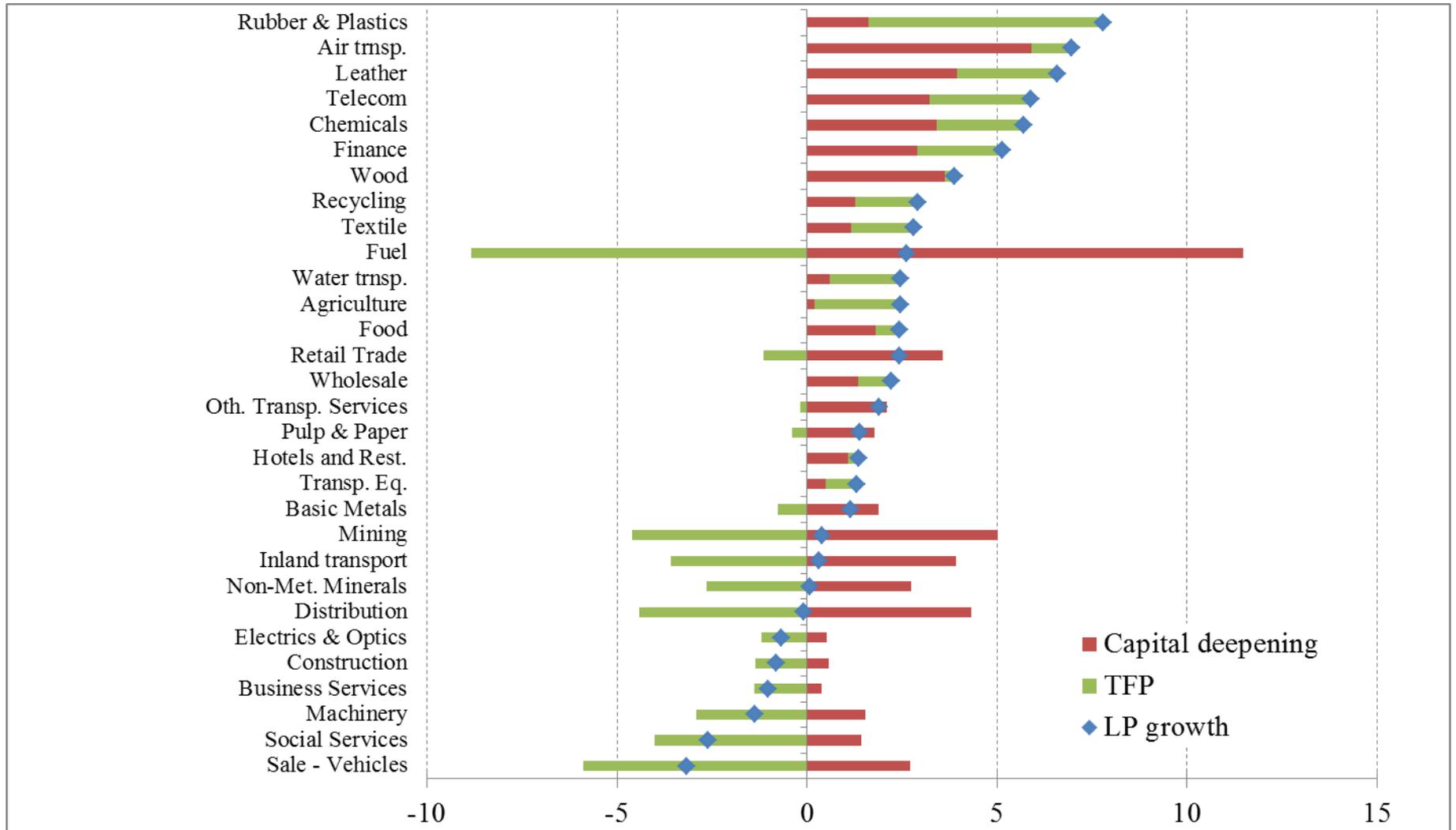
Source: Russia KLEMS, March 2017

The role of Labor Composition

	Contributions (pp.)			
	1995-2002	**2003-2007**	**2008-2012**	**1995-2012**
Aggregate Real GDP growth	2,78	7,14	1,03	3,74
Hours worked	-0,09	0,83	-0,13	0,22
Aggr. Lab. Productivity	2,86	6,31	1,16	3,52
Labor reallocation	1,31	0,72	0,09	0,76
Intra-industry Lab. Productivity Growth	1,55	5,59	1,08	2,76
MFP	1,63	3,17	-1,61	1,16
Capital Intensity	-0,33	2,26	2,47	1,38
Labor composition	0,25	0,15	0,22	0,22

Source: Russia KLEMS, March 2017; labor composition – own calculations

Labor Composition and Labor Productivity Growth in Russia and CEEs in 1995-2007

Gr. rates (pp)	RUS	CZE	HUN	SVN	GER
Real VA	4,58	2,65	3,85	3,79	1,60
Hrs worked	0,32	-0,19	0,41	-0,19	-0,12
LP total	4,25	2,84	3,45	3,99	1,71
Reallocation	0,98	0,23	0,19	1,23	0,25
LP within	3,28	2,60	3,26	2,76	1,46
MFP	2,20	0,72	2,17	0,82	0,69
K/H	0,89	1,70	0,69	1,49	0,73
Lab. Quality	0,19	0,19	0,40	0,45	0,05

NOTE: Total economies. Yearly averages in 1995-2007
Russia KLEMS 2017, EU KLEMS 2008

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Publications

This project has been published as:

Voskoboynikov, Ilya B. 2012. "New Measures of Output, Labor and Capital in Industries of the Russian Economy." *GGDC Research Memorandum* GD-123. www.ggdc.net

Timmer, Marcel P. and Ilya B. Voskoboynikov, 2014. "Is Mining Fuelling Long-run Growth in Russia? Industry Productivity Growth Trends since 1995." *Review of Income and Wealth* 60, Supplement Issue, November: S398-S422.

Timmer, Marcel P., and Ilya B. Voskoboynikov. 2016. «Is Mining Fuelling Long-Run Growth in Russia? Industry Productivity Growth Trends in 1995-2012». In *Growth and Stagnation in the World Economy*, (eds.) Dale W. Jorgenson, Kyoji Fukao, and Marcel P. Timmer. Cambridge University Press.

Voskoboynikov, Ilya B. 2017. "Structural Change, Expanding Informality and Labour Productivity Growth in Russia." 18/2017. BOFIT Discussion Papers. Helsinki: Bank of Finland. http://urn.fi/URN:NBN:fi:bof-201711291674.

Thank you!