Zukunft der Arbeit, Arbeit der Zukunft – eine globale Perspektive!

Geht uns die Arbeit aus?

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Wien, 22. Februar 2019

Inhalt

- **Langfristige Prognosen von BIP, Bevölkerung, Beschäftigung, Migration**
- **„*The End of Globalization*“? (H. James, 2001)**
- **Digitalisierung: Nicht disruptiv!**
- **Neue Arbeitsformen: Ungleiche und kombinierte Informalisierung auf globaler Ebene**

Geht uns die Arbeit in Zukunft aus?

These:

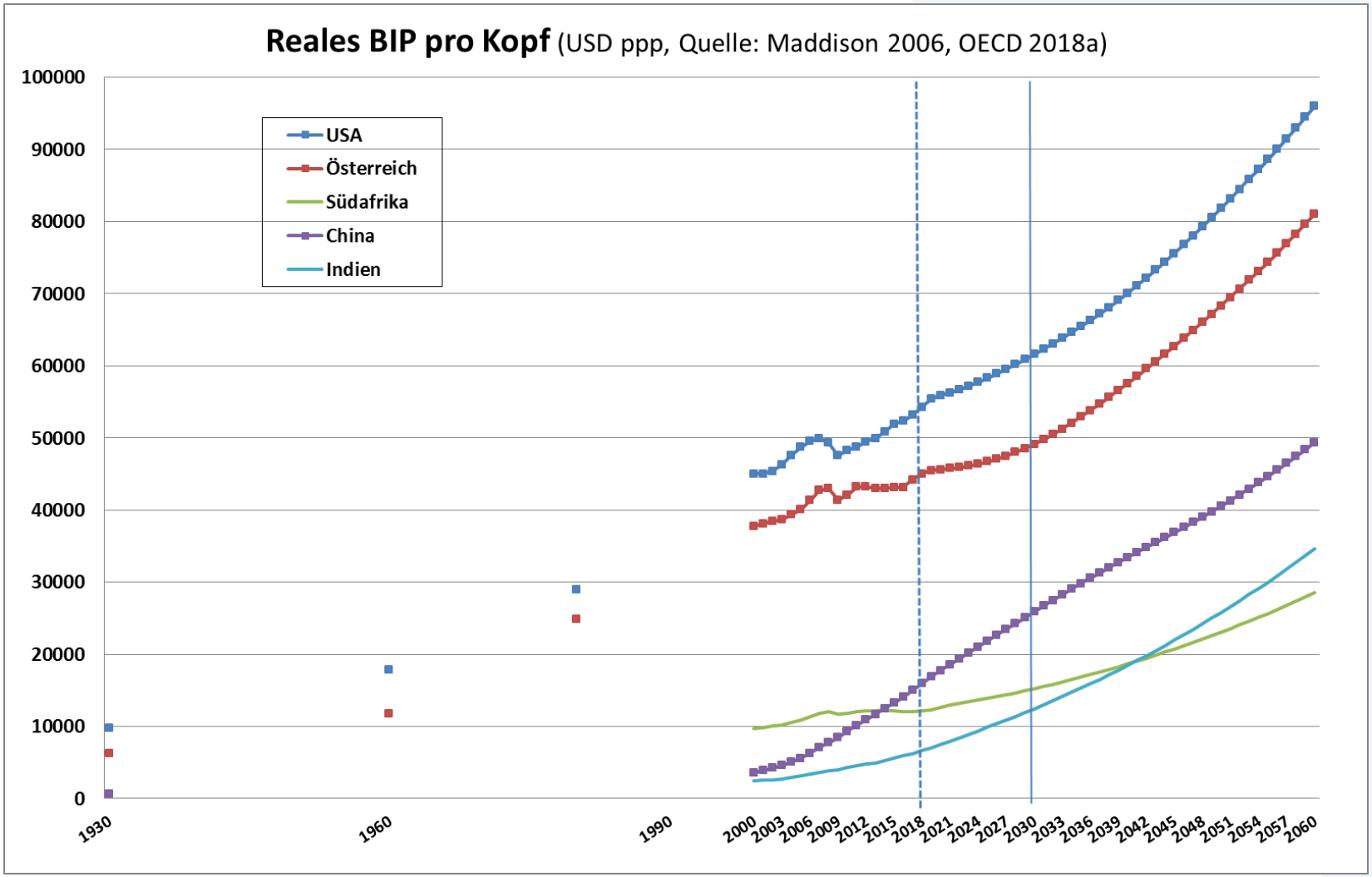
(75%) *Nein,* *sie wird uns nicht ausgehen, aber die Bedingungen, unter denen wir in Zukunft arbeiten werden müssen, werden sich* ***radikal verschlechtern****! Die historische Schwächephase des Kapitalismus (1950-1980) wurde mit der daran anschließenden neoliberalen Periode überwunden, es herrscht wieder Normalität:*
Proletarisierung - globale Informalität – Prekarisierung

(25%) Alles wird gut!

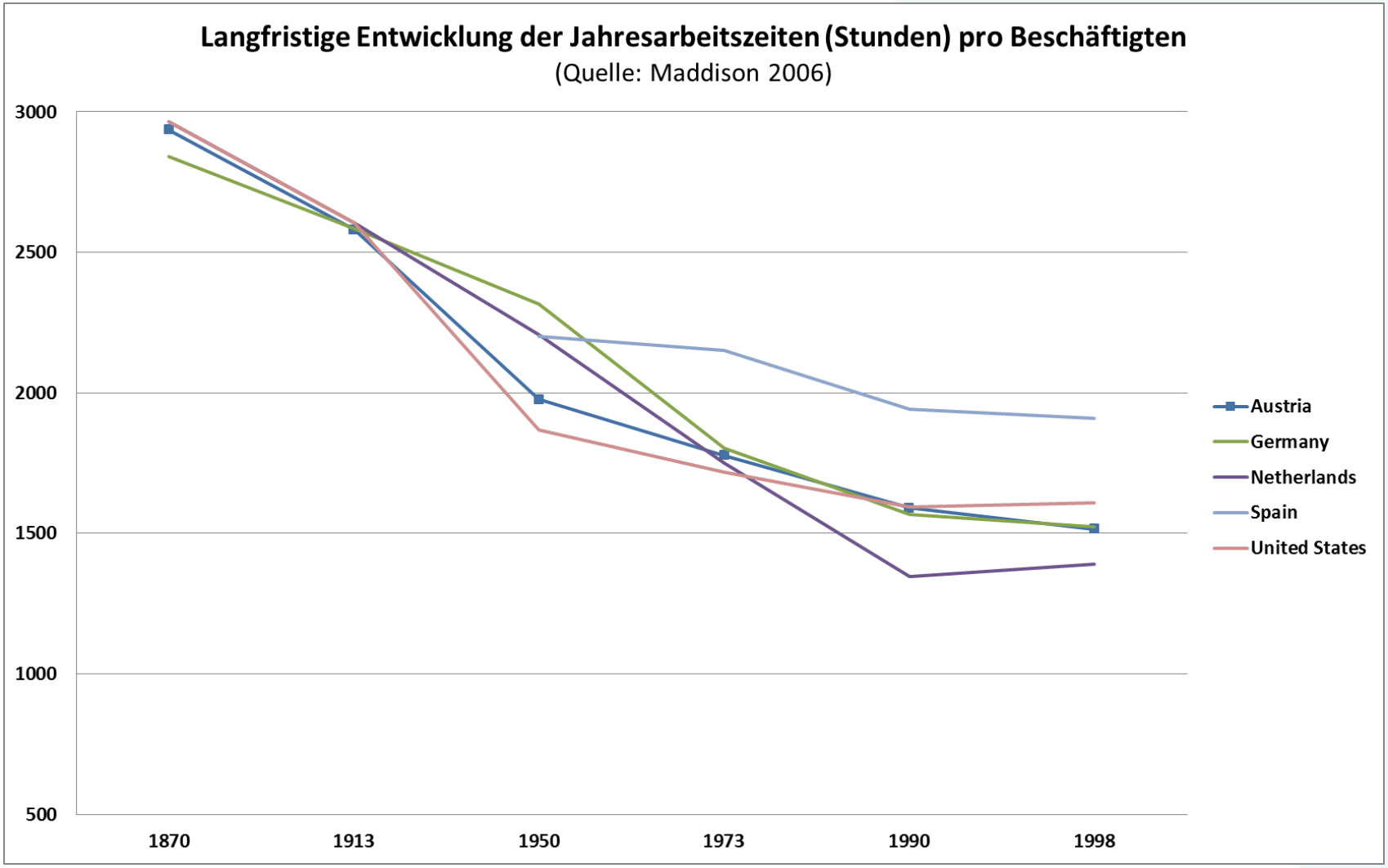
PROGNOSEN

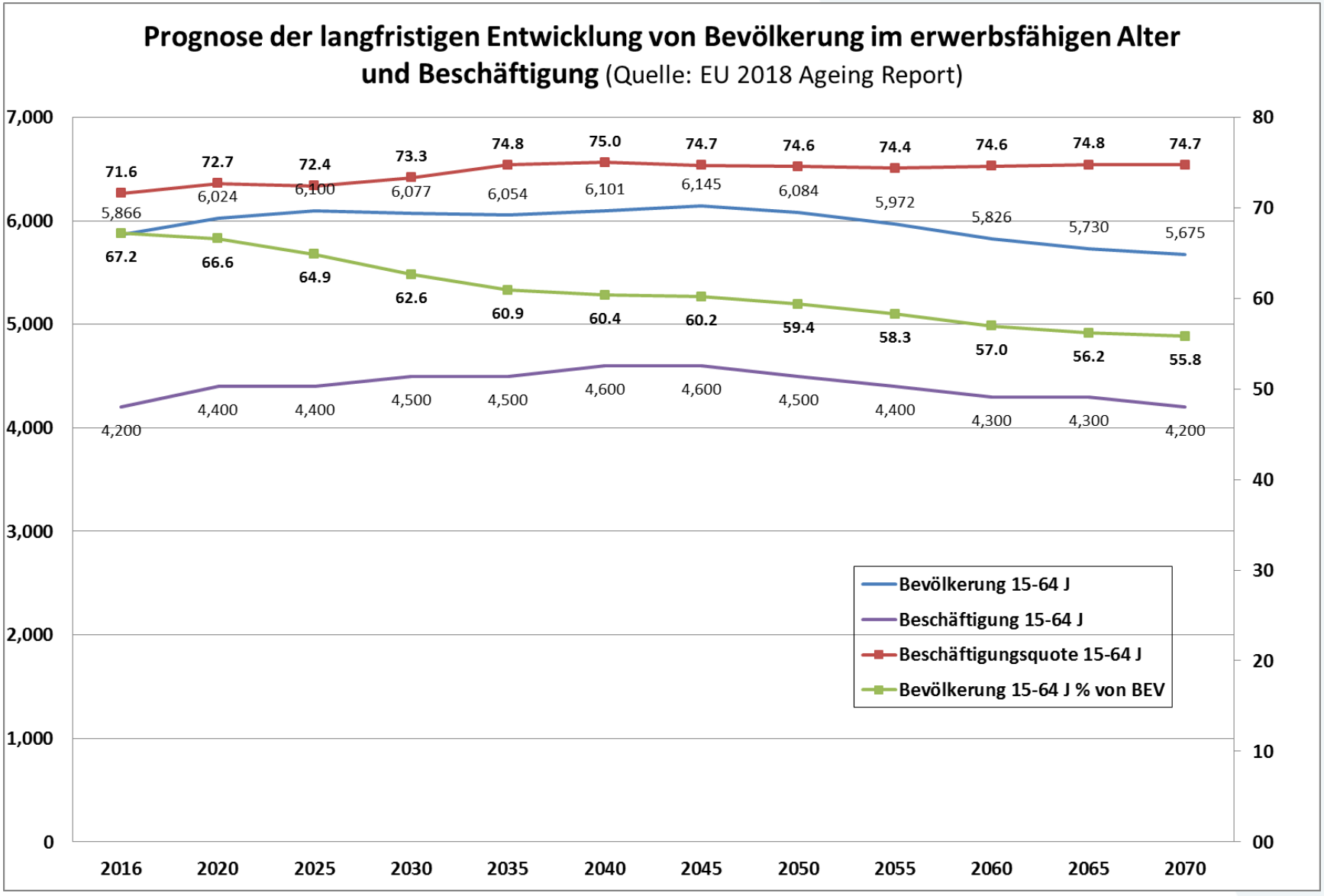
Keynes (1930), Economic Possibilities for our Grand-children: „***Three-hour shifts or fifteen-hour week may put off the problem for a great while***.“

OECD-Prognose bis 2060: Spielräume für AZV und Reallohnzuwächse!



AZV kam zum Stillstand!

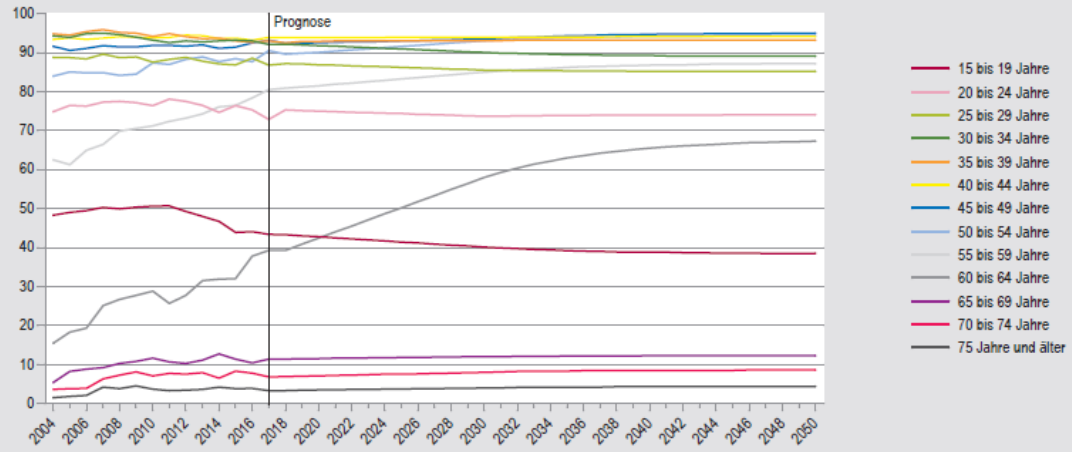



Prognose der langfristigen Entwicklung von Bevölkerung im erwerbsfähigen Alter und Beschäftigung (Quelle: EU 2018 Ageing Report)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
80
70
60
50
40
30
20
10
00
2016
2020
2025
2030
2035
2040
2045
2050
2055
2060
2065
2070
71.6
72.7
72.4
73.3
74.8
75.0
74.7
74.6
74.4
74.6
74.8
74.7
5,866
6,024
6,100
6,077
6,054
6,101
6,145
6,084
5,972
5,826
5,730
5,675
67.2
66.6
64.9
62.6
60.9
60.4
60.2
59.4
58.3
57.0
56.2
55.8
4,200
4,400
4,400
4,500
4,500
4,600
4,600
4,500
4,400
4,300
4,300
4,200
Bevölkerung 15-64 J
Beschäftigung 15-64 J
Beschäftigungsquote 15-64 J
Bevölkerung 15-64 J % von BEV

Anstieg der EP bis 2050: 4,55-4,79 Mio

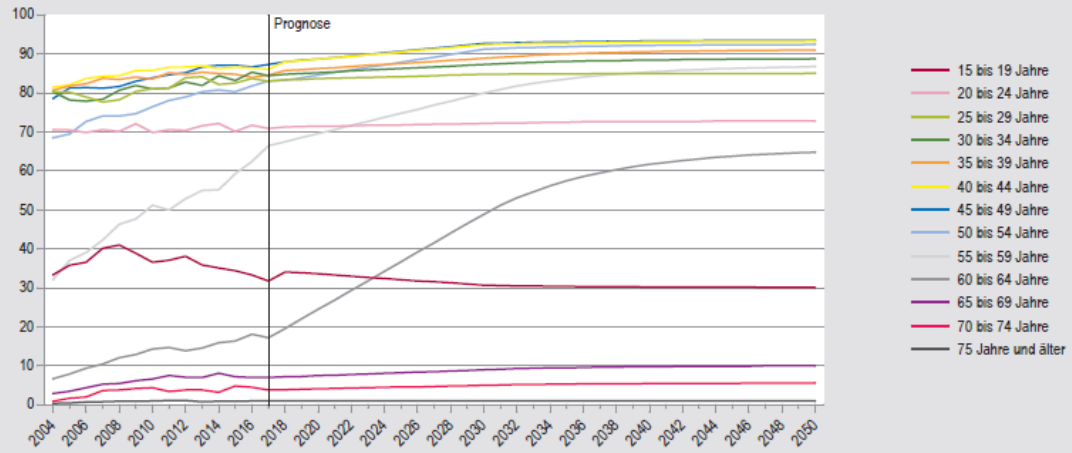
(Quelle: STAT 2018)

Extrapolation der altersspezifischen Erwerbquoten[1]) der Männer (Trendvariante) Grafik 1



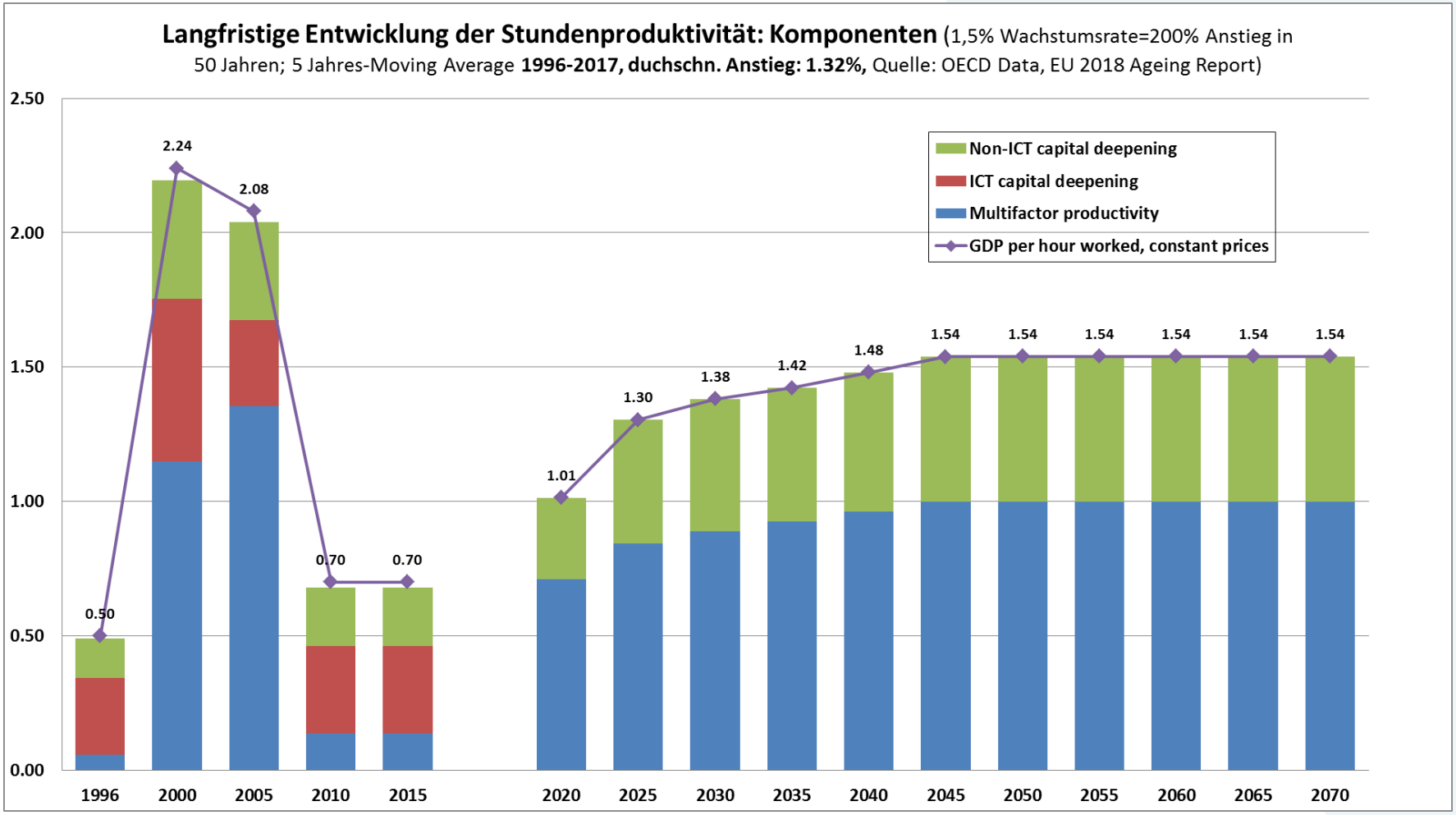
Q: STATISTIK AUSTRIA, Erwerbsprognose 2018. - 2004-2017 keine Prognosewerte, sondern eigene Berechnungen auf Basis von Arbeitskräfteerhebung und Abgestimmter Erwerbsstatistik. - 1) Erwerbspersonen in % der Bevölkerung gleichen Alters und Geschlechts.

