LA COMPETITIVITÀ DELL'INDUSTRIA EUROPEA NELL'ERA DIGITALE

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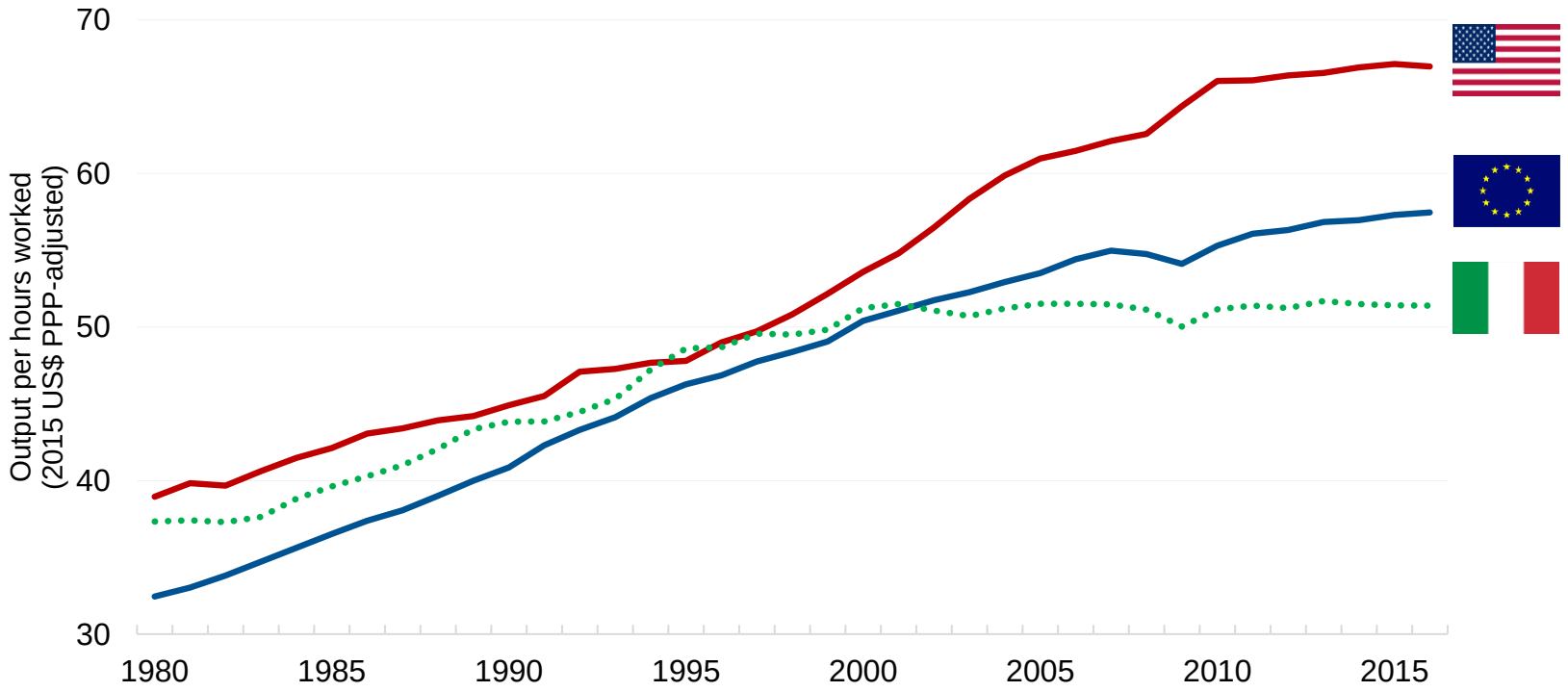
ICT & EU vs. US PRODUCTIVITY GAP

"You can see the computer age everywhere but in the productivity statistics"

Robert Solow (1987)

Figure 1. Labour productivity dynamics, EU15 vs. US



Source: the Conference Board Total Economy Database.

MACRO TRANSMISSION CHANNELS

Several theories have been proposed to describe the dynamic effects of ICT revolution and rationalize possible cross-country differences. Timmer and van Ark (2005) summarizes them into three (consequential) transmission channels:

1. rapid technological progress in the production of ICT goods raises total factor **productivity growth** in **ICT producing industries**;

   → **DIRECT** effect

2. introduction of new products and the fall in prices of ICT-goods induce an **ICT investment** boom;

   → **CAPITAL** deepening

3. consequent **spread** of ICT technology **into other industries** facilitates and induces firms to introduce more efficient organizational forms, with an expected additional increase in productivity due to TFP growth in the ICT-using sectors.

