

The Future of Work

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Economic growth

- Sustained economic growth requires new technology
- But new technology does not impact economic sectors uniformly
- Some benefit, some lose: this change is the **structural transformation** associated with growth

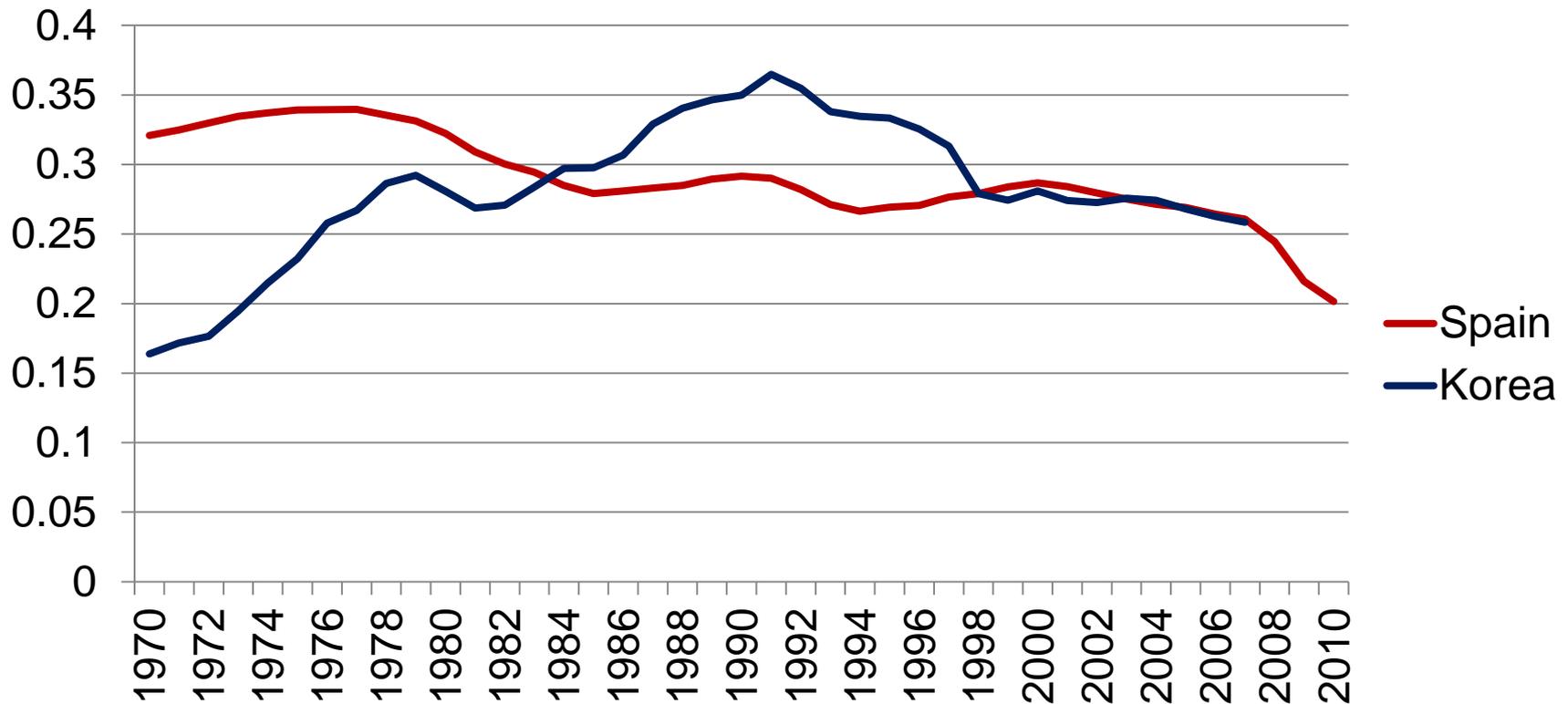
Stylised facts of development and growth

- Agricultural employment falls continually
- Industrial employment rises and then falls
- Service employment rises continually
- These trends are largely due to new technology
- Within industrial sectors, employment in sectors benefiting from new technology shrinks