Extrapolation der altersspezifischen Erwerbquoten[1]) der Frauen (Trendvariante) Grafik 2

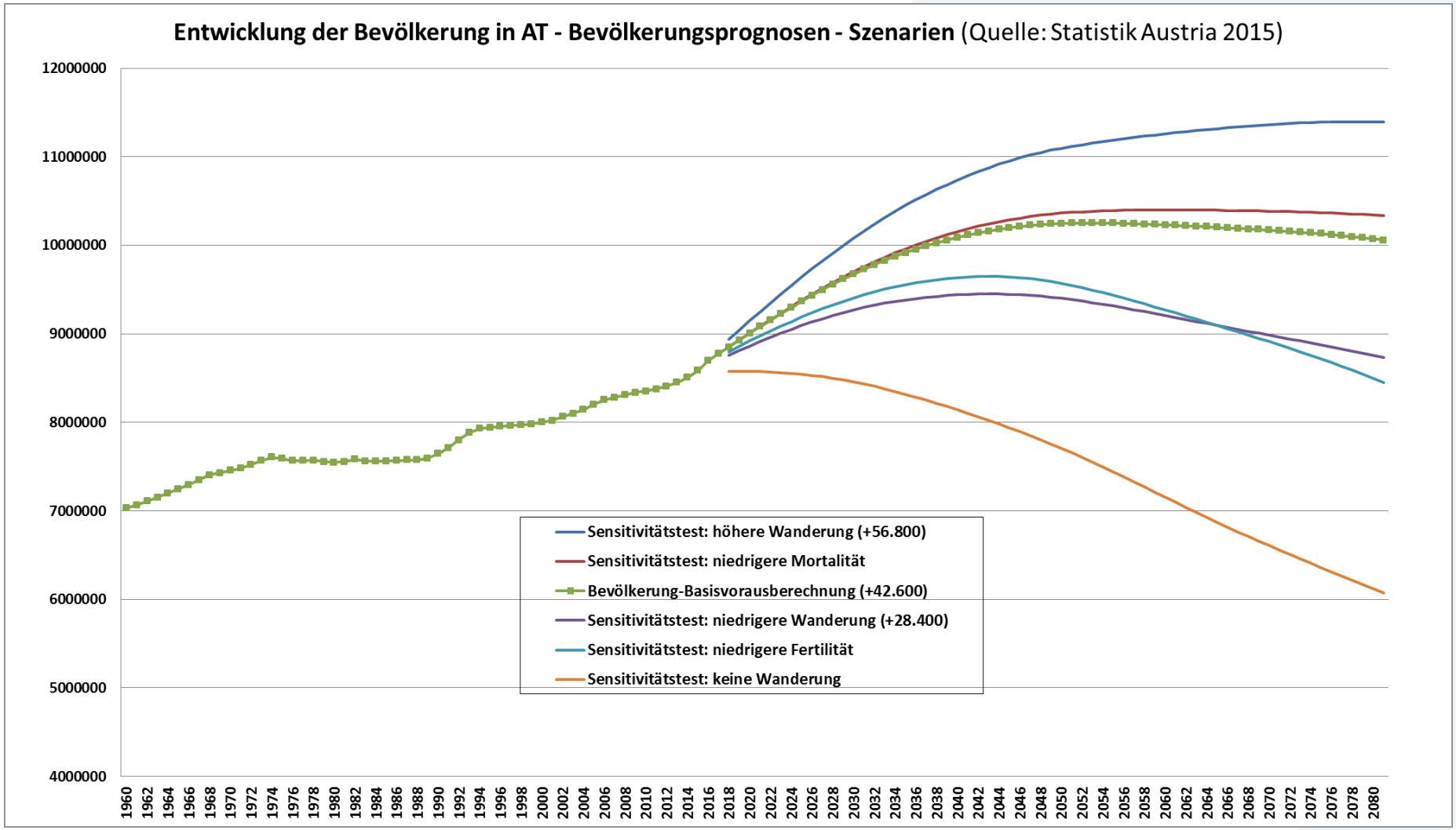


Q: STATISTIK AUSTRIA, Erwerbsprognose 2018. - 2004-2017 keine Prognosewerte, sondern eigene Berechnungen auf Basis von Arbeitskräfteerhebung und Abgestimmter Erwerbsstatistik. - 1) Erwerbspersonen in % der Bevölkerung gleichen Alters und Geschlechts.

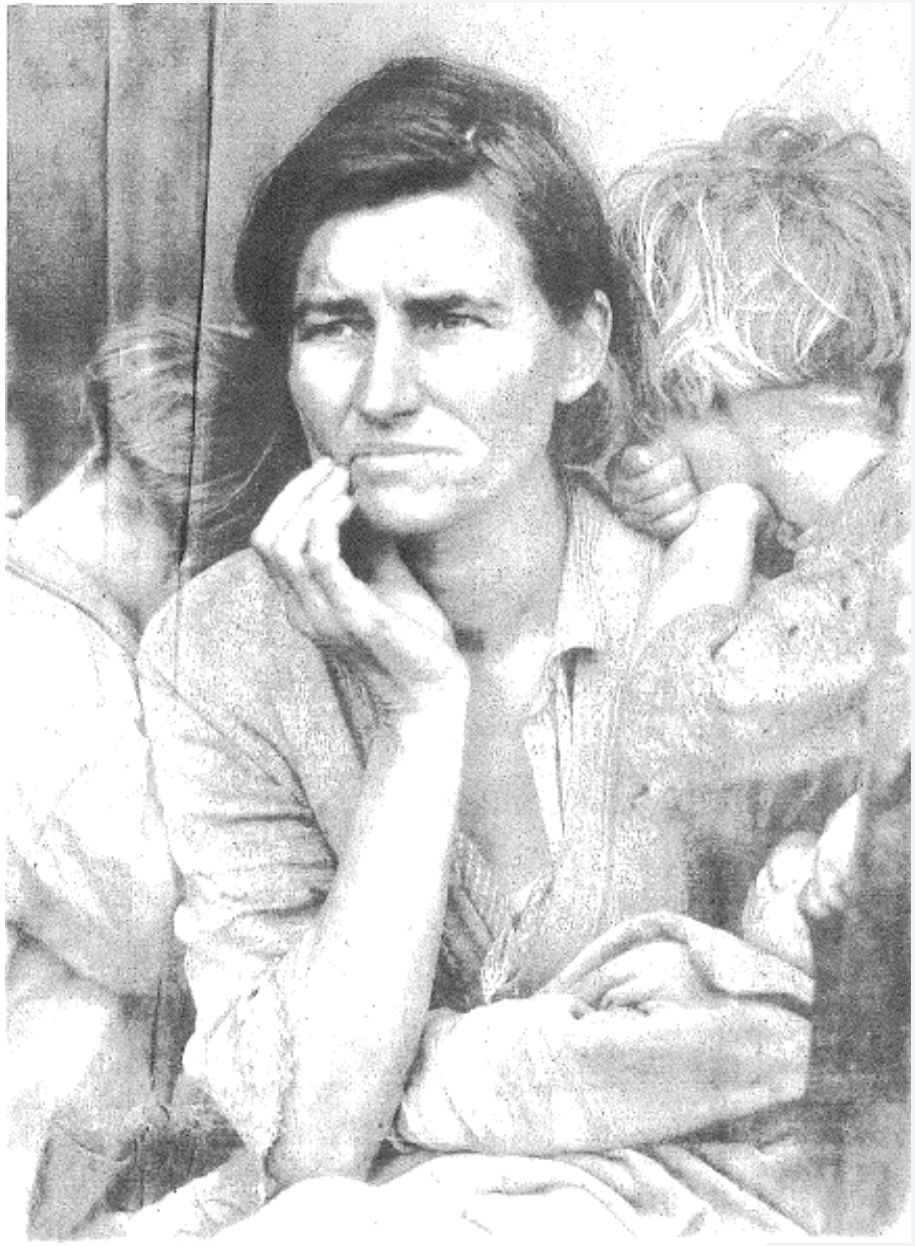
Verdoppelung der Produktivität in 50 Jahren? Digitalisierungseffekte?! Viel Optimismus in der Prognose!



Österreichische Bevölkerung 2080: 13 oder 6 Millionen?

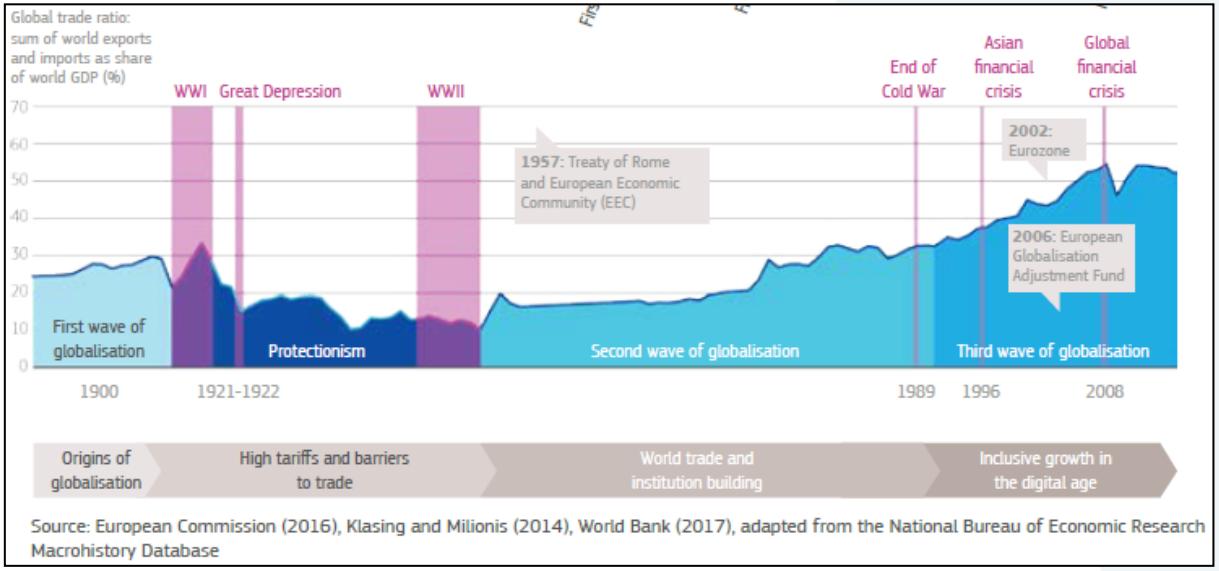


GLOBALISIER-UNG



Globalisierung

Quellen: EU (2017), OECD (2017a)



Source: European Commission (2016), Klasing and Milionis (2014), World Bank (2017), adapted from the National Bureau of Economic Research Macrohistory Database

Figure 4b. Net migration to OECD countries, per thousand inhabitants

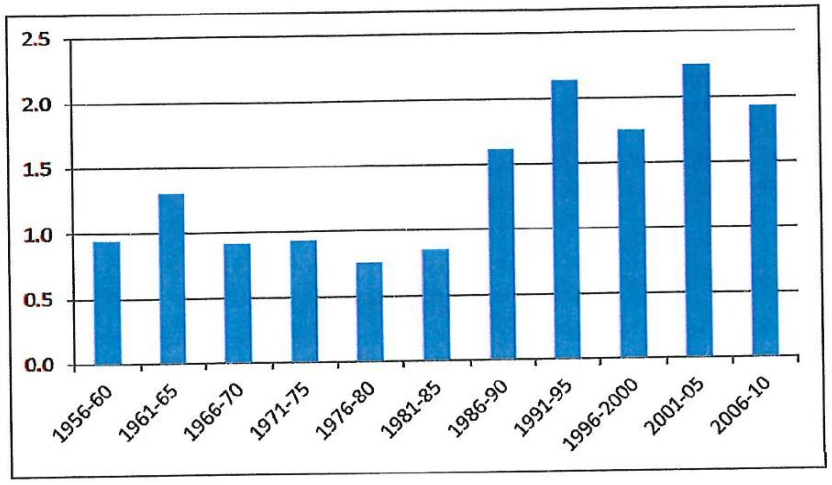
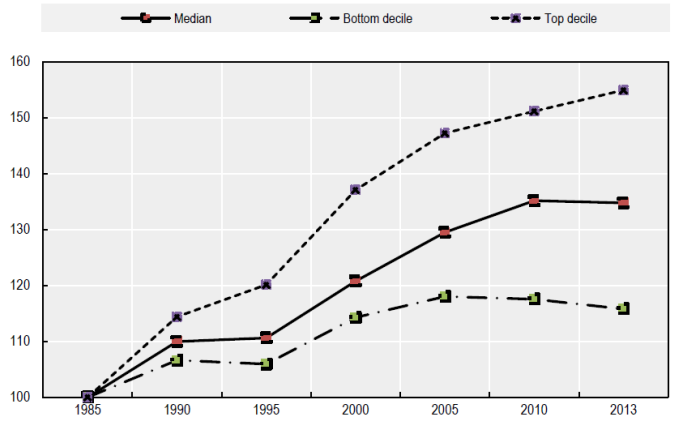


Figure 2. Trends in household disposable income by income group in selected OECD countries[1]

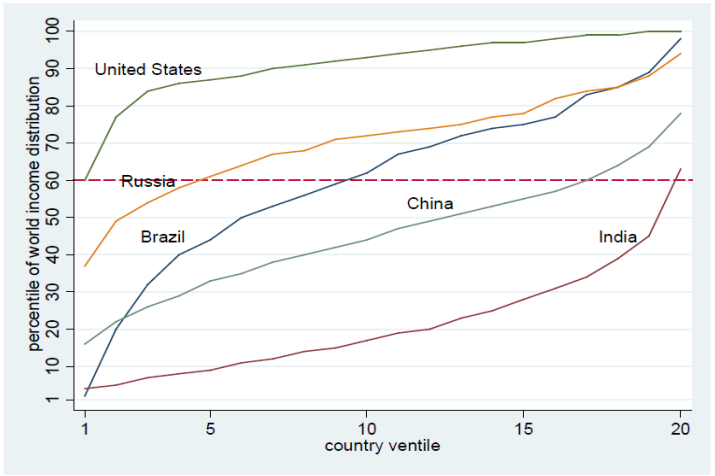
Index 1985=100, OECD17



1. Unweighted average of 17 countries: Canada, Germany, Denmark, Finland, France, United Kingdom, Greece, Israel, Italy, Japan, Luxembourg, Mexico, Netherlands, Norway, New Zealand, Sweden and United States.

Globale Einkommensunterschiede

Figure 7. Different countries and income classes in global income distribution, 2005



Note: The line drawn at y=60 shows the global position of the poorest 5% of the US population.

