

Denmark's productivity

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Presentation at seminar with the
Productivity Commission of New Zealand

25 October 2013

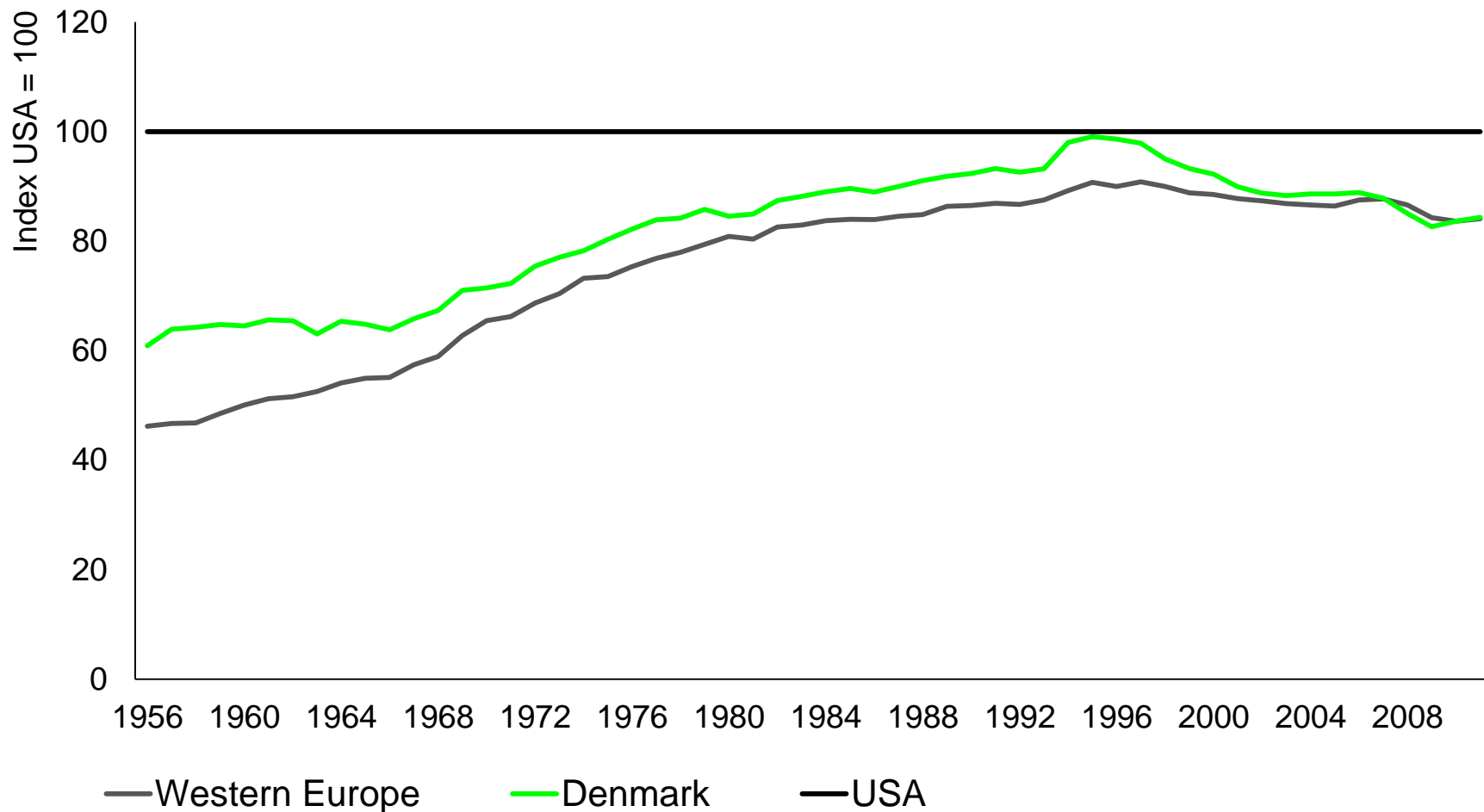
Setup of the commission

- 9 independent experts (professors and top managers from private and public sector)
- Independent secretariat (7 full time economists, 1 communications assistant and 4 research assistants)
- Established in 2012 and must finish its work by end 2013
- Must work openly and ensure on-going debate

