

How the world of work is changing: a review of the evidence

Maarten Goos

The past, present and future

- The past (1820-1980): Industrial Revolution results in *skill-upgrading* and *decreasing inequality*.
- The present (after 1980): Computer Revolution is leading to *job polarization* and *increasing inequality*.
- But optimistic about future computerization if skills are supplied to support such changes.

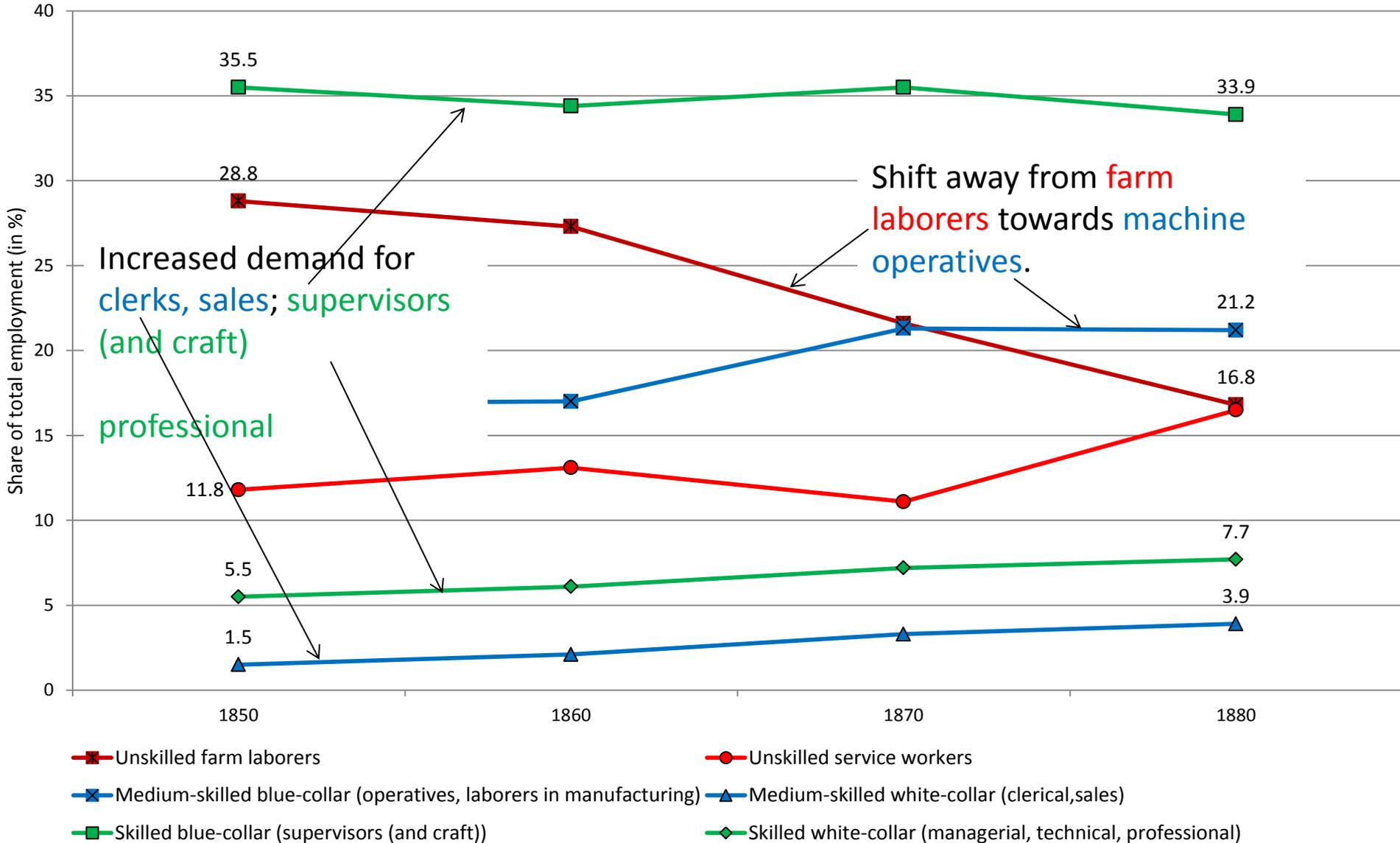
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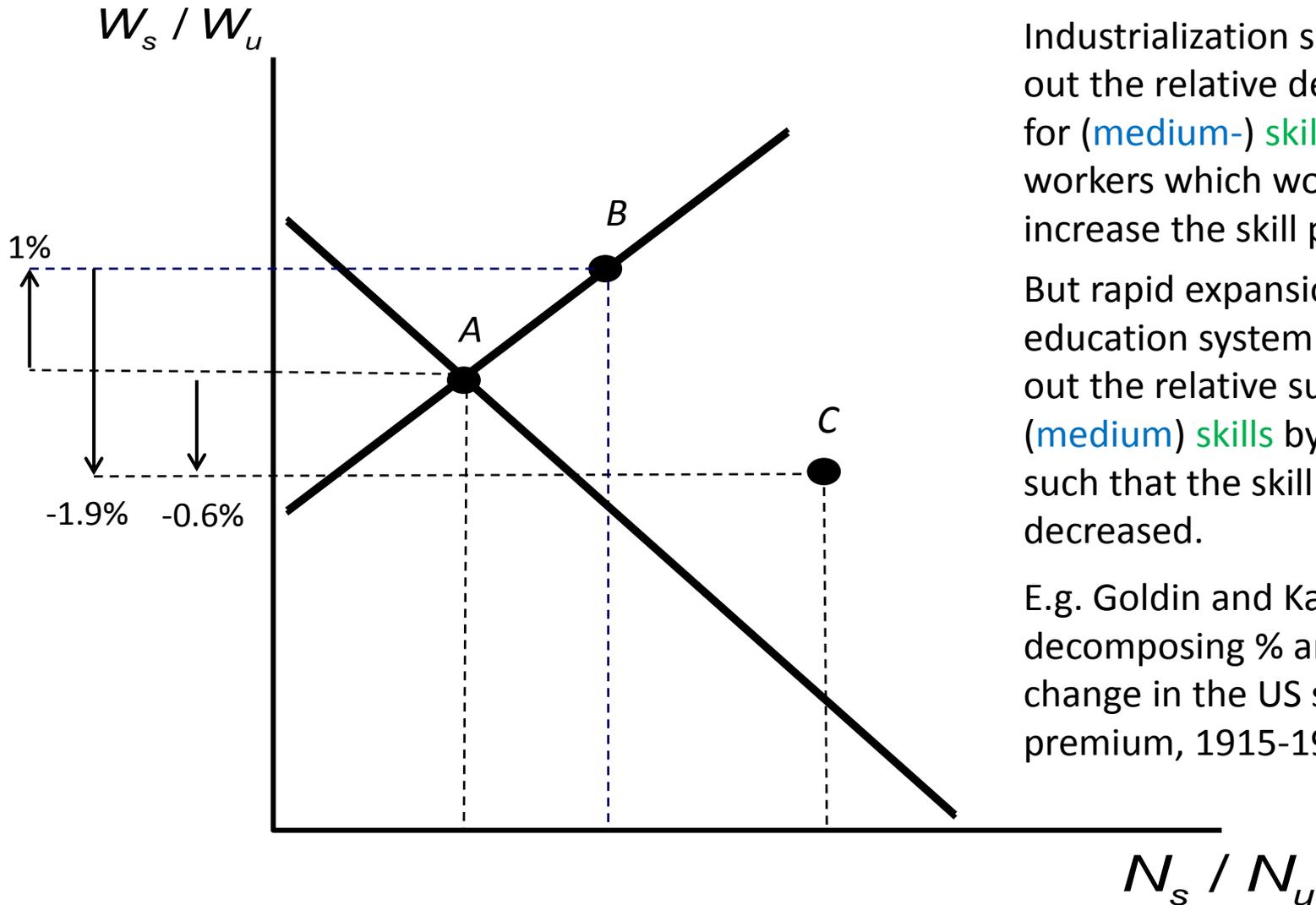
What explains skill-upgrading?

