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Industry 4.0: Supercharging Productivity with Digital Technologies

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The Information Technology and Innovation Foundation is a Washington, D.C.-based think tank at the cutting edge of designing innovation policies and exploring how technological innovation will boost economic growth and improve quality of life. ITIF focuses on:

- Innovation processes, policy, and metrics,
- Internet, big data and IT policy,
- IT and economic productivity,
- Science and tech policy, and
- Innovation and trade policy.

■ Today's Presentation

1

The *Nature* of the EU-US Productivity Gap

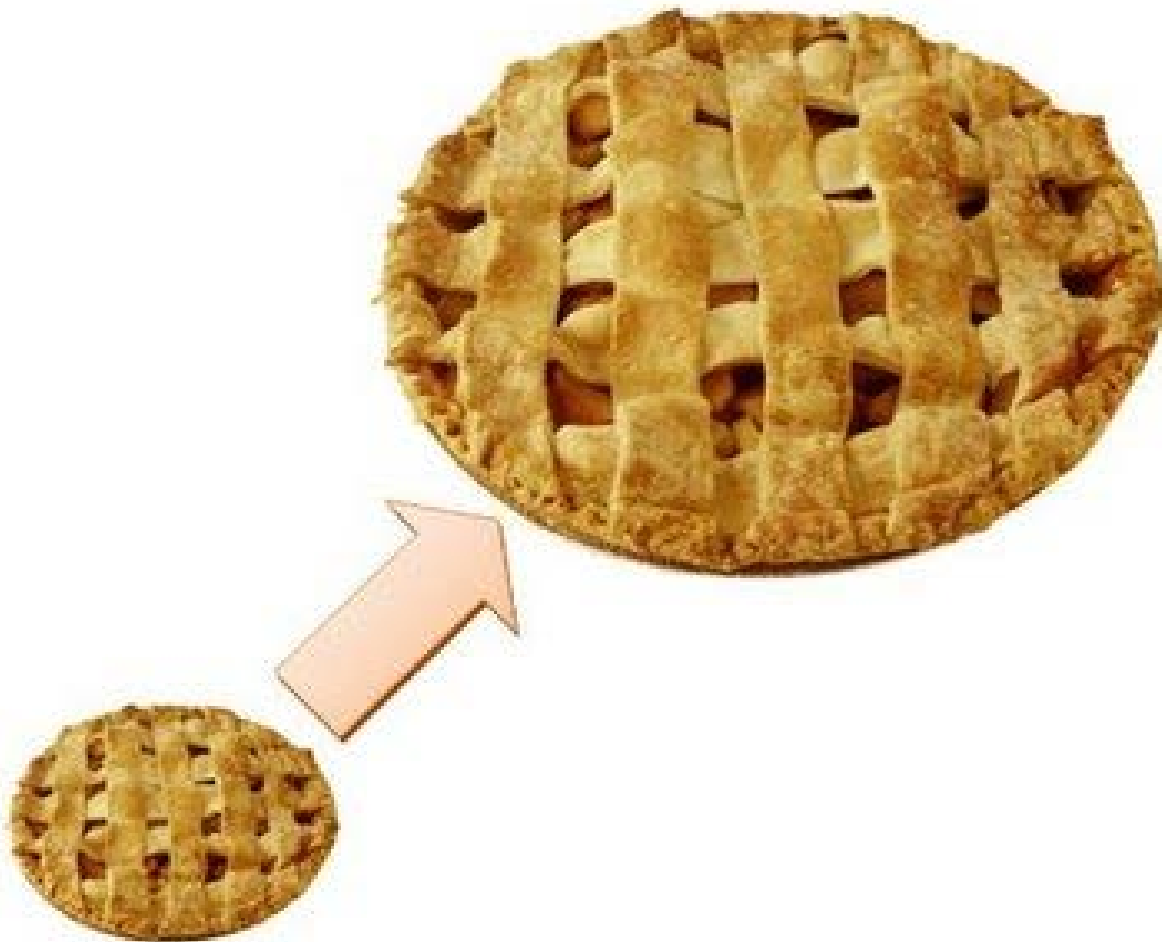
2

Causes of the EU-US Productivity Gap

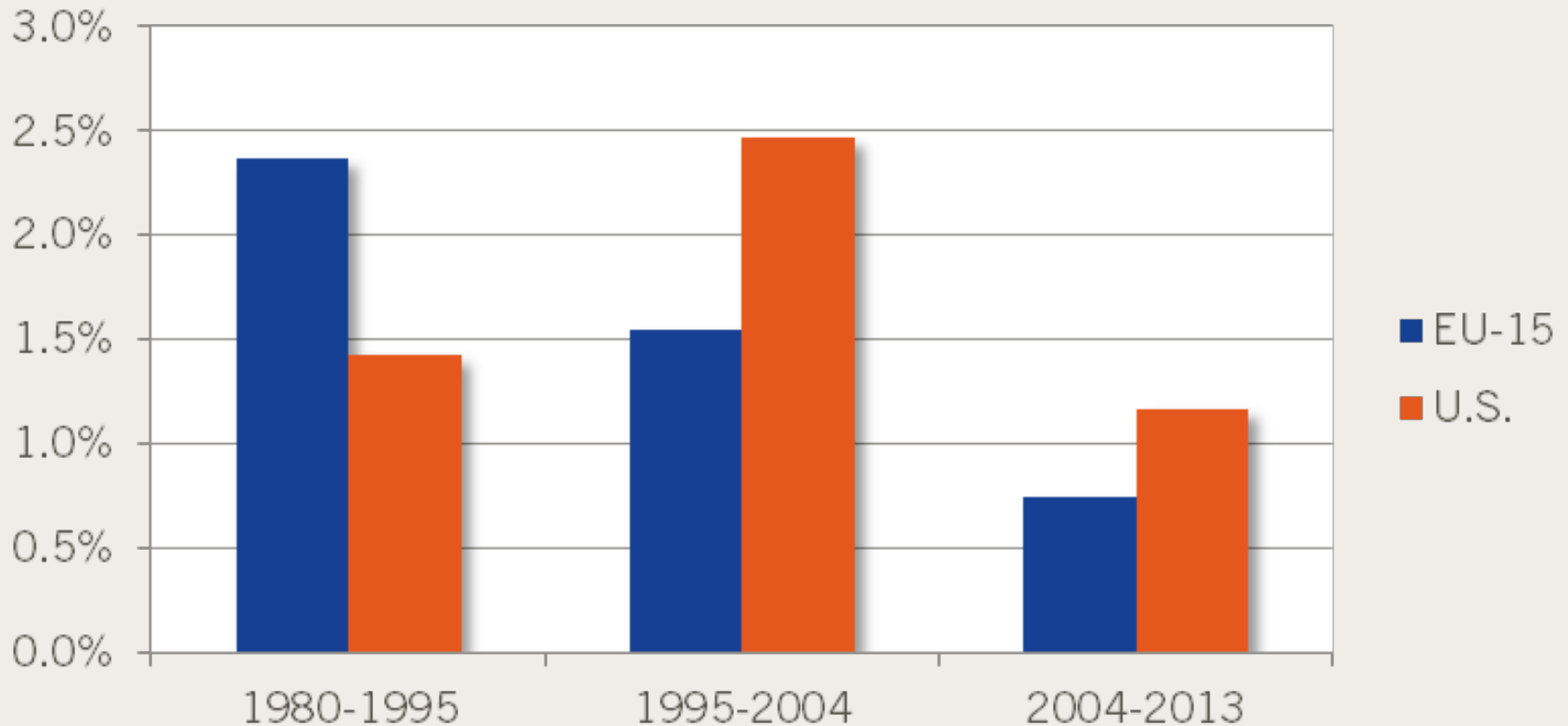
3

Some *Solutions* For Closing the Gap

- Productivity Grows the “Pie”