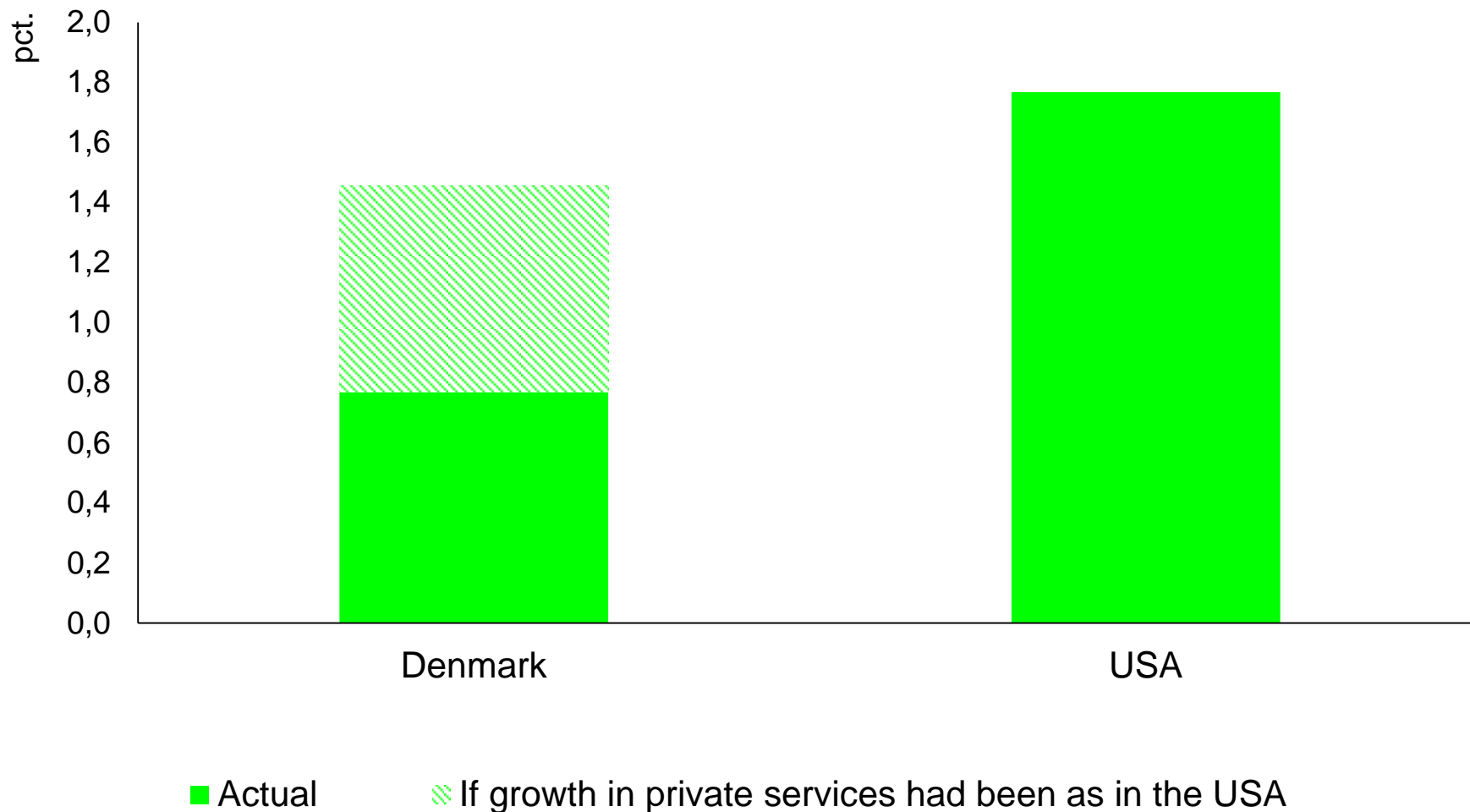
The evolution of productivity in Denmark:

