



# Productivity in Western and Eastern Germany after the Unification: What can we learn?

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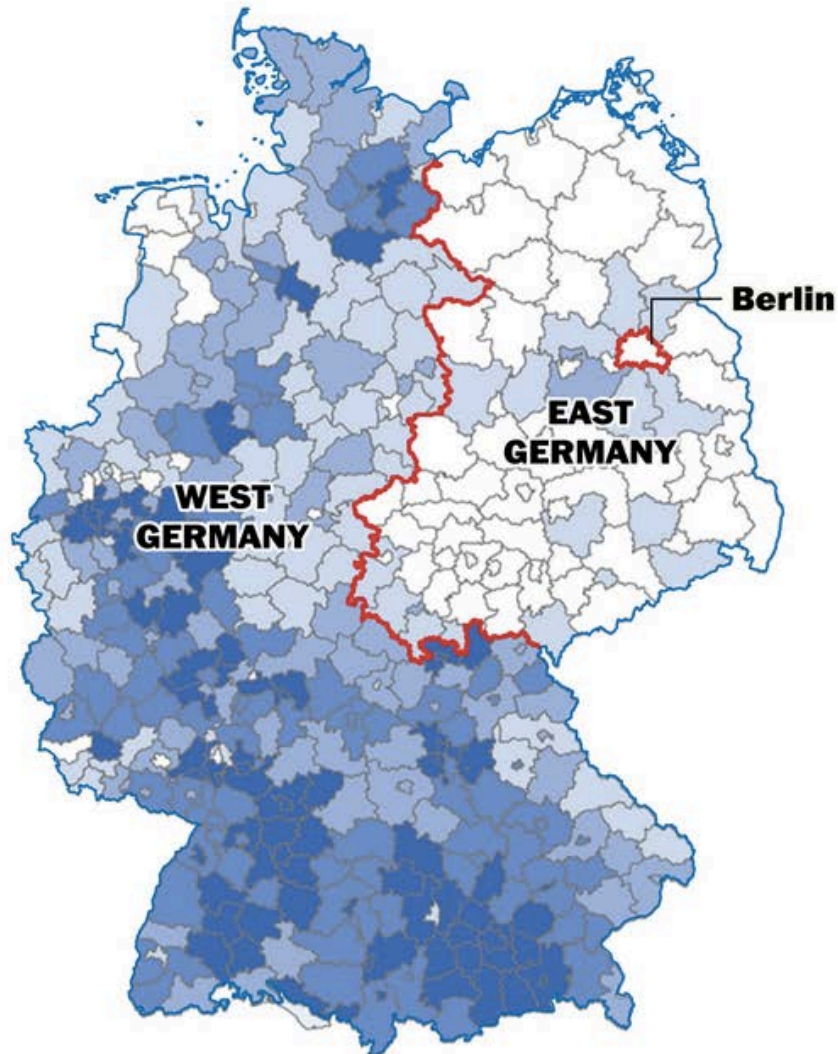


# Motivation

- 25 years after the reunification, there is still distinct differences in the patterns of economic development in the western and eastern Germany.
- In particular, the productivity differs in the two regions.
- It is enigmatic why the difference still exists, because:
  - the same culture and language, law, institutions, and other non-physical infrastructure,
  - the almost same conditions of physical infrastructure,
  - the better human capital in Eastern Germany, if formally measure it,
  - the same or better per worker capital stock in the production sector of Eastern Germany,
  - most old managers were replaced with new managers.