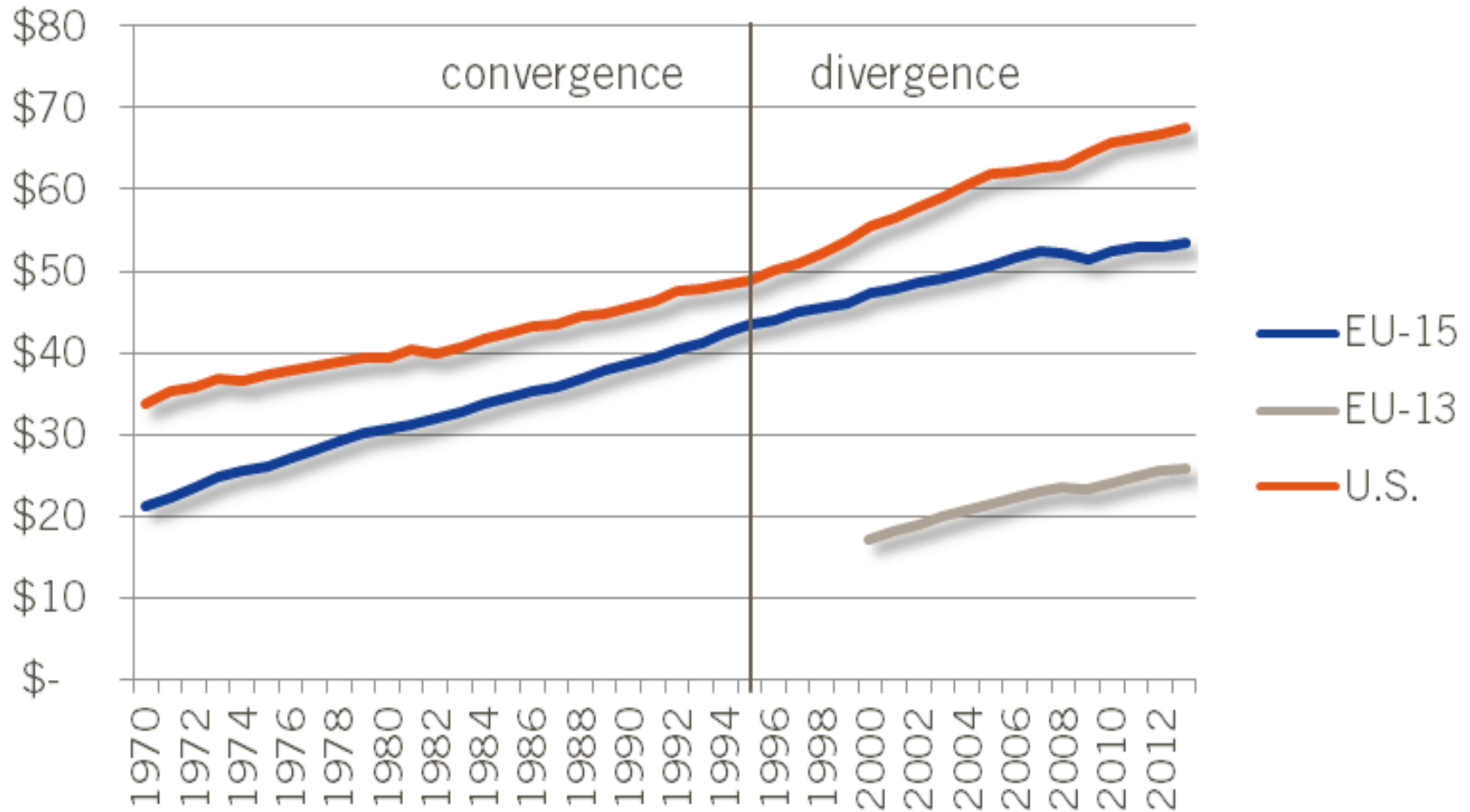
■ Since 1995 EU-15 Falling Behind U.S. in Labor Productivity



Annual Labor Productivity Growth

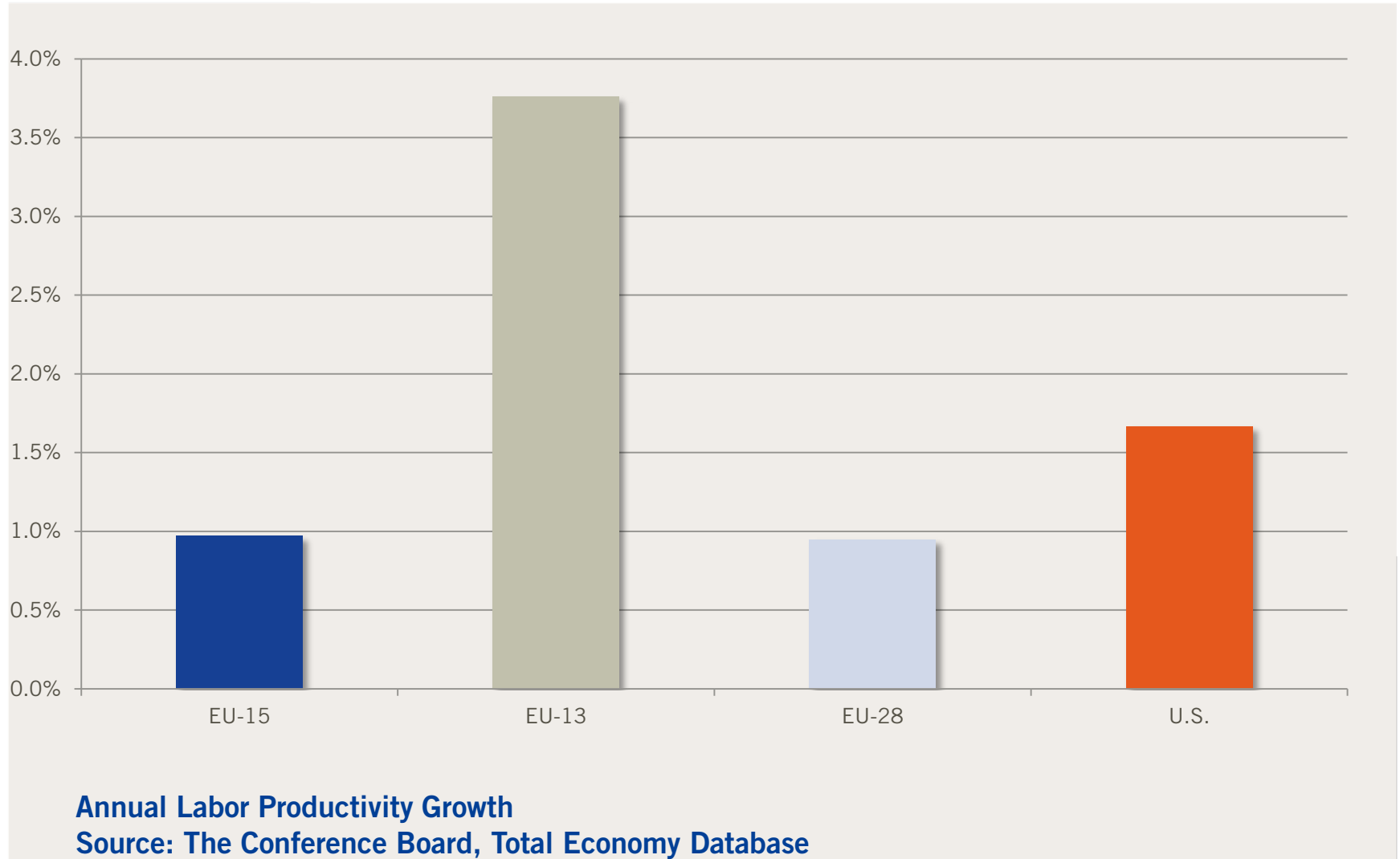
Source: The Conference Board, Total Economy Database

