Productivity in Korea

Jungwook Kim

CONTENTS

1 Current Status

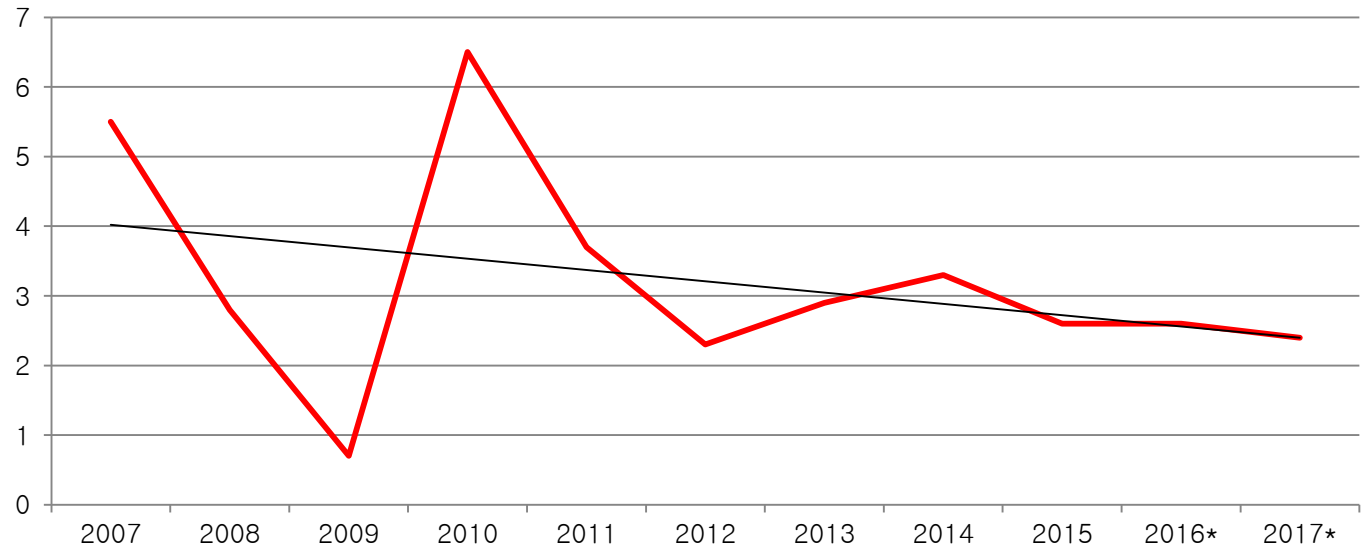
Current Status of Korean Economy

- **Slowdown in Economy**
- **Productivity Deterioration?**
- **Foreseeable Deep Uncertainty**

KDI

Current Status of Korean Economy

- **Slowdown in Economy**



<GDP growth rate of Korea>

Source: Bank of Korea (2007-2015)

*** 2016-2017 estimates: KDI Economic Forecast**

KDI

Current Status of Korean Economy

- **Productivity Deterioration?**
- An International comparison suggests productivity of Korea was at higher level.

Country	Manufacture			Service			Construction		
	Labor	Capital	TFP	Labor	Capital	TFP	Labor	Capital	TFP
Korea	-0.11	3.25	3.15	1.29	2.66	0.22	-0.01	0.18	-0.25
Japan	-1.16	0.72	0.63	0.19	0.85	-0.05	-1.60	-0.12	-0.63
USA	-1.19	0.66	3.14	0.78	1.49	0.19	0.39	0.87	-2.54
UK	-1.97	0.07	1.47	1.26	1.57	0.38	0.57	0.70	-0.59
GER	-1.01	0.31	0.81	0.44	1.23	0.09	-2.30	-0.04	-0.58
FRA	-0.72	0.42	1.09	0.93	0.91	-0.03	1.05	0.64	-1.27

<Input Contribution to Value Added Ratio Growth, 1996-2009>

Source: Korea Productivity Center

KDI

Current Status of Korean Economy

- **Value added ratio** is a proxy for productivity or efficiency in production.