# Differences between WG and EG



## Disposable Income

Data: 2011

More

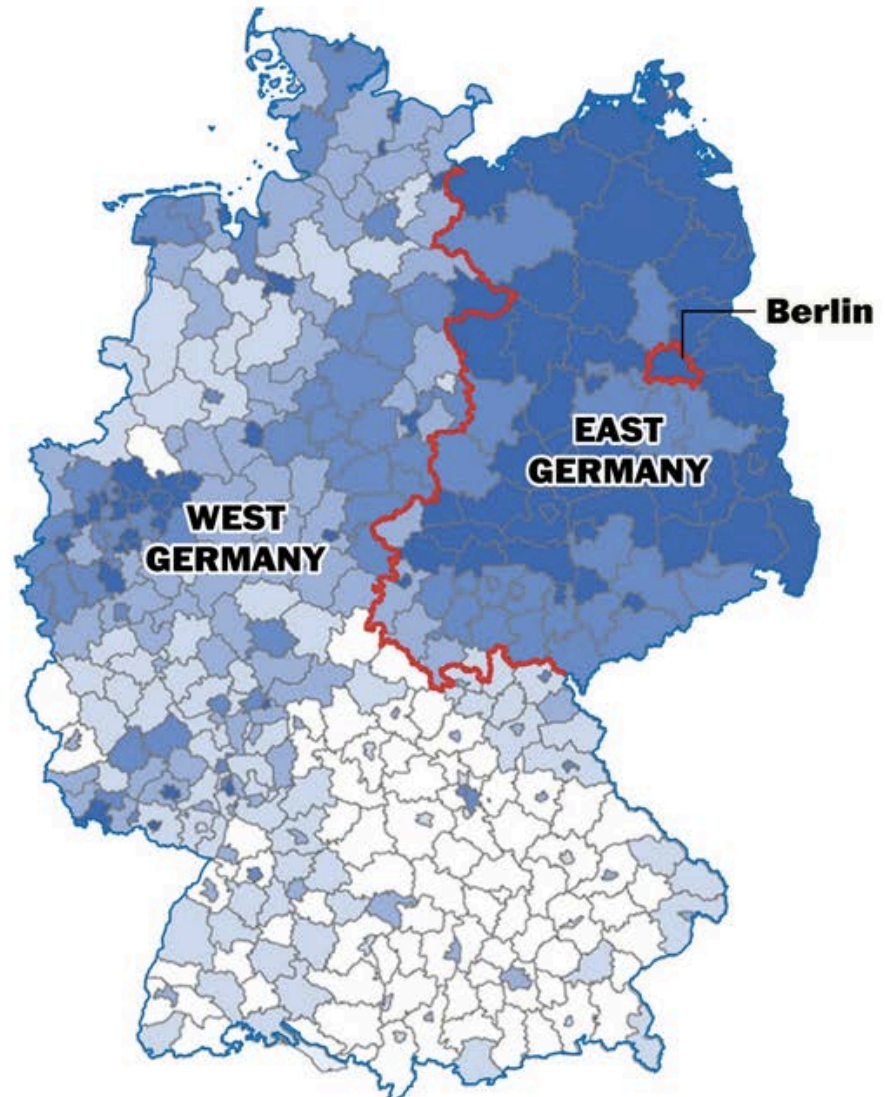
Less



# Differences between WG and EG

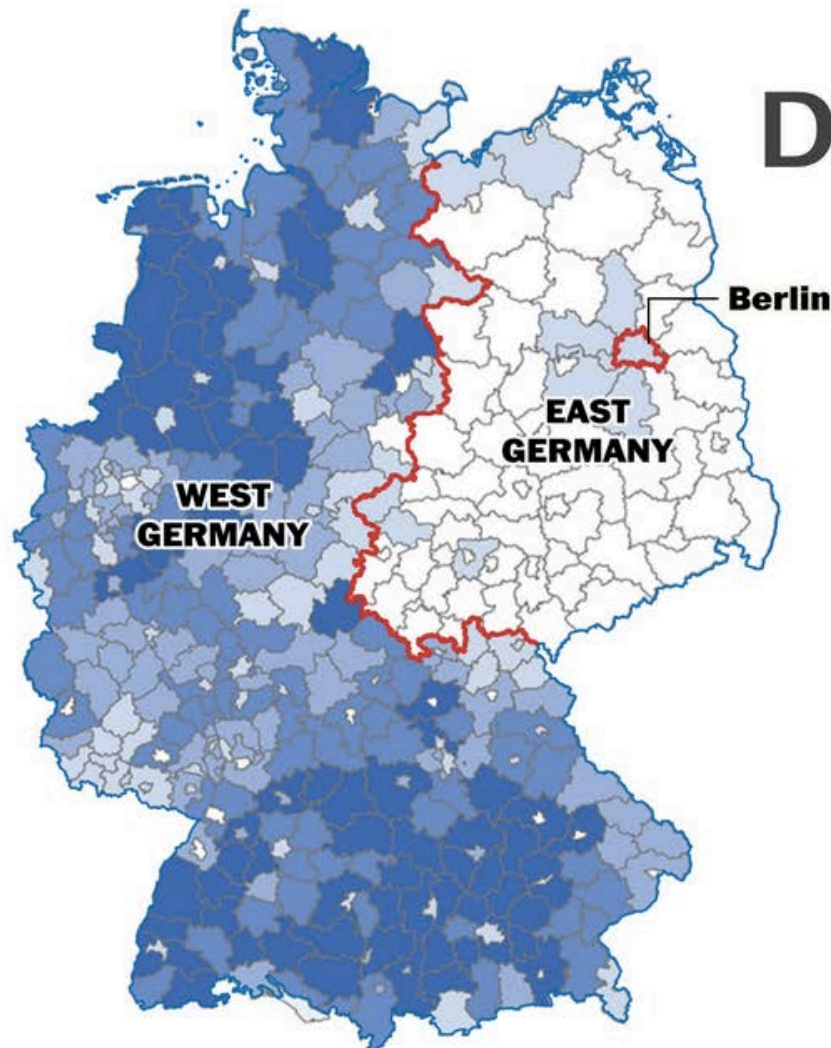
## Unemployment rate

Data: 2013





# Differences between WG and EG



## Demographics

Percentage of young people  
among total population

Data: 2011

Higher

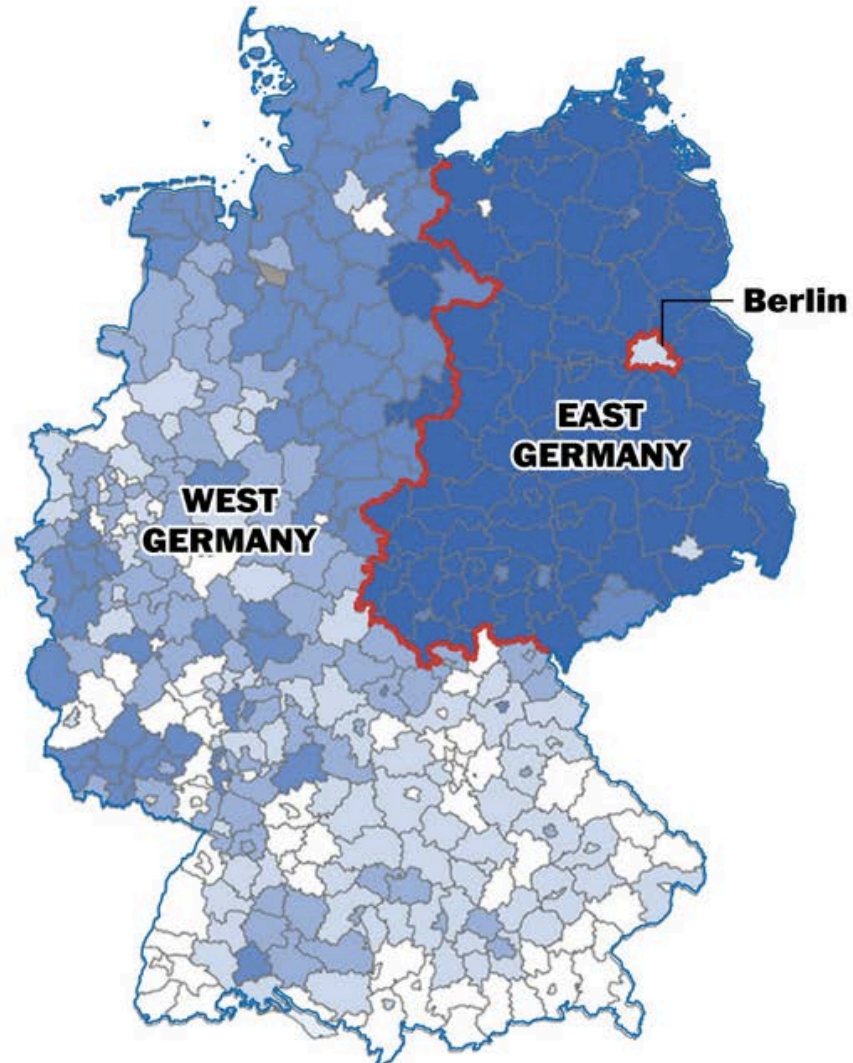
Lower



# Differences between WG and EG

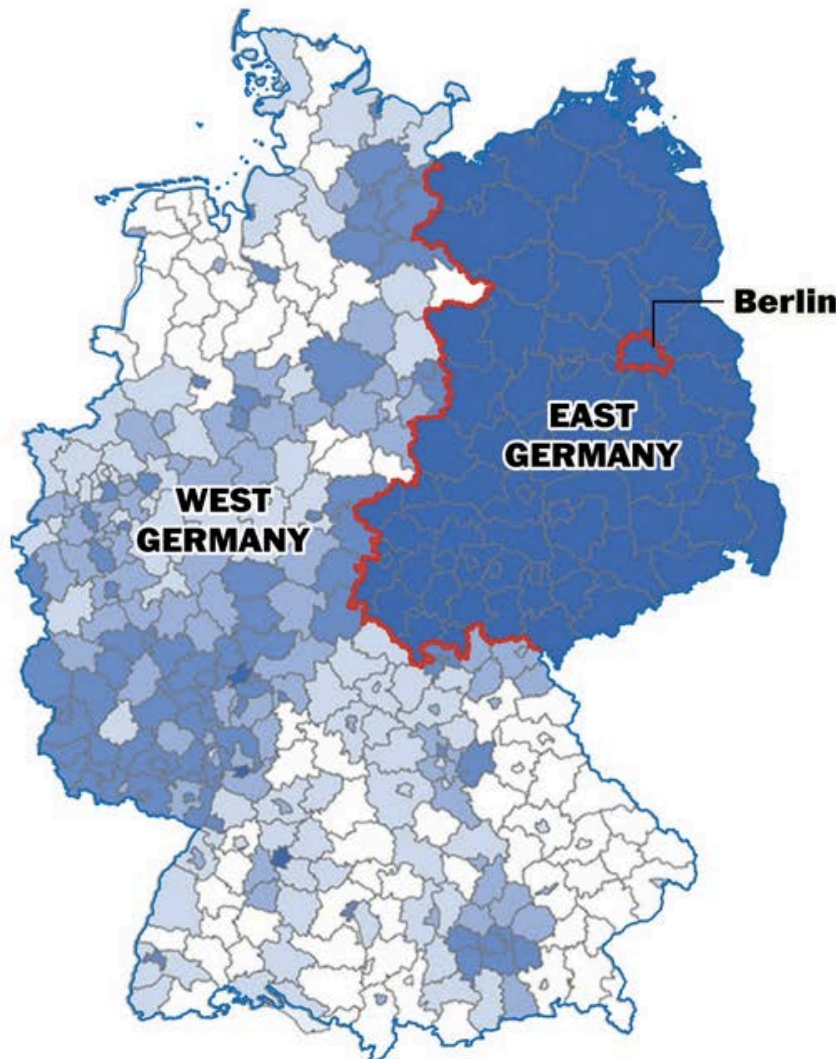
## Size of farms

Data: 2010





# Differences between WG and EG



Percentage of  
0 – 2 year olds  
in full-time  
**child care**

Data: 2013

More care

Less care





## **Purpose: Let's look at it more in detail!**

- I do not have any definite explanation for the productivity gap yet.
- If it is indeed difficult to find the causes, then it would suggest we need to be more careful about the determinants of productivity: per worker capital stock and formally counted education years can not sufficiently account for the productivity level.