- Introduction of purpose-built machinery (e.g. assembly line) and the rise of large factories resulted in **farm laborers** → **machine operatives**.
- In manufacturing, increased demand for **clerks**; **supervisors**; **managerial, technical and professional** occupations.
- In services, increased demand for **unskilled service workers** (e.g. travel), medium-skilled services (e.g. **sales**) and skilled services (e.g. **managers**).

Skill-upgrading in the US occupational distribution, 1850-1880



Inequality decreased before 1980



Industrialization shifted out the relative demand for (medium-) skilled workers which would increase the skill premium.

But rapid expansion of the education system shifted out the relative supply of (medium) skills by more such that the skill premium decreased.

E.g. Goldin and Katz (2008) decomposing % annualized change in the US skill premium, 1915-1940.

The past: conclusions

- Industrial Revolution lead to *skill-upgrading* in the occupational composition of the labor force and *decreasing inequality* due to rapid expansion of the education system.
- Skill-upgrading (the “human capital century”) and decreasing inequality (the “great compression”) resulted in strong economic growth.

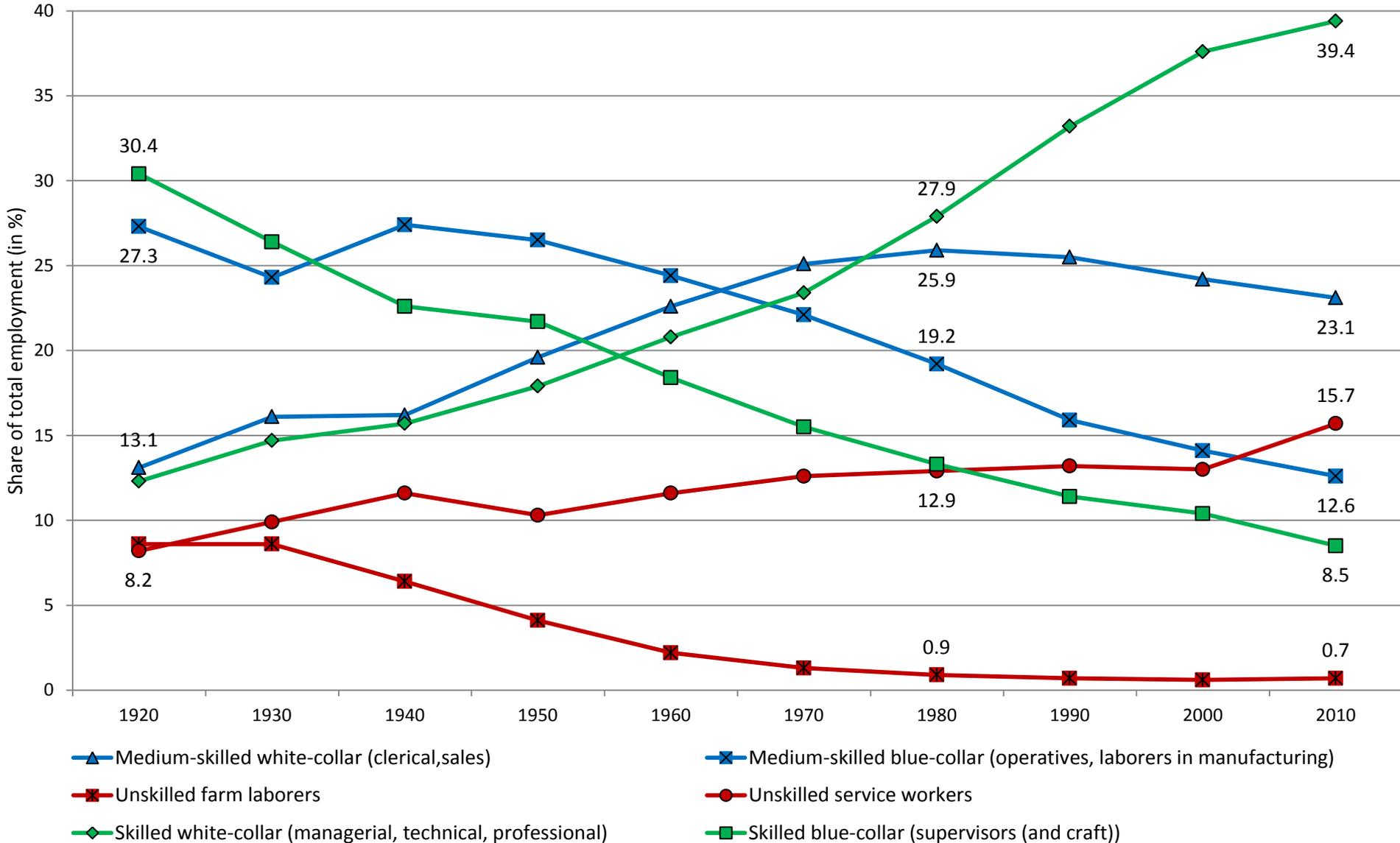
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What explains job polarization?