Industrial job destruction from new technology

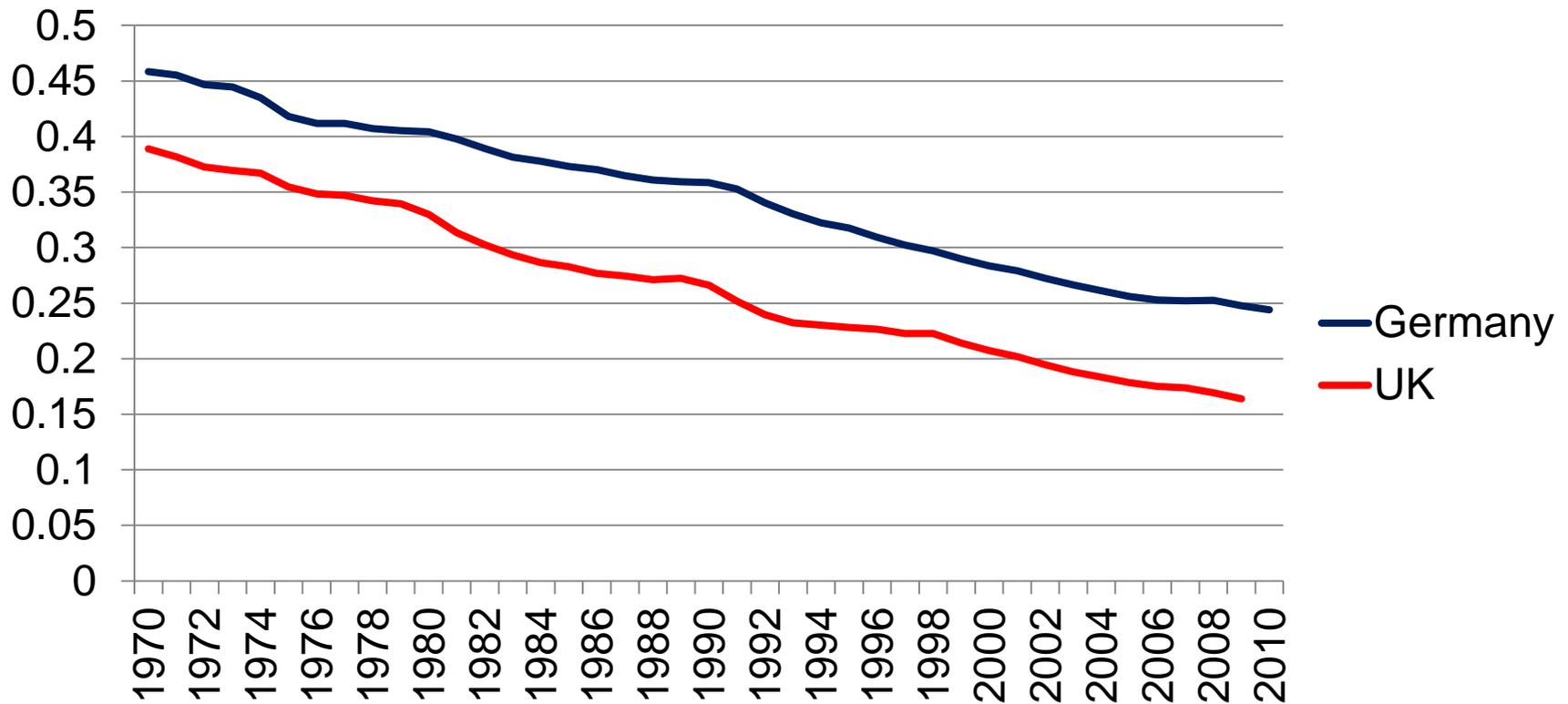
- Industrial employment typically rises up to 35-40% of overall employment and then falls to about 15%
- Even in newly industrialised countries: Korea came down from 35% in 1990 to 27% in 1999
- UK from 27% to 21% and Germany from 36% to 29% over same period
- These are technology driven but unrelated to robots and AI

Industrial employment shares Newly industrialised countries



Industrial employment shares

Mature industrial economies



Robots and AI

- Are robots and automation different?
- Not in fundamental ways
- Robots are destroying jobs even in agriculture – delivering boxes, driving machinery, “soft” robots for fruit picking
- But most job destruction from robots is in services: sectors that attract robots lose employment

Main difference compared with historical data

- The structural transformation – what type of jobs are destroyed – is the main difference
- First industrial technologies destroyed the jobs of skilled artisans and craftsmen