Figure 8. Italy and the rest of the world

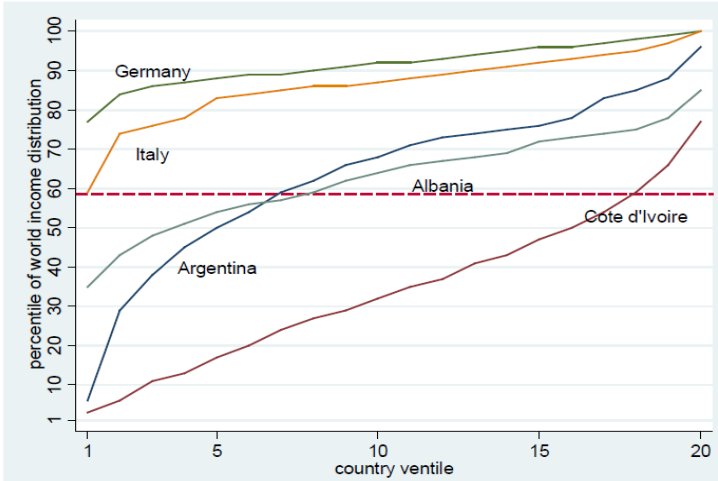


Table 1. Nominal and real (food) hourly wages for several occupations. Annual after tax wage divided by the number of effective annual hours of work, March 2009

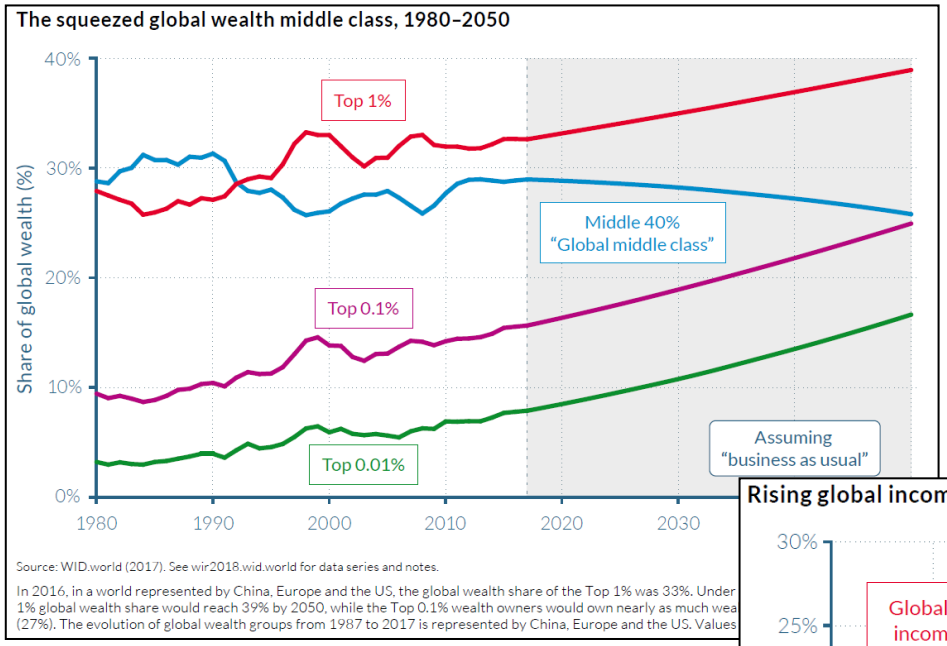
	Building laborer 1		Skilled industrial worker 2		Engineer 3	
	Nominal after tax wage (in $)	Real food wage	Nominal after tax wage (in $)	Real food wage	Nominal after tax wage (in $)	Real food wage
New York	16.6	16.6	29.0	29.0	26.5	26.5
London	9.7	15.4	19.0	30.4	22.1	35.2
Beijing	0.8	1.3	2.3	3.8	5.8	9.5
Delhi	0.5	1.7	2.1	6.9	2.9	9.1
Nairobi	0.6	1.5	2.0	4.7	4.0	9.2
Rich vs poor (unweighted ratio) 4	20.4	10.9	11.0	5.8	5.8	3.3

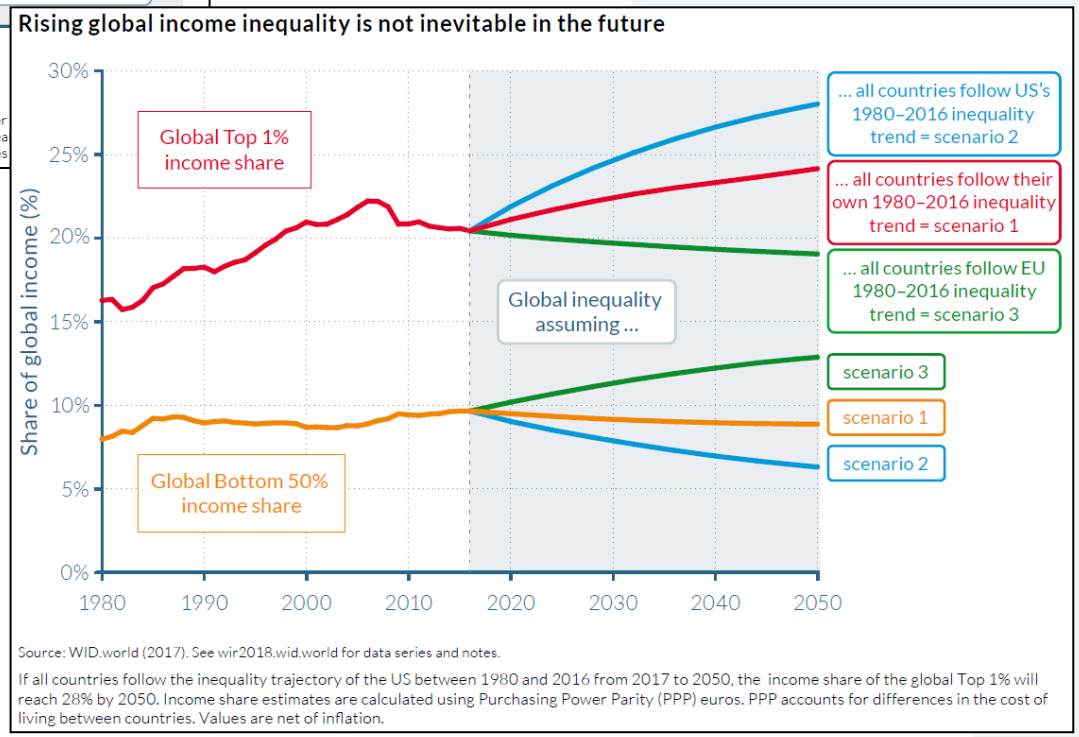
Note: Food prices are estimated from a basket of 39 food products with weights reflecting West European consumption patterns. New York food prices are set equal to 1. Real food wage (in New York food prices) is estimated by dividing the nominal after tax dollar wage by the food price index (not shown here). Annual number of hours worked is equal to the weekly number of hours of work given for each profession and country separately (Union de Banques Suisses, 2009, pp. 34–35) multiplied by 52 weeks, and reduced for the number of official and paid vacation days per year for each country (Union de Banques Suisses, 2009, p. 30). 1. Unskilled or semi skilled laborer, about 25 years of age, single. 2. Skilled worker with vocational training and about 10 years of experience, working in a large company in the metal working industry, approximately 35 years of age, married, two children. 3. Employed in an industrial firm in the electrical engineering sector, university or technical college graduate with at least 5 years of experience, about 35 years of age, married, two children. 4. Rich are New York and London; poor are Beijing, Delhi and Nairobi.

Quelle: Milanovic (2012)

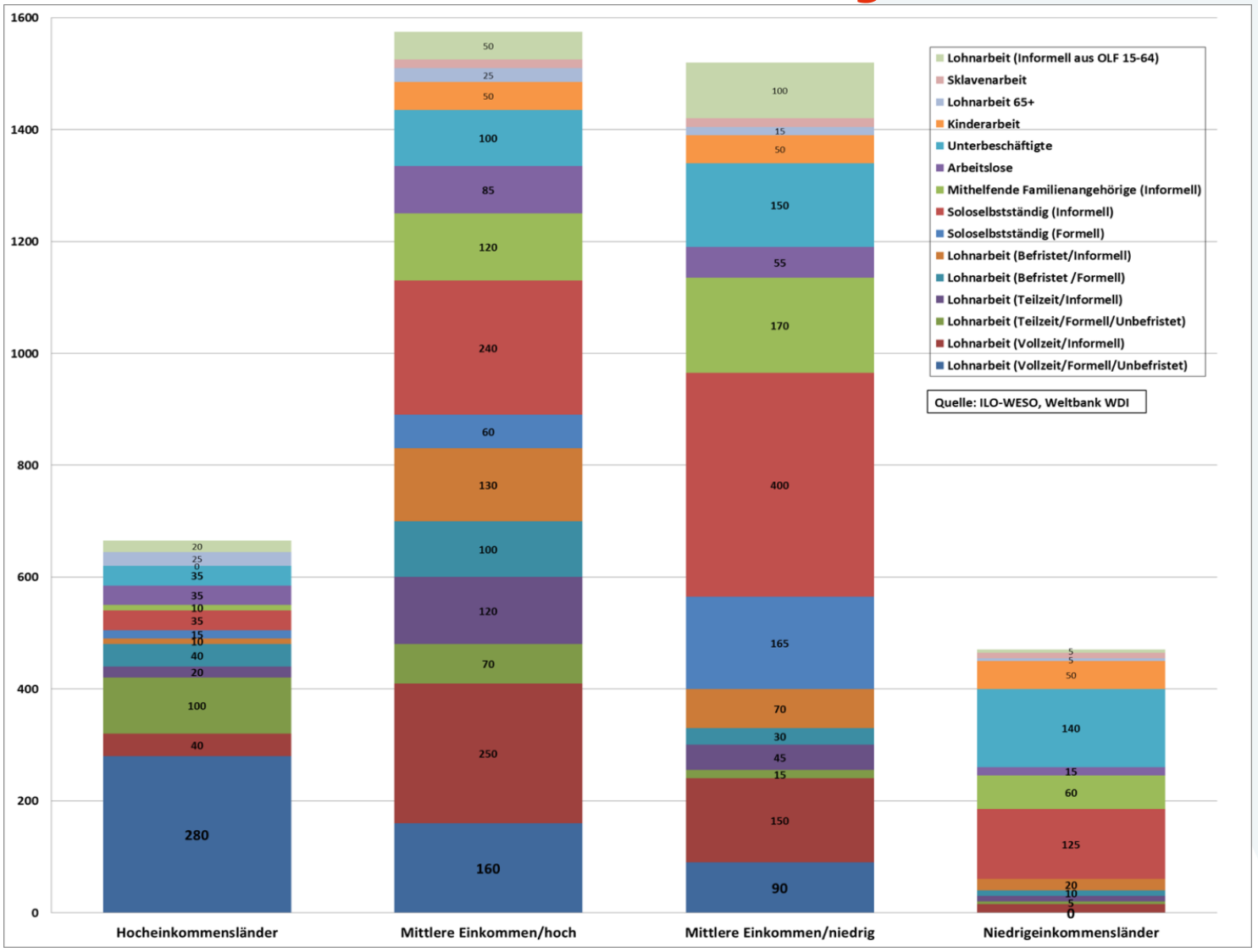
Prognosen der globalen Verteilung von Vermögen und Einkommen bis 2050

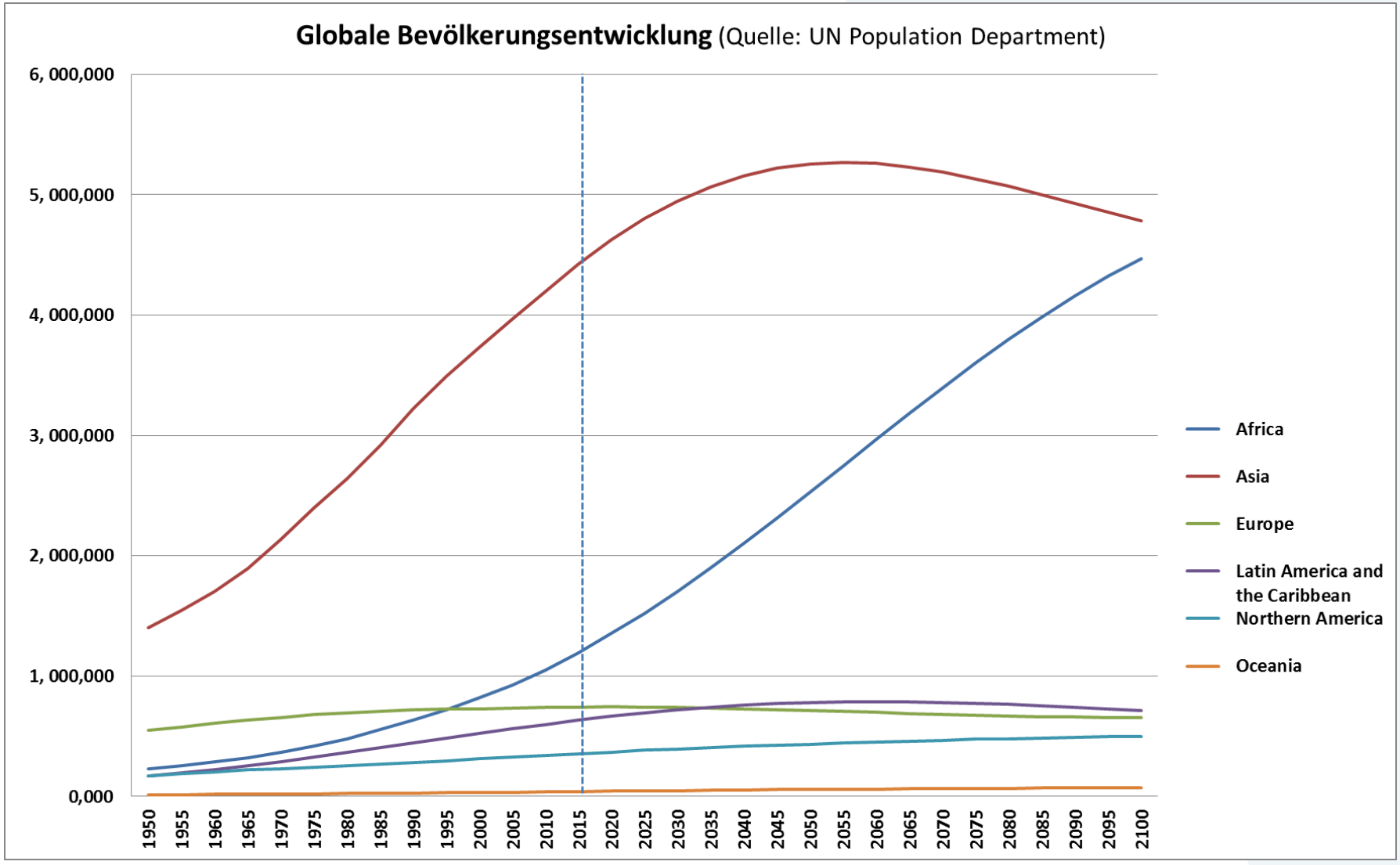
(Quelle: World Inequality Report 2018)





Globales Prekariat? Ungleiche und kombinierte Informalisierung (Quelle: ILO WESO-Data)



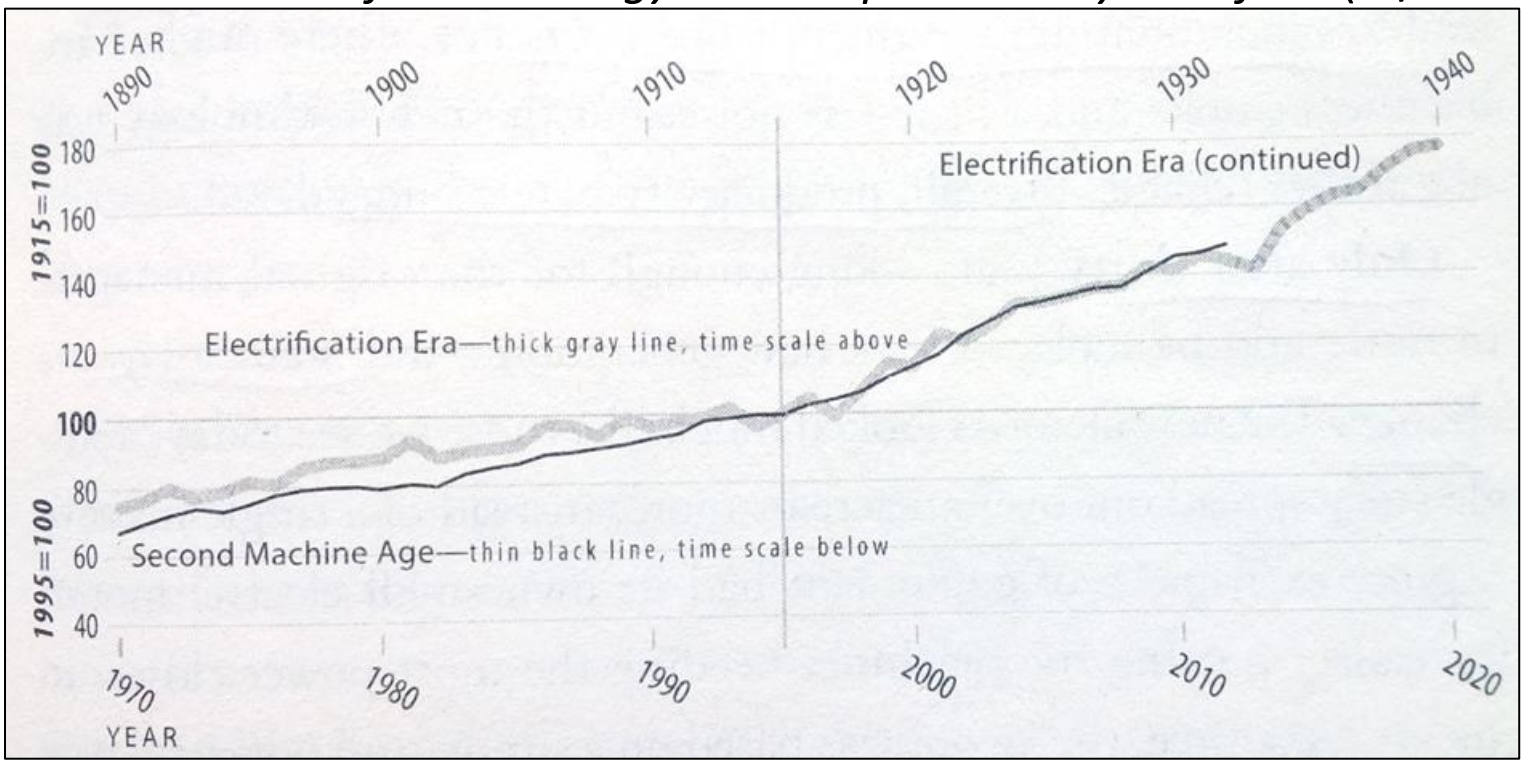

Globale Bevölkerungsentwicklung (Quelle: UN Population Department)
6, 000,000
5, 000,000
4, 000,000
3, 000,000
2, 000,000
1, 000,000
0,000
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
2060
2065
2070
2075
2080
2085
2090
2095
2100
Africa
Asia
Europe
Latin America and the Caribbean
Northern America
Oceania

DIGITALISIERUNG

Technological-dicontinuity paradigm

Brynjolfsson/McAffee 2014, Ford 2015: Arbeitsplätze werden durch IKT transformiert und automatisiert! 2 Implikationen:

- Starke Produktivitätszuwächse nicht nur in IT-intensiven Sektoren
- IT wird Arbeitskraft mehr und mehr ersetzen!
- Aber: „*…General purpose technologies always need complements. Coming up with those* ***can take years, or even decades,*** *and this creates* ***lags*** *between the introduction of a technology and the productivity benefits*“ (B./Mc. 2014, p. 102)



Quelle: Brynjollfson/ McAffe 2014, p. 101

Argumentation der „Alarmisten“

Erik Brynjolfsson und Andrew McAffee (2014), Martin Ford (2015)

- **Strukturbruch in technologischen Entwicklung** - Computern, Robotern, dem Internet, Smartphones, etc.; viele Innovationen – langsame Entwicklung**, dann Explosion;** genau an dieser Stelle seien wir angelangt
- Charakter der „digitalen Revolution“: „**exponential** (Leistungsfähigkeit der Computer verdoppelt sich alle 1,5 Jahre)**, digital** (Infos digital vorhanden, „Information rules“), **and combinatorial** (Innovationen als Neu-Kombinationen).
- „**General Purpose Technology**“ - wie Elektrizität
- Verweis auf die 1. und 2. Industrielle Revolution (**positive Effekte dauerten auch ca. 100 Jahre)**
- Maschinen übernehmen zunehmend **kognitive Aufgaben,** Algorithmen treffen **Entscheidungen**, machen **Vorhersagen**, Maschinen sind im Stande zu lernen; zunehmend kommen nicht nur niedrigqualifizierte Beschäftigte unter Druck, auch „white collar jobs“, etwa in den Bereiche **Medizin (Radiologie), Finanzmarktanalysen, Journalismus, Analyse von Gesetzesmaterien**, etc.
- Neuen Unternehmen wie **Google, Facebook**, etc. - **vergleichsweise wenigen Beschäftigten ;** General Motors 1979 840.000 Beschäftigte hatte bei einem Umsatz von $ 11 Mrd. (in $ 2012), Google hat 38.000 Mitarbeiter bei einem Umsatz von $ 14 Mrd.; **Netzwerkeffekte** führen zu **Monopolen** die wenig oder **keine Steuer** zahlen!
- Neue Berufe wie **Web Designer, Programmierer** stellen nur ca. 20% aller Berufe dar, 80% hat es 1914 auch schon gegeben
- Seit Anfang der 1970er Jahre Entwicklung der Produktion in USA **abgekoppelt von jener der Reallöhne**, weil zunehmend Maschinen die Arbeit nicht nur unterstützen, sondern diese ersetzen („machines are becoming workers“);
- Ungleicher werdende **Einkommensverteilung** - ein **Nachfrageproblem**: „**machines do not consume**“, Millionäre können nicht tausende Mahlzeiten zu sich nehmen, etc.