■ Then Convergence; Now Divergence



GDP per hour worked, Source: The Conference Board, Total Economy Database

■ U.S. Productivity Growth Leads EU-28: 2000-2013



■ Different Patterns of Convergence/Divergence (EU-15)

		2004-2013	
		Diverging	Converging
1995-2004	Converging	Finland Greece Sweden United Kingdom	Ireland
	Diverging	Belgium Denmark France Germany Italy Luxembourg Netherlands Portugal	Austria Spain

■ Different Patterns of Convergence/Divergence (EU-13)

		2004-2013	
		Diverging	Converging
1995-2004	Converging		Bulgaria Czech-Republic Hungary Lithuania Poland Romania Slovak-Republic
	Diverging	Cyprus Malta	

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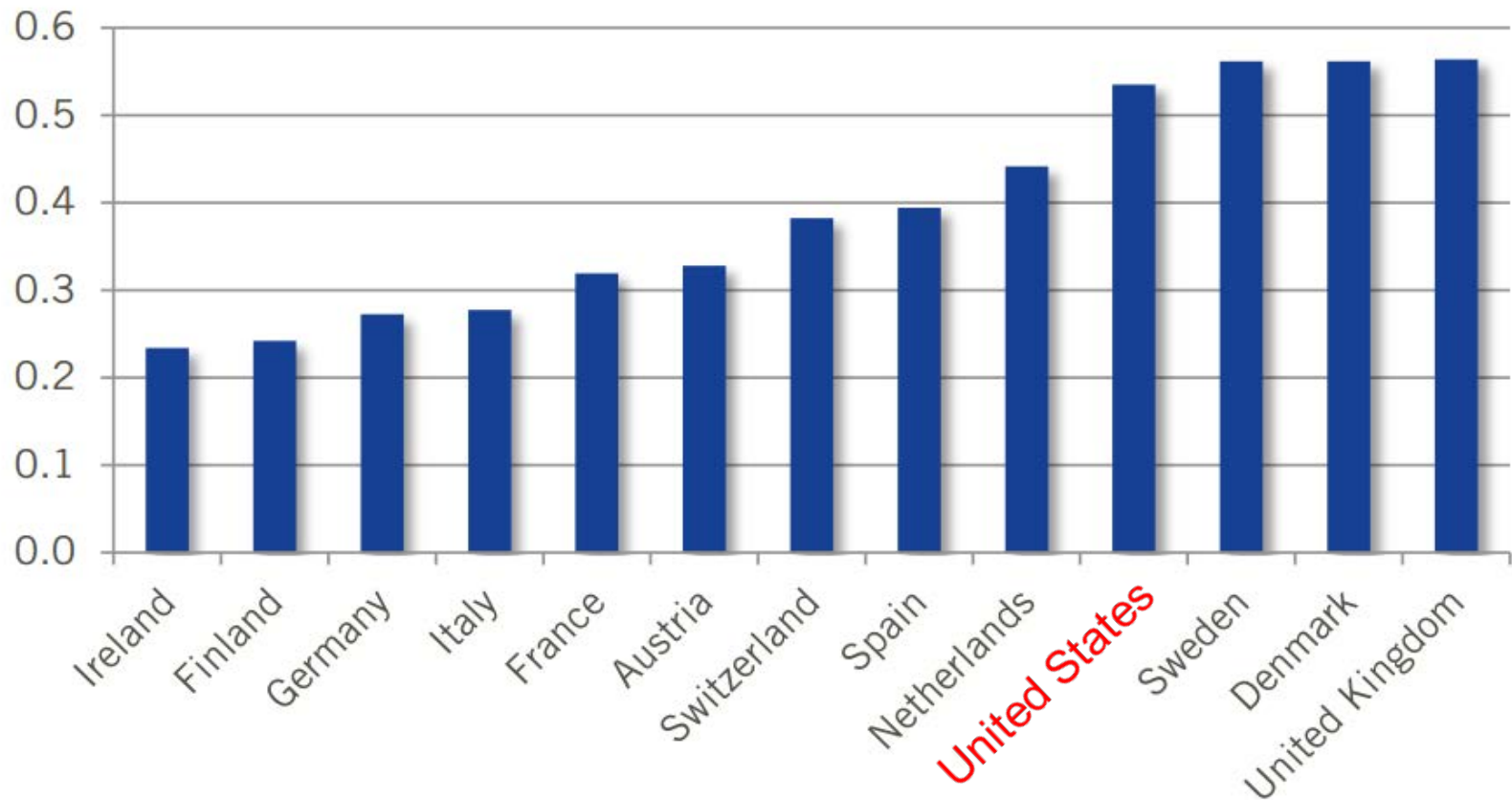
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Causes of the EU-US Productivity Gap

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Some *Solutions* For Closing the Gap