Steam engine and electricity

- Steam and much more so electricity enabled concentration in bigger cities and bigger factories destroying mainly unskilled jobs
- Computers destroyed routine jobs mostly in the middle of the skills distribution
- Robots and AI likely to destroy more skilled “thinking” jobs or “decision makers”

Wages

- Productivity-wages link seems to be broken with computerization
- The workers benefiting most are the most skilled ones; they are computer users
- Middle jobs suffer most because they are replaced by computers and lower skilled ones don't benefit because they don't use computers

Impact of AI

- Inequality rises in the digital age
- How will AI influence wages?
- Still an unknown but likely to increase inequality further

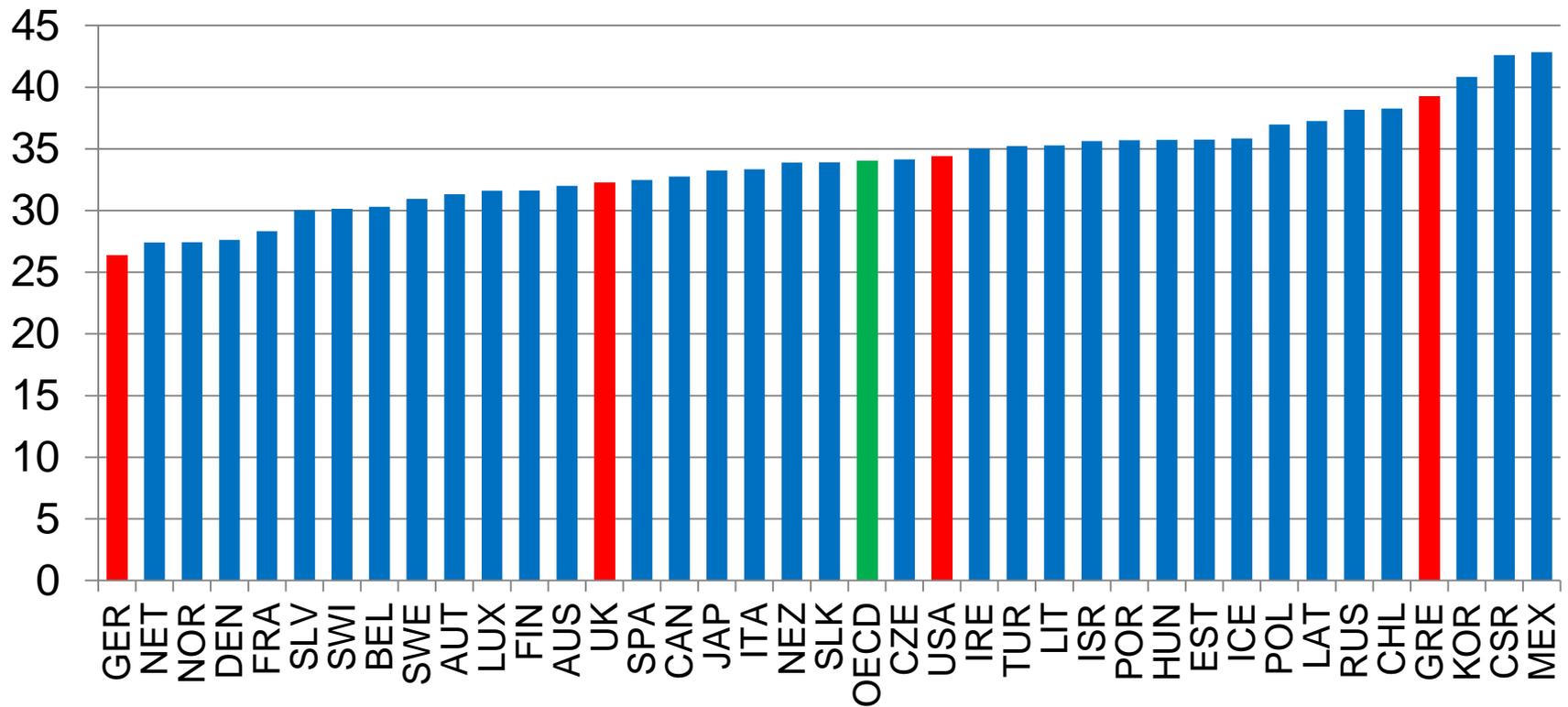
Impact on employment and hours of work

- We don't know yet which sectors will be affected most
- But we know something about total work
- Robots and AI will replace more and more of the work currently done by humans.
- This is also typical of older technologies – as John Maynard Keynes famously predicted in 1933