Argumentation der „historischen Realisten"

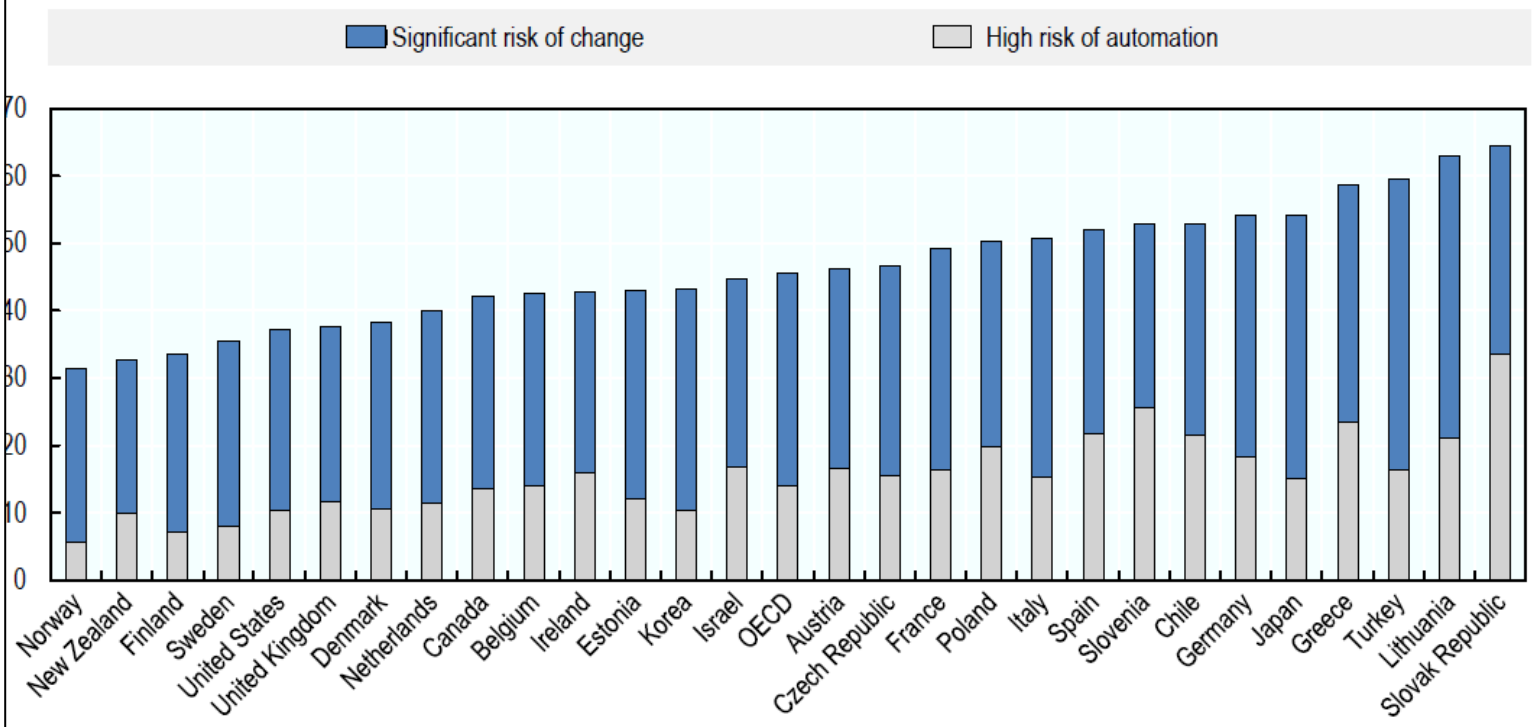
Kompensatorische (makroökonomische) Effekte

- **Technische Fortschritt** zunächst mit **Freisetzungseffekten** verbunden, Kapital ersetzt Arbeit; gleichzeitig wirken mehrere kompensatorische Effekte, die den Erstrundeneffekt aufheben - aber natürlich nicht müssen
- Höhere Kapitaleinsatz - **Produktivitätssteigerungen** - zu **niedrigeren Preisen**; damit erhöht sich die **Nachfrage** nach diesem Produkt und (ceteris paribus) erhöhen sich die **Realeinkommen**, wodurch die **Nachfrage** auch nach anderen Produkten steigt; in „**winner-takes-it-all"-Märkte**n fallen preissenkenden Wirkungen von Technologieeinsatz geringer aus!
- Manche Arten von Tätigkeiten (meist mit höheren Qualifikationen verbunden) verhalten sich **komplementär zum Kapitaleinsatz**
- Bei **Produktinnovationen** entsteht zusätzliche Nachfrage durch neue Produkte und Dienstleistungen. Darüber hinaus gilt: „***Innovative Güter sind durch eine hohe Preiselastizität der Nachfrage*** *gekennzeichnet. Technischer Fortschritt und Innovationen ermöglichen also* ***Beschäftigungsaufbau bei Produktivitätswachstum***."
- Technologische Innovationen führen zudem bei den Zulieferbetrieben zu zusätzlicher Nachfrage und können auch die Exportnachfrage erhöhen.
- *„Thus,* ***physically demanding, repetitive, dangerous, and cognitively monotonous work*** *was* ***receding****, ushered out by* ***extraordinary productivity gains in agriculture****. Rising* ***consumer affluence*** *spurred* ***demand for manufacturing goods and leisure complements****. Growth of technologically intensive corporations, health care services, and higher education created employment for credentialed professionals and a cadre of supporting clerical, administrative, and sales workers. Though automation was clearly reducing labor demand across a large swath of occupations, it is easy to see why overall job prospects appeared broadly favorable during this period*." (Autor 2015)
- **Österreich**: **1870**=2,1 Besch/4,5 Mio. Bev-**BQ=47%, 2017**: 4,4/8,8 Mio Bev-**BQ=50%**
- **Zusammenfassend kann festgehalten werden: Technologischer Wandel erhöht in der Regel die Produktivität, führt über Preis- und andere Effekte zu einer Erhöhung der Nachfrage; diese wird auch durch Produktinnovationen gesteigert.**

Automatisierungswahrscheinlichkeiten

Figure 2.6. Jobs at risk of automation in OECD countries

Share of jobs which are at a high risk of automation or a significant risk of change (%).



Note: Jobs are at high risk of automation if the likelihood of their job being automated is at least 70%. Jobs at risk of significant change are those with the likelihood of their job being automated estimated at between 50 and 70%. Data for Belgium correspond to Flanders and data for the United Kingdom to England and Northern Ireland. The sample for the Russian Federation does not include the population of the Moscow municipal area. More detailed information can be found in the Technical Report of the Survey of Adult Skills (OECD, 2014).
Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012); and Nedelkoska, L. and G. Quintini (2018), "Automation, Skill Use and Training", OECD Social, Employment and Migration Working Paper No. 202.

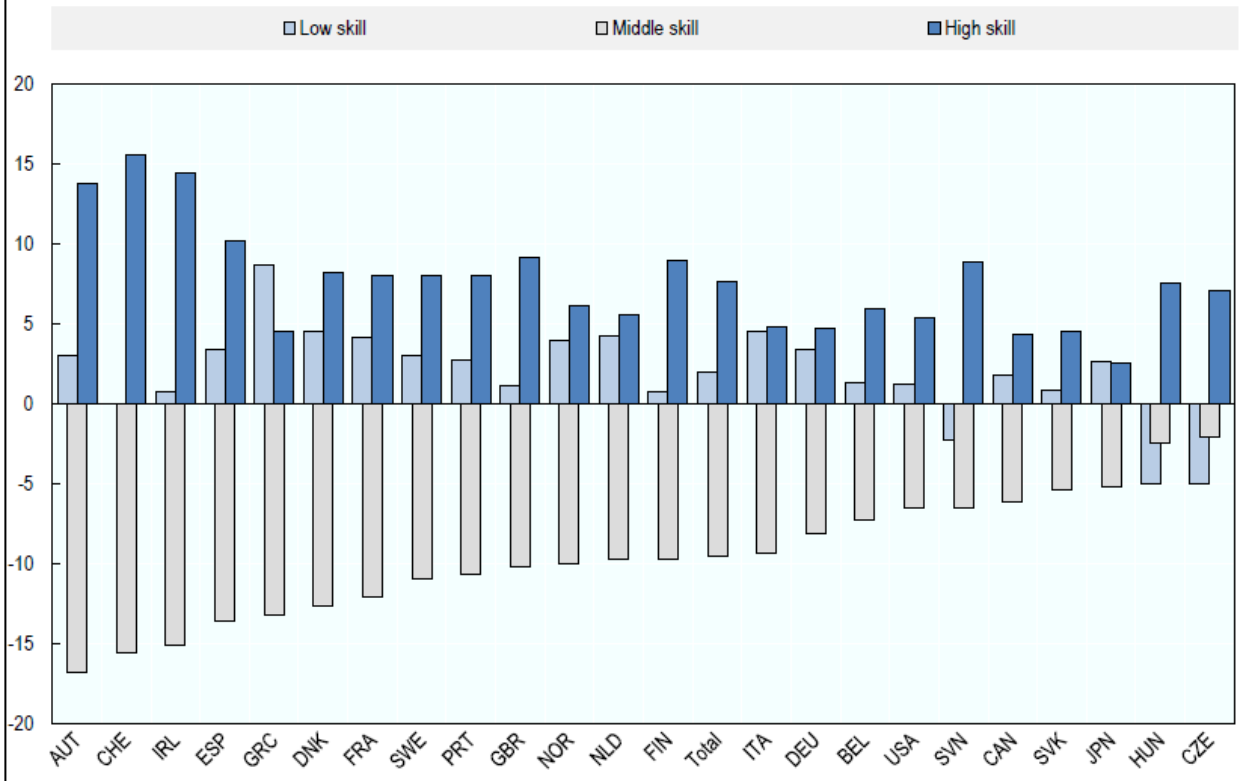
Quelle:

OECD 2018b

Stimmt das Bild der Polarisierung?

Figure 2.14. The labour market is polarising

Change in percentage point change in share of total employment, 1995 to 2015

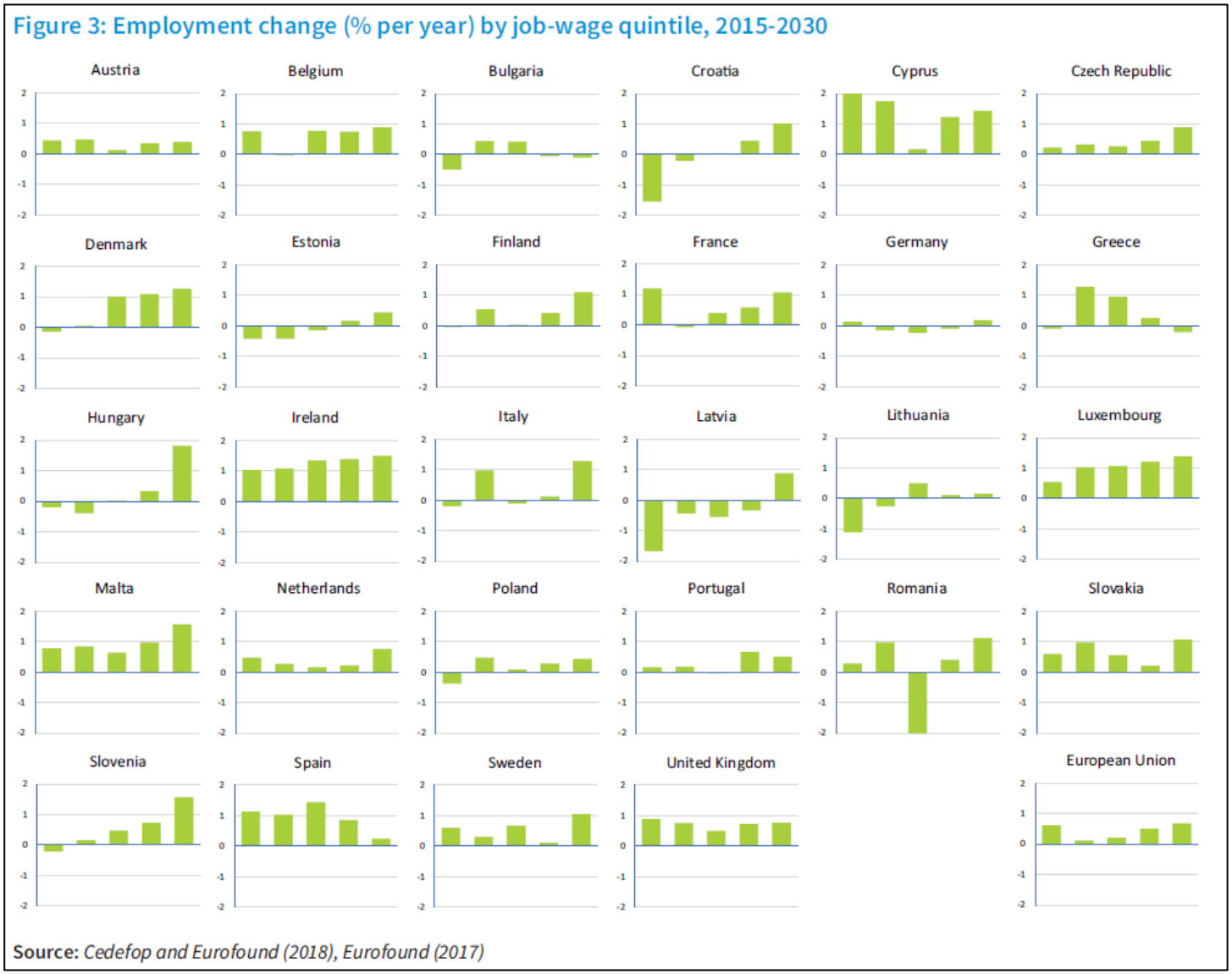


Note: High-skilled occupations include jobs classified under the ISCO-88 major groups 1, 2, and 3. That is, legislators, senior officials, and managers (group 1), professionals (group 2), and technicians and associate professionals (group 3). Middle-skilled occupations include jobs classified under the ISCO-88 major groups 4, 7, and 8. That is, clerks (group 4), craft and related trades workers (group 7), and plant and machine operators and assemblers (group 8). Low-skilled occupations include jobs classified under the ISCO-88 major groups 5 and 9. That is, service workers and shop and market sales workers (group 5), and elementary occupations (group 9).

Source: OECD (2017), "How technology and globalisation are transforming the labour market", in OECD Employment Outlook 2017, OECD Publishing, Paris, https://doi.org/10.1787/empl_outlook-2017-7-en.

Polarisierung UND Upgrading

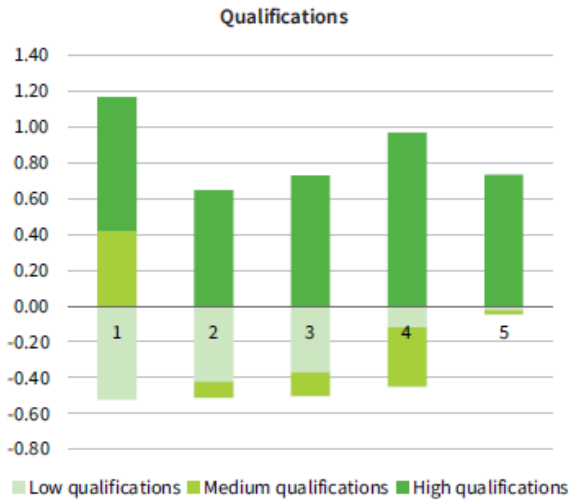
(Quelle: Eurofound 2018)

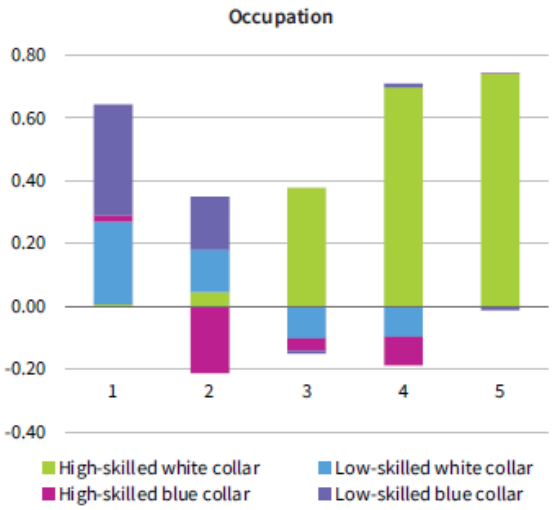


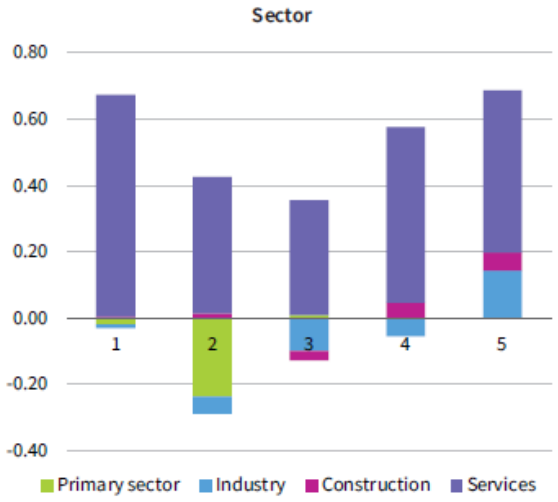
Polarisierung UND Upgrading

(Quelle: Eurofound 2018)

Figure 4: Employment change (% per year) by job-wage quintile, 2015-2030. EU by qualification, occupation and economic sector