   → **INDIRECT** effect

WORKING HYPOTHESES

Europe and (overall) Italy's **lagging growth performance** might be caused by:

1a. a **smaller ICT-producing sector**;

1b. a relatively **lower productivity growth** in ICT-producing sectors;

2a. **lower ICT investment** rates;

2b. consequently, lower contribution of **ICT capital deepening**;

Macroeconomic & institutional drivers

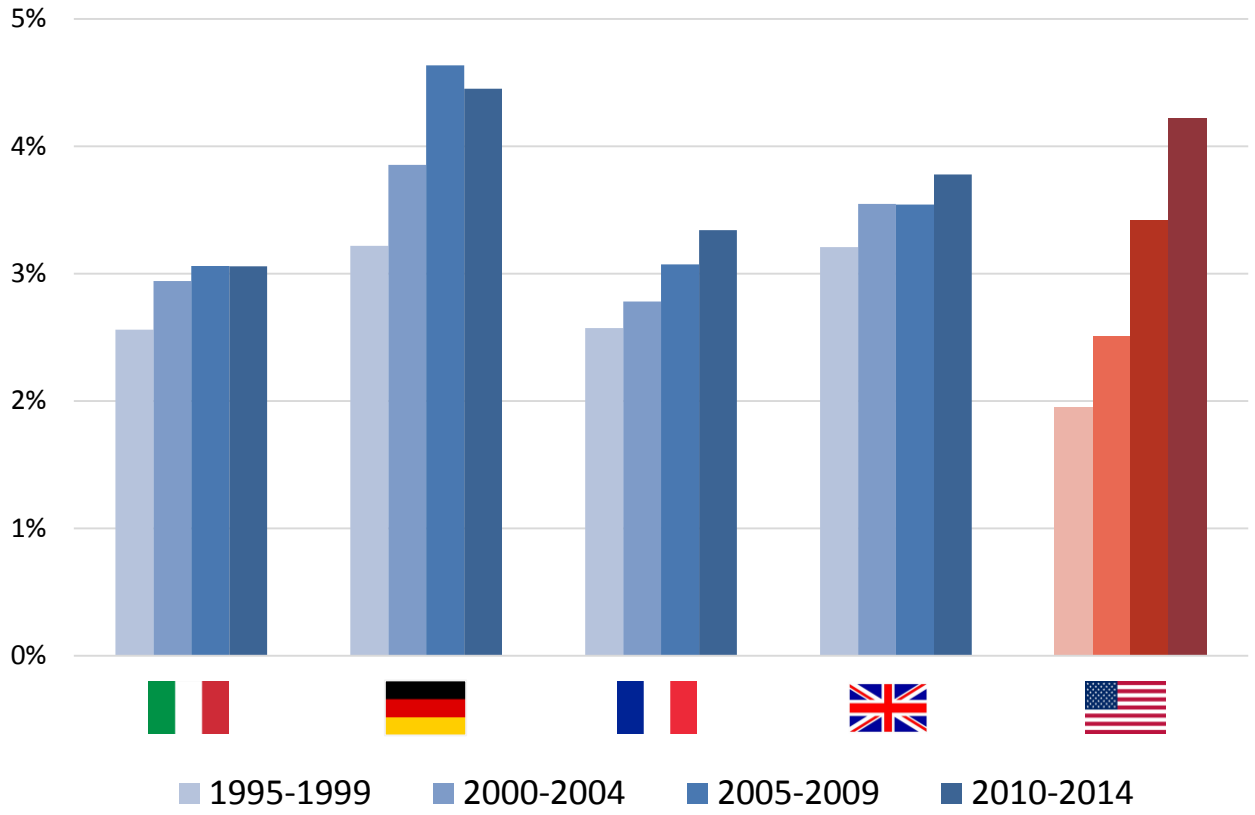
3. **limited spread** of ICTs products/practices in ICT-**using** industries

Managerial & firm organization drivers

..or a combination of these factors.

1a. SMALLER ICT-PRODUCING SECTORS?

