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**Patterns and Drivers of Financial Sector
Growth in the Digital Age**
**Comparative Insights from 13 Industrialized
Economies**

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Outline

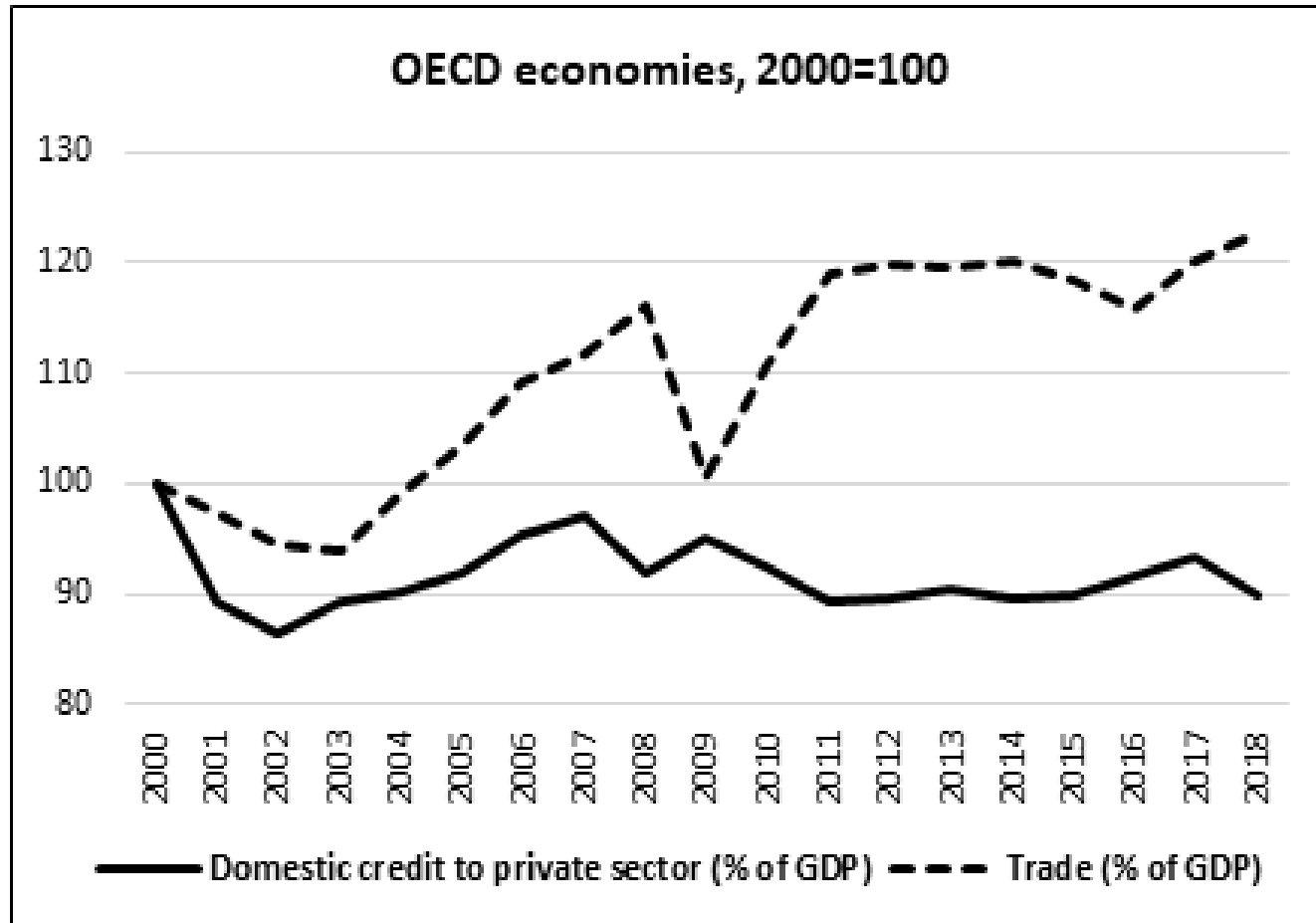
- Introduction
- Growth patterns
- Decomposition frameworks & estimation results
- Key findings