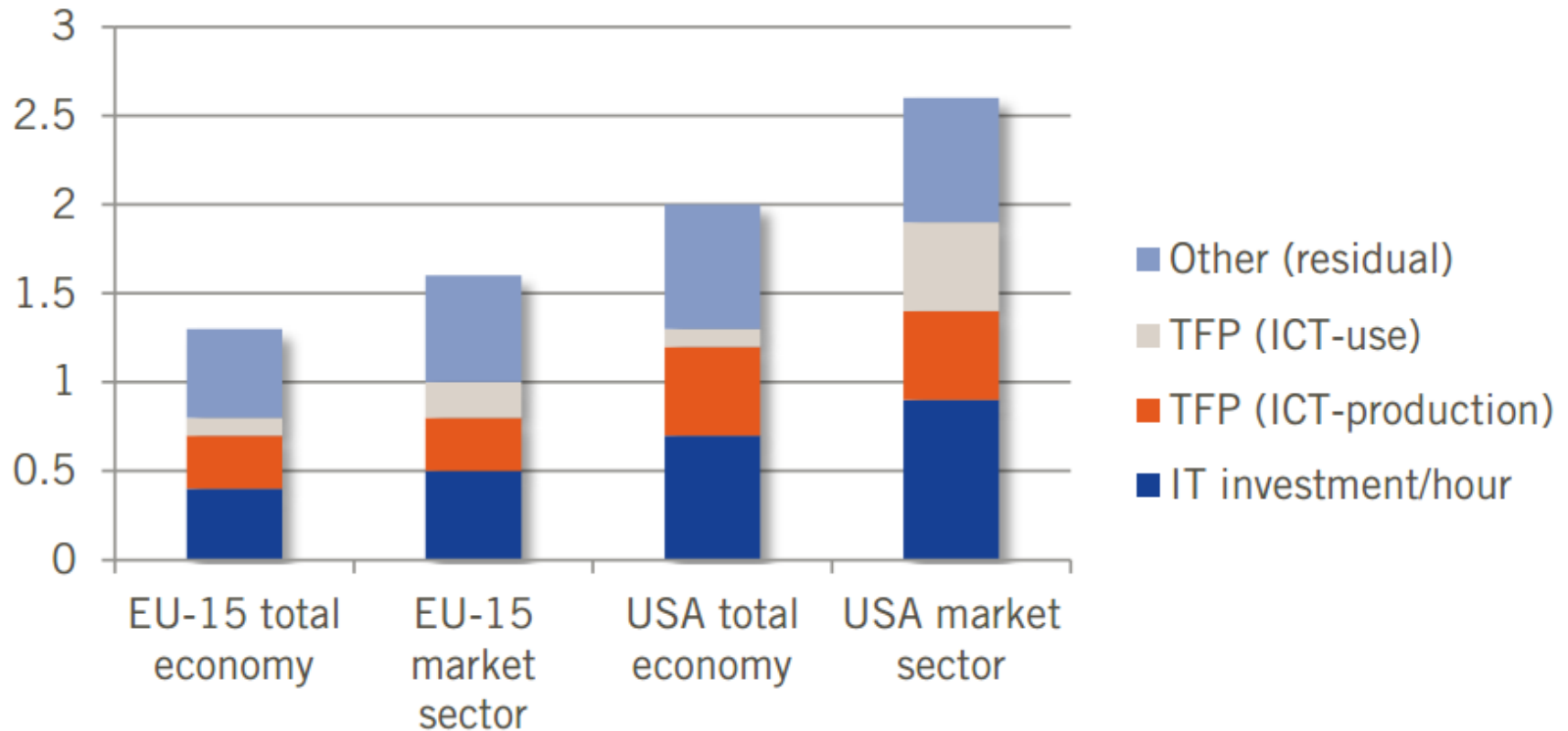
■ U.S. Gets More Growth From ICT



ICT contribution to average annual GDP growth rate, 1985-2010
Source: OECD StatExtracts, Country Statistical Profile 2012

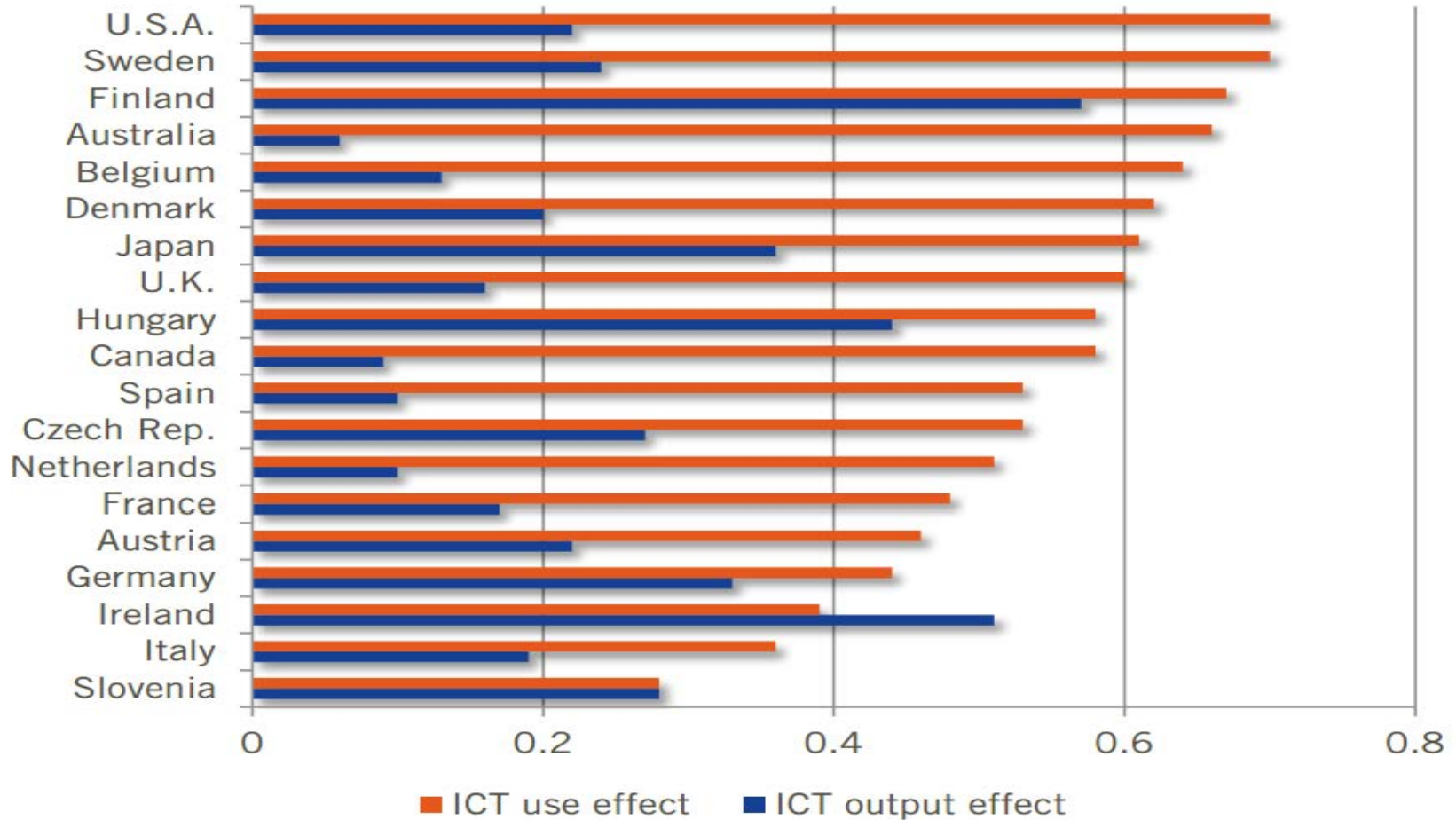
Most U.S. Advantage Comes From ICT Use and Investment