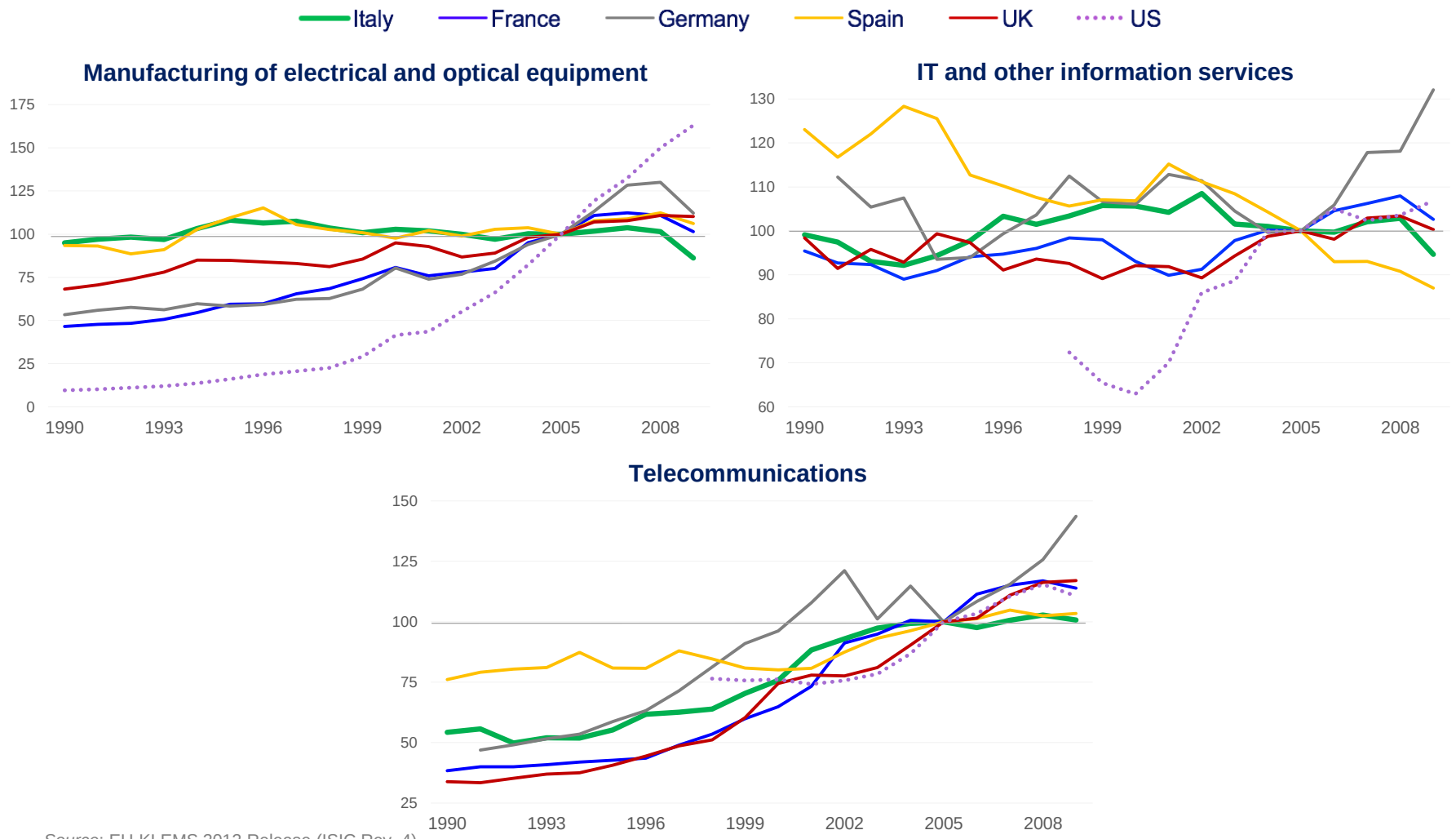
Figure 3. Share of value added created by ICT-sectors, constant prices



Source: OECD, Gross value added, constant prices, ISIC Rev. 4
Notes: sectors considered are manufacturing of computer, eletronic and optical products (sec. 26), electrical equipment (sec. 27), IT and other information services (sec. 62-63)

1b. LESS PRODUCTIVE ICT-PRODUCING INDUSTRIES?