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Introduction

Some economic trends influencing the financial sector in industrialized economies



Data source: WDI (2020)

Description of financial sector

(Section K: Financial and Insurance from the UN ISIC Rev. 4)

Main Divisions	Sub-divisions
Division 64: Financial service activities, except insurance and pension funding	<p>641 Monetary intermediation (6411 Central banking; 6419 Other monetary intermediation)</p> <p>642 Activities of holding companies (6420 Activities of holding companies)</p> <p>643 Trusts, funds and similar financial entities</p> <p>649 Other financial service activities, except insurance and pension funding activities (6491 Financial leasing; 6492 Other credit granting; ...)</p>
Division 65: Insurance, reinsurance and pension funding, except compulsory social security	<p>651 Insurance (6511 Life insurance; 6512 Non-life insurance)</p> <p>652 Reinsurance</p> <p>653 Pension funding</p>
Division 66: Activities auxiliary to financial service and insurance activities	<p>661 Activities auxiliary to financial service activities, except insurance and pension funding (6611 Administration of financial markets; 6612 Security and commodity contracts brokerage; 6619 Other activities auxiliary to financial service activities)</p> <p>662 Activities auxiliary to insurance and pension funding (6621 Risk and damage evaluation; 6622 Activities of insurance agents and brokers; 6629 Other activities auxiliary to insurance and pension funding)</p> <p>663 Fund management activities</p>



The EU KLEMS 2019 Productivity dataset

- The EU KLEMS Release 2019 provides a database on measures of economic growth, productivity, employment, capital formation, and technological change at the industry level for all EU member states, Japan, and the US.
- Productivity measures are developed based on growth accounting techniques. The EU KLEMS Release 2019 provides supplementary indicators on intangible assets. More details can be found in Stehrer, Bykova, Jäger, Reiter, and Schwarzhappel (2019).
- This study examines 13 economies with data available for the period 2000-2015, which include six G7 economies (the US, Germany, France, Italy, Japan, and the UK) and seven other European countries (Austria, Belgium, the Czech Republic, Denmark, Finland, the Netherlands, and Sweden).

Estimates of global ICT spending by industry in 2014

	Millions of US\$	Share in Total	Growth (%)
Financial sector	686,335	24.5%	2.0
• <i>Banking & Securities</i>	<i>498,377</i>	<i>17.8%</i>	<i>2.1</i>
• <i>Insurance</i>	<i>187,958</i>	<i>6.7%</i>	<i>1.8</i>
Communications: Media	444,639	15.9%	1.5
Education	66,524	2.4%	1.0
Government	447,114	16.0%	-1.2
Healthcare Providers	107,934	3.9%	2.7
Manufacturing & Mining	498,995	17.8%	1.0
Retail	179,538	6.4%	2.5
Transportation	133,785	4.8%	1.6
Utilities	149,379	5.3%	1.3
Wholesale Trade	87,707	3.1%	0.69
Total Market	2,798,950	100.0%	1.2