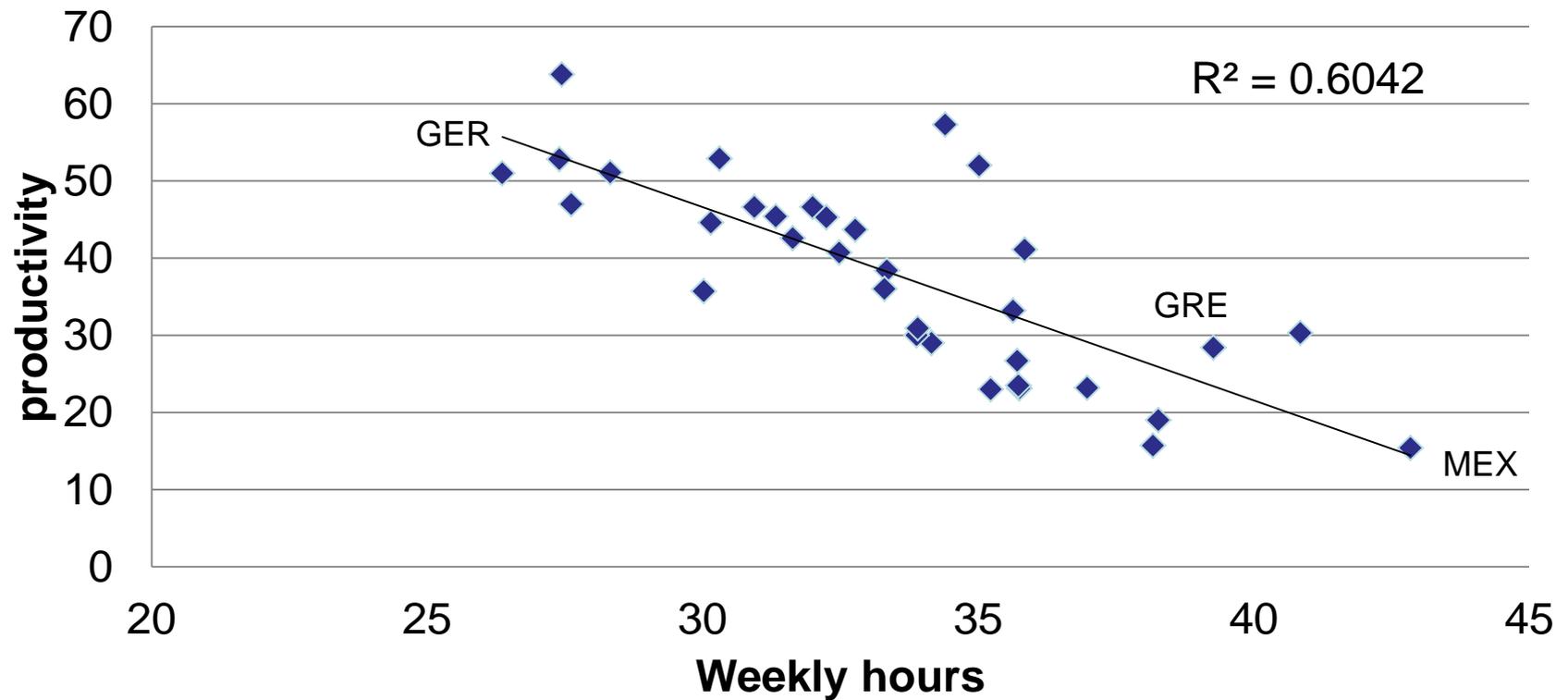
Hours of work

- On average countries with higher productivity work shorter hours
- Some of the gains from new technology are taken as increased leisure time

Weekly hours of work, 2014



Hourly labour productivity and weekly hours of work, 2014



Job sharing and creation

- In countries like Germany there is a lot of “job sharing”, mainly through part-time work
- But also new jobs are created in other sectors of the economy that cannot be automated
- Part of the gain from new technology is taken as additional demand for services that make life easier: “luxuries”