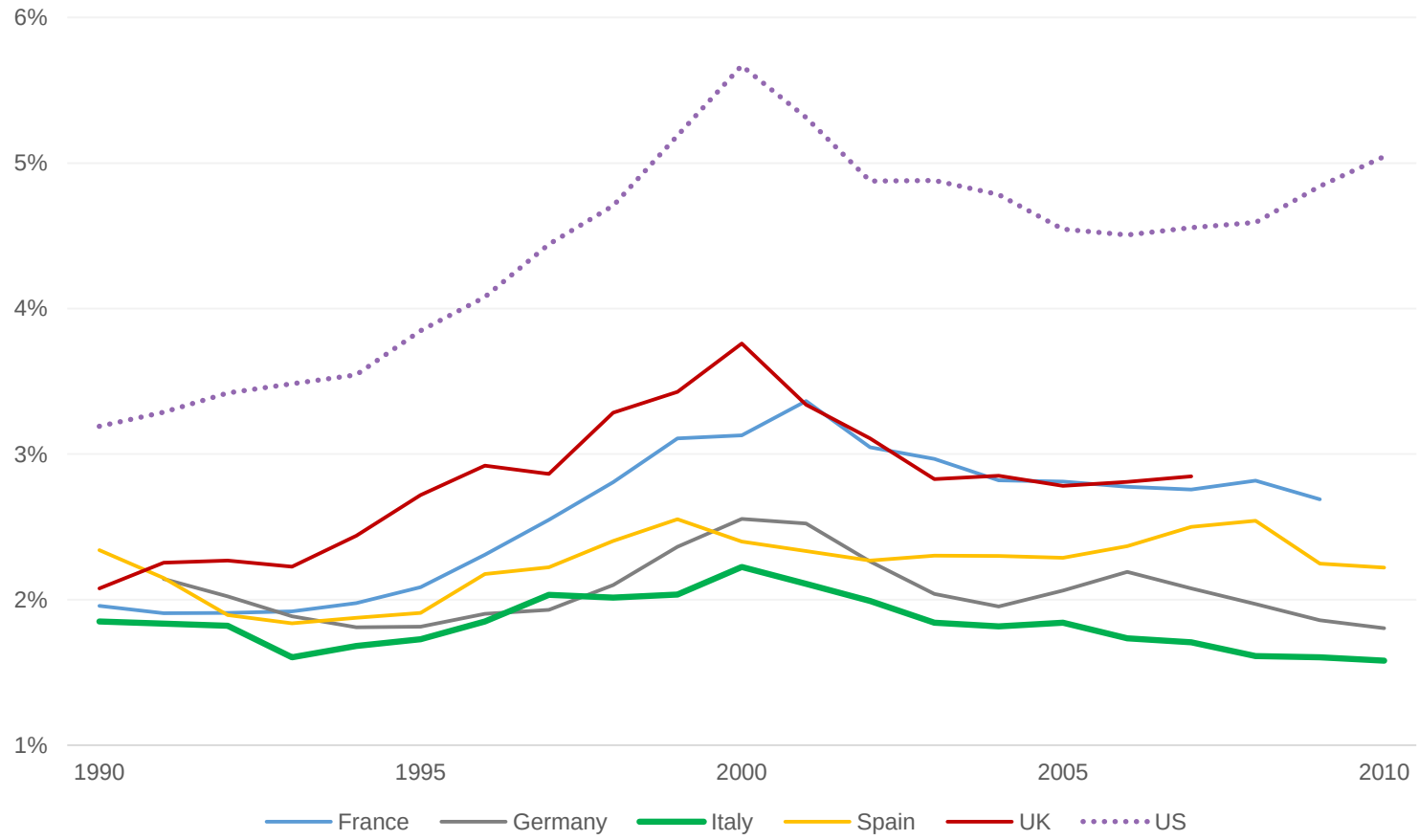
Figure 4. Total factor productivity dynamics by industry (2005=100)



Source: EU-KLEMS 2012 Release (ISIC Rev. 4)

2a. LOWER ICT INVESTMENTS?