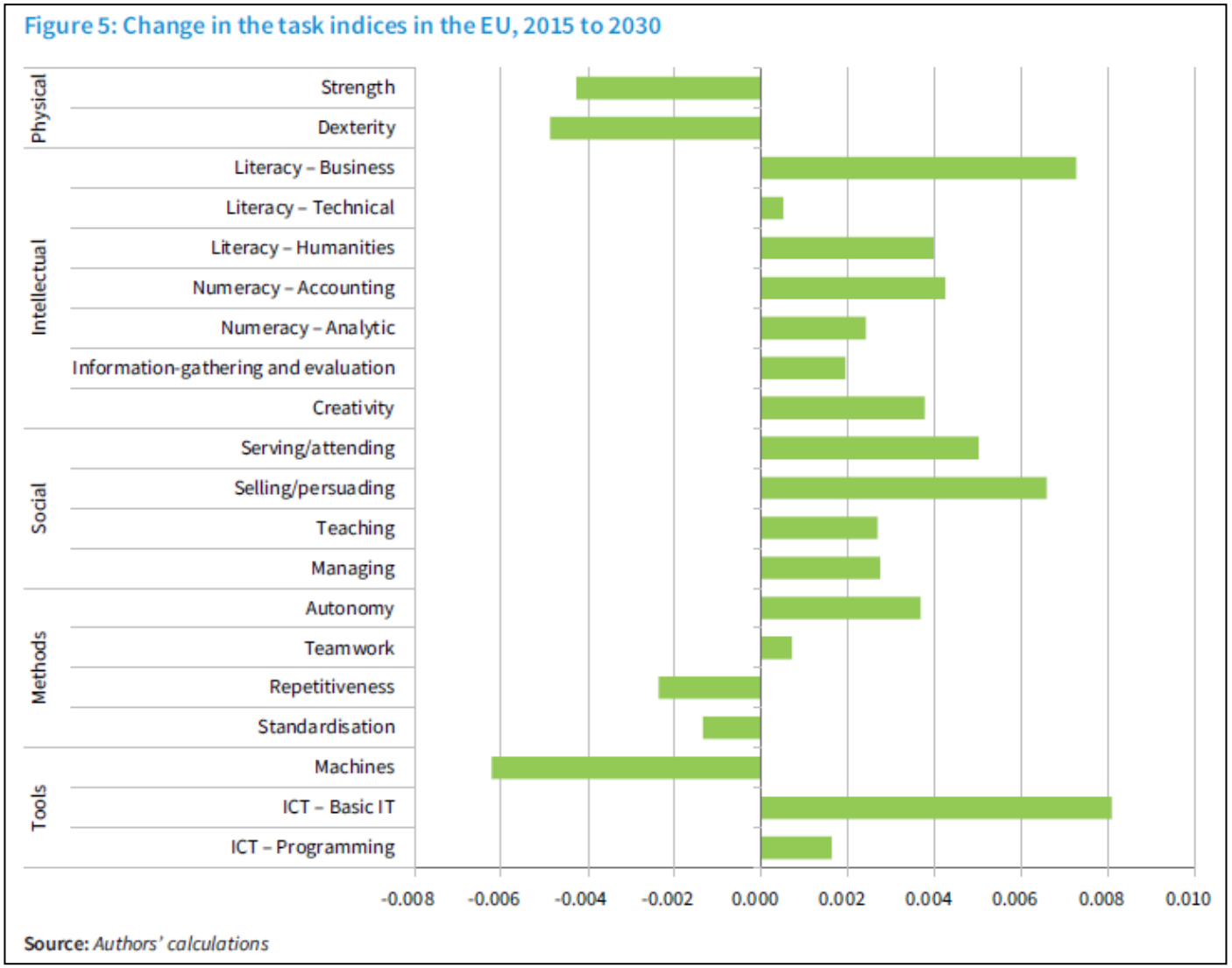




Source: *Cedefop and Eurofound (2018), Eurofound (2017).*

Polarisierung UND Upgrading

(Quelle: Eurofound 2018)

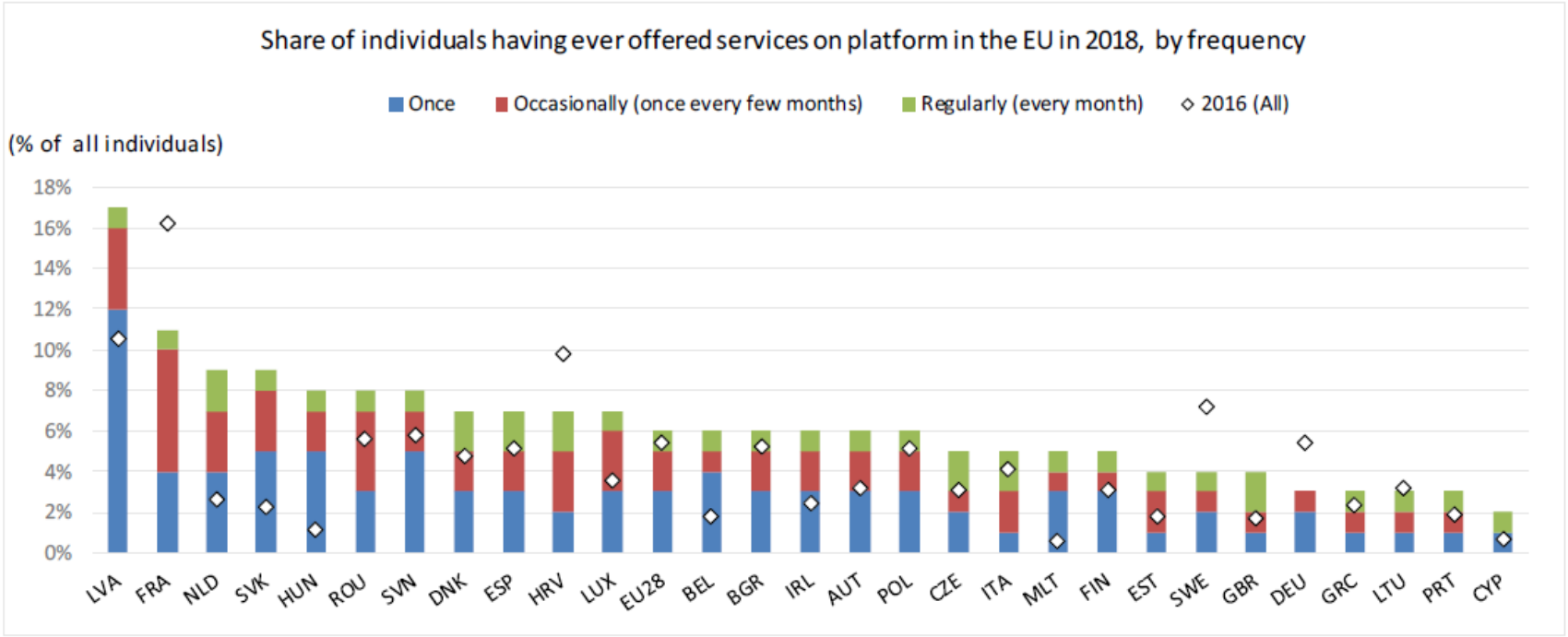


NEUE ARBEITSFORMEN

Plattformarbeit: Potenzial zur Disruption!

Figure 1.3. There is wide variation in participation in platform work across countries

Share of individuals having ever offered services on platform in the EU in 2018, by frequency.



Note: Platforms include capital platforms.
Source: The use of collaborative platforms, Flash Eurobarometer n°467, September 2018.

Quelle: OECD 2018c

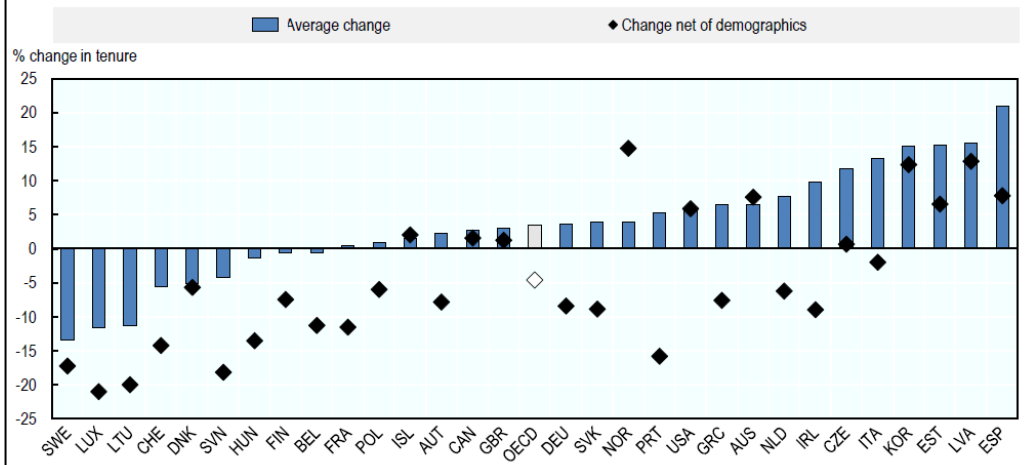
Bundesministerium
Arbeit, Soziales, Gesundheit
und Konsumentenschutz

Beschäftigungsstabilität

Quelle: OECD 2019b

Figure 3.1. Job stability has decreased in the majority of countries after accounting for population ageing

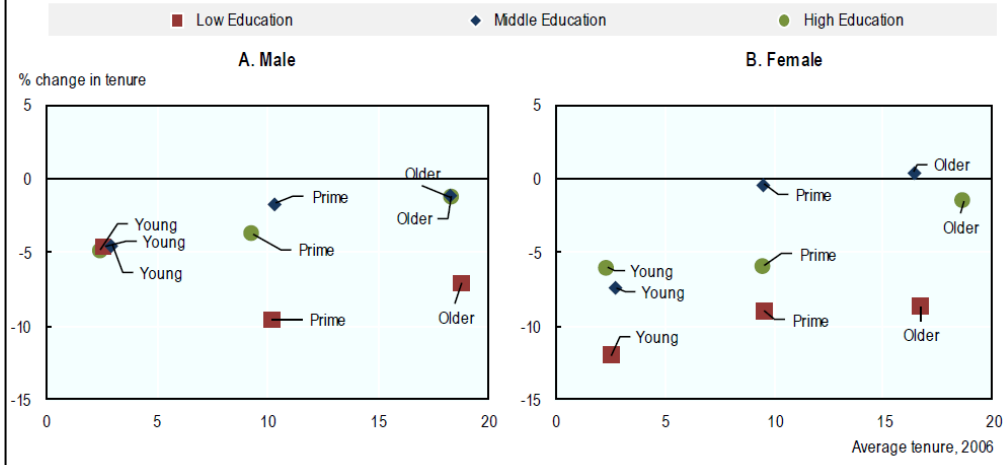
Average change in mean tenure and change net of demographics for workers not in education, 2006 to 2017[a]



Note: The OECD average is the unweighted average of the displayed countries. The *Average change* is the percentage change in average tenure between 2006 and 2017. The *Change net of demographics* shows the estimated changes once controlling for the composition of the labour force by age, gender and education. The methodology is similar to the one used by Farber (2010[6]).
Australia, Germany, and the United States are from 2016, data for Korea are from 2014.
ropean labour force survey (EU-LFS), The German Socio-Economic Panel (GSOEP) for Germany,
ngitudinal survey for Australia, KLIPS longitudinal survey for Korea, Canada LFS, and the CPS
pplement for the United States.

Figure 3.2. Low-educated workers have experienced the largest drops in job stability

Changes in job tenure (years) by gender, age and education, 2006 to 2017[a]

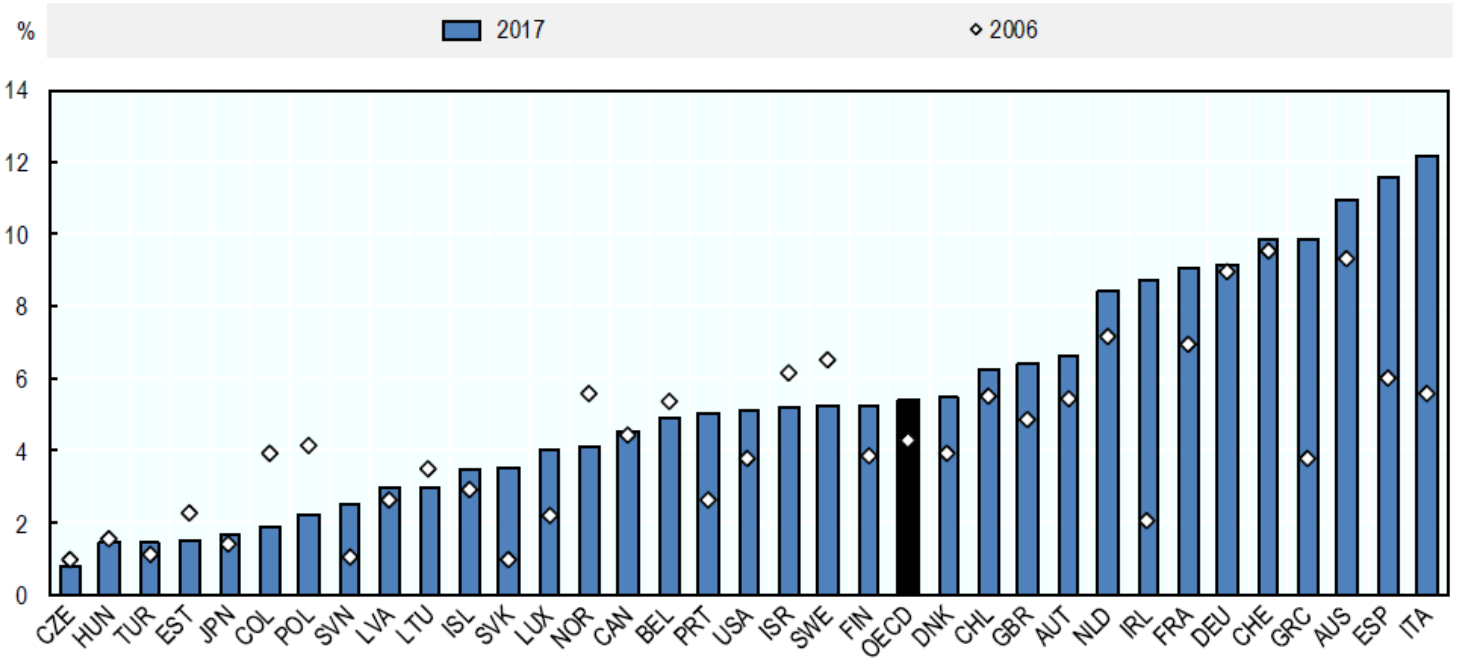


Note: Each data point is the unweighted average of the countries included in the analysis, excluding Korea due to data quality. The x-axis is the observed average tenure in 2006 and the y-axis is the percent change in average tenure by 2017. Young workers are aged 15 to 29 years, Prime-aged workers are aged 30 to 54, and Older workers are aged 55 to 69.
a) Data for Australia, Germany, and the United States are from 2016.
Source: EU-LFS, GSOEP, HILDA, Canada LFS, and the CPS January Supplement.

Unterbeschäftigung (Quelle: OECD 2019b)

Figure 3.6. The majority of countries have seen increases in underemployment, but particularly those hit hardest by the crisis

Percentage share of dependent workers in underemployment, 2006 and 2017, or latest year[a].



Note: The OECD average is the unweighted average of the countries depicted. Underemployed workers are in part-time employment (working 30 hours or less per week) who report either that they could not find a full-time job or that they would like to work more hours.
a) Data for Australia, Germany, and Japan are from 2016. Data for Chile and Turkey are from 2015, while Israel data is from 2011. Colombia data for 2006 is from 2007, while Chile uses data from 2009.
Source: EU-LFS, United States CPS, Canada LFS, Turkey LFS, Japan JHPS/KHPS, German GSOEP, Colombia GEIH, Chile CASEN, Israel LFS, Australia HILDA.