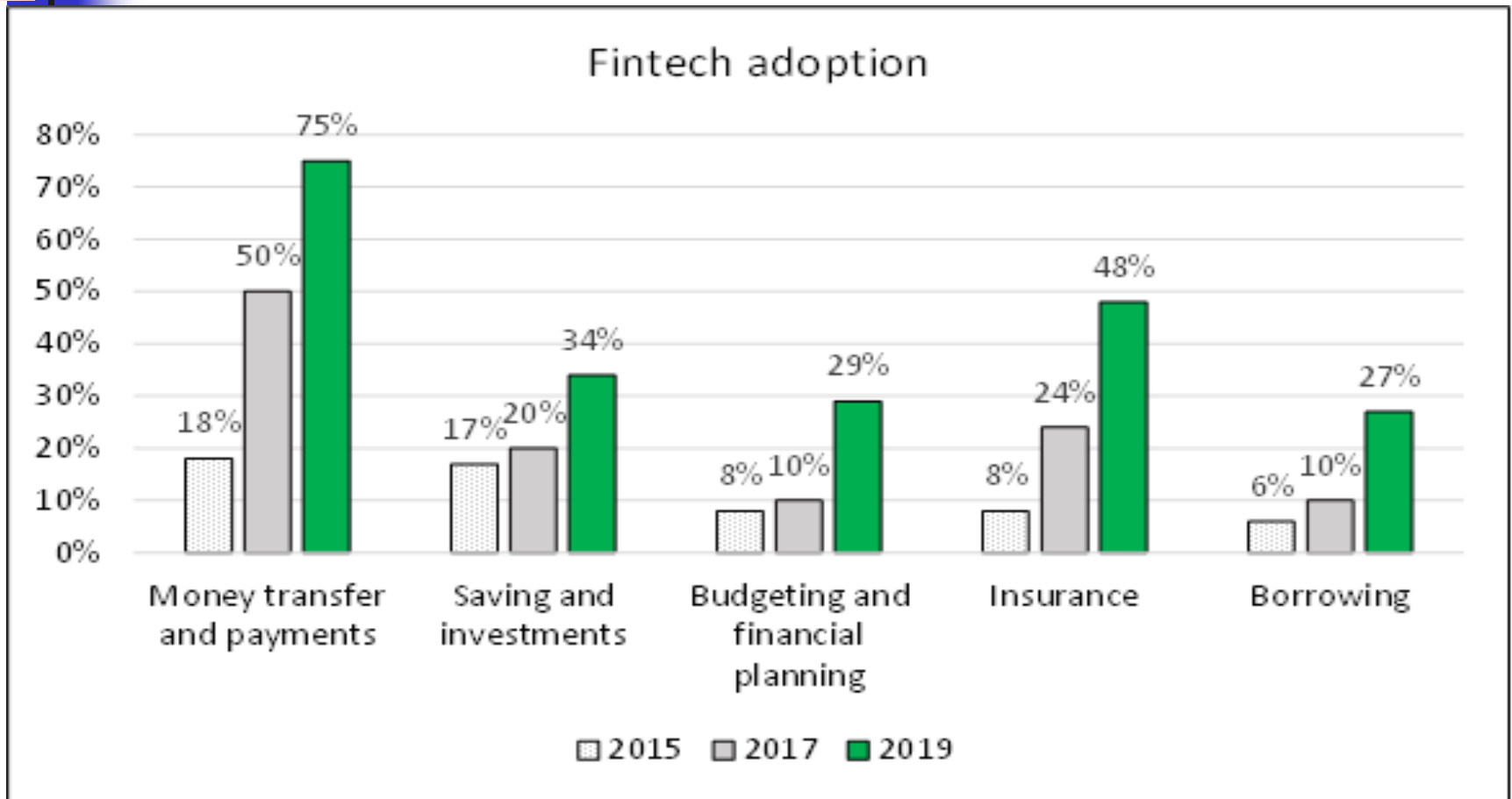
Source: Garner (2015)

Applications of new digital technologies to financial services

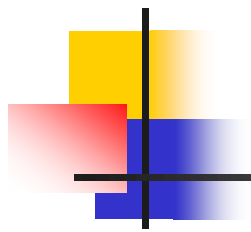
Financial services	Digital Technology						
	Blockchain	Big Data	IoTs	Cloud	AI	Biometric	AR/VR
Payment	X						
Advisory	X	X			X		X
Investment	X	X			X		X
Lending	X	X		X			
Insurance	X	X	X		X	X	
Security	X	X				X	
Operations	X	X		X			
Communications	X	X	X		X		X