■ and Investment



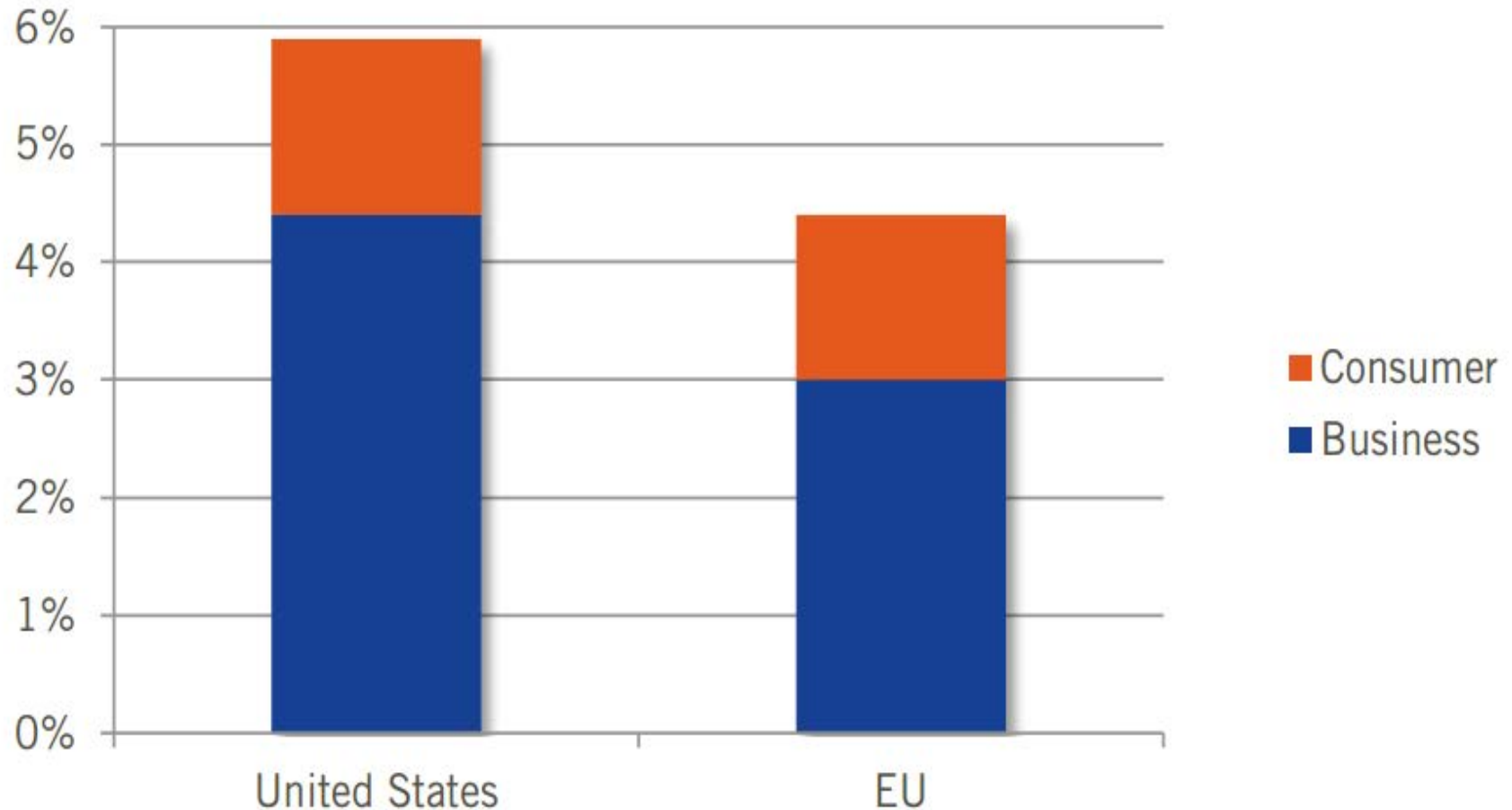
Components of labor productivity growth (average percentage points per annum), 1995-2007. Source: "ICT Capital and Productivity Growth," EIB Papers 16, no. 2 (2011)

■ Most U.S. Advantage Comes From ICT Use



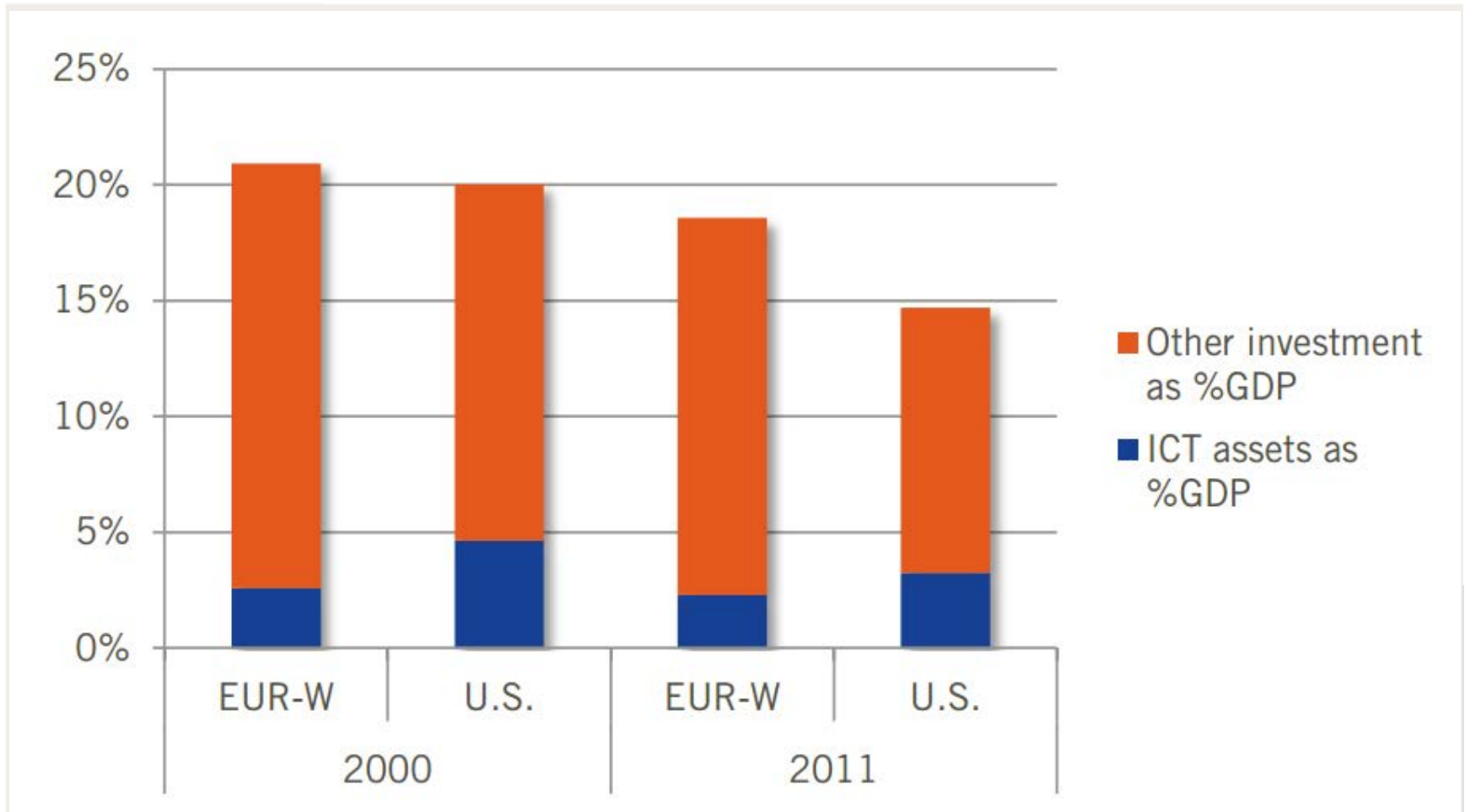
2000 to latest year, percentage points per annum. Source: *Economic Modelling* 29, no. 5 (2012)