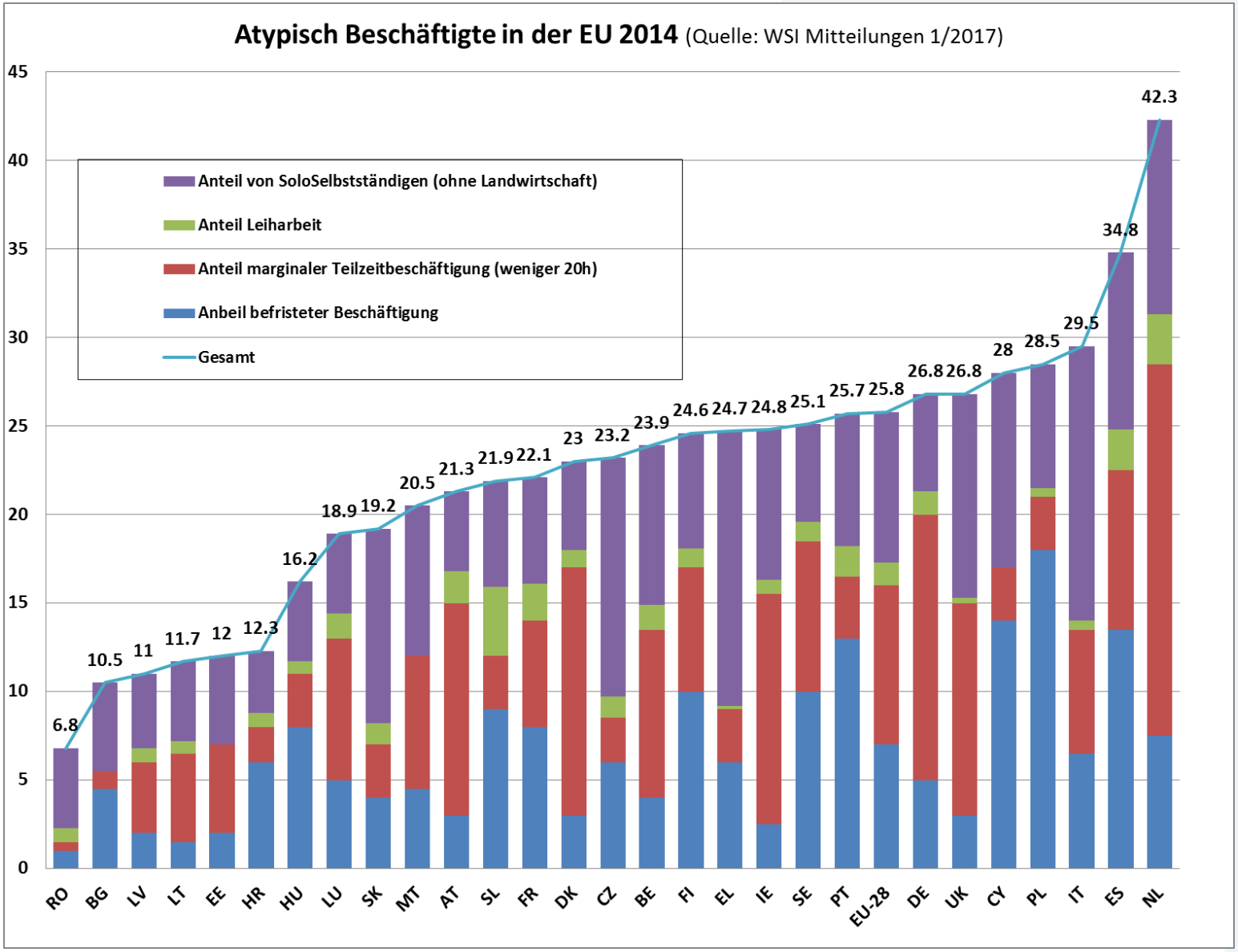
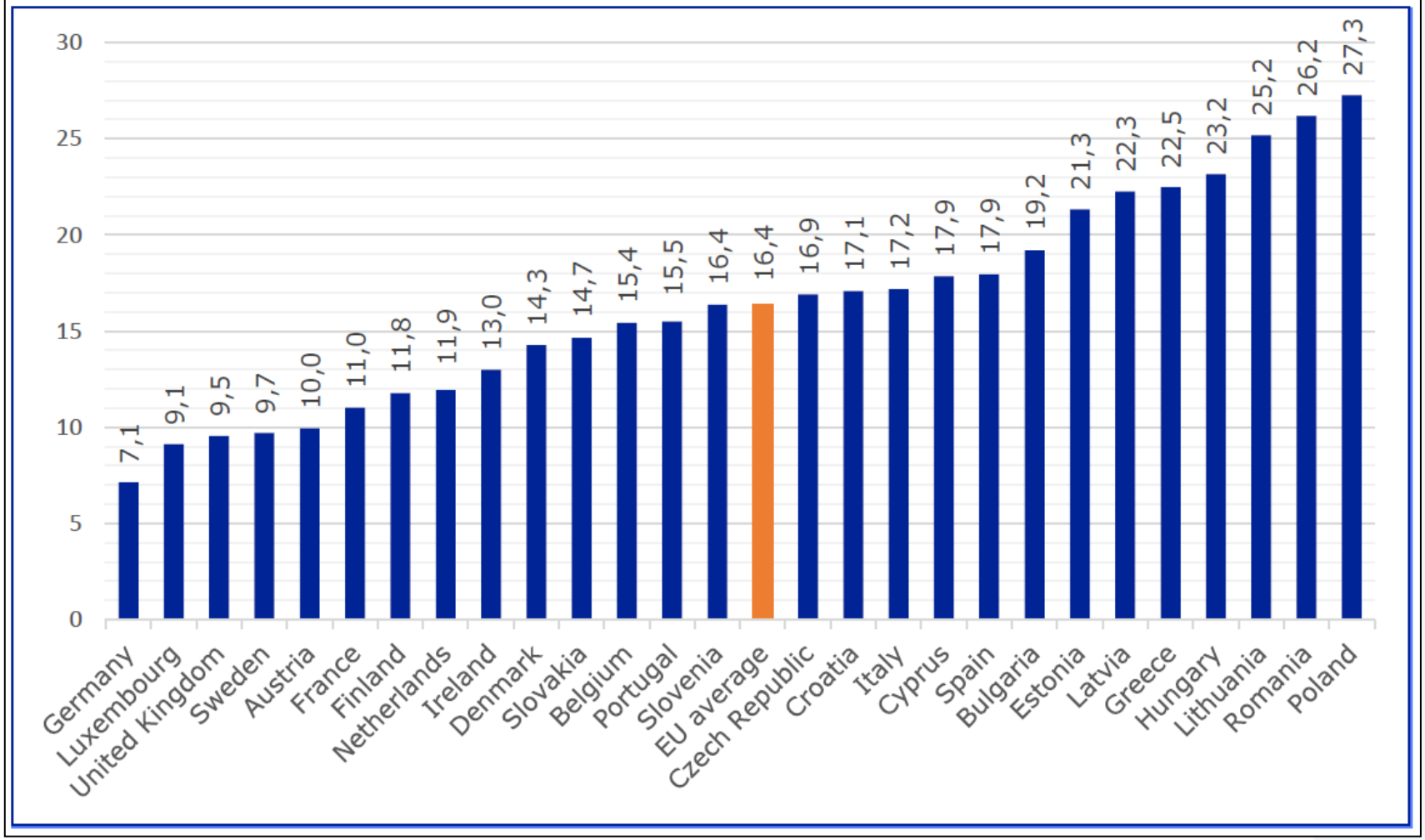

Atypisch Beschäftigte in der EU 2014 (Quelle: WSI Mitteilungen 1/2017)
Anteil von SoloSelbstständigen (ohne Landwirtschaft)
Anteil Leiharbeit
Anteil marginaler Teilzeitbeschäftigung (weniger 20h)
Anbeil befristeter Beschäftigung
Gesamt
45
40
35
30
25
20
15
10
5
0
6.8
10.5
11
11.7
12
12.3
16.2
18.9
19.2
20.5
21.3
21.9
22.1
23
23.2
23.9
24.6
24.7
24.8
25.1
25.7
25.8
26.8
26.8
28
28.5
29.5
34.8
42.3
RO
BG
LV
LT
EE
HR
HU
LU
SK
MT
AT
SL
FR
DK
CZ
BE
FI
EL
IE
SE
PT
EU-28
DE
UK
CY
PL
IT
ES
NL

Figure 2. Undeclared work in the private sector as % of total GVA, LIM estimates for 2013



Quelle: EU (2017b)

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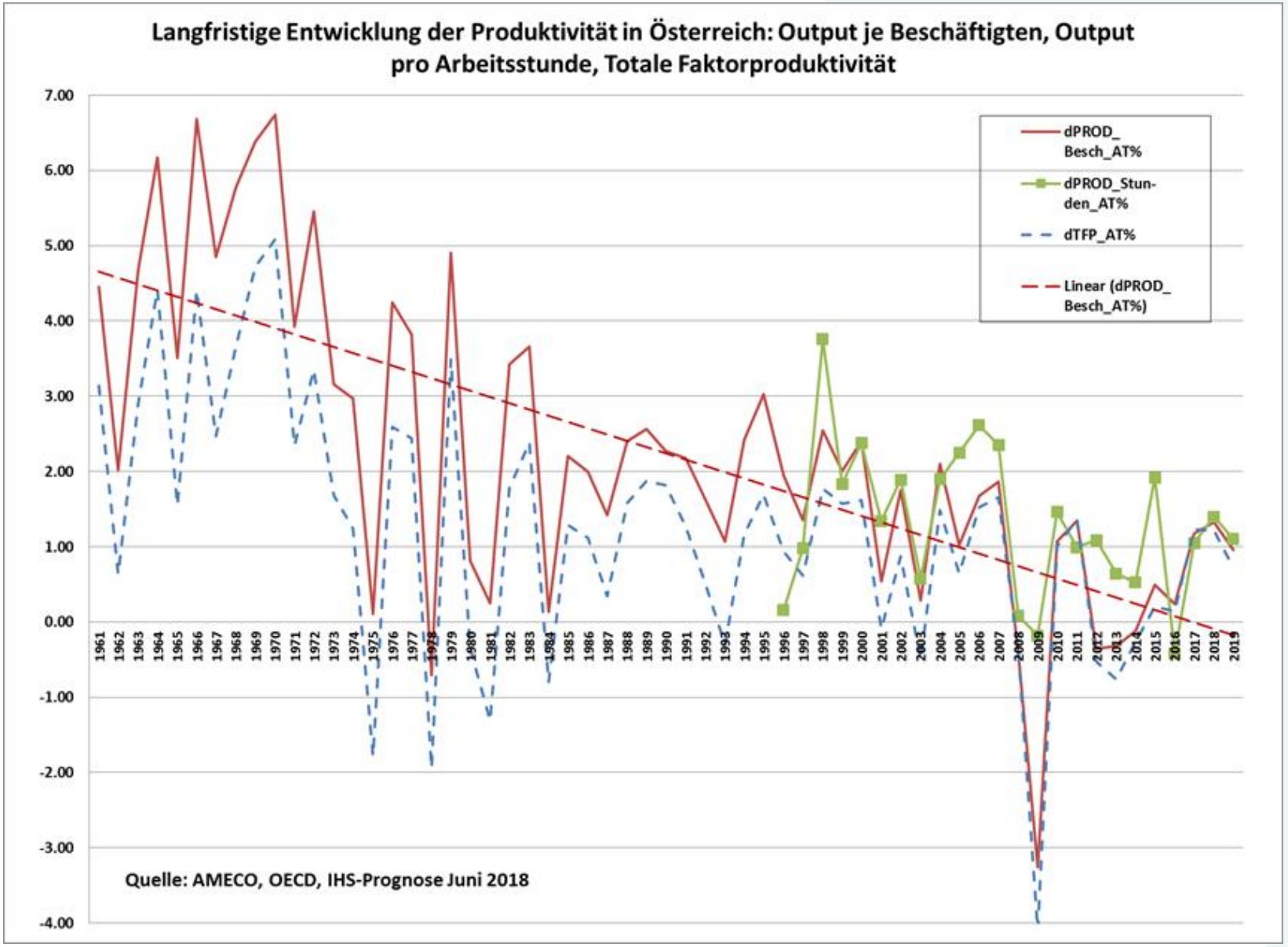
Danke für Ihre Aufmerksamkeit!

ANHANG


Langfristige Entwicklung der Produktivität in Österreich: Output je Beschäftigten, Output pro Arbeitsstunde, Totale Faktorproduktivität
dPROD_ Besch_AT%
dPROD_Stun- den_AT%
dTFP_AT%
Linear (dPROD_ Besch_AT%)
Quelle: AMECO, OECD, IHS-Prognose Juni 2018

Produktivität und Reallöhne

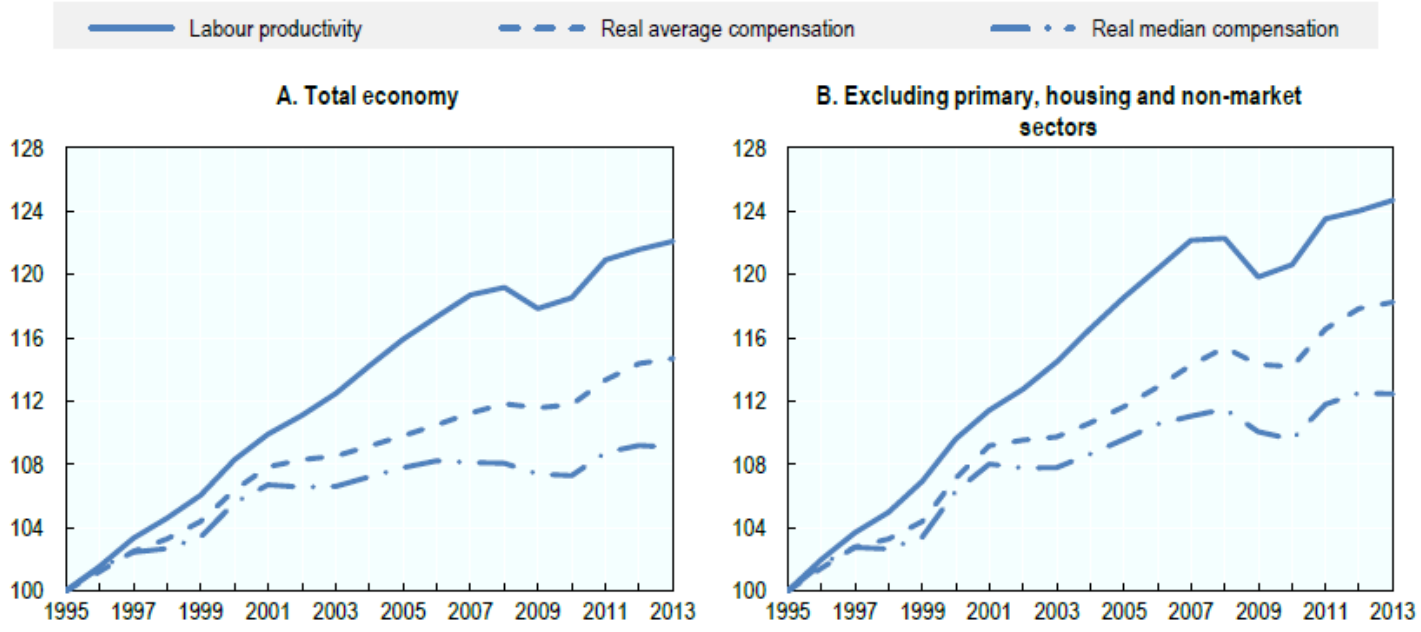
	dTFP_AT%	dPROD_Besch_AT%	dPROD_Stunden_AT%	Real compensation per employee AT%
2000	1.62	2.41	2.38	0.91
2001	-0.09	0.54	1.34	-0.44
2002	0.88	1.75	1.89	0.93
2003	-0.50	0.29	0.58	0.40
2004	1.48	2.10	1.89	0.31
2005	0.65	1.03	2.25	-0.49
2006	1.53	1.67	2.61	1.16
2007	1.66	1.87	2.35	0.73
2008	-0.40	-0.44	0.08	1.31
2009	-4.09	-3.25	-0.18	-0.24
2010	1.00	1.07	1.46	0.22
2011	1.36	1.35	0.99	0.21
2012	-0.52	-0.35	1.09	0.62
2013	-0.77	-0.32	0.64	0.57
2014	-0.26	-0.12	0.53	-0.11
2015	0.20	0.49	1.92	-0.22
2016	0.14	0.24	-0.41	1.27
2017	1.23	1.17	1.05	0.08
2018	1.21	1.32	1.40	0.85
2000-2018	**6.34**	**12.81**	**23.86**	**8.07**
2010-2018	**3.61**	**4.85**	**8.66**	**3.48**

Quelle: AMECO

Produktivität und Reallöhne

Figure 2.15. Real median wages have decoupled from labour productivity

Indices, 1995 = 100

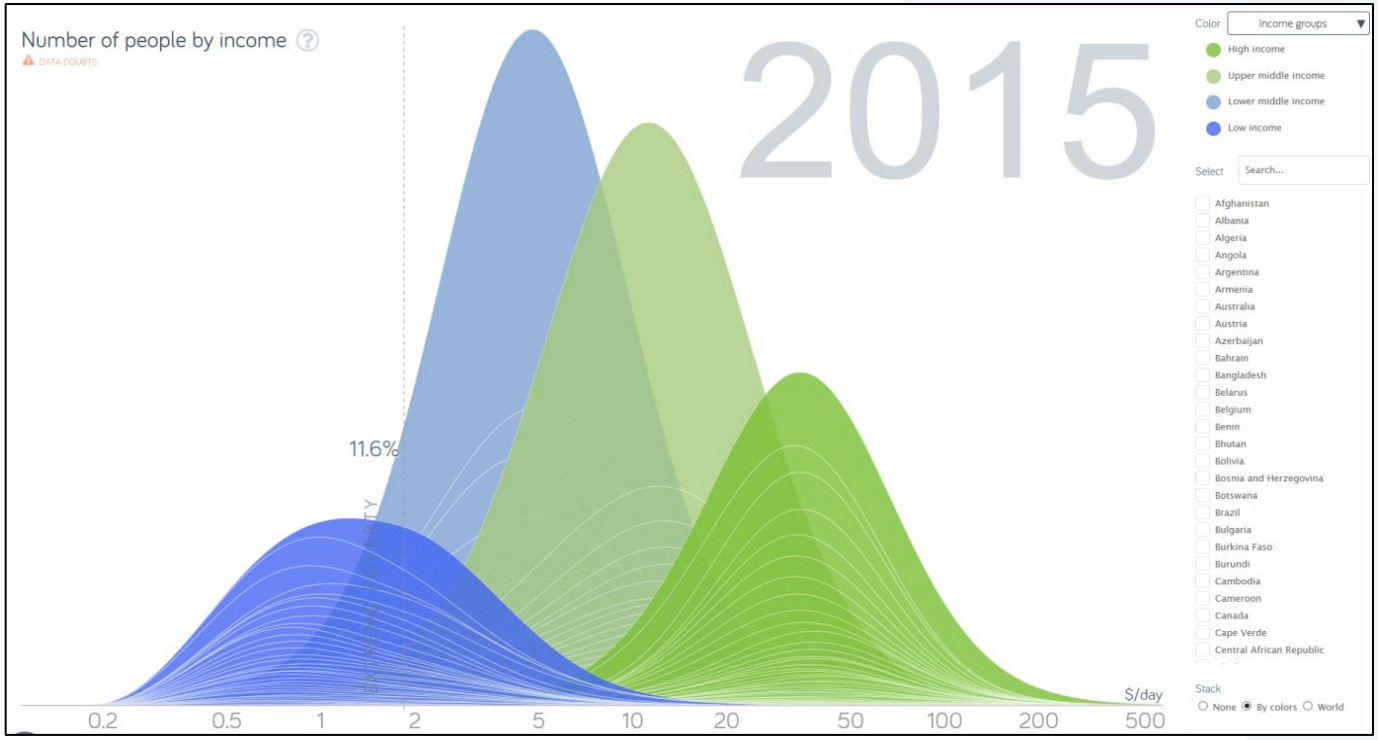


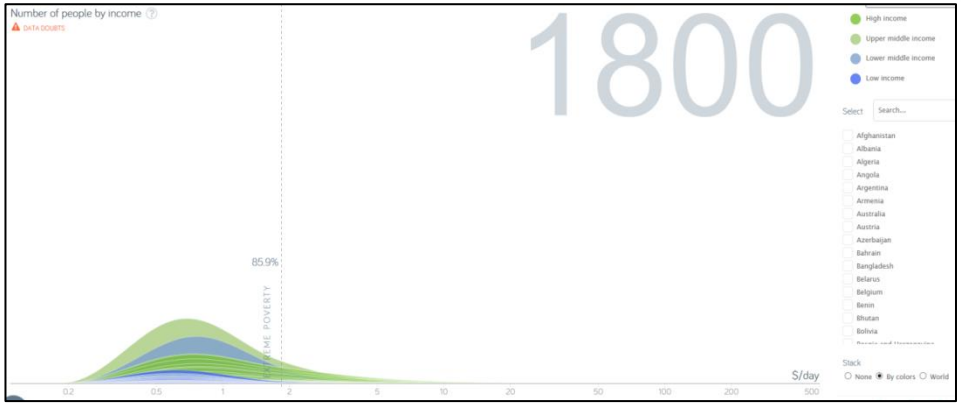
Note: Gross domestic product (GDP) weighted average of 24 countries (two year moving averages ending in the indicated years). 1995 2013 for Finland, Germany, Japan, Korea and the United States; 1995 2012 for France, Italy and Sweden; 1996 2013 for Austria, Belgium and the United Kingdom; 1996 2012 for Australia and Spain; 1997 2013 for the Czech Republic, Denmark and Hungary; 1997 2012 for Poland; 1996 2010 for the Netherlands; 1998 2013 for Norway; 1998 2012 for Canada and New Zealand; 1999 2013 for Ireland; 2002 11 for Israel; 2003 13 for the Slovak Republic. In Panel A, all series are deflated by the total economy value added price index. In Panel B, all series are deflated by the value added price index excluding the primary,