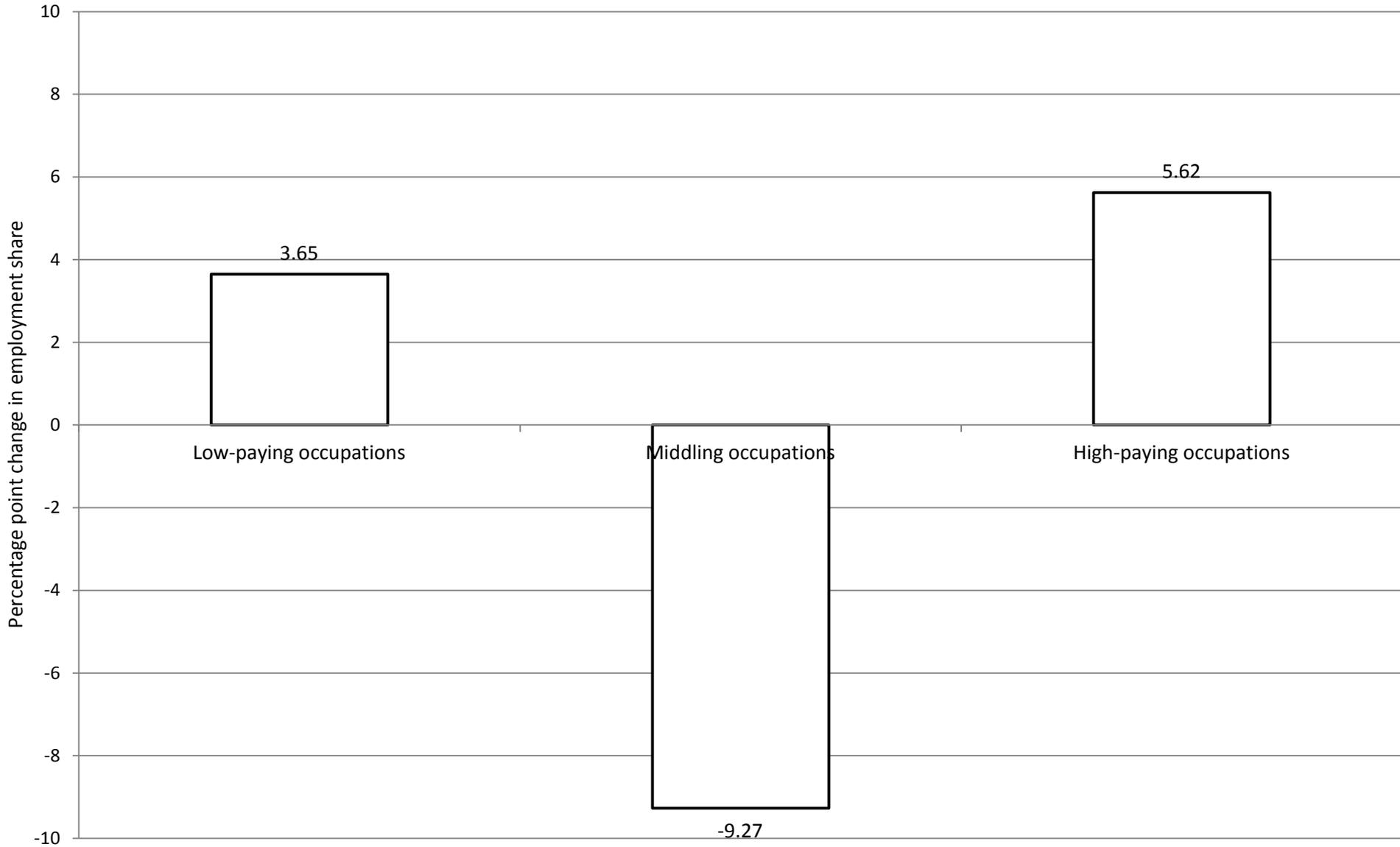
- Introduction of robotic/computer equipment doing codifiable/routine tasks decreases relative demand for **machine operatives** and **clerks**
- Increased relative demand for **managerial, technical and professional** occupations doing non-routine tasks (e.g. writing software).
- Computers cannot do the non-routine tasks in **unskilled service jobs** (e.g. cleaning a room).