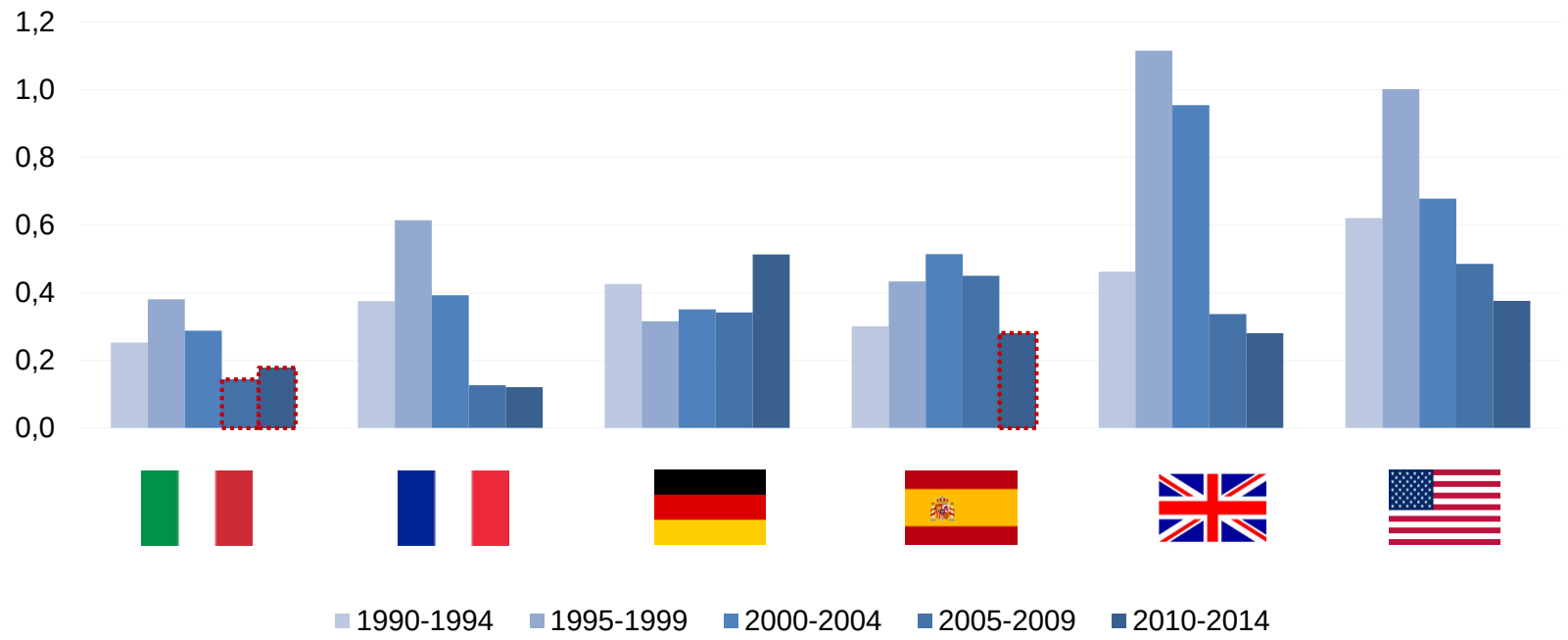
Figure 6. Annual ICT investment as % of GDP



Source: OECD.
Notes: ICT investment comprises the acquisition of IT equipment such as computers and related hardware; communications equipment; and software.