## Purpose: Fact?

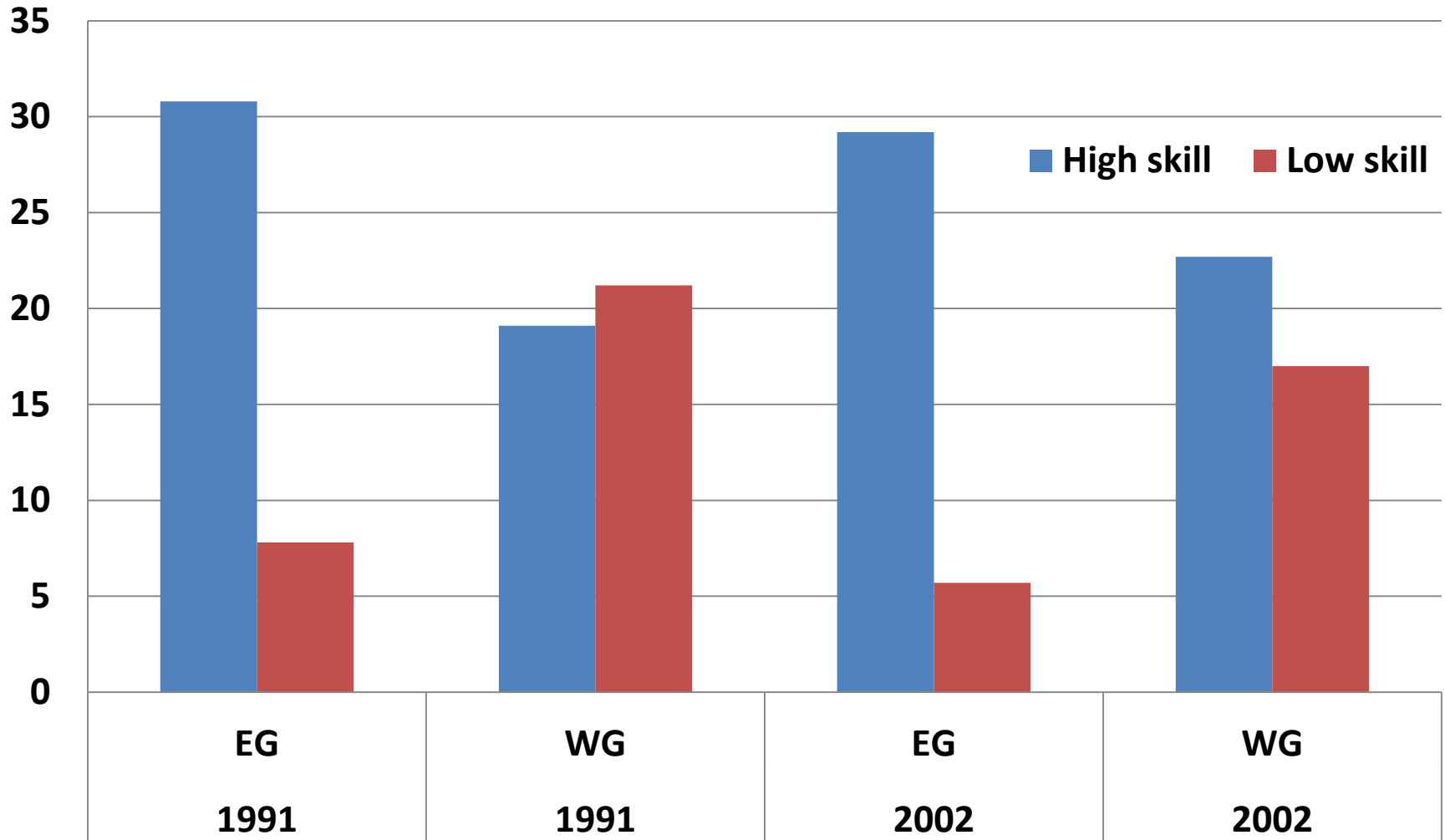
- Take a look at labor.
- Take a look at capital stock.
- Calculate the hypothetical productivity gaps.



# Human capital formally measured

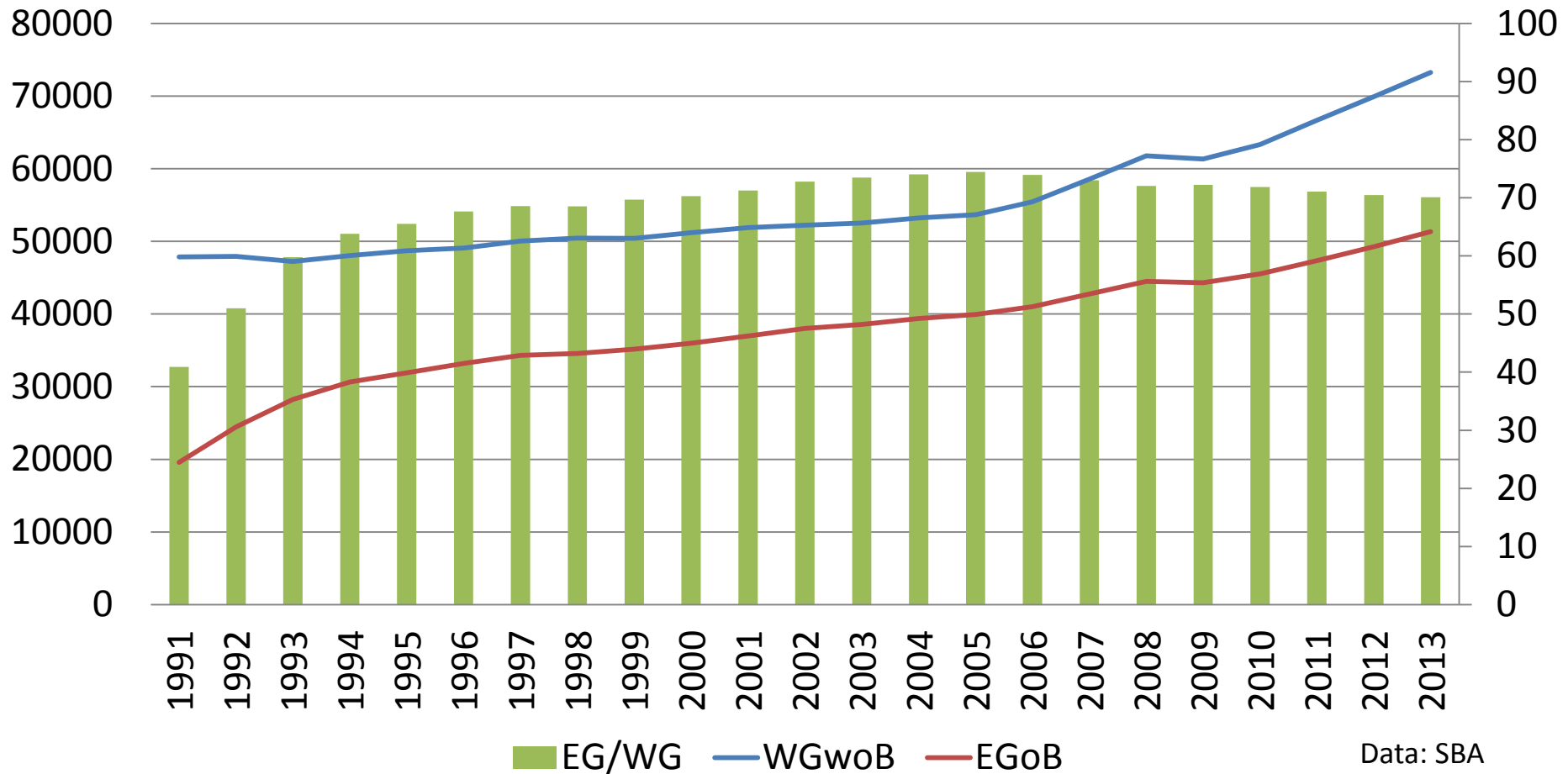
% of the total population of age 25-65 at the year of 2002