Job polarization in the US occupational distribution after 1980

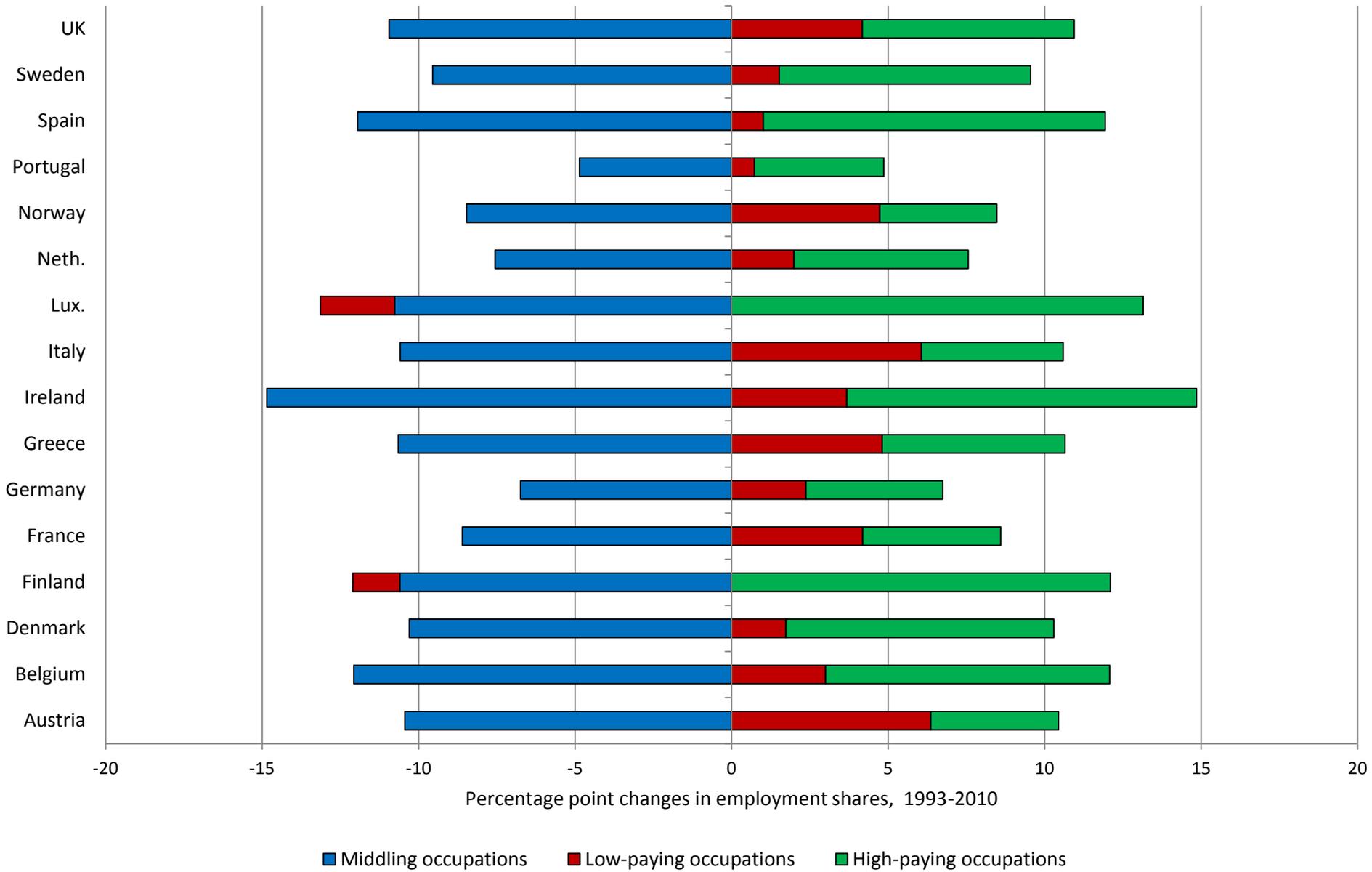


Source: Katz and Margo (2013)