The broad picture

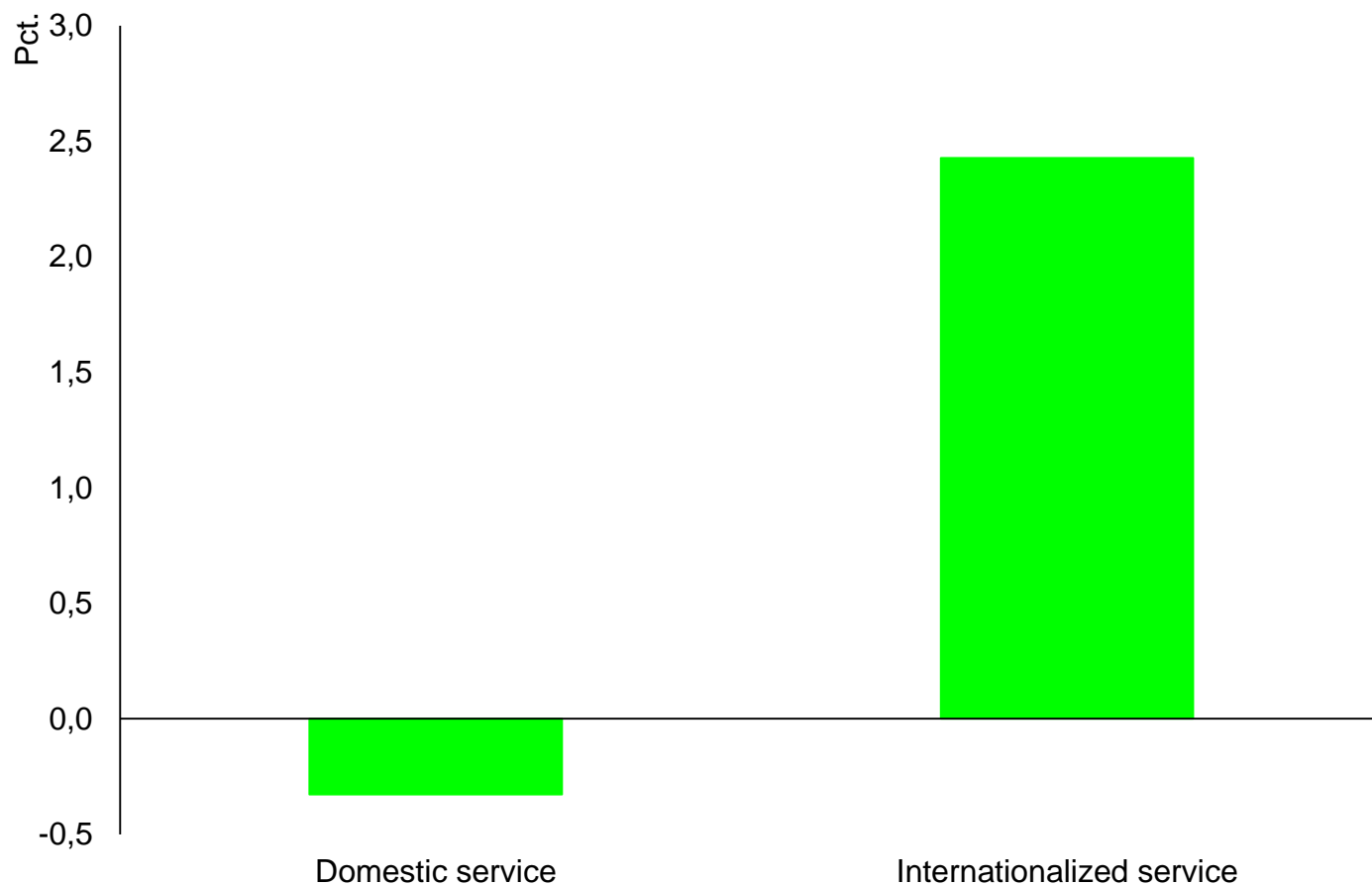
Real output per hour relative to the USA