2b. ICT CAPITAL DEEPENING ACROSS COUNTRIES

Figure 8. Contribution to GDP growth of ICT capital deepening

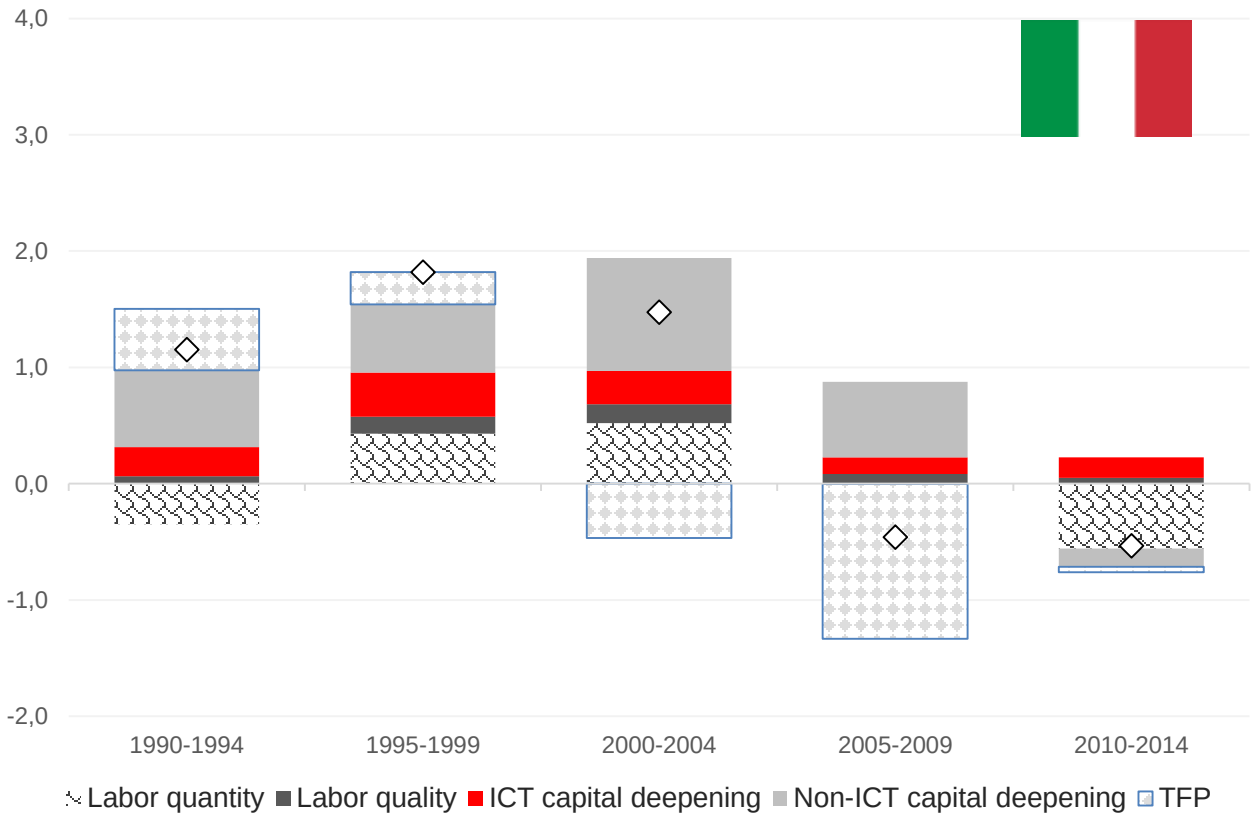


Source: The Conference Board Total Economy Database, 2015.
Notes: Red outlined segments correspond to period in which average GDP growth has been negative.

Italy and France displayed the **lowest contribution** to GDP growth, lower than 0.2%. However, in relative terms it **remained the only positive contribution** to aggregate value added growth, largely negative in the last years considered.

2b. ICT CAPITAL DEEPENING AND GROWTH: ITALY

Figure 7. Contribution to GDP growth, 5-years average

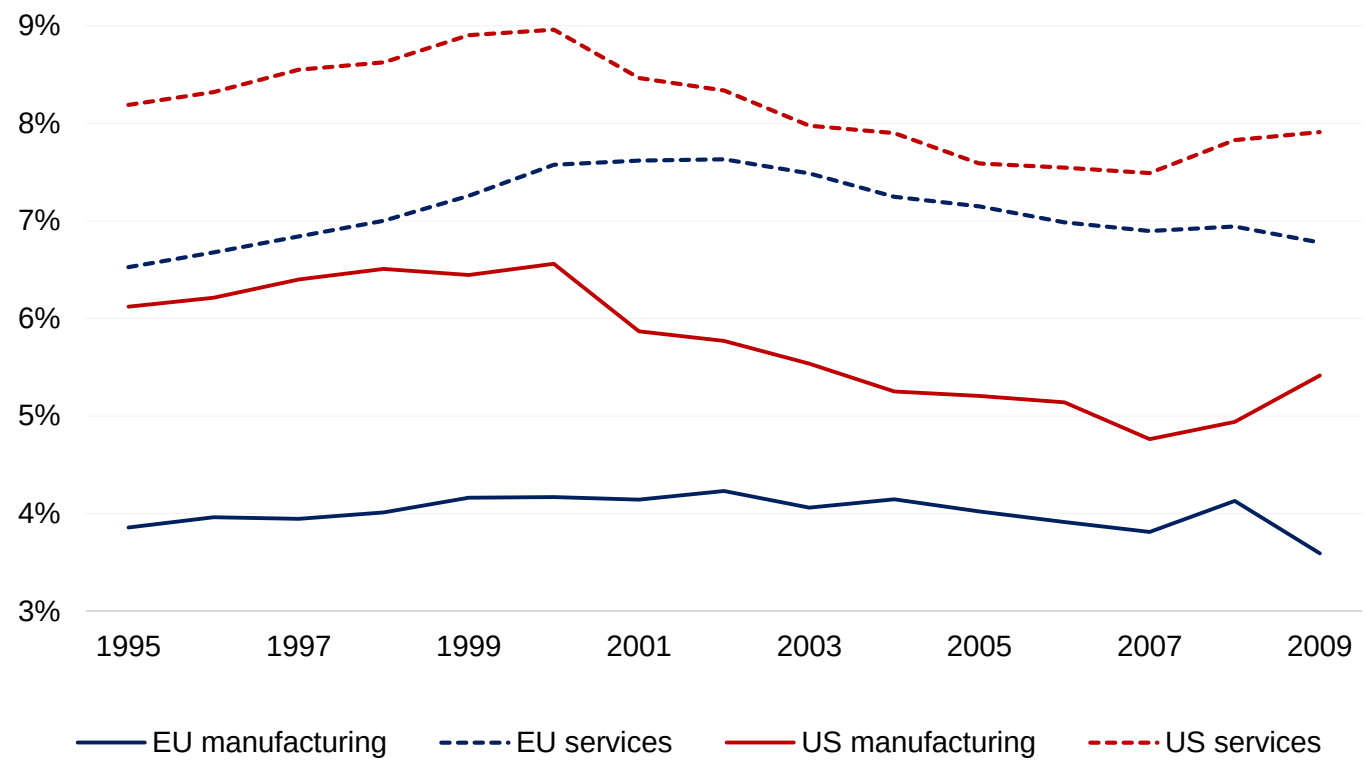


Source: The Conference Board Total Economy Database, 2015,

3. ADOPTION OF ICT INPUTS BY ICT-USING SECTORS

Descriptive statistics (I)