Period	Manufacture	Construction	Service
02-03	24.93	39.65	43.66
04-06	23.20	37.86	42.86
07-09	21.92	33.01	39.52
10-12	20.38	29.10	35.72
13-15	22.09	30.64	37.40
Total Ave.	22.33	33.65	39.56

<Value Added Ratio by Sector in Korea>

Source: Bank of Korea

KDI

Value Added Ratio by Sector

Manufacture			
Period	Average	S/M	Large
07-09	21.92	24.27	20.65
10-12	20.38	23.89	19.01
13-15	22.09	26.61	20.18
07-15	21.46	24.92	19.95
Construction			
Period	Average	S/M	Large
07-09	33.01	35.58	27.15
10-12	29.10	31.38	24.39
13-15	30.64	34.40	23.54
07-15	30.92	33.79	25.03

Source: Bank of Korea

KDI

Concentrated or Dominated Economy

- Large companies in Manufacture sector takes 72% of sales volume and 61% of value added in 2014.
- Large companies in Construction sector takes 47% of sales volume but 28% of value added in 2014.

Average		Large (A)	S/M (B)	B/A
MF	Sales	33.63	0.43	1.28%
	VA	4.23	0.09	2.13%
Con	Sales	7.44	0.22	2.96%
	VA	0.93	0.06	6.45%

<Average Sales Volume and Value Added>

Unit: 10 Billion KRW (approx. 10 Million USD)

Source: Bank of Korea, Author's calculation

KDI

Issues around Productivity in Korea

- Economic Slowdown
- Productivity Deterioration?
- **Foreseeable Deep Uncertainty**
  - ◆ Population Aging
  - ◆ Climate Change
  - ◆ Fourth Industrial Revolution

2 Various Aspects of Productivity

Asset and Sales by Sector

- Sectoral figures show recent slowdown in terms of total asset and sales volume.

Period	Manufacture		Construction		Service	
	GR of Total Asset	GR of Sales Volume	GR of Total Asset	GR of Sales Volume	GR of Total Asset	GR of Sales Volume
02-03	5.04	7.19	7.45	9.62	4.32	1.84
04-06	8.49	9.74	9.67	4.58	6.93	5.60
07-09	13.83	10.65	12.37	10.63	9.93	9.30
10-12	9.05	12.08	1.86	1.94	7.40	11.04
13-15	4.39	-1.36	3.68	4.98	5.54	3.97
Average	8.38	7.70	6.98	6.12	7.00	6.67

KDI

Growth Rate by Size of Firms

Manufacture				
Period	Large		S/M	
	GR of Total Asset	GR of Sales	GR of Total Asset	GR of Sales
07-09	13.98	10.88	13.55	10.27
10-12	8.89	12.51	9.63	11.09
13-15	3.04	-3.61	8.16	4.34
Average	8.64	6.59	10.45	8.56

Construction				
Period	Large		S/M	
	GR of Total Asset	GR of Sales	GR of Total Asset	GR of Sales
07-09	17.60	14.56	7.63	8.39
10-12	1.31	1.83	2.66	2.02
13-15	1.67	2.09	6.45	7.42
Average	6.86	6.16	5.58	5.94

Measures for Productivity

- But some measures of productivity tell different story; even construction industry is not stronger.

Period	Manufacture		Construction		Service	
	Profit Rate	Breakeven Ratio	Profit Rate	Breakeven Ratio	Profit Rate	Breakeven Ratio
02-03	6.81	82.23	4.89	86.39	4.70	93.96
04-06	6.34	80.02	5.93	83.19	5.04	91.49
07-09	5.86	84.64	4.70	89.75	4.15	95.21
10-12	5.81	81.72	2.36	98.62	3.81	95.78
13-15	4.84	86.22	**2.59**	**96.66**	3.76	96.05
Ave.	5.87	83.02	4.04	91.25	4.26	94.54

KDI

R&D Activity

- R&D ratio refers the size of R&D spending relative to the sales volume.
- That ratio is highly correlated with value added ratio, which implies that R&D activity is connected to productivity.

Correlation Coefficient: Value added ratio and R&D ratio (2007-2015)		
Total	Manufacture	0.555
	Construction	0.615
	Service	0.836
Manufacture	Large	0.501
	S/M	0.745
Construction	Large	0.841
	S/M	0.399

KDI

Possible scenario

- **Impact of R&D activity?**

Manufacture				
Period	Large		S/M	
	VA ratio	R&D ratio	VA ratio	R&D ratio
07-09	20.65	2.02	24.27	1.14
10-12	19.01	1.84	23.89	1.10
13-15	20.18	2.35	26.61	1.24
Average	19.95	2.07	24.92	1.16
Construction				
Period	Large		S/M	
	VA ratio	R&D ratio	VA ratio	R&D ratio
07-09	27.15	0.50	35.58	0.37
10-12	24.39	0.37	31.38	0.32
13-15	**23.54**	**0.36**	34.40	0.38
Average	25.03	0.41	33.79	0.36

KDI

Labor Productivity

- Labor productivity can be measured by product increment by one unit of labor.