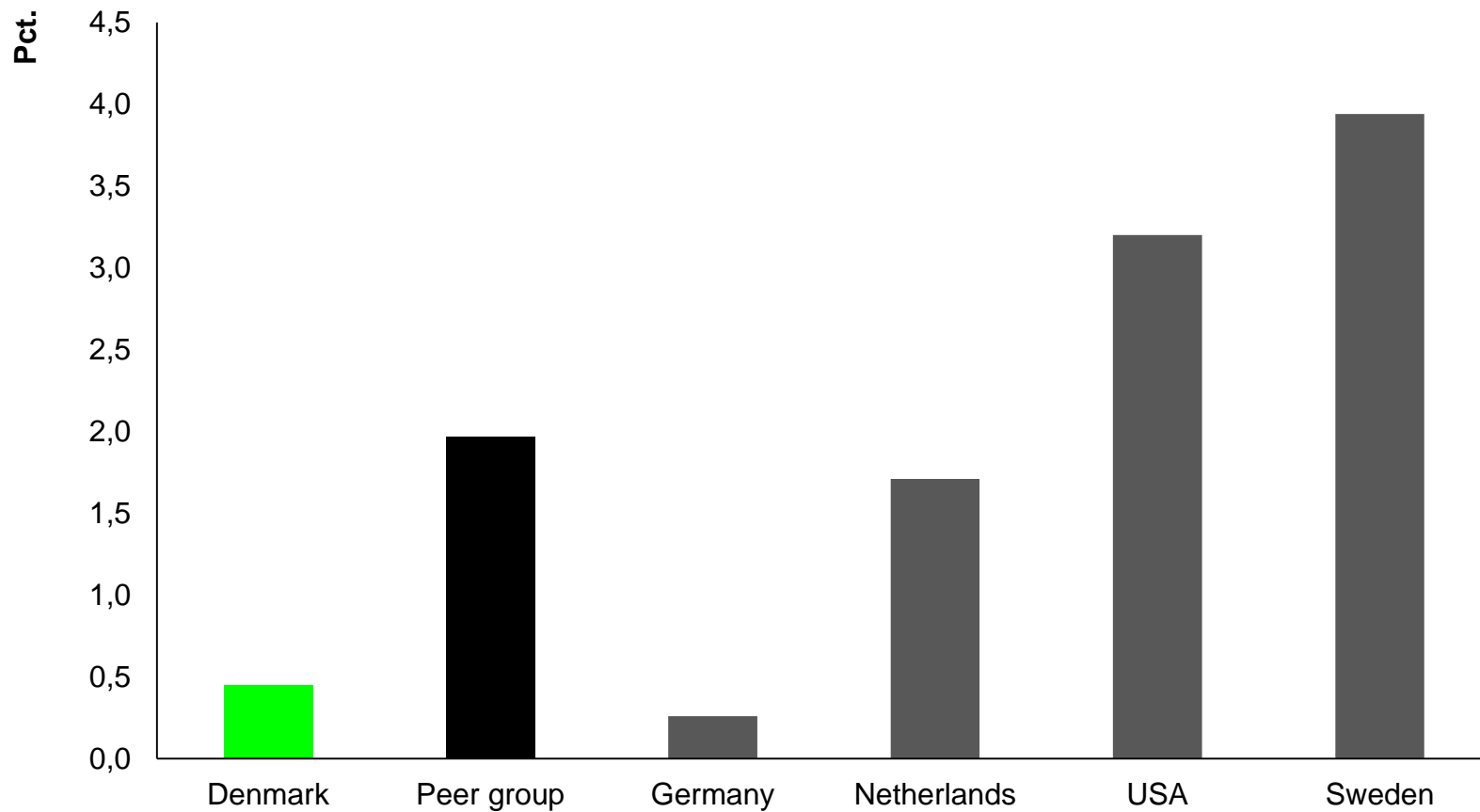
A large part of the Danish productivity problem is concentrated in the service sector



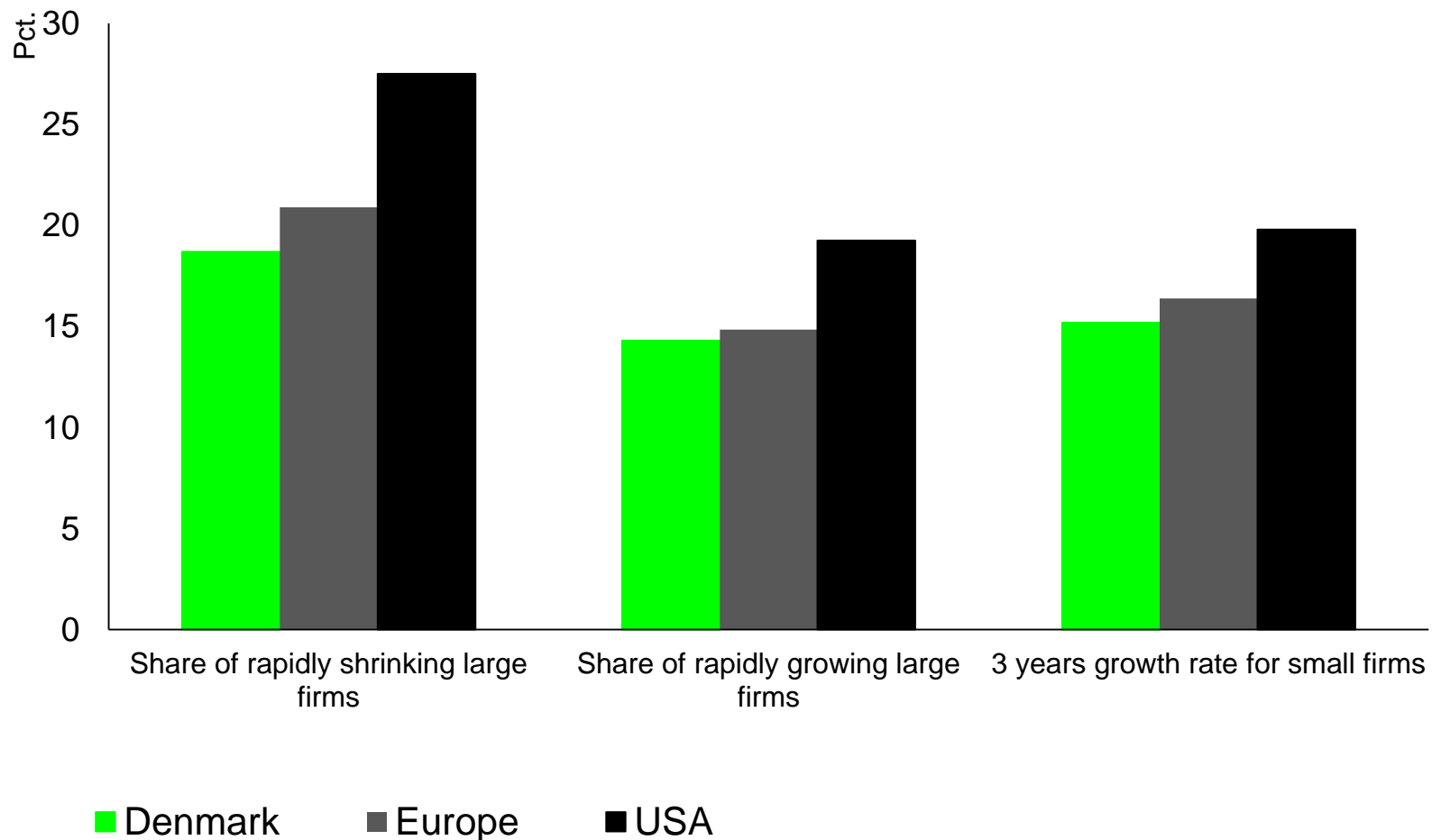
Productivity growth in the Danish service sector