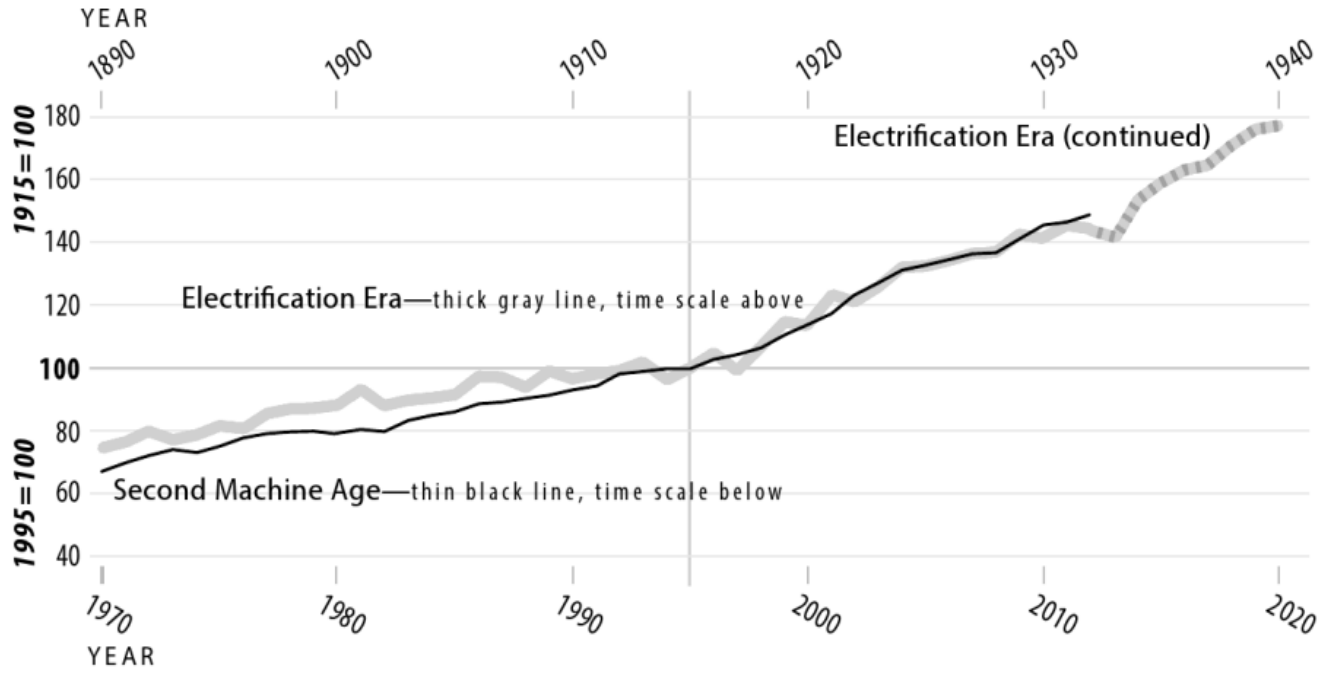
Figure 10. (Weighted) ICT input share over time – manufacturing vs services, EU vs US



ICT & PRODUCTIVITY: A REVOLUTION OR AN OLD STORY?

History shows that productivity growth driven by general purpose technologies can arrive in **multiple waves** (Syverson, 2013).

Figure 2. Labour productivity during the electrification and the IT Eras in the US