■ U.S. Businesses Invest More in ICT



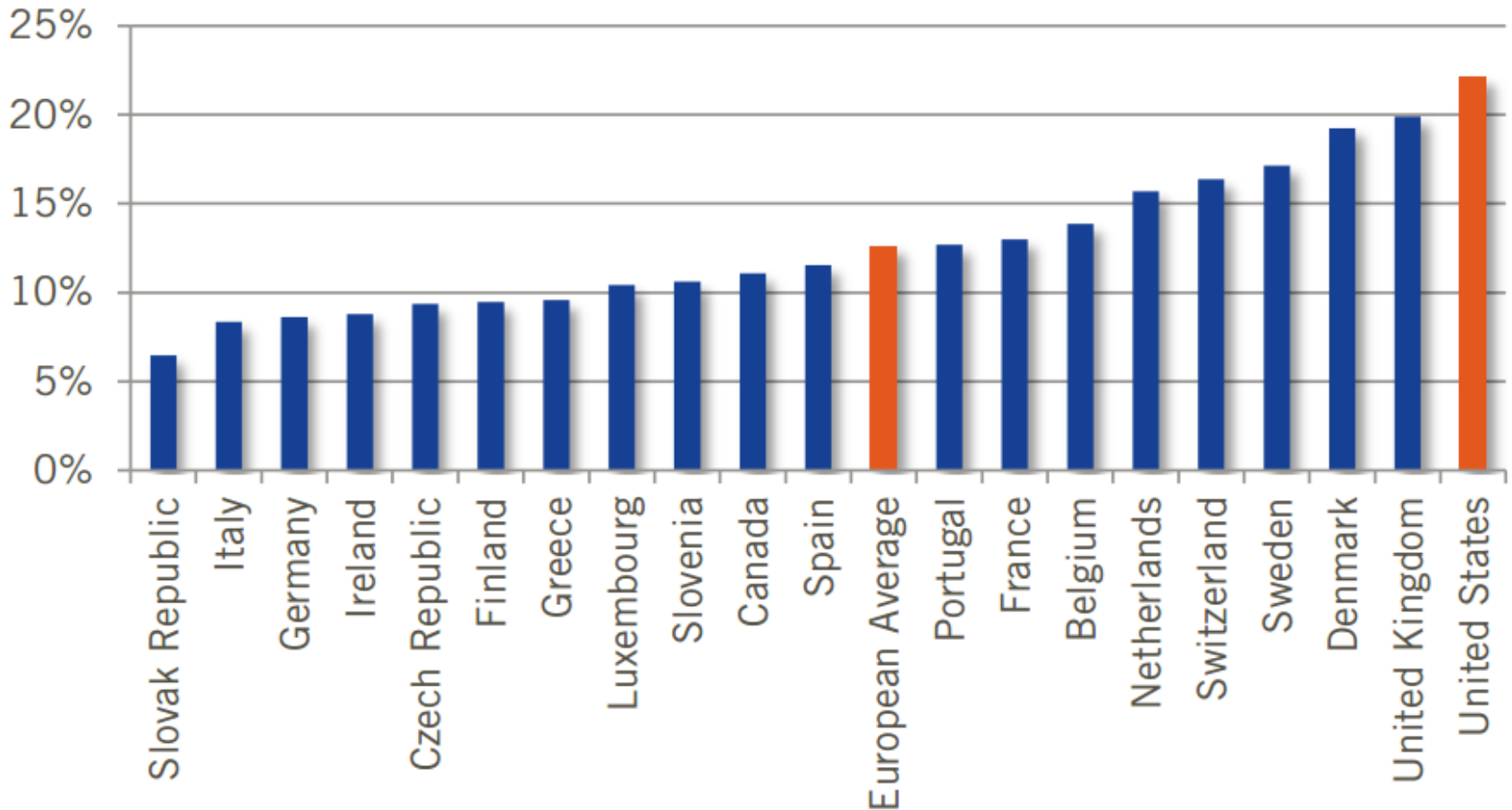
Share of GDP, 2010; Source: National Science Foundation, Science and Engineering Indicators 2014

■ U.S. Exceeds EU in ICT Investment (1)



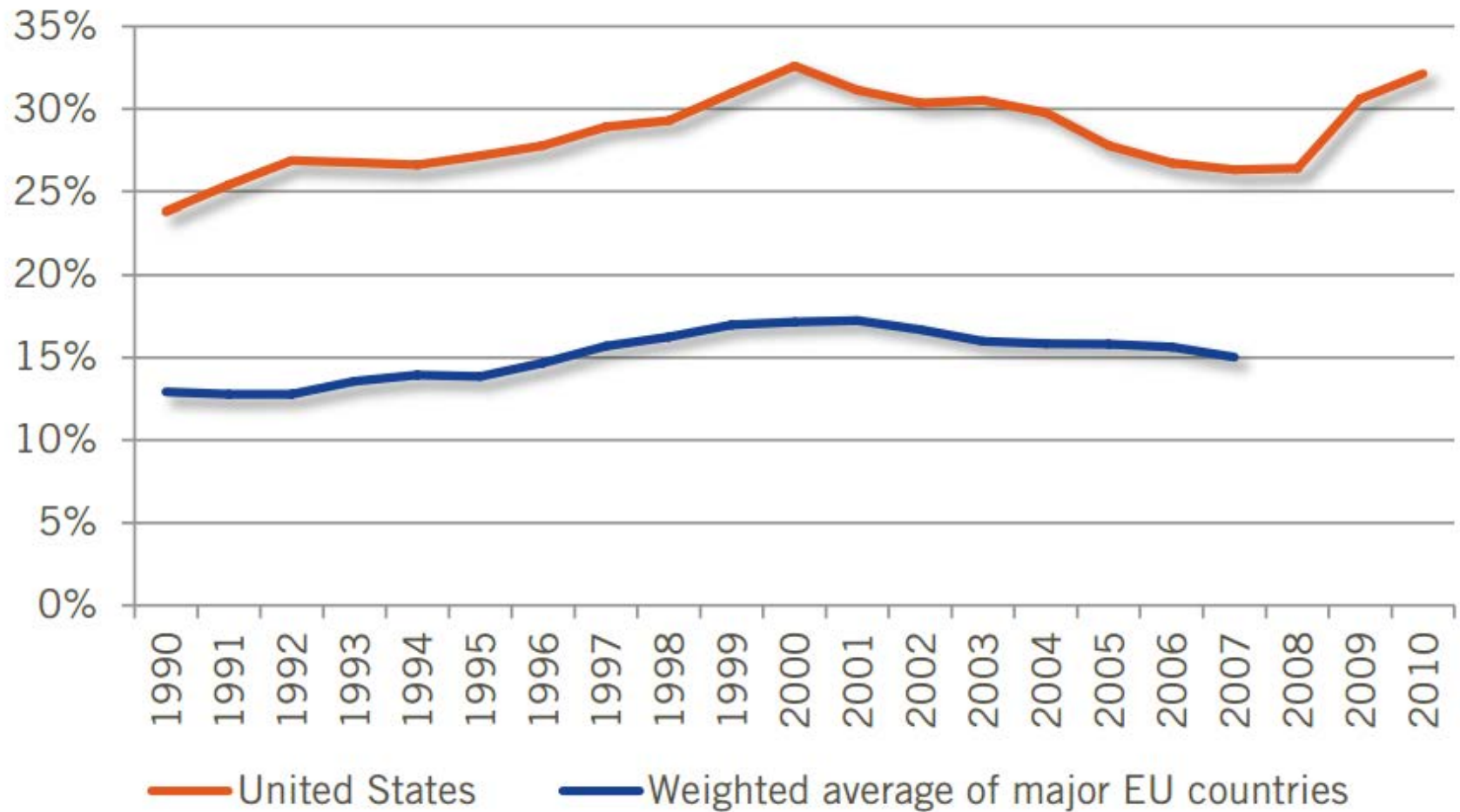
Gross fixed capital formation as a percentage of GDP (EUR-W is weighted average of major European countries)
Source: "ICT Capital and Productivity Growth," EIB Papers 16, no. 2 (2011)