Quelle: OECD 2019a

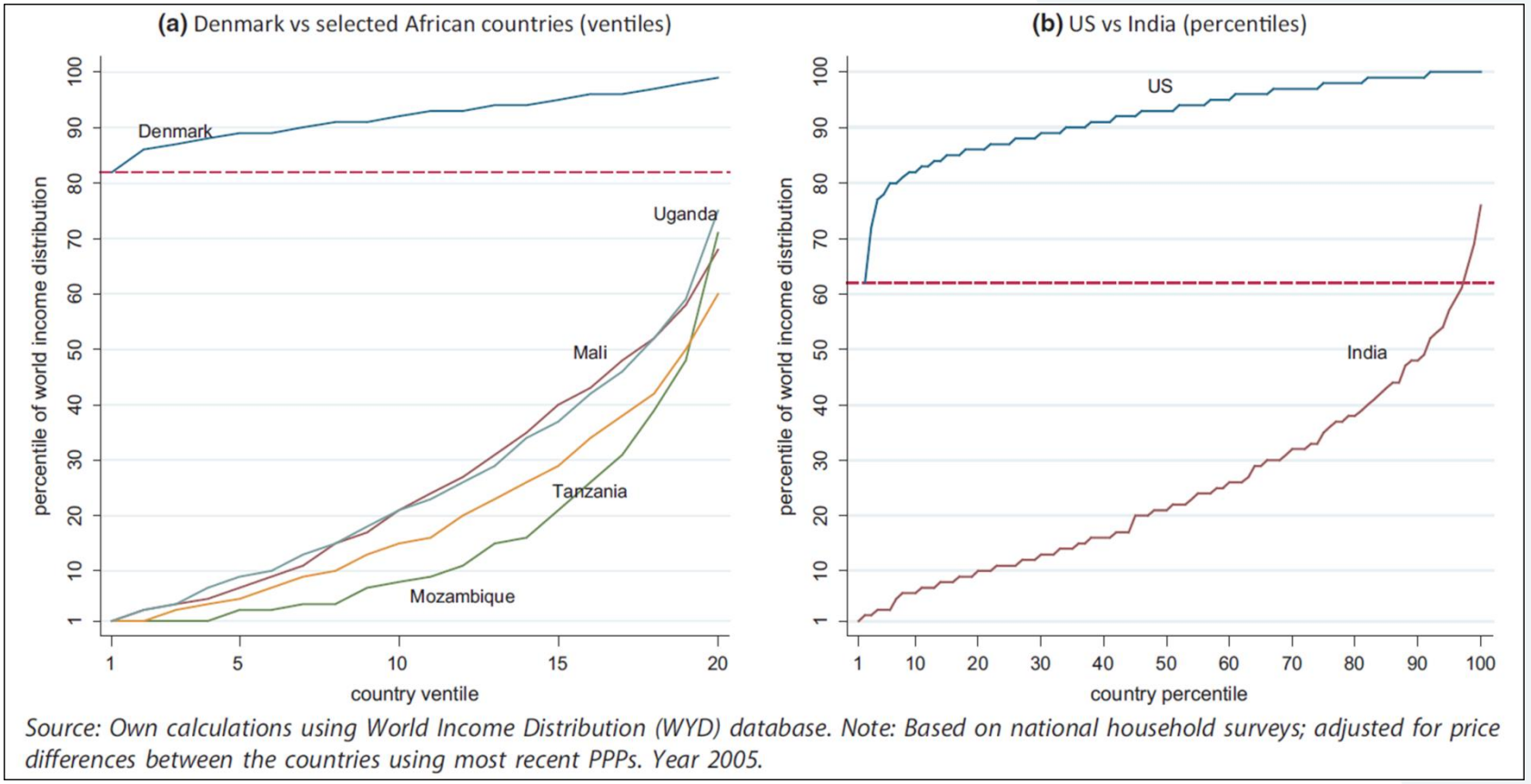
Globale Einkommensverteilung noch BNE-Gruppen

Quelle: https://www.gapminder.org/tools/#$chart-type=mountain



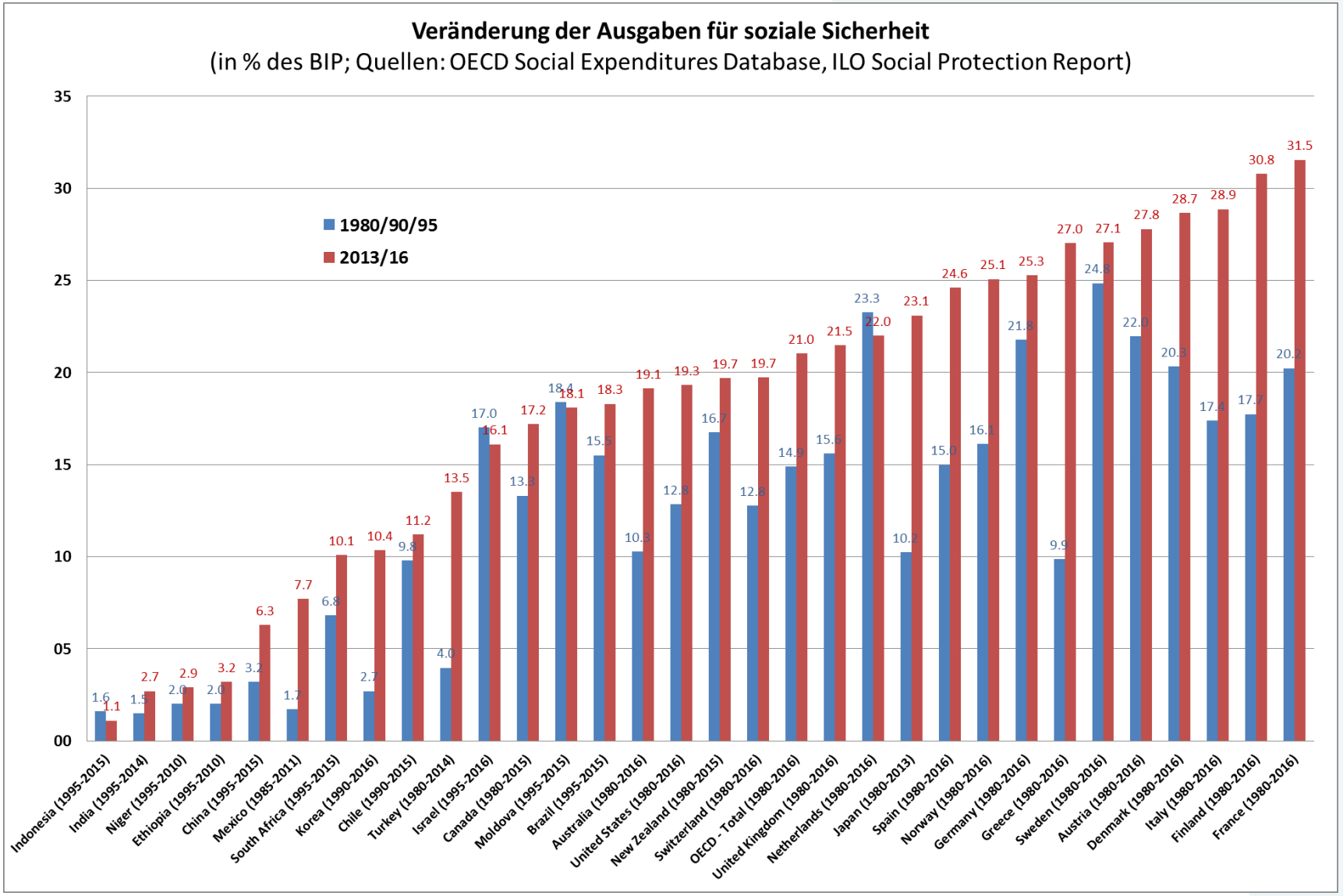


Globale Einkommensunterschiede



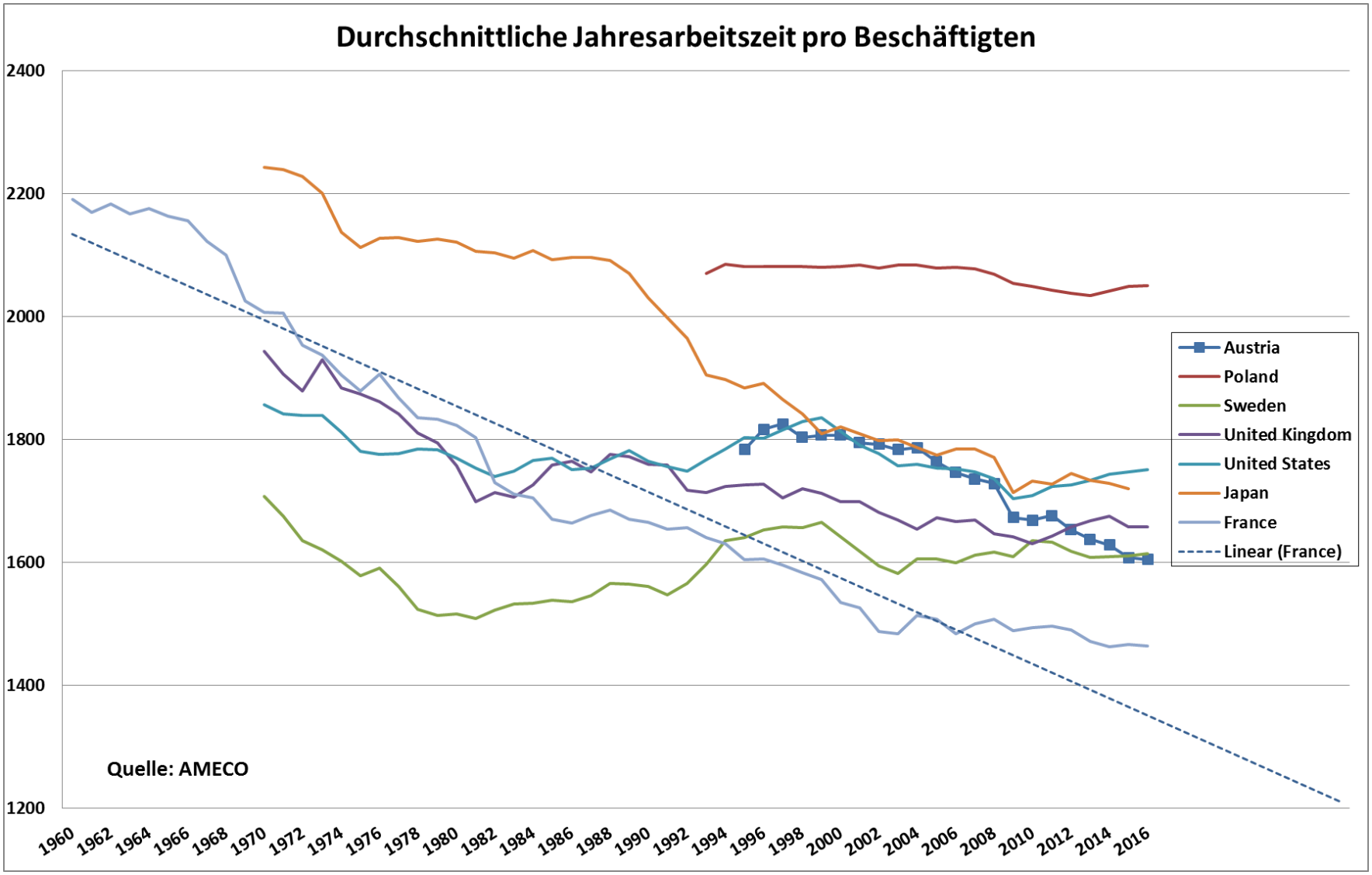
Source: Own calculations using World Income Distribution (WYD) database. Note: Based on national household surveys; adjusted for price differences between the countries using most recent PPPs. Year 2005.

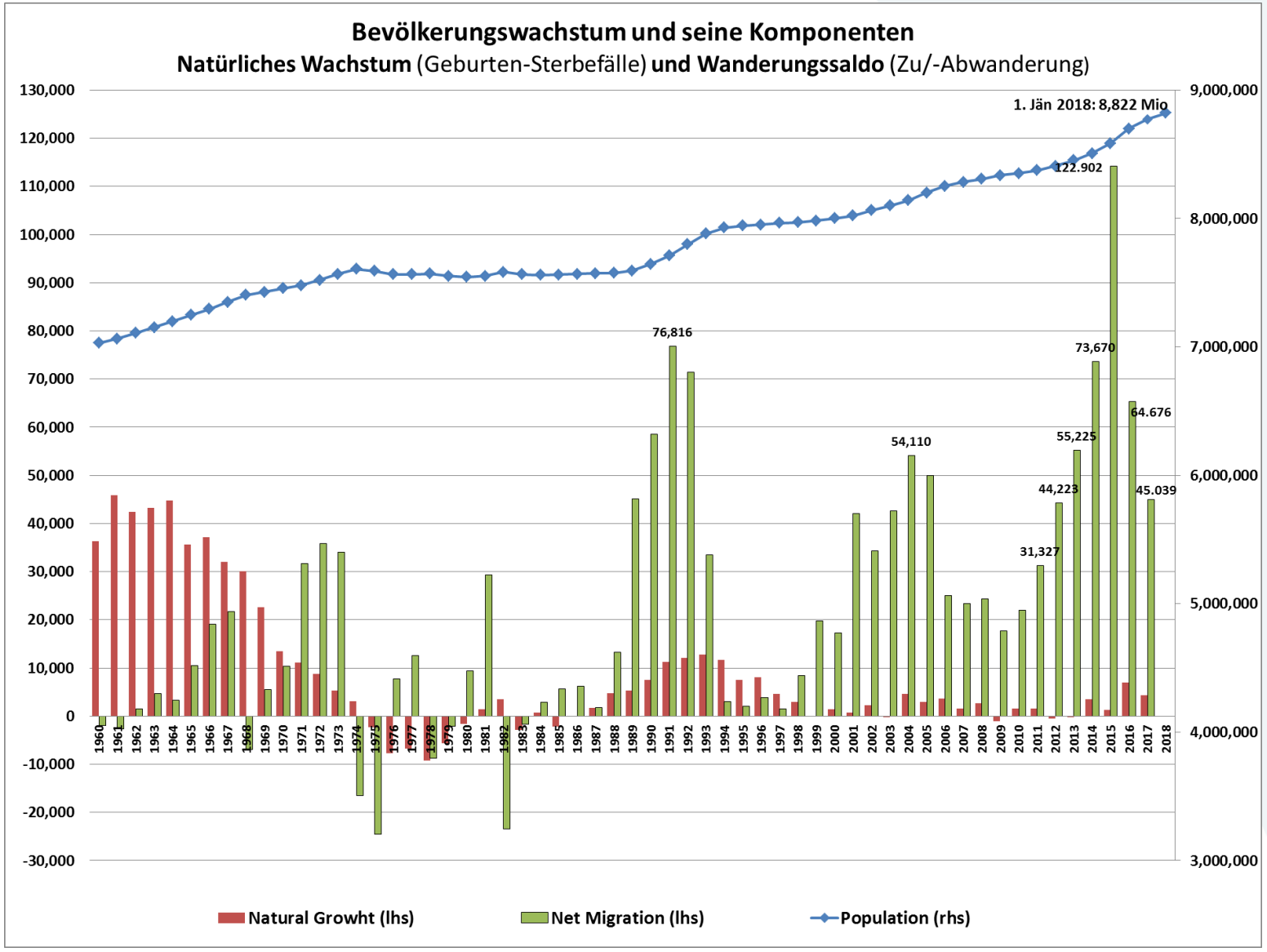
Quelle: Milanovic (2012)


Veränderung der Ausgaben für soziale Sicherheit
(in % des BIP; Quellen: OECD Social Expenditures Database, ILO Social Protection Report)
1980/90/95
2013/16
35
30
25
20
15
10
05
00
Indonesia (1995-2015)
India (1995-2014)
Niger (1995-2010)
Ethiopia (1995-2010)
China (1995-2015)
Mexico (1985-2011)
South Africa (1995-2015)
Korea (1990-2016)
Chile (1990-2015)
Turkey (1980-2014)
Israel (1995-2016)
Canada (1980-2015)
Moldova (1995-2015)
Brazil (1995-2015)
Australia (1980-2016)
United States (1980-2016)
New Zealand (1980-2015)
Switzerland (1980-2016)
OECD - Total (1980-2016)
United Kingdom (1980-2016)
Netherlands (1980-2016)
Japan (1980-2013)
Spain (1980-2016)
Norway (1980-2016)
Germany (1980-2016)
Greece (1980-2016)
Sweden (1980-2016)
Austria (1980-2016)
Denmark (1980-2016)
Italy (1980-2016)
Finland (1980-2016)
France (1980-2016)

Entwicklung AZ und Wohlstand - in der langen Frist

	Tages-AZ	Wochen-AZ	Urlaub	Lebens-AZ, Fakt. Pens.Alter	Arbeitsan-gebot-HH	Wohlstand BIP/Kopf (USA $ 1990) (BIP-AUT, int.Mrd.US $)
19. Jhdt (1820)	bis 16 h	80 h				500 (4)
1885	11 h	66 h			60 h	
1919	8 h	48 h				
1950	8 h	48 h	2 Wo		48 h	1200 (26)
um 1960	8 h	45 h	von 2 auf 3 Wo			
1970	8 h	43 h		61,3		
1975/77	8 h	40 h	auf 4 Wo			
1985	8 h	38,5 h (KV)	auf 5 Wo	58,1	70-75	
um 2005	8 h	38,5 h (KV)	auf 5 Wo	58,1	70-75	27000 (180)


Durchschnittliche Jahresarbeitszeit pro Beschäftigten
2400
2200
2000
1800
1600
1400
1200
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Austria
Poland
Sweden
United Kingdom
United States
Japan
France
Linear (France)
Quelle: AMECO