Ragnitz(2007)



# Labor productivity (Overall)

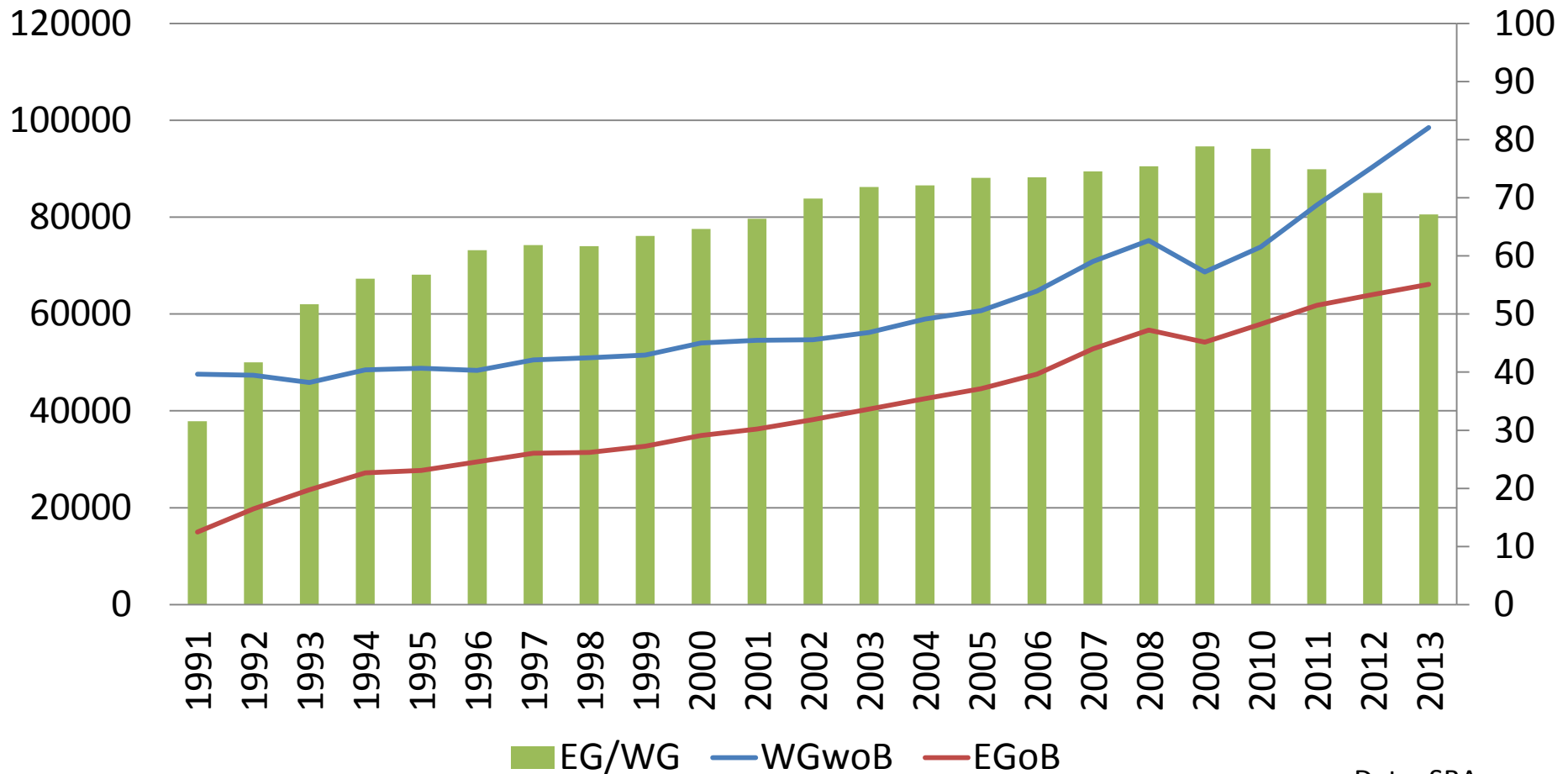
Value added per worker  
2005 Euro(Left), % Ratio(Bar, Right)





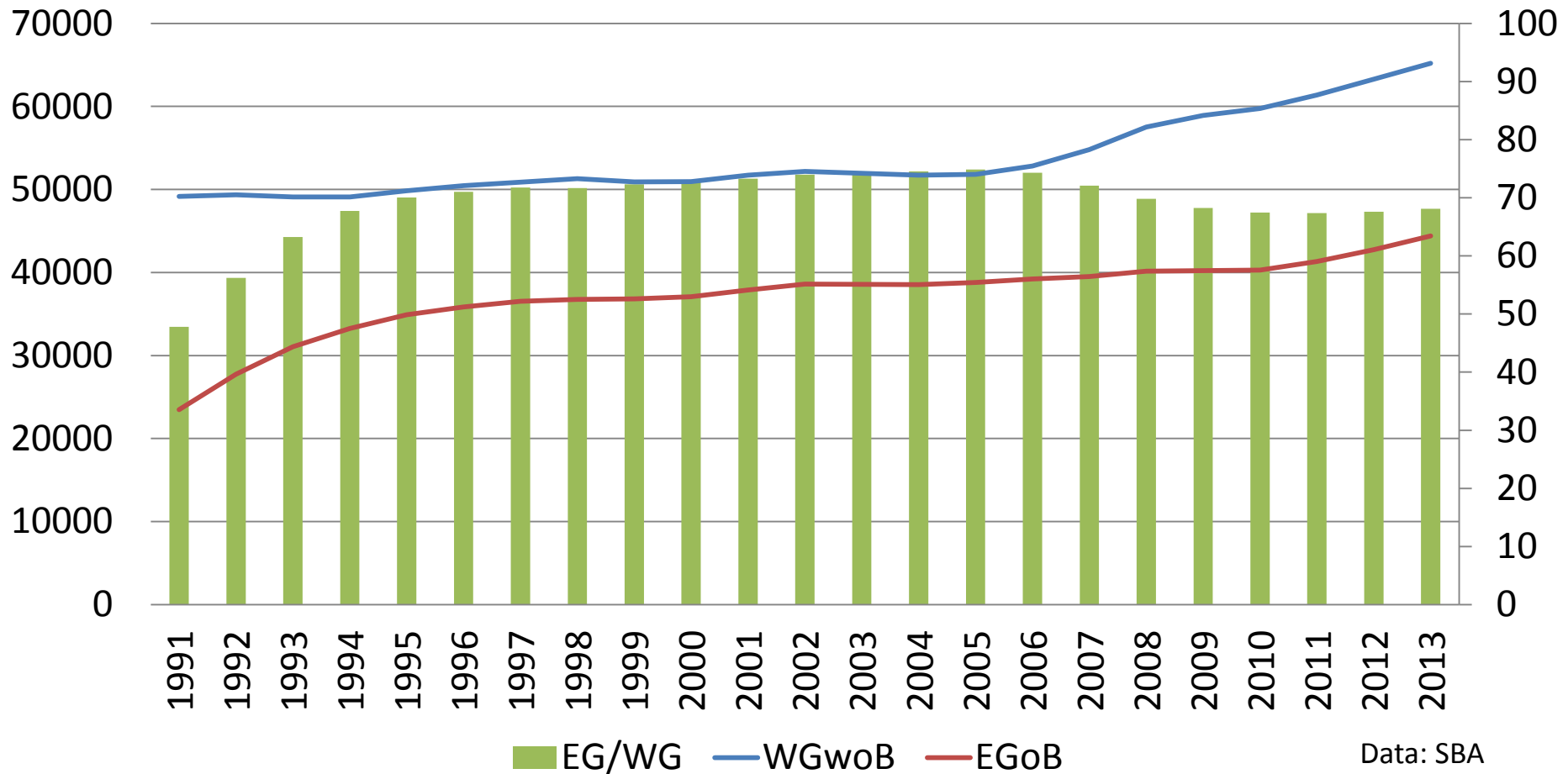
# Labor productivity (Production exc. services)