Job polarization in 16 European countries, 1993-2010

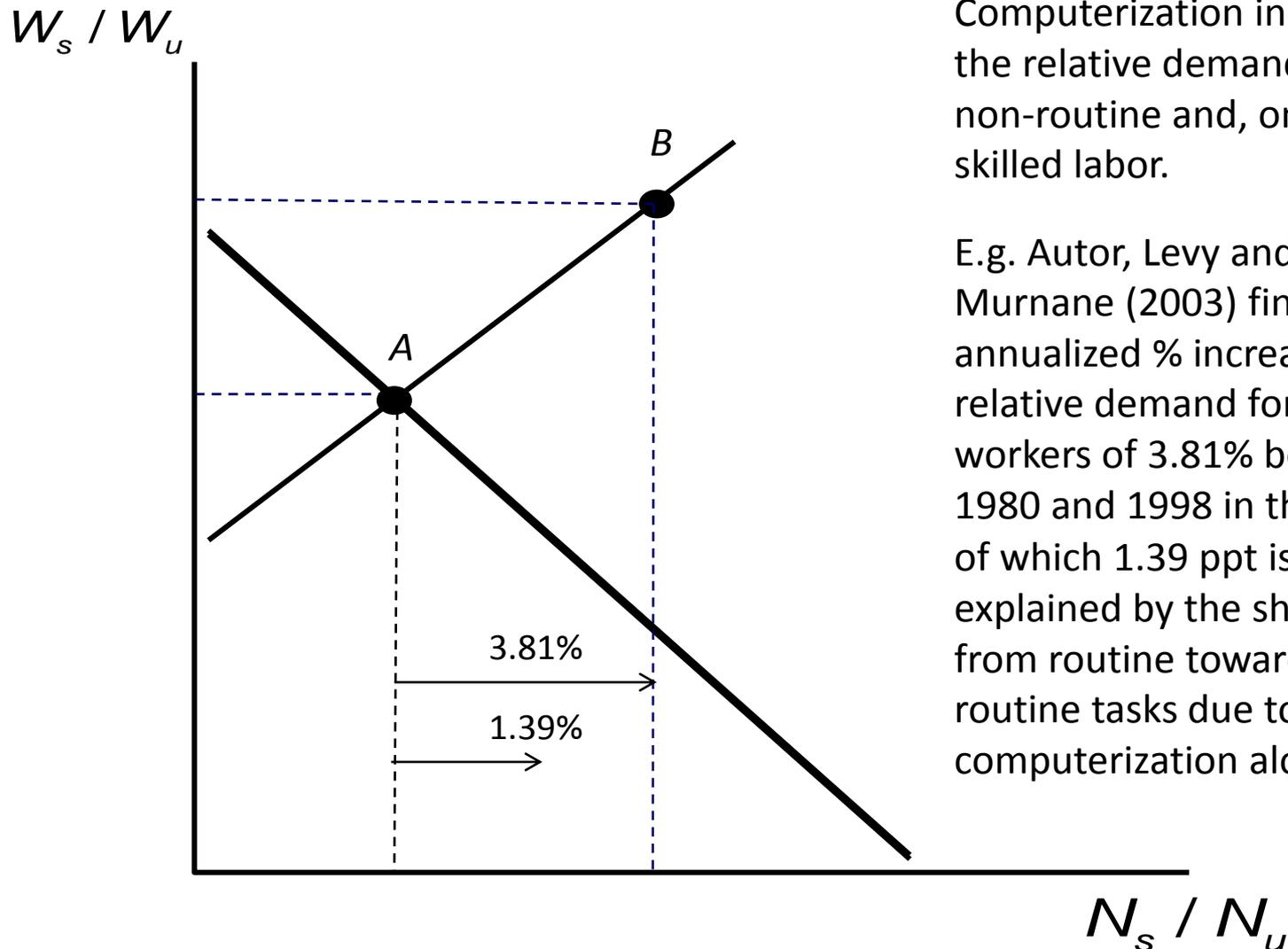


Source: Goos, Manning and Salomons (2013)