Source: (OECD, 2018); adapted from Table 1, p. 14

The rate of fintech adoption by worldwide consumers: 2015, 2017, 2019



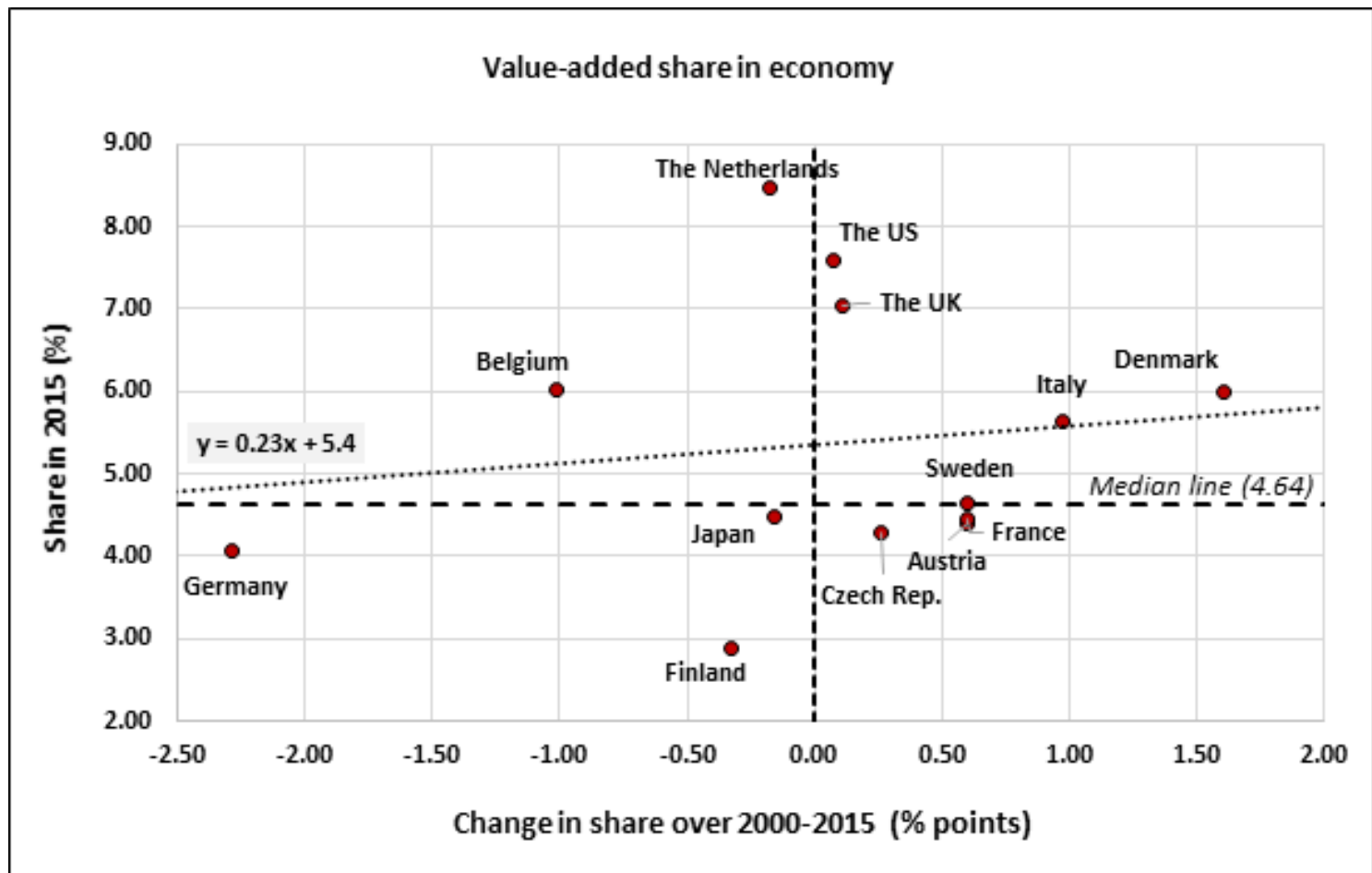
Source: EY (2019), adapted from Figure 4, p. 10.