■ US. Exceeds EU in ICT Investment (2)



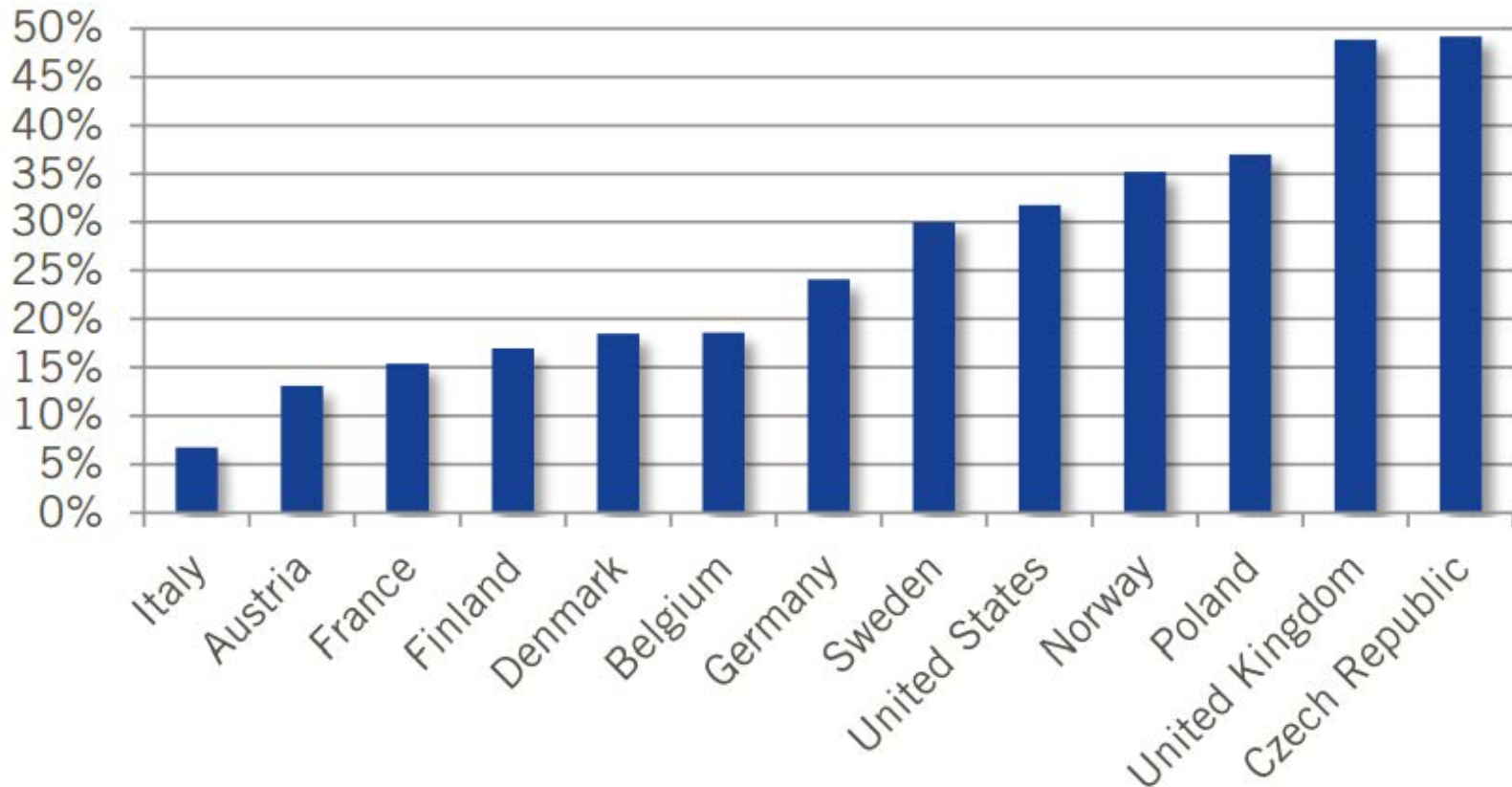
ICT assets as percentage gross fixed capital formation, 2011. Source: OECD, Science, Technology and Industry Scoreboard 2013

■ A Bigger Share of U.S. Investment Goes to ICT



Shares of ICT investment as percent of nonresidential investment.
Source: OECD StatExtracts, Country Statistical Profiles 2012

■ As a Result, Services Productivity Growth is High



Total labor productivity growth in services from 1999-2009.
Source: OECD StatExtracts, Productivity Database By Industry 2012

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The *Nature* of the EU-US Productivity Gap

2

The *Causes* of the EU-US Productivity Gap

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Some *Solutions* For Closing the Gap