Example: Productivity Growth in Retail 1995-2010



Danish firm dynamics lagging behind



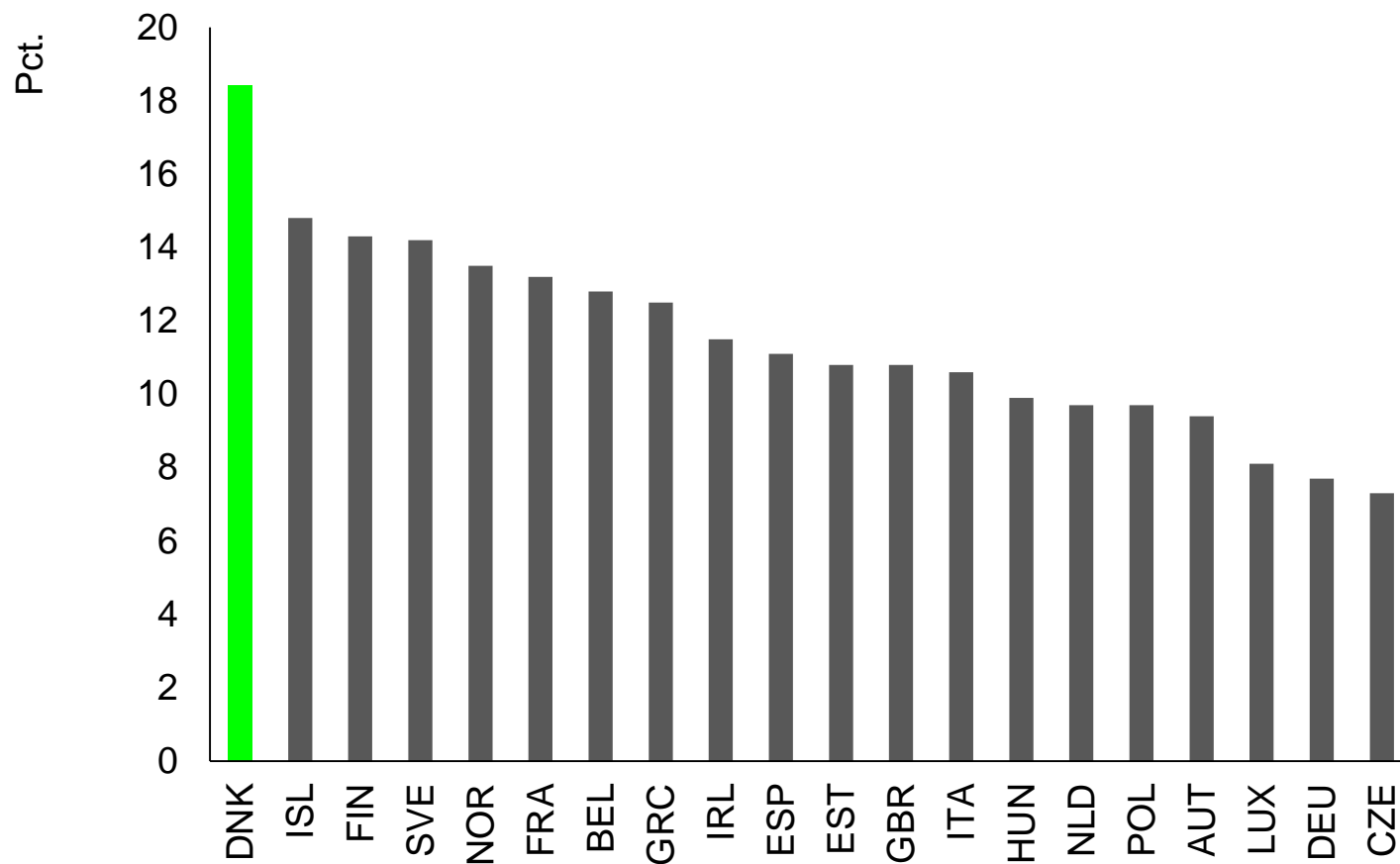
Report on competition, internationalization and regulation