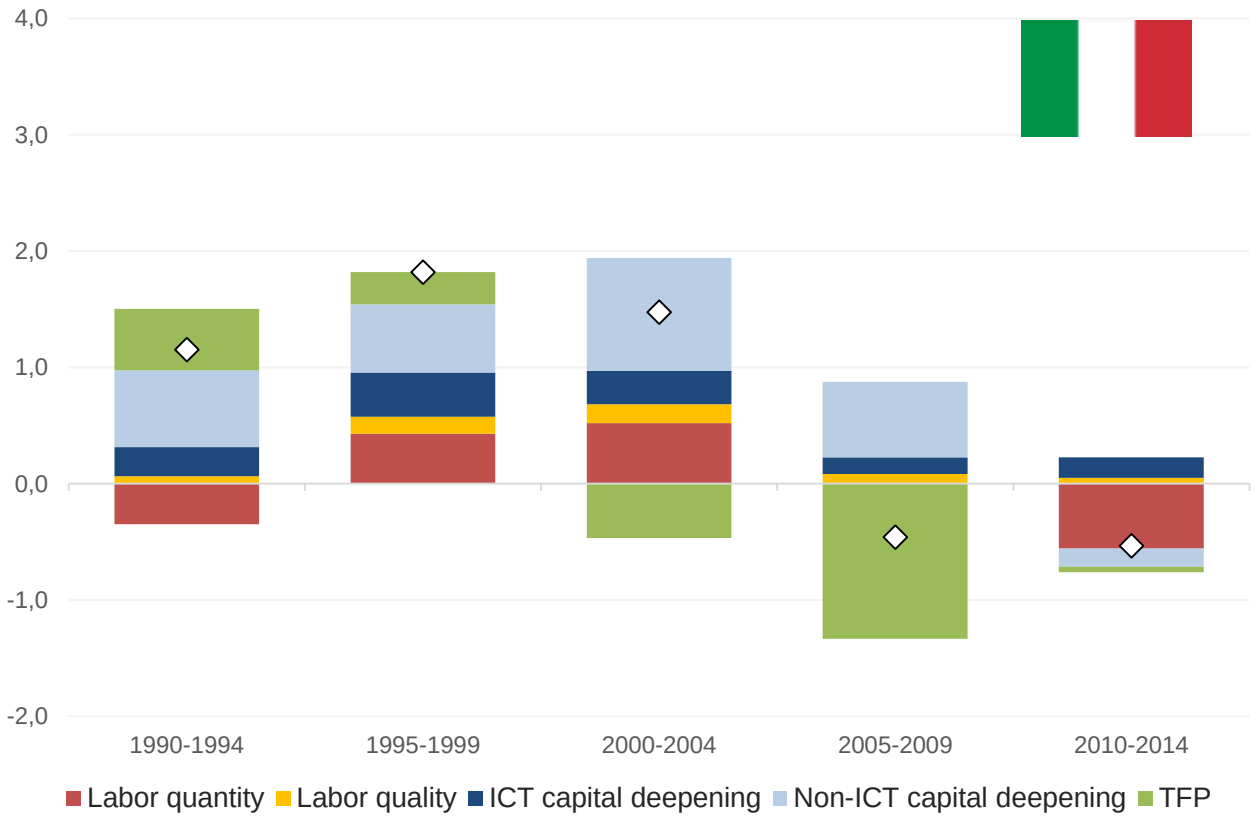


Source: Brynjolfsson, E., & McAfee, A. (2014) based on Syverson (2013).

But GPTs always need **complements**, such as changes in business processes or institutions (e.g. competition law) to fully express their potential.

THE ANATOMY OF GDP GROWTH IN ITALY

Figure 7. Contribution to GDP growth, 5-years average



Source: The Conference Board Total Economy Database, 2015,

THE ‘LACKING COMPLEMENTS’ OF GPTs IN ITALY

What are the **potential factors** behind the 'lack of ICT transmission' ?

1. **Smaller firm size.** Larger firms are more likely to invest in ICTs.
2. **Reduced market size / lower economies of scale.** In a larger and more aggregated market, as the U.S., firms can spread the fixed costs of their ICT investments over a higher volume of sales.
3. **Higher distance from the frontier.** The more sizable productivity slowdown in Italy could reflect a **slowing diffusion of productivity gains from the frontier** through the rest of the economy, in particular due to **protected markets**, especially in business services.
4. **Poor management practices.** These practices exhibit strong complementarity with the adoption of ICT capital. Italian firms have proven to be less willing or able to reengineer business processes around the use of ICT.

CONCLUSIONS & POLICY IMPLICATIONS

Low pass-through of ICT inputs to growth in Italy, due to:

1. a **smaller** *(hp. 1a)* and **less dynamic** (in terms of within-industry productivity growth) **ICT-producing industry** *(hp. 1b)*

15%

2. **lower ICT investment rates** *(hp. 2a)* with an impact in terms of **lower contribution of ICT capital deepening** to GDP growth *(hp. 2b).*

25%

3. the **diffusion of ICT inputs into other industries,** although technologically similar to the one of other countries, **generates lower productivity effects in ICT-using industries** (*hp. 3*)**.**

60%

- Incentives (e.g. tax credits) not only to ICT physical investments (e.g. Industry 4.0) but also to projects aimed at reorganizing a company strategy (suppliers, production, clients, …) around ICT

- Institutions supportive of ICT opportunities (competition & labor law)

REFERENCES

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