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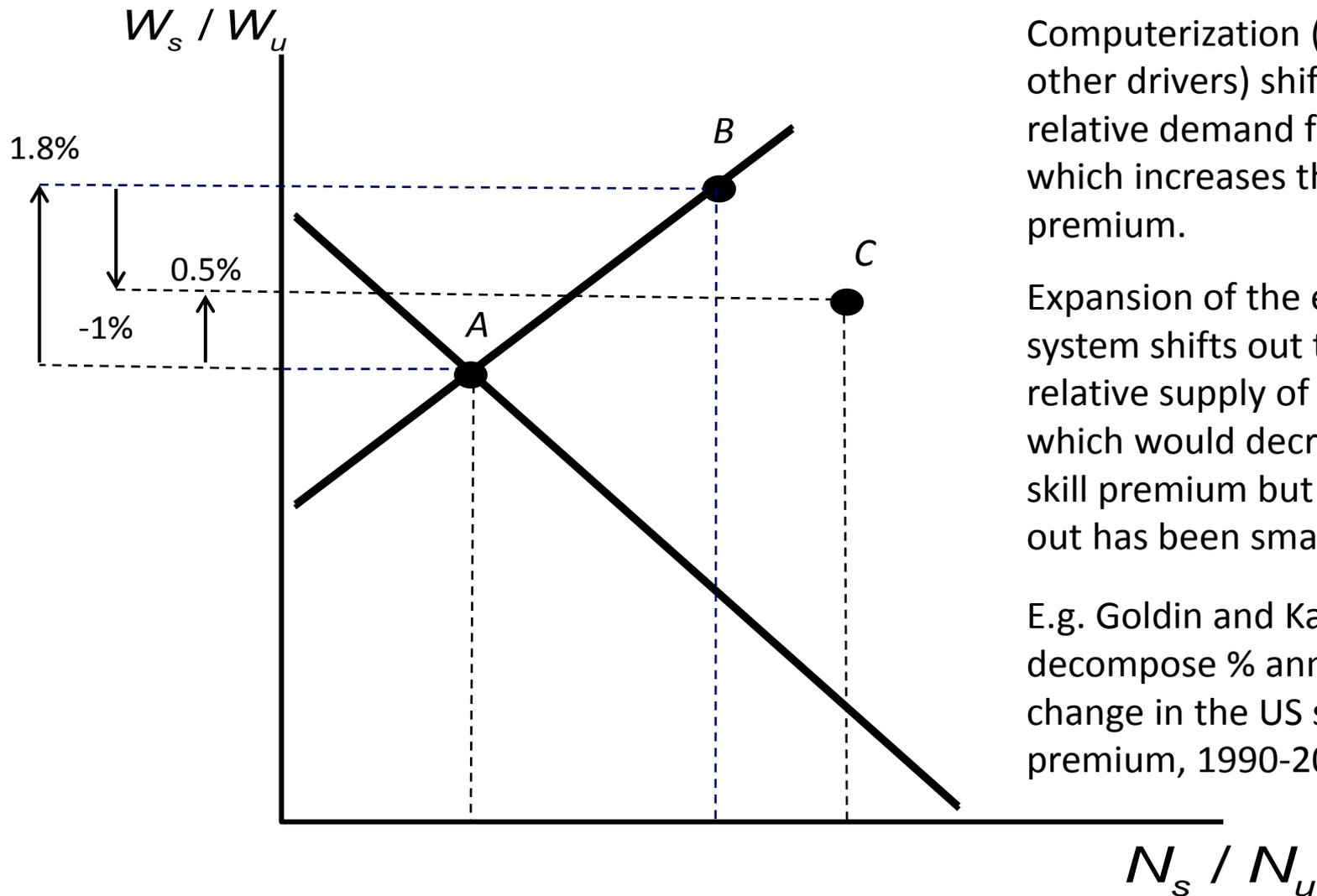
Evidence on computerization



Computerization increases the relative demand for non-routine and, on net, skilled labor.

E.g. Autor, Levy and Murnane (2003) find an annualized % increase in relative demand for skilled workers of 3.81% between 1980 and 1998 in the US of which 1.39 ppt is explained by the shift away from routine towards non-routine tasks due to computerization alone.

Inequality increased after 1980



Computerization (among other drivers) shifts out the relative demand for skills which increases the skill premium.

Expansion of the education system shifts out the relative supply of skills which would decrease the skill premium but this shift out has been smaller.

E.g. Goldin and Katz (2008) decompose % annualized change in the US skill premium, 1990-2005.