Value added per worker  
 2005 Euro(Left), % Ratio(Bar, Right)



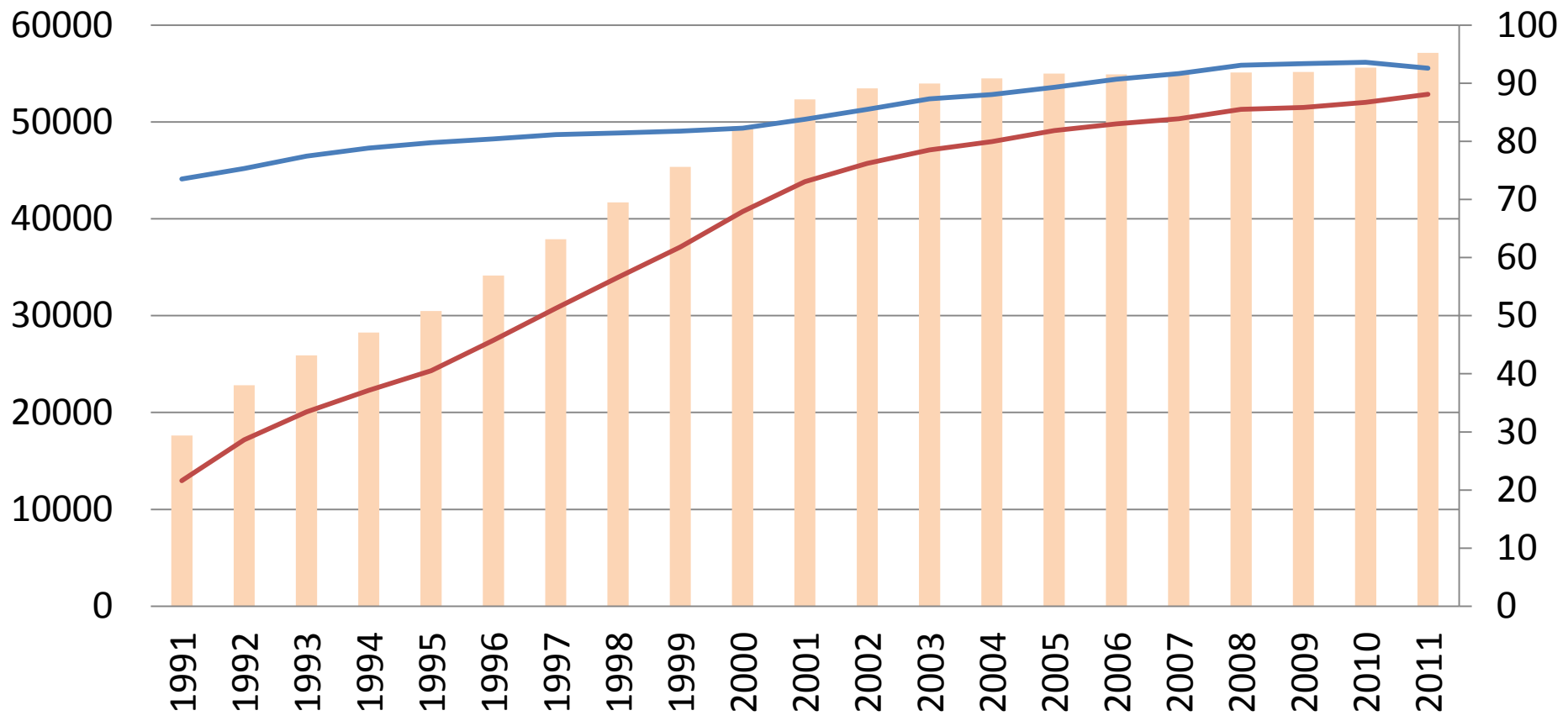
# Labor productivity (**Services**)

Value added per worker  
2005 Euro(Left), % Ratio(Bar, Right)



# Capital stock (Overall)

## Capital Stock per worker 2005 Euro(Left), % Ratio(Bar, Right)



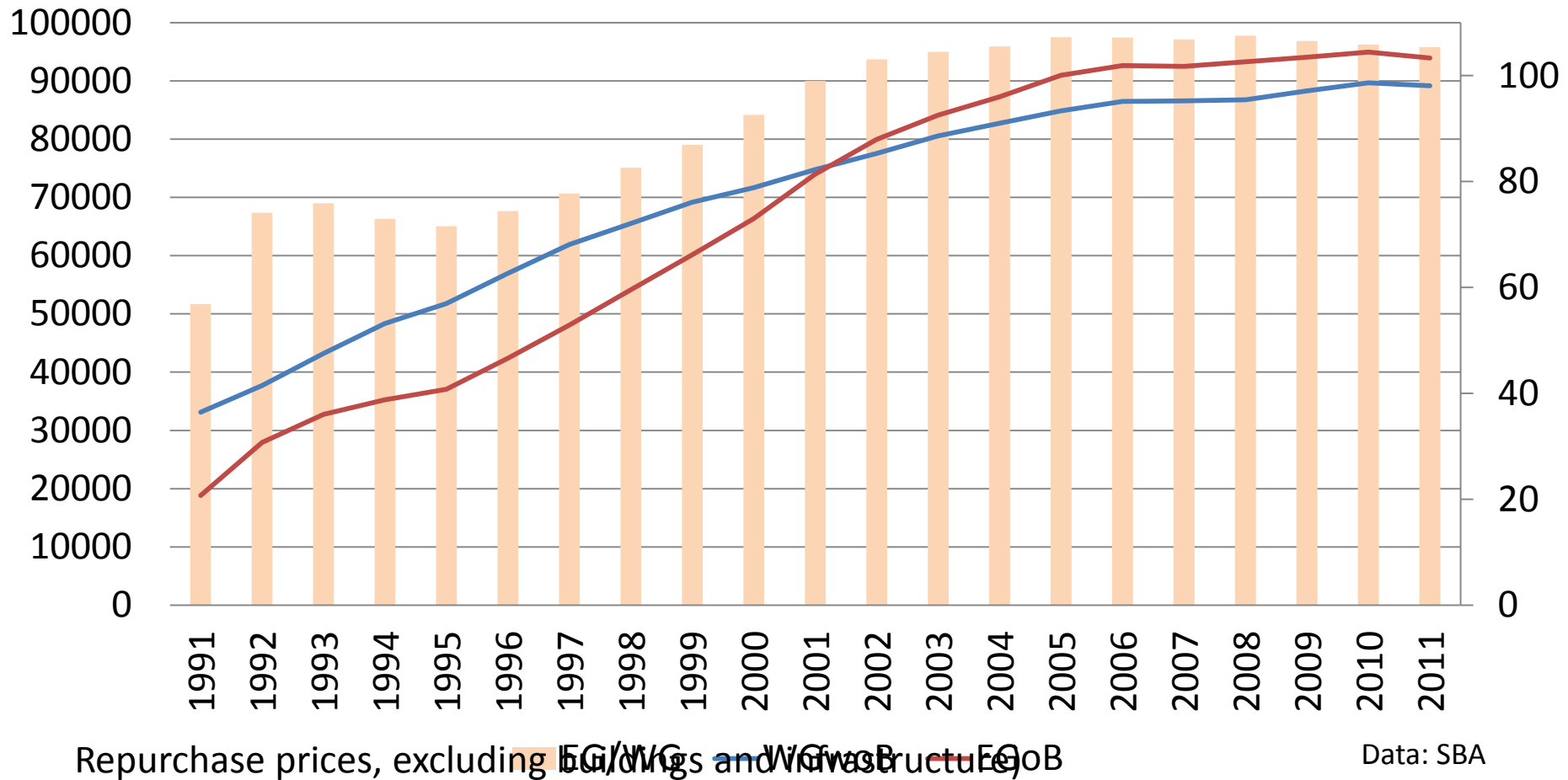
Repurchase prices, excluding buildings and infrastructure