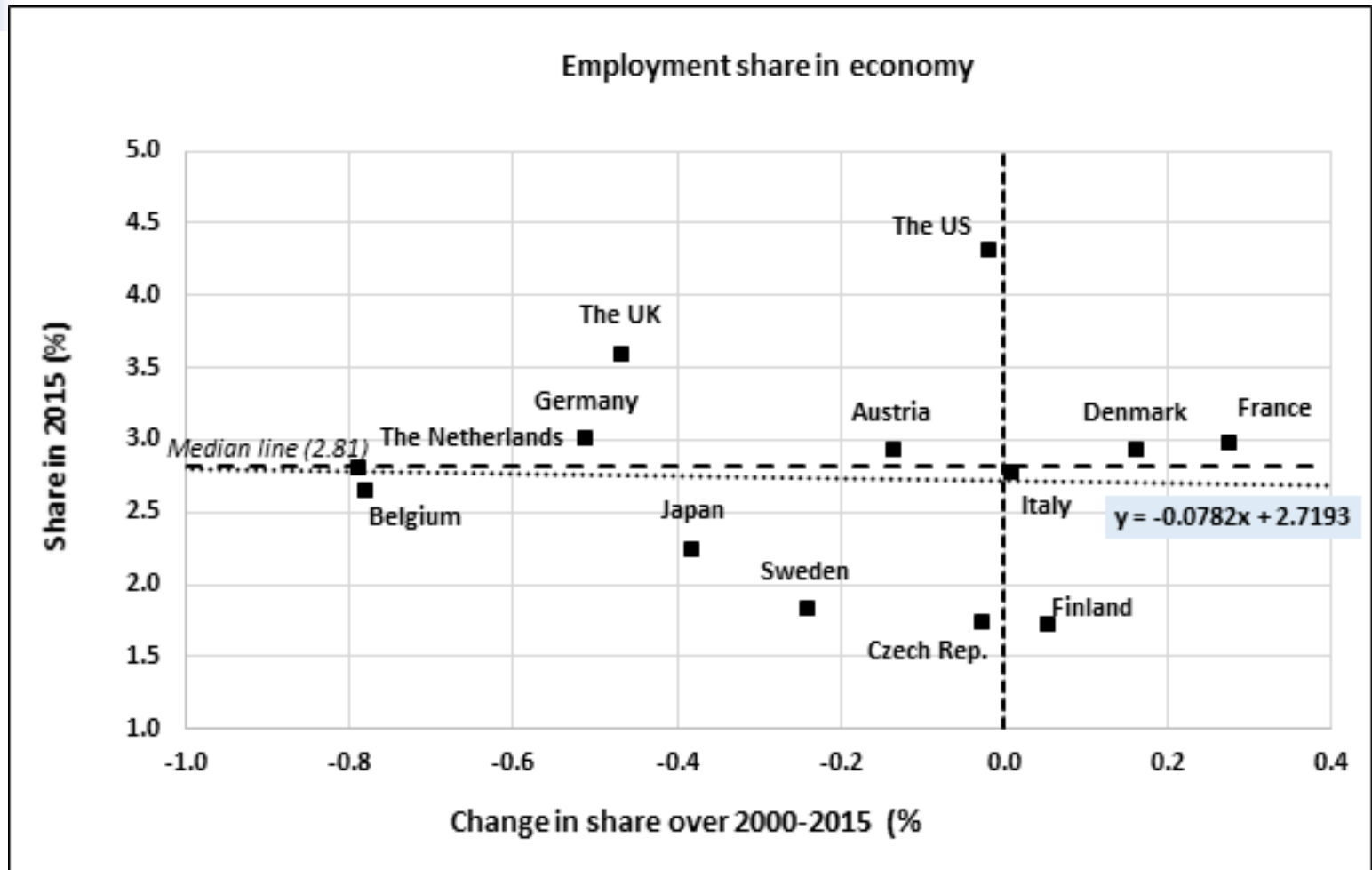
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Growth patterns

Financial sector value-added share in the economy



Financial sector employment share in the economy



Six growth patterns

G1="Robust growth";