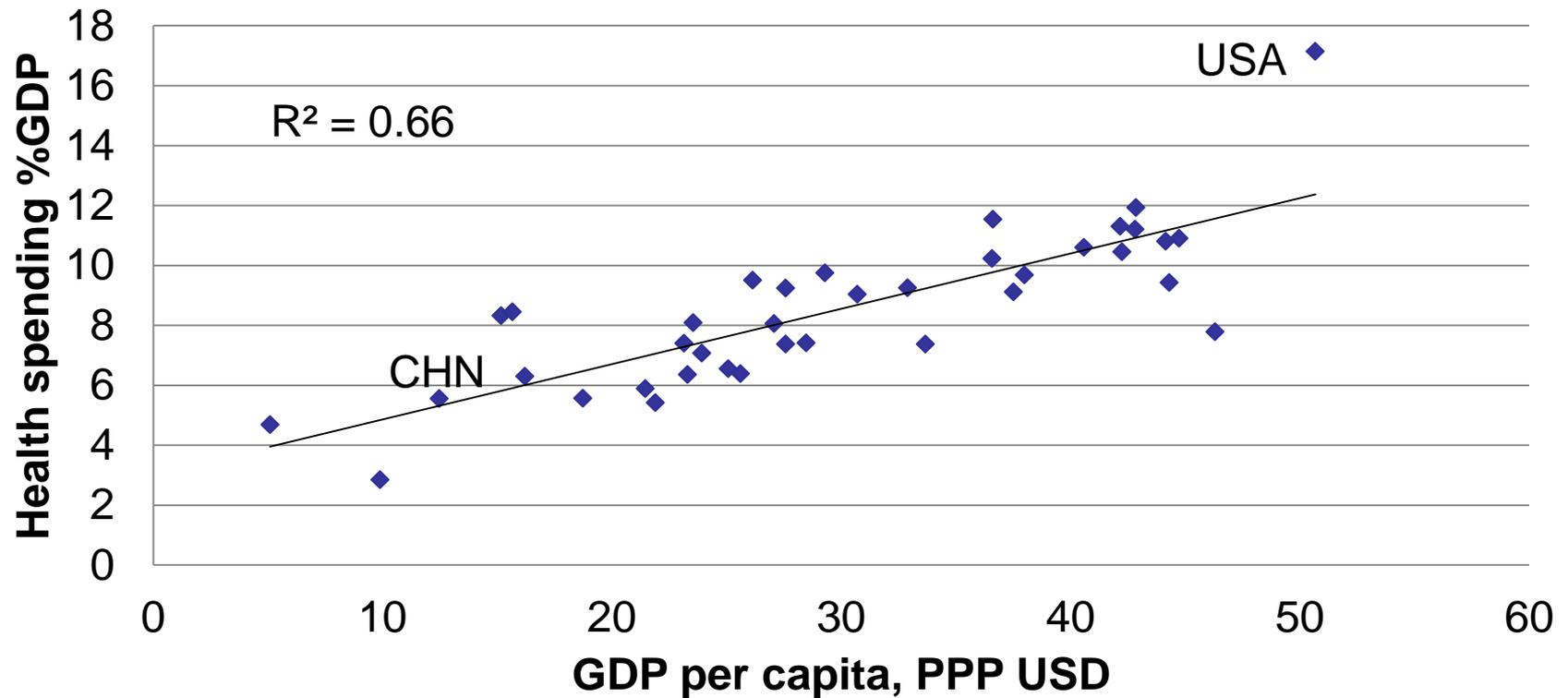
Which sectors will create jobs?

- The main sectors that will benefit from new job creation are labour intensive services that wealthier societies demand
 - Health and care
 - Education
 - Hospitality industry – leisure
 - Real estate management
 - Household services
 - Personal services

Wealthy aging societies

- Especially health and care will create jobs, because of higher demand for good quality health care and aging societies
- The leisure industry because of fewer hours of work
- Household services, real estate management because we become wealthy enough not to “bother” with such chores

Health services as “luxuries” (major economies, 2014)



Conclusions

- New technologies have always been “disruptive” but they should be welcomed because they increase productivity and careful government policy could ensure that everyone in society benefits
- Robotics and AI are disruptive at a higher level of the skills distribution – otherwise their impact does not seem to be different from previous innovations, e.g., the introduction of electricity