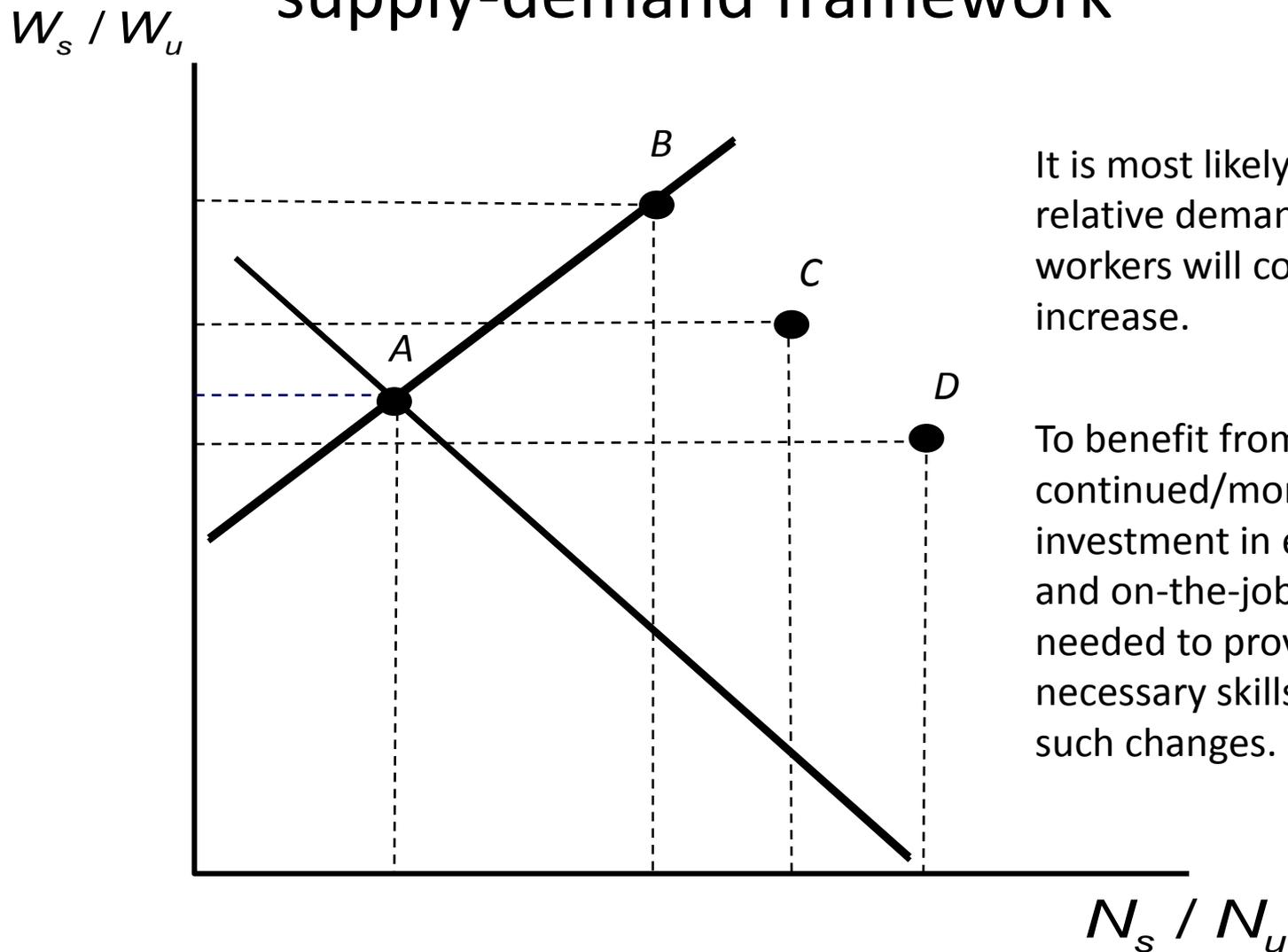
The present: conclusions

- Computer Revolution leads to skill-upgrading on net but also to *job polarization* and *increasing inequality* due to slowdown in educational expansion.
- This is very different from the past and, so far, economic growth has been less strong (“We see computers everywhere except in the productivity statistics”).

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What the future should look like in a supply-demand framework



It is most likely that the relative demand for skilled workers will continue to increase.

To benefit from this, continued/more rapid investment in education and on-the-job training is needed to provide the necessary skills to support such changes.

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