Thrust of recommendations:

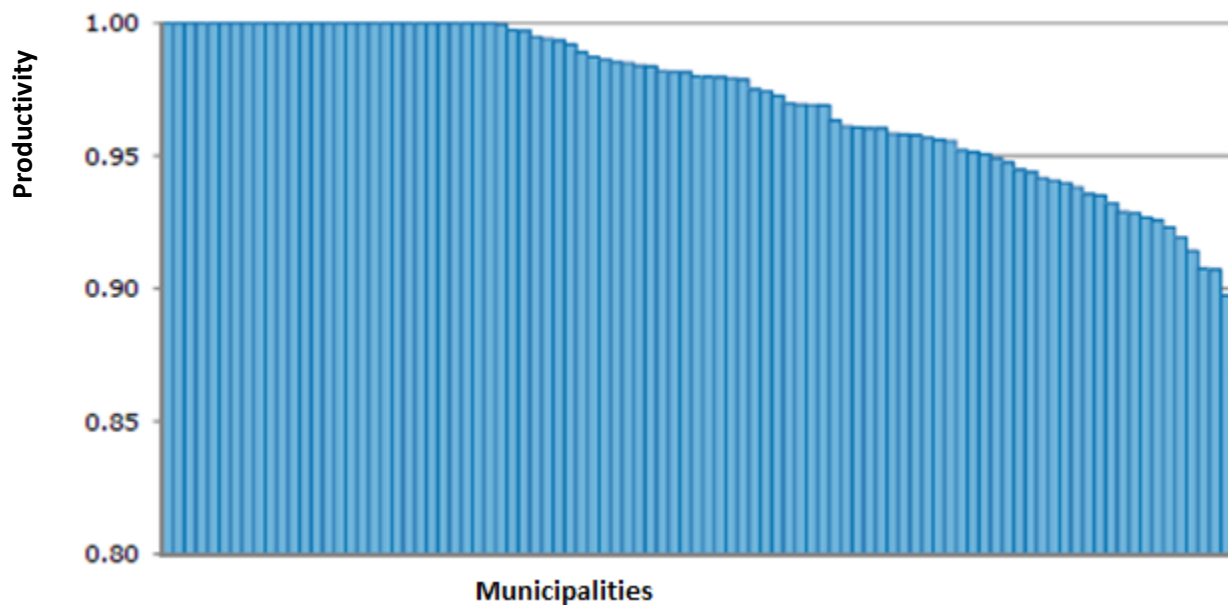
- Strengthen competition through tougher competition law and lower barriers to cross-border trade and investment
- Remove unnecessary regulation, including regulatory barriers to market entry in protected sectors

Improving public sector efficiency

Public sector wage bill as a share of GDP, 2012



Benchmarking of productivity in the municipalities shows considerable variation



Best data is for schools. Estimate of potential for productivity gain is 5,4 billion DKK (12 percent of current expenditure).