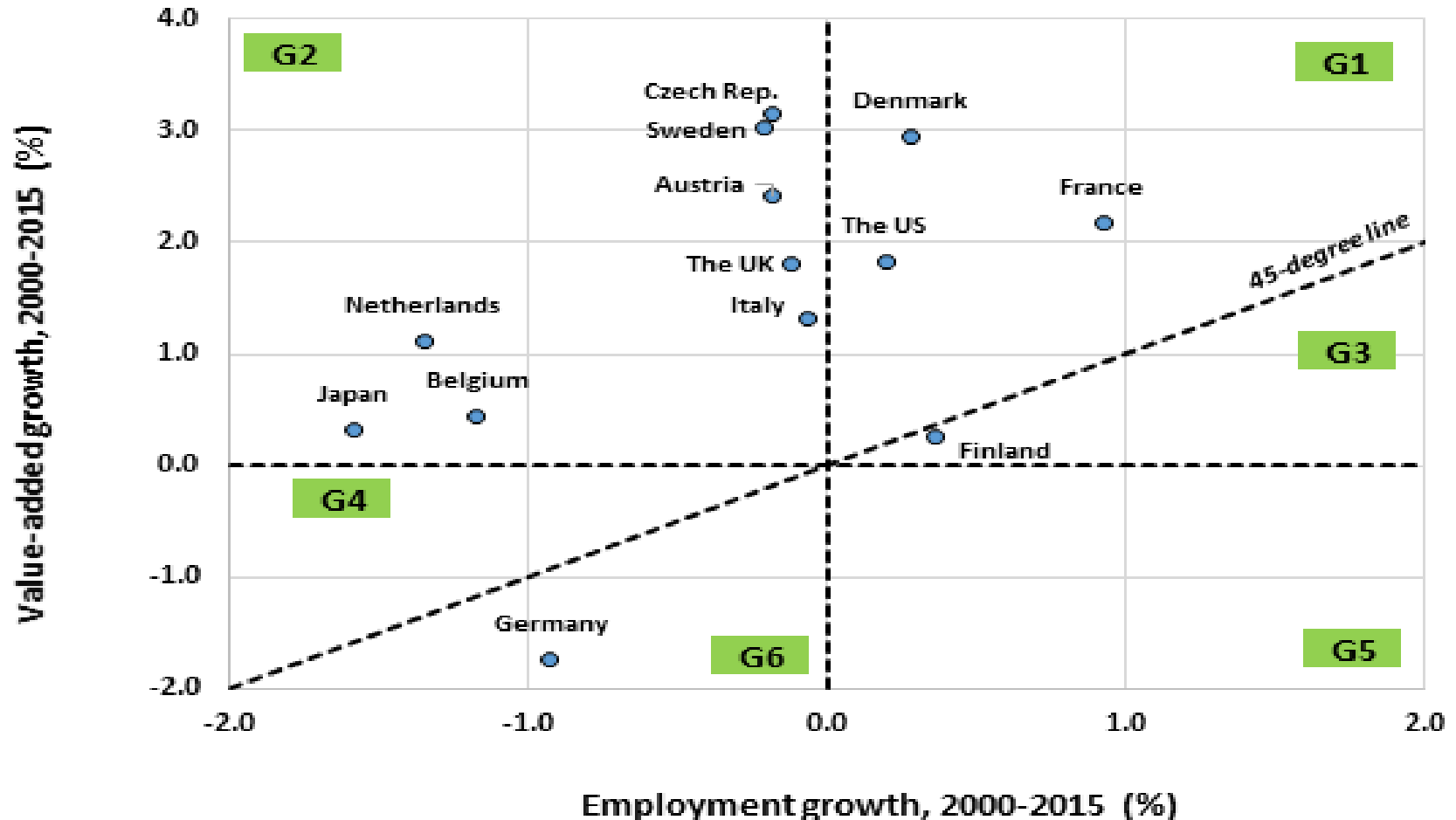
G2="Competitive growth";

G3="Uncompetitive growth";

G4="Restructuring for productivity";

G5="Unproductive employment expansion";

G6="Shrinking"





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**Decomposition
frameworks & estimation
results**

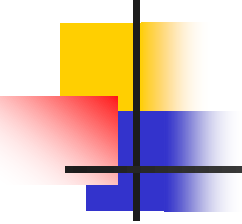


Labor Productivity Growth Decomposition Framework

Jorgenson, Ho, and Stiroh (2005, 2008); Timmer, O'Mahony, and van Ark, B. (2007):

$$\Delta \ln LP_c = \sum_i \bar{v}_{c,i}^K \Delta \ln k_{ci} + \bar{v}_c^L \Delta \ln LQ_c + \Delta \ln A_c$$