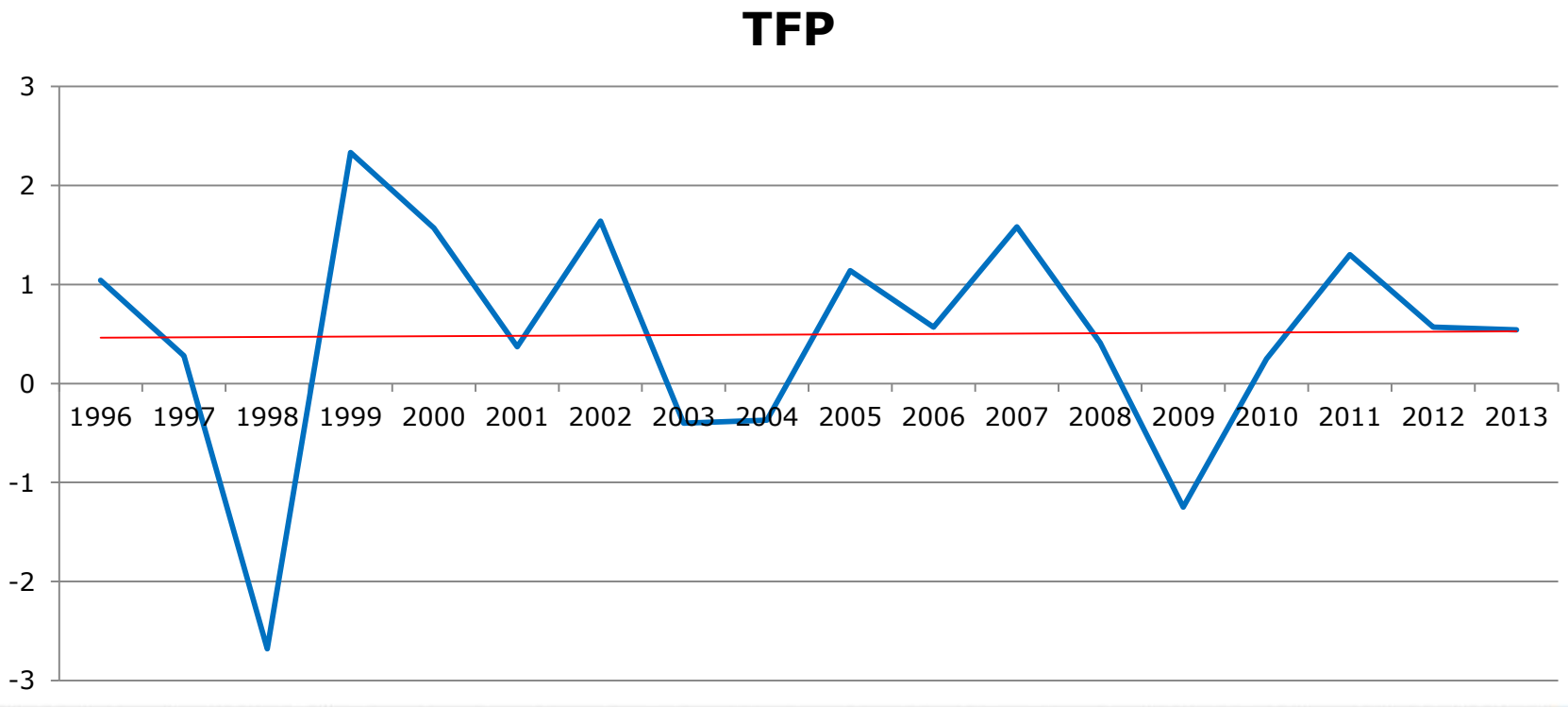
	2010	2011	2012	2013	2014	2015
Manufacture	100	101.4	98.9	97	94.5	92.5
Construction	100	87.1	81.4	92.8	88.4	87.3
Service	100	99.5	97.3	97	95.6	96.4