Data: SBA



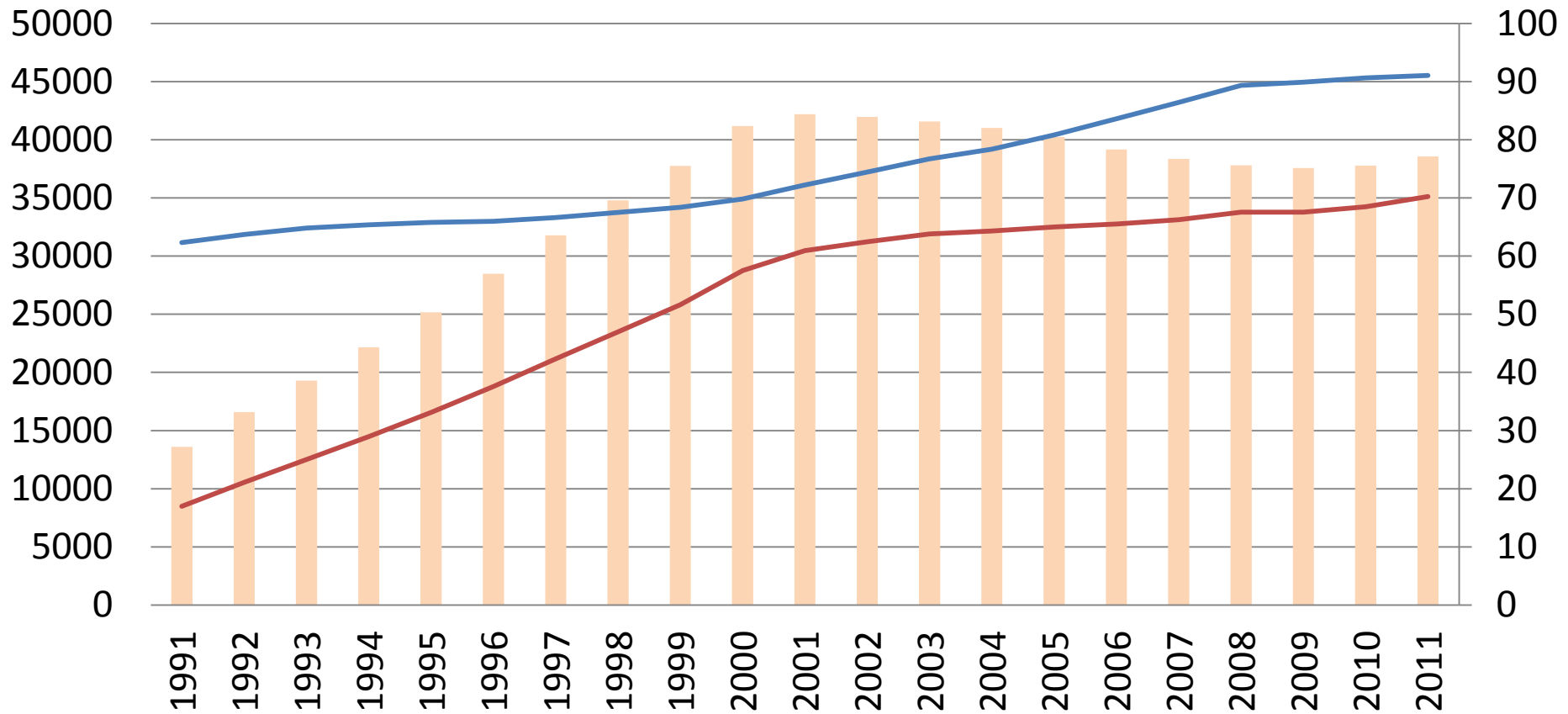
# Capital stock (Production exc. services)

## Capital Stock per worker 2005 Euro(Left), % Ratio(Bar, Right)



# Capital stock (Services)

## Capital Stock per worker 2005 Euro(Left), % Ratio(Bar, Right)



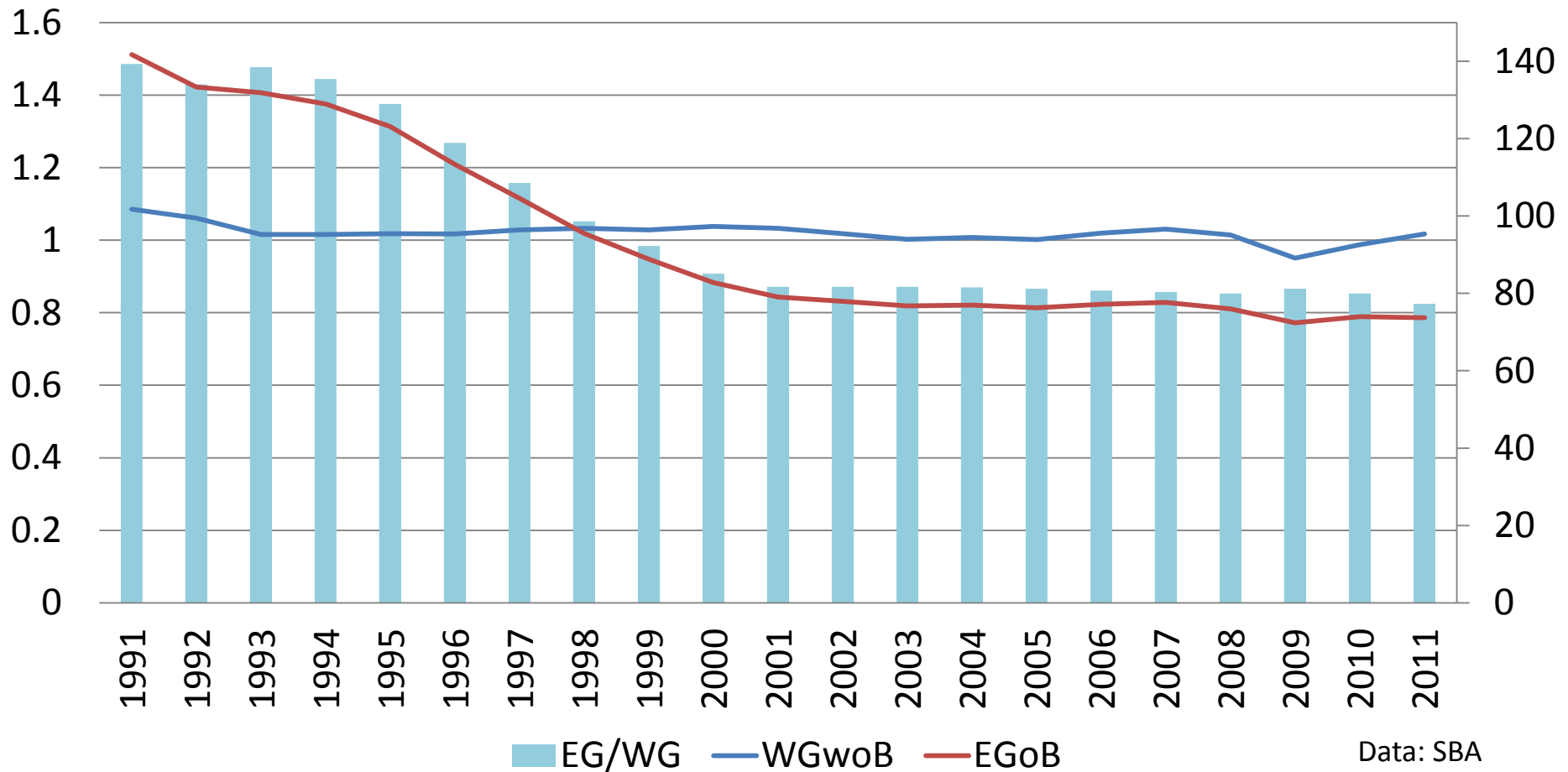
Repurchase prices, excluding buildings and infrastructure