Improving public sector efficiency: Thrust of policy recommendations

- Focus on outcomes for citizens, not on regulation of work processes
- Hold institutions and their managers accountable for outcomes, but allow them flexibility in organizing public service production
- Reward those who achieve good outcomes. Follow up on those who do not.
- Design budget systems that allow for savings and investment at the level of individual public sector units within the framework of multi-year ceilings on total expenditures

Ongoing work

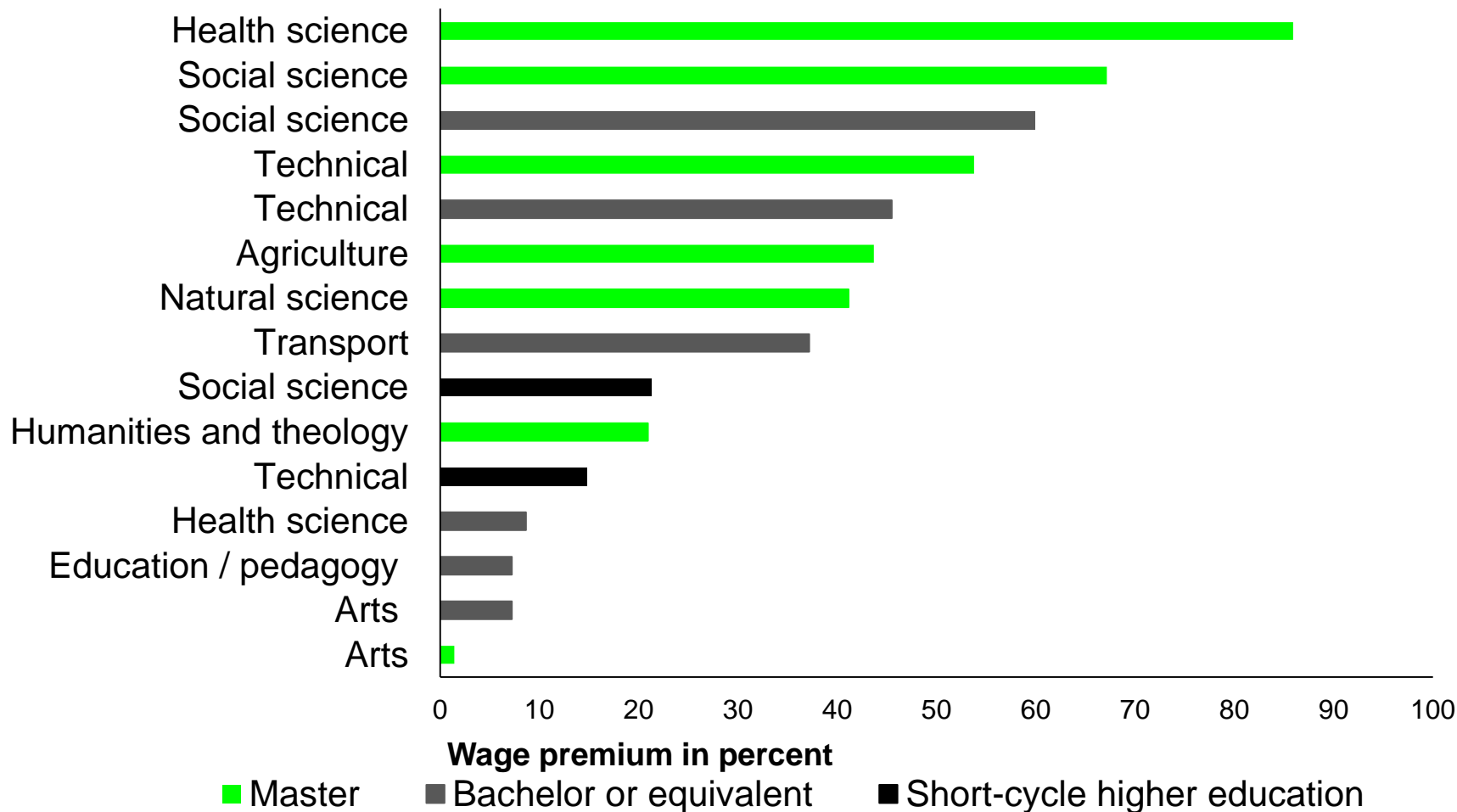
Ongoing analysis

- Education, R&D and innovation
- Infrastructure (digital and transport) and productivity
- Public procurement and public-private partnerships

Example of work in progress:

Does education policy
matter?