KDI

3 Discussion

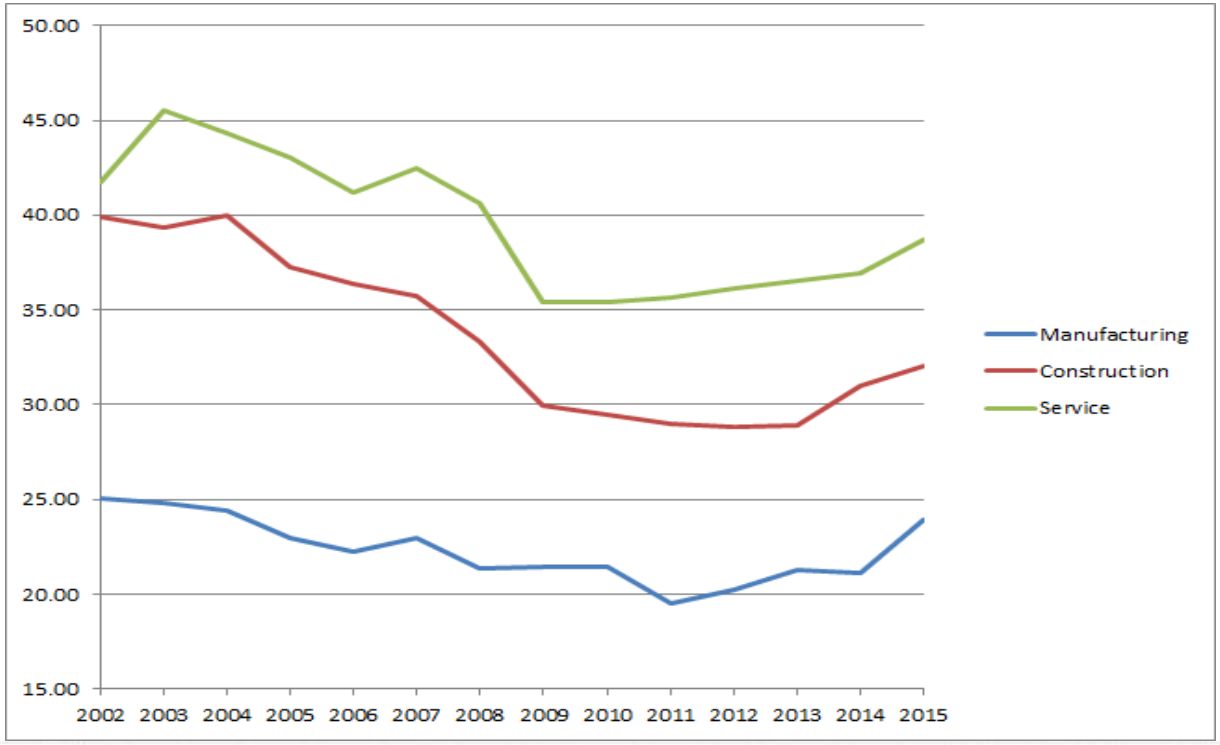
Productivity Stagnation

- TFP in Korea is plateau after 1996.



Productivity Rebound?

- Sectoral productivity reveals declining trend, but there's non-trivial rebound in recent years.



Enhancing Productivity : Construction

- Construction industry in Korea contributed employment and GDP growth in significant way.

- However, expected downturn in housing supply along with low labor productivity suggests need for change, such as investment and restructuring.

Enhancing Productivity : Construction

- Equipment investment in Construction industry is in low level; the equipment investment to GDP is lower than other countries.

	Korea	USA	GER	FRA	ITA	OECD
Equipment Investment in Construction	0.10	0.21	0.17	0.20	0.21	0.25

- More investment can make industry less labor-intensive, and more productive.

KDI

Enhancing Productivity : Manufacture

- **TFP can be enhanced via resource redistribution. ("Misallocation and Manufacturing TFP in Korea, Oh, KDI, 2015)**

- *"The distribution of firm productivity within the same industry is known to be highly dispersed; thus, resource redistribution toward more productive cases generates higher TFP growth throughout the economy, even if the productivity level of each firm does not change."*

KDI

Enhancing Productivity (Oh, 2015)

- Overall allocative efficiency in Korea declined from 1990 to 2012.
  - Allocative efficiency in Korea is lower than that in USA.
- The potential loss from worsening allocative efficiency was estimated about 0.6% points in TFP annually.
- The result shows that the larger the firm, the less the firm produces compared to its efficient level.
- Many small-sized establishments are uncompetitive in Korean manufacture sector; subsidies to unproductive small-sized firms are heavily implemented.

KDI