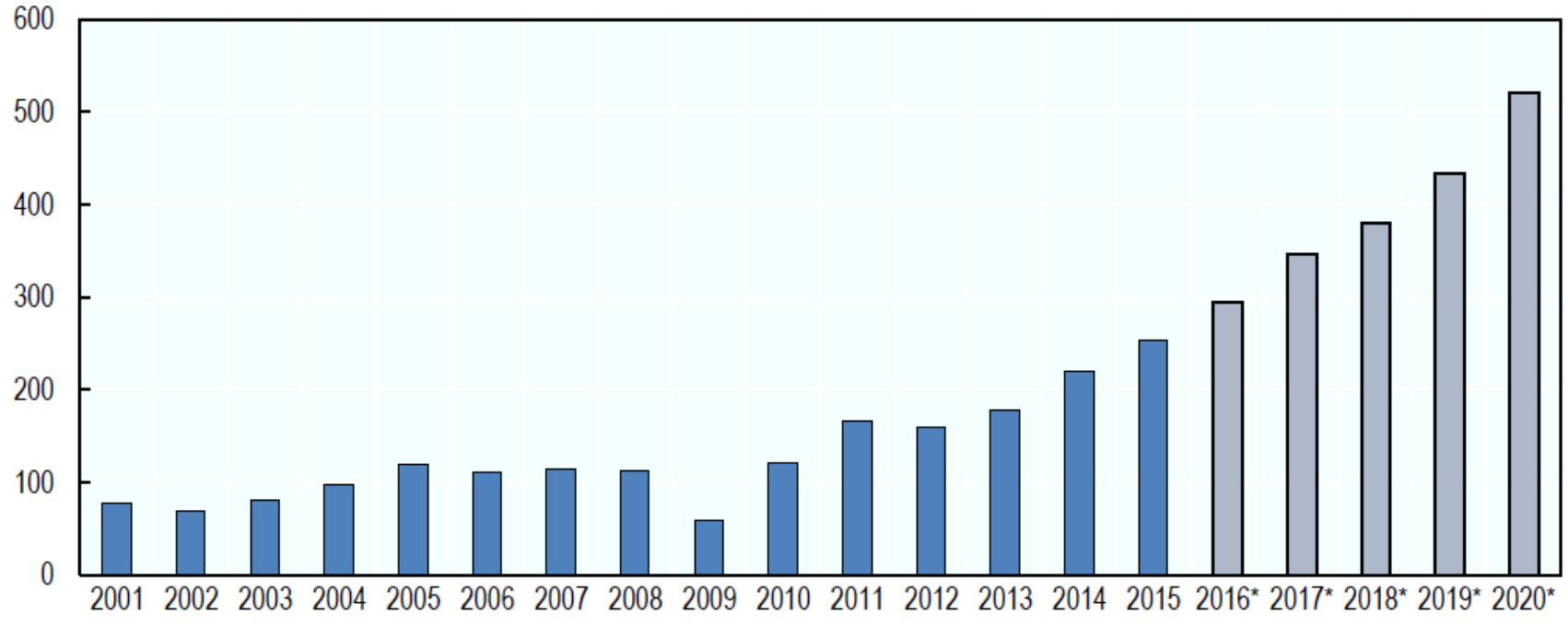


Quelle:
Eurostat

Einsatz von Robotern

Figure 2.2. The march of the robots

Estimated worldwide annual supply of industrial robots, thousands of units

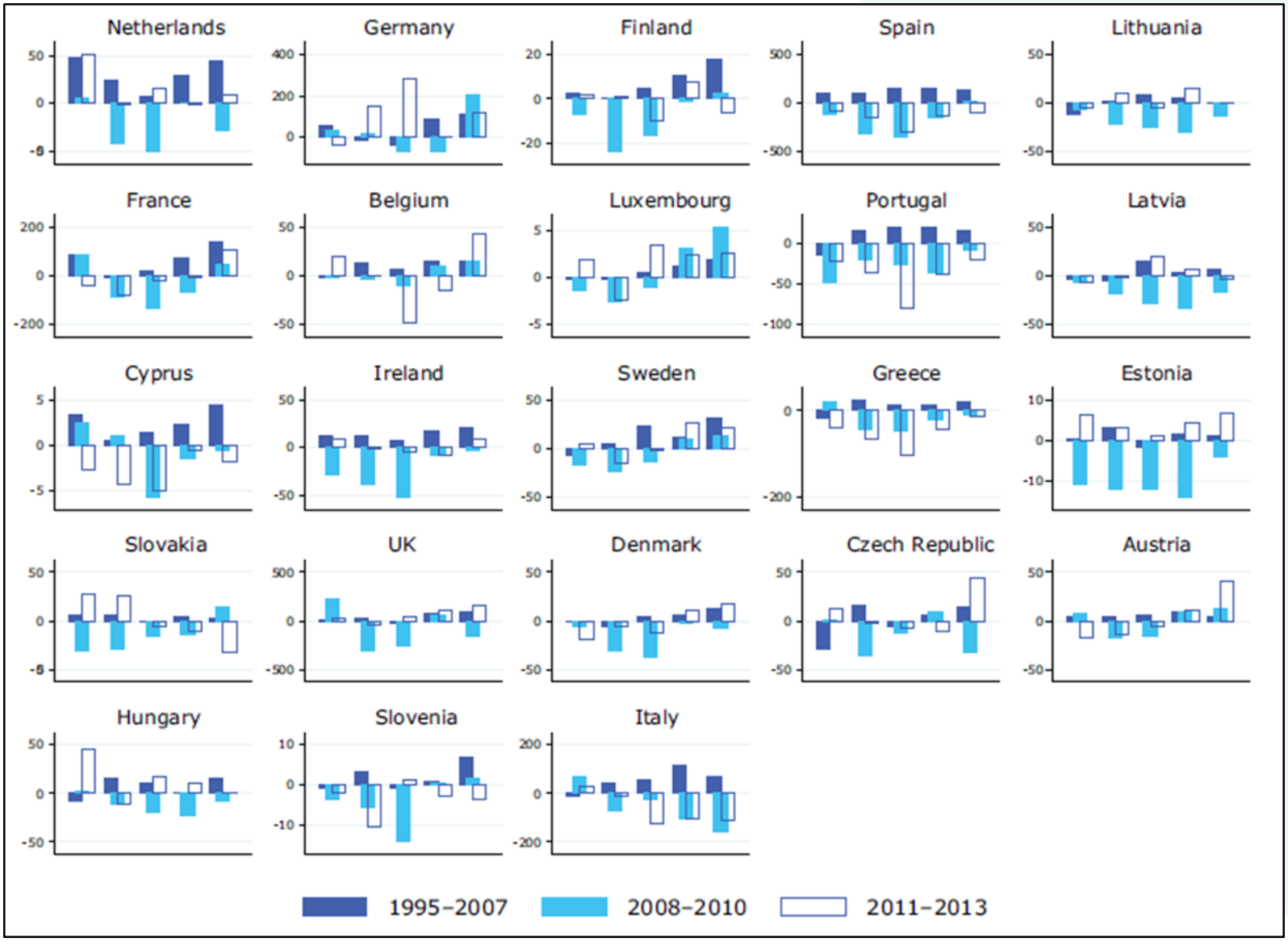


Note: *forecast.
Source: International Federation of Robotics (IFR).

Quelle: OECD 2019a

Polarisierung UND Upgrading

(Quelle: Eurofound 2014)



Stimmt das Bild der Polarisierung?

Tabelle 3: Verschiebung der Beschäftigungsstruktur (Arbeitsstunden) 1994-2015

	Verteilung 1994	relative Entwicklung 1994-2015
Hochlohnberufe	14,6%	8,5 PP
Berufe mit mittlerer Entlohnung	51,8%	-6,6 PP
Niedriglohnberufe	33,6%	-1,9 PP

Quelle: Mikrozensus AKE 1994-2015, eigene Berechnungen.

Tabelle 5: Verschiebung der Beschäftigungsstruktur (Arbeitsstunden) 1994-2015: Vergleich verschiedener Varianten der Lohnhierarchie

	Haupt-variante	Variante 1	Variante 2	Variante 3
Hochlohnberufe	8,5 PP	8,5 PP	8,4 PP	7,1 PP
Berufe mit mittlerer Entlohnung	-6,6 PP	-6,3 PP	-4,1 PP	-9,8 PP
Niedriglohnberufe	-1,9 PP	-2,2 PP	-4,3 PP	2,7 PP

Quelle: Mikrozensus AKE 1994-2015, eigene Berechnungen.
Anmerkung: In Variante 1 wurde die Lohnhierarchie von 1995/97 für die Einteilung der Berufslohngruppen herangezogen und die Berufsgruppe LeiterInnen kleiner Unternehmen (ISCO-88 13) exkludiert. In Variante 2 wurde abweichend zur Lohnhierarchie von 1995/97, die Berufsgruppen LeiterInnen kleiner Unternehmen (ISCO-88 13) sowie biowissenschaftliche Fachkräfte und Gesundheitsfachkräfte (ISCO-88 32 als Hochlohnberufe klassifiziert und FahrzeugführerInnen und BedienerInnen mobiler Anlagen (ISCO-88 83) zu den Niedriglohnberufen zugeordnet. In Variante 3 wurde die Einteilung der Berufslohngruppen von Goos et al. (2014) für die Berechnungen herangezogen.

Quelle:
IHS 2017

Polarisierung UND Upgrading

(Quelle: Eurofound 2018)

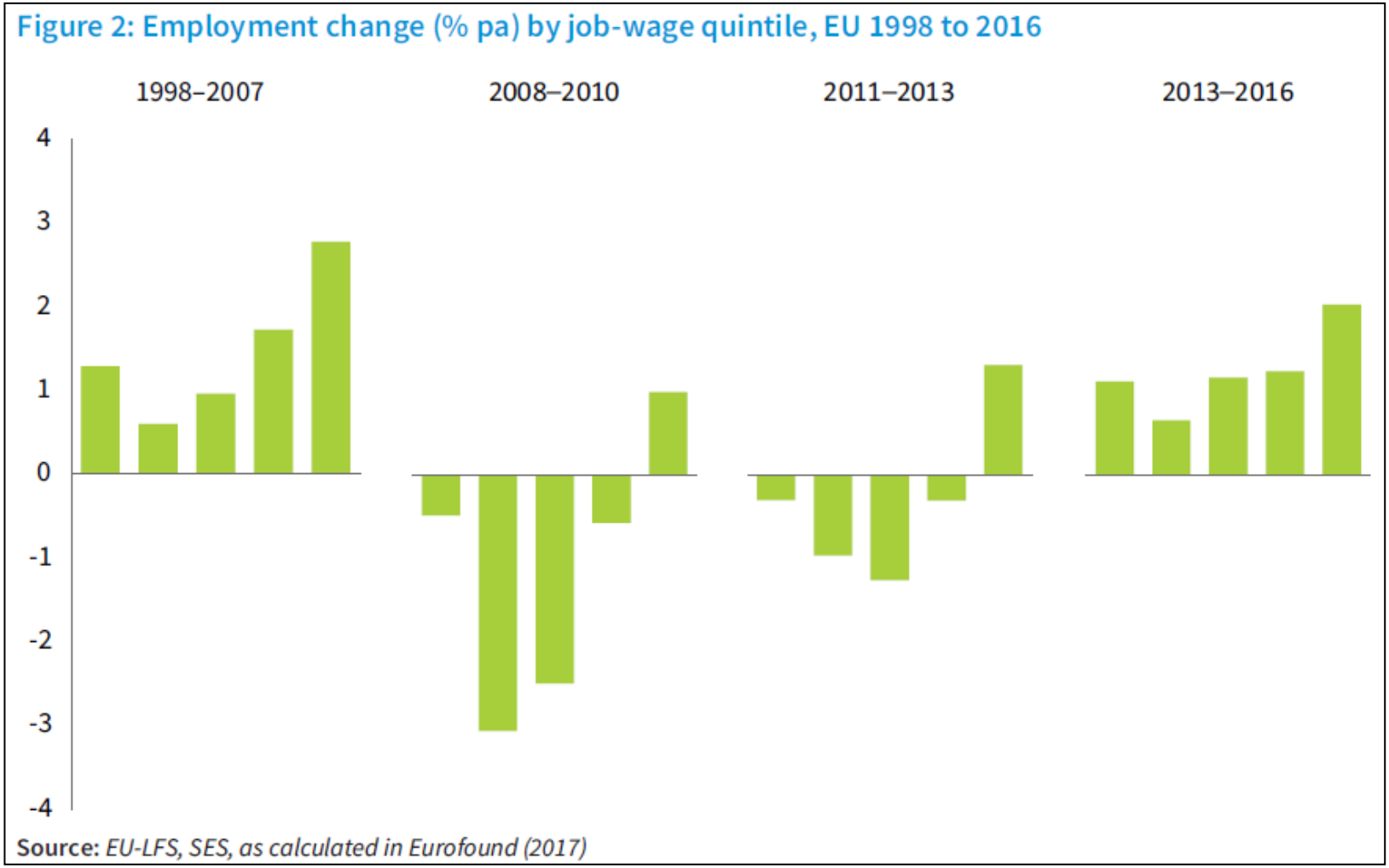
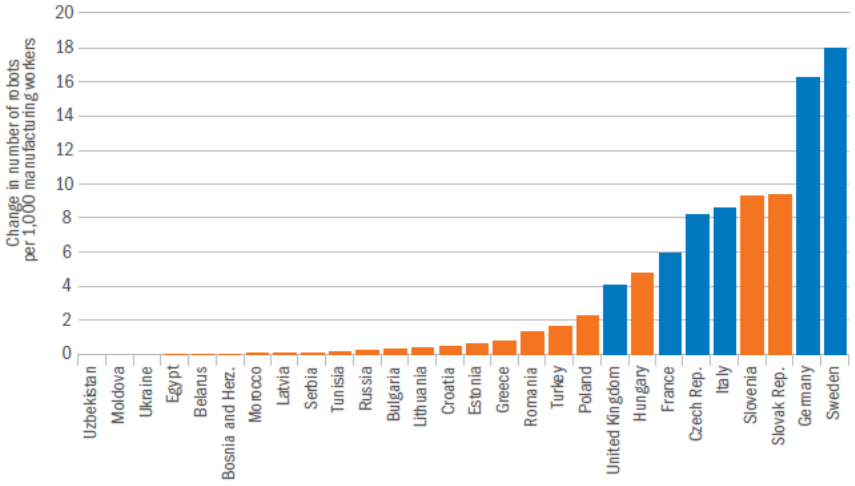
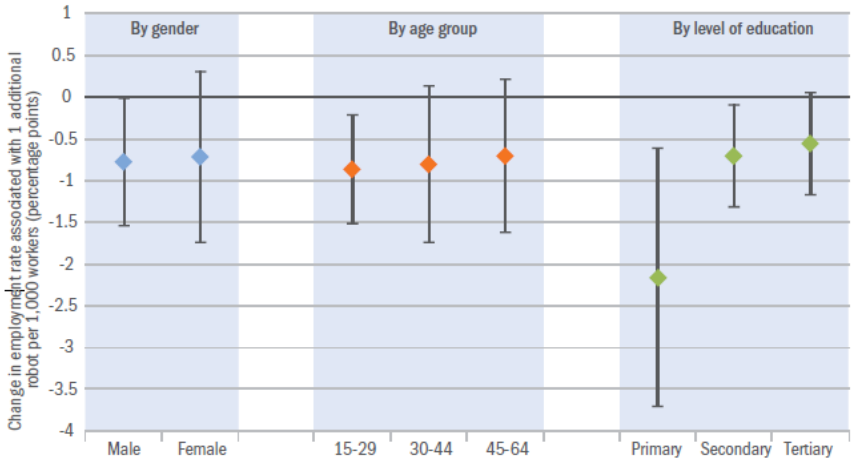


CHART 2.9. Change in the number of robots per 1,000 manufacturing workers, 1993-2016



Source: IFR, ILO and authors' calculations.

CHART 2.10. Impact of robotisation by gender, age group and level of education

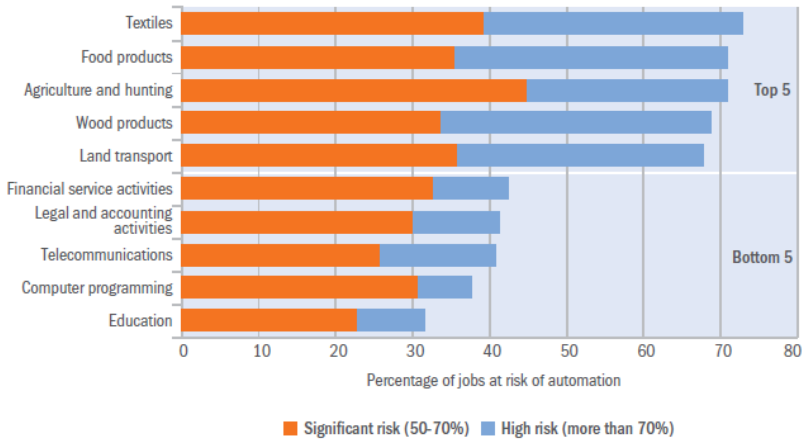


Source: Eurostat, IFR and authors' calculations.
Note: Based on regression analysis for individual demographic groups (see Annex 2.4 for details). Lines correspond to the 95 per cent confidence intervals associated with these estimates.

Quelle: EBRD 2019

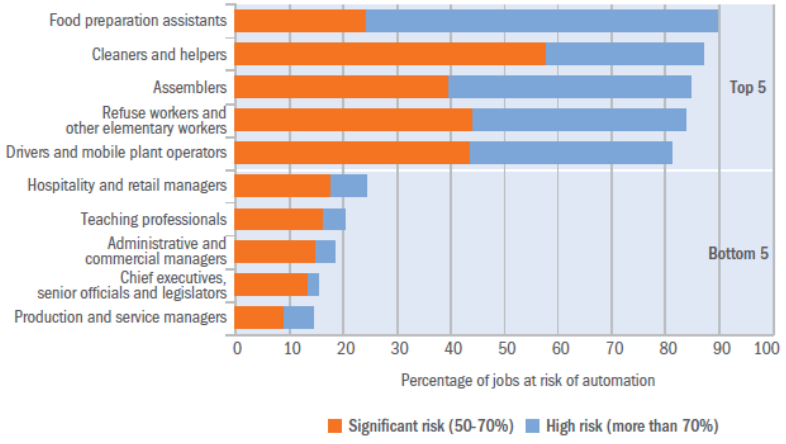
Automatisierungswahrscheinlichkeiten

CHART 2.12. Industries expected to be most and least affected by automation in the EBRD regions



Source: Nedelkoska and Quintini (2018) and authors' calculations.
Note: Based on two-digit ISIC classification (rev. 4). Jobs are at high risk of automation if at least 70 per cent of the tasks involved are at risk of being automated. Jobs are at significant risk of automation if between 50 and 70 per cent of tasks are at risk of being automated. Estimates are simple averages across Cyprus, Estonia, Greece, Lithuania, Poland, the Slovak Republic, Slovenia and Turkey. Industries with fewer than 10 observations in four countries or more have been excluded.

CHART 2.13. Occupations expected to be most and least affected by automation in the EBRD regions



Source: Nedelkoska and Quintini (2018) and authors' calculations.
Note: Based on two-digit ISCO-08 classification. Jobs are at high risk of automation if at least 70 per cent of the tasks involved are at risk of being automated. Jobs are at significant risk of automation if between 50 and 70 per cent of tasks are at risk of being automated. Estimates are simple averages across Cyprus, Estonia, Greece, Lithuania, Poland, the Slovak Republic, Slovenia and Turkey. Occupations with fewer than 10 observations in four countries or more have been excluded.

Quelle: EBRD 2019