Data: SBA



# Capital productivity (Overall)

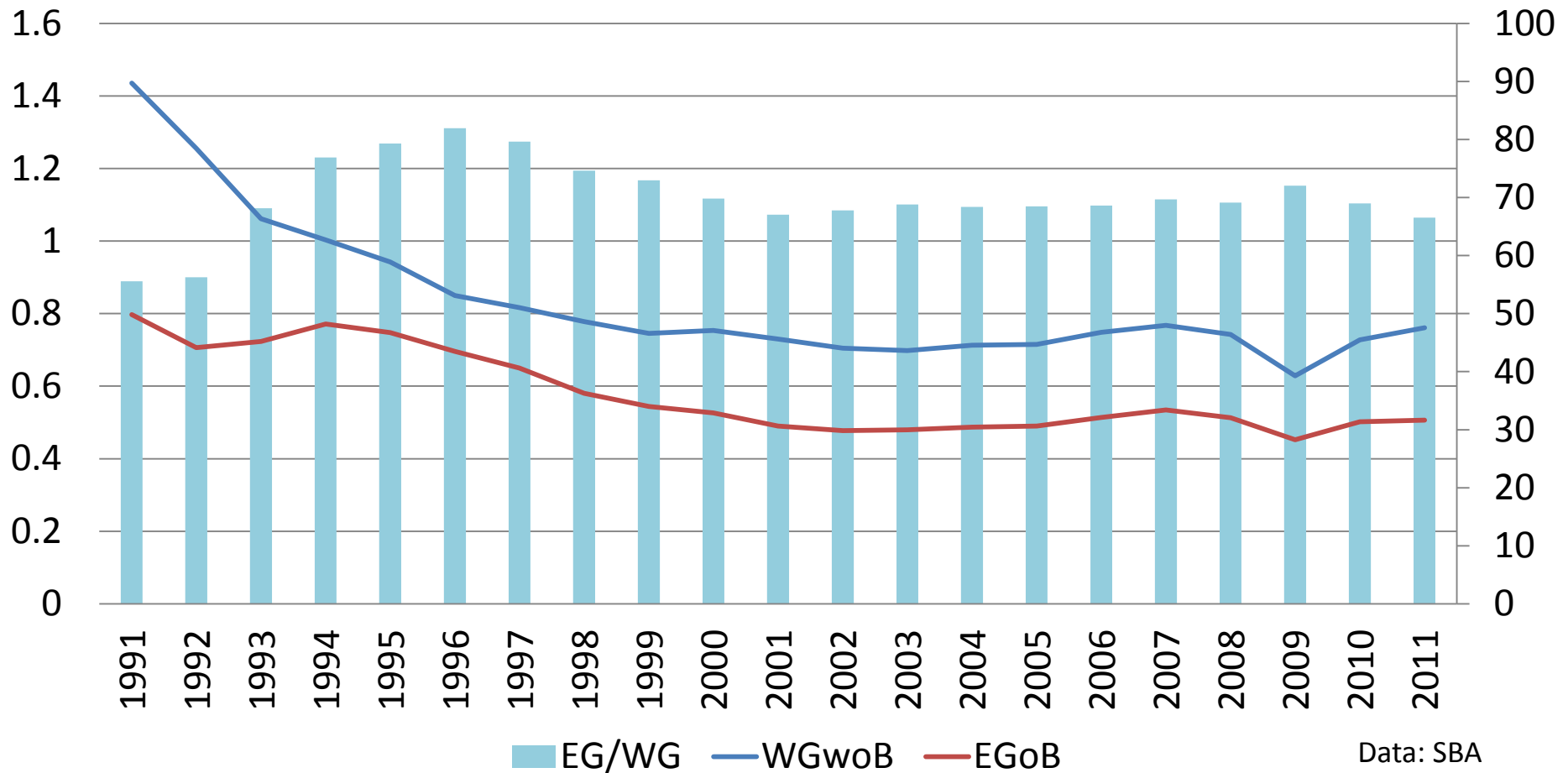
Capital productivity  
2005 Euro(Left), % Ratio(Bar, Right)





# Capital productivity (Production exc. services)

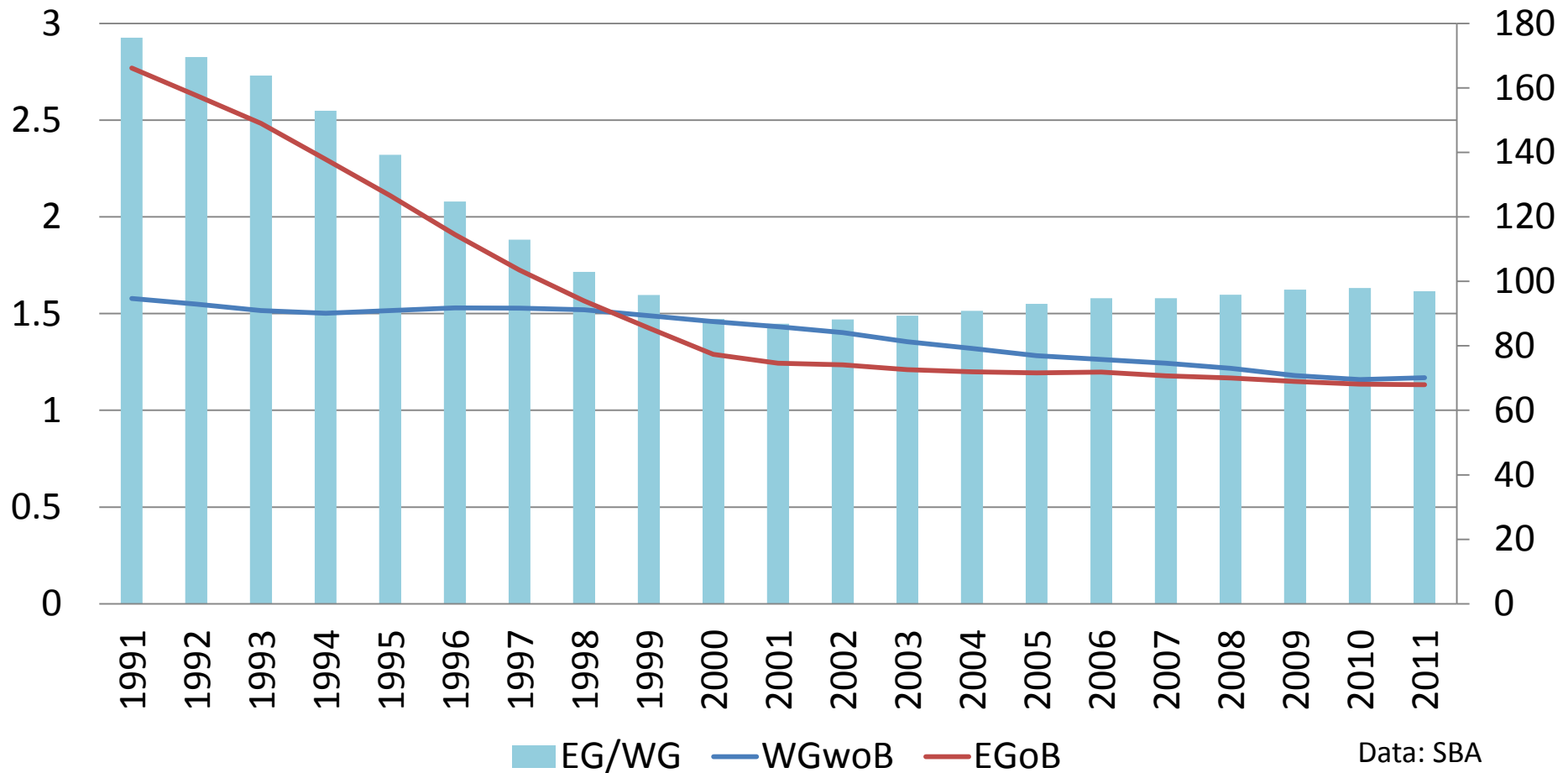
## Capital productivity 2005 Euro(Left), % Ratio(Bar, Right)