Significant wage disparities across fields of education

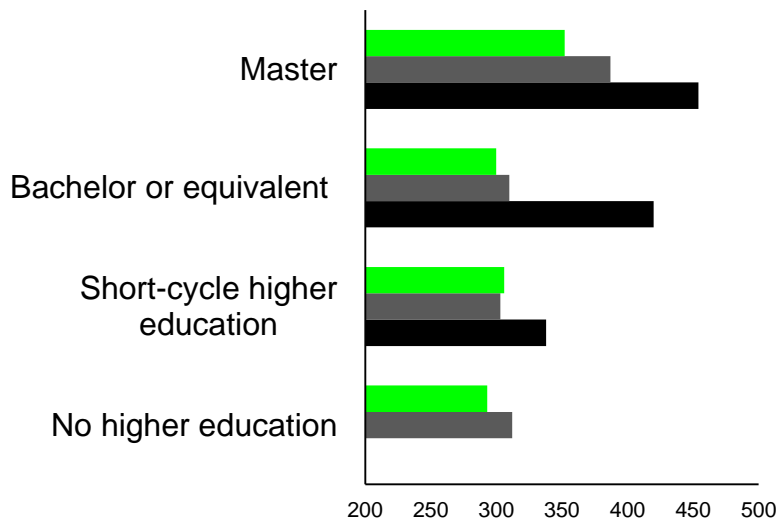


Scope for policy?

- Wages reflect productivity levels
- The policy implications depend on the source of wage disparities
- Selection (policy irrelevant)
- Quality (increase quality in low-wage fields)
- Supply and demand (change the composition of the student body)

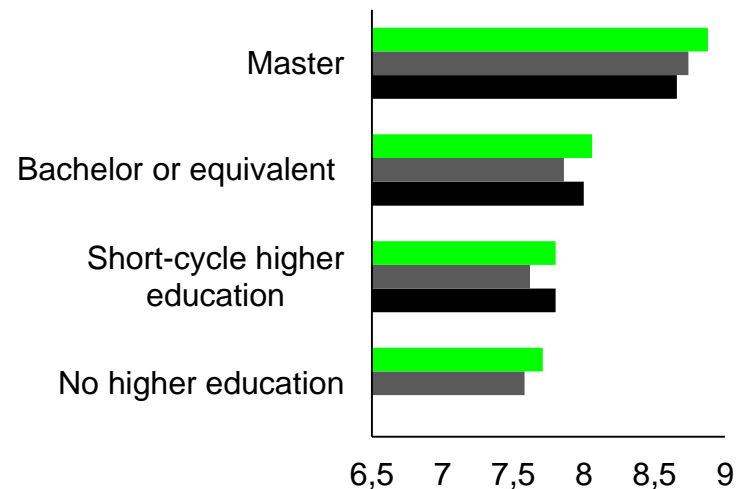
Selection?

- Math entrance requirement in tertiary education highly correlated with wages
- Are high wages a consequence of the type of education, or are math skills simply an indication of personal traits such as ambition or willingness to work hard?



- No high school math
- High school math is not required for higher education
- High school math is required for higher education

Hourly wages



- No high school math
- High school math is not required for higher education
- High school math is required for higher education

High school GPA

Selection: Previous evidence from Danish high school students

- Joensen and Nielsen (2009)*: Quasi-experimental evidence suggest that math courses in high school improve labor market outcomes
- Dalgaard, Sørensen and Schultz (unpublished)**: IV-estimates indicate that selection is driving wage differential between high school students with and without elective courses in math. High school students with math still have a higher total labour income when accounting for selection

**Is there a Causal Effect of High School Math on Labor Market Outcomes?
Journal of Human Resources*

***Do Human Arts Really Offer a Lower Return to Education?*

A study of siblings

- Workers with a university degree that requires high school math to enter earn 30 percent more annually than other university graduates
- To take unobserved genetic or social differences of the two groups into account, we use a matched sibling data set

We restrict attention to sibling pairs where

- Both have completed a university degree
- Their degrees differ in the math requirement
- We control for age, gender, high school GPA and high school math grade

A study of siblings

Earnings premium from math requirement

	A	B	C
<u>Comparison:</u>			
Unconditional	31 pct.	27 pct.	27 pct.
Conditional	27 pct.	24 pct.	19 pct.
Conditional and sibling fixed effects	22 pct.	23 pct.	16 pct.
<u>Controls:</u>			
Age, gender	Yes	Yes	Yes
High school GPA	No	Yes	Yes
High school math grade	No	No	Yes
<u>Observations</u>	18,896	13,666	12,326

Selection or education?

- There is a large effect on income from math-based education unrelated to genetic or social differences, gender, age, high school GPA etc.
- Selection may still matter, but is unlikely to explain all of the remaining income differential
- A policy that increases the share of tertiary students studying math-heavy subjects will improve labour productivity