- Focus More on ICT *Use* by All EU Organizations

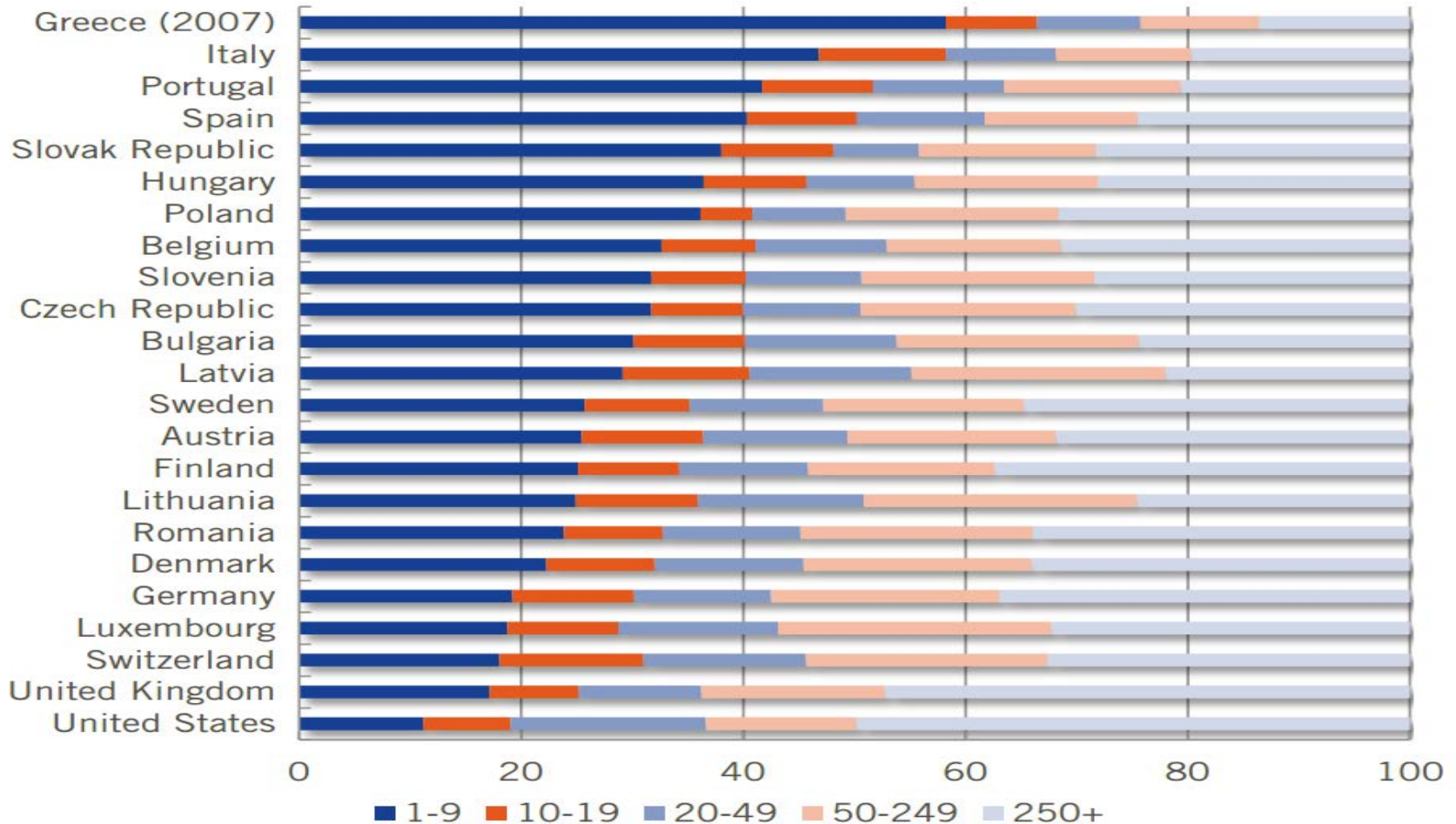
Work to be the global leader, not in search, Web 2.0, and software, but in *use*, through PPPs:

- Smart Cities
- Health Analytics
- IOT Deployment
- ITS Deployment
- Digital Cash
- Digital Signatures

■ Create a Bigger Market

- Europe Digital Single Market
- Europe Single Market
- Transatlantic Market (TTIP)

■ Reduce SME Preferences, Exemptions and Subsidies



Percent of total workforce employed at enterprises by size, 2010. Source: OECD, Entrepreneurship at a Glance 2013

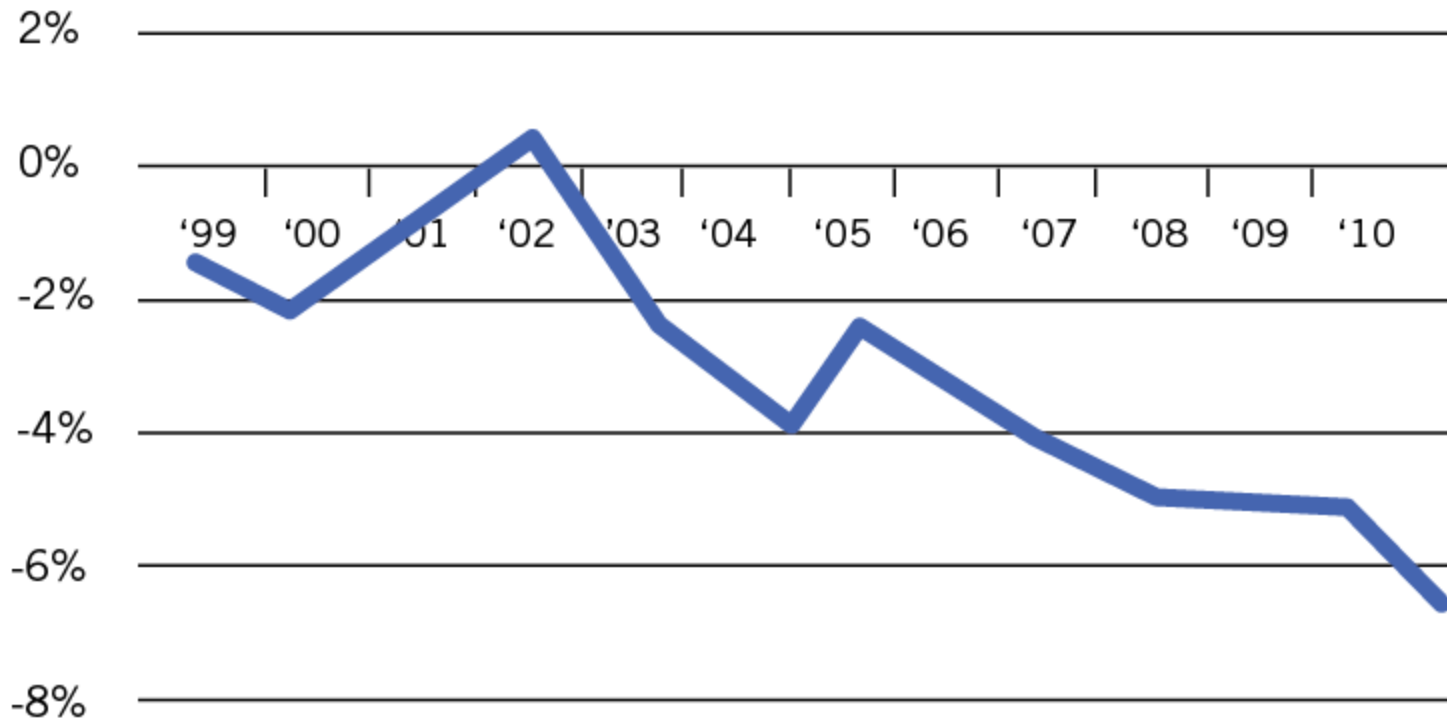
■ Accept Creative Destruction



“In capitalist reality, as distinguished from its textbook picture, it is not [price] competition which counts but the competition from the new commodity, the new technology . . . which strikes not at the margins of the profits of the existing firms but at their very lives - Joseph Schumpeter, *Capitalism, Socialism and Democracy*, 82-3.

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U.S. Lets Book, Periodical and Music Stores Go Out of Business



Annual change in number of establishments. Source: U.S. Bureau of Labor Statistics

■ Reduce Regulations, Especially at National Level

- Product market regulations, including industry entry rules (e.g., Uber), act as a productivity drag on ICT, lowering its impact by 16% for each dollar invested. (Van Reenen, et al.)
- Labor market regulations reduce productivity gains from ICT by approximately 45%. (Van Reenen, et al.)
- EU Privacy Directive reduces online ad effectiveness by 65%. (Tucker and Goldfarb)

- Allow Your Companies To Access the Best ICT in the World



Volkswagen



Focus on Comparative Advantage and Core Strengths



Europe

- **Engineering**
- **Advanced Manufacturing**
- **Industrial Internet/
Industry 4.0**



United States



- **Computer Science**
- **Software & Applications**
- **SMAC (social, mobile,
analytics, cloud)**



■ Digital Policy Development

- Each agency/directorate should develop digital transformation strategies.
- Expand tax incentives for investments in ICT hardware and software.
- Be world leader in ICT platform deployment (e.g. ITS, smart cities, health IT, etc.)

Thank You

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