# Capital productivity (Services)

## Capital productivity 2005 Euro(Left), % Ratio(Bar, Right)



# Productivity gap : method

- Method: Growth accounting based on normalized CES production function

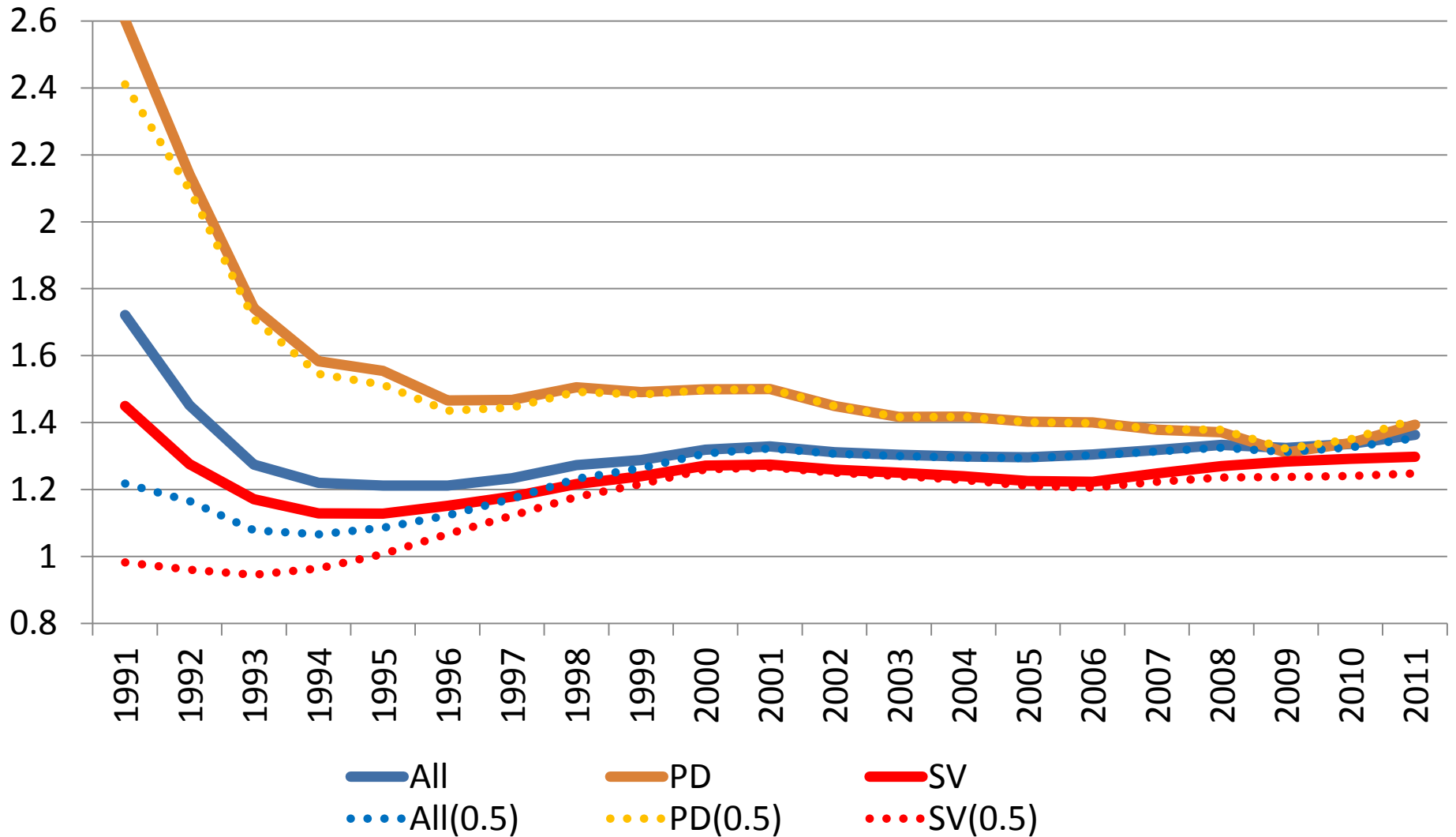
$$Y_t = Y_0 \left[ \pi_0 \left( K_t G_K^t \right)^s + (1 - \pi_0) \left( L_t G_L^t \right)^s \right]^{\frac{1}{s}}$$

$$s = \frac{\sigma - 1}{\sigma} \text{ or } \sigma = \frac{1}{1 - s}$$

- $Y$ ,  $K$ ,  $L$  and  $G$  are indexed to the base period.
- The share parameter  $\pi_0$  for WG from 2005 all German IOT,  $\pi_0$  for EG from 2005 Regional Accounting data of the federal state, Sachsen-Anhalt.
- Approximate  $G_K^t$  with  $Y^t/K^t$  and  $G_L^t$  with  $Y^t/L^t$ .
- Calculate hypothetical  $Y^t\text{-hat}$ , replacing  $G_*^t$  for EG with  $G_*^t$  for WG.
- The difference between  $Y^t$  and  $Y^t\text{-hat}$  indicates the difference in the TFPs of WG and EG.



# Productivity gap (WG=1, $\sigma=1$ and 0.5)





## Some observations on the productivity gap

- The gap decreased rapidly until the middle of the 1990s.
- The catching-up slowed in the last-half of the 1990s because the EG productivity in services did not improved. The EG productivity in production continued to improved, very slowly though.
- The catching-up was slightly accelerated in the first half of the 2000s, because the EG productivity was slightly improving both in production and services.
- The tendency was reversed after the Lehman Shock.
- Nevertheless, the gap was not significantly closed in the 2000s. **There has been a gap the size of which was in the range from 20 to 40% of the WG level.**



## Again, the enigma.

- Some explanations exist.
- The EG production structure was biased in favor of the low-value added sectors. Thus, under-usage of human capital occurs.
  - However, why the bias exists?
  - Old- and new-historical factors?
  - People move faster than business entities?
- Maybe the gap is within normal variations of regional productivity differences in other countries.
  - Old- and new-historical and geographical factors?
  - The high-productivity big companies think global.
  - Still, the question remains. Why is it uniformly low in EG?



# Outlook

- It is not easy to clearly explain why the productivity gap still exist between WG and EG.
- This suggests that we are not very successful to understand the determinants of productivity.