Sources of Labor Productivity Growth

- 
-
- (i) **Non-ICT: $LPGcon_{c,NICT} = \bar{v}_{c,NICT}^K \Delta \ln k_{c,NICT}$**
 - (ii) **ICT hardware: $LPGcon_{c,ICTHW} = \bar{v}_{c,ICTHW}^K \Delta \ln k_{c,ICTHW}$**
 - (iii) **Intangible SW&DB: $LPGcon_{c,SWDB} = \bar{v}_{c,SWDB}^K \Delta \ln k_{c,SWDB}$**
 - (iv) **Intangible R&D: $LPGcon_{c,R\&D} = \bar{v}_{c,R\&D}^K \Delta \ln k_{c,R\&D}$**
 - (v) Labor composition: $LPGcon_{c,LQ} = \bar{v}_c^L \Delta \ln LQ_c$
 - (vi) TFP growth: $TFPG = \Delta \ln A_c$

Sources of the financial sector's labor productivity growth (LPG) by country 2000-2015

Country	Group ^a	LPG (%)	Contribution to LPG by source (% points)					
			Capital deepening				LQ	TFPG
			NICT	ICTHW	SWDB	R&D		
Czech	G2	3.33	0.23	0.0966	0.2937	0.0216	0.58	2.10
Sweden	G2	3.24	0.52	0.4903	0.5080	0.0298	0.70	1.00
Denmark	G1	2.67	-0.78	0.1230	0.5984	0.3465	0.60	1.79
Austria	G2	2.59	0.12	-0.0380	0.2586	-0.0187	0.24	2.03
Netherlands	G2	2.47	-0.76	0.2337	0.2466	0.0833	0.40	2.26
UK	G2	1.92	0.84	-0.0324	0.0873	0.0202	0.49	0.51
Japan	G2	1.91	0.03	0.3142	0.6976	0.0015	0.20	0.67
US	G1	1.63	0.40	0.2714	0.2231	-0.0156	0.42	0.32
Belgium	G2	1.61	0.05	-0.1915	0.2061	0.0653	0.31	1.18
Italy	G2	1.38	0.33	0.0221	0.0002	-0.0310	0.17	0.89
France	G1	1.25	0.41	0.3308	0.1999	0.0000	0.29	0.01
Finland	G3	-0.12	-1.73	0.2788	0.0453	0.4312	0.08	0.78
Germany	G6	-0.81	0.002	0.0337	0.0556	0.0140	0.14	-1.05
Selected statistics								
# of economies with a "+" value ^b		11	10	10	13	9	13	12
Correlation with LPG ^c		1.00	0.30	0.12	0.59	-0.20	0.78	0.77
MEDIAN		1.91	0.12	0.12	0.22	0.02	0.31	0.89
MIN		-0.81	-1.73	-0.19	0.0002	-0.03	0.08	-1.05
MAX		3.33	0.84	0.49	0.70	0.43	0.70	2.26

The links between digital transformation and financial sector growth

Explanatory variable	Dependent variable								
	LPG			TFPG			HG		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
LPGcon_ICTHW	-1.08 (0.92)		-1.64* (0.91)	-2.49*** (0.96)		-2.9** (0.96)	-0.72** (0.34)		-0.51 (0.33)
LPGcon_SWDB		2.3*** (0.76)	2.55*** (0.77)		1.44* (0.81)	1.89* (0.81)		-1.05*** (0.28)	-0.97*** (0.28)
LnINC_L1	4.8 (8.4)	12.4 (8.4)	11.5 (8.4)	5.6 (8.7)	12.2 (9.0)	10.6 (8.8)	7.9** (3.1)	5.6* (3.1)	5.3* (3.1)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	195	195	195	195	195	195	195	195	195
R2	0.05	0.09	0.10	0.06	0.04	0.09	0.15	0.20	0.21

Notes:

LPG=Labor productivity growth; TFPG=TFP growth; HG=Hours worked growth



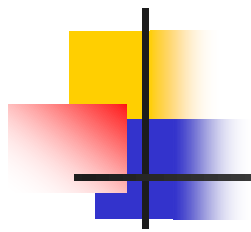
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Key findings



Key findings

- Dominant patterns of financial sector growth:
 - Significant value-added expansion
 - Sharp employment reduction
 - Strong labor productivity growth
- TFP growth, labor quality, and digital transformation are major sources of the sector's growth and catchup on labor productivity.
- ICT investment is a key driver of labor productivity growth not only through its direct contribution but also through its influence on TFP growth and workforce streamlining.



Thank You