Innovation, Globalization, and the Sustainability of the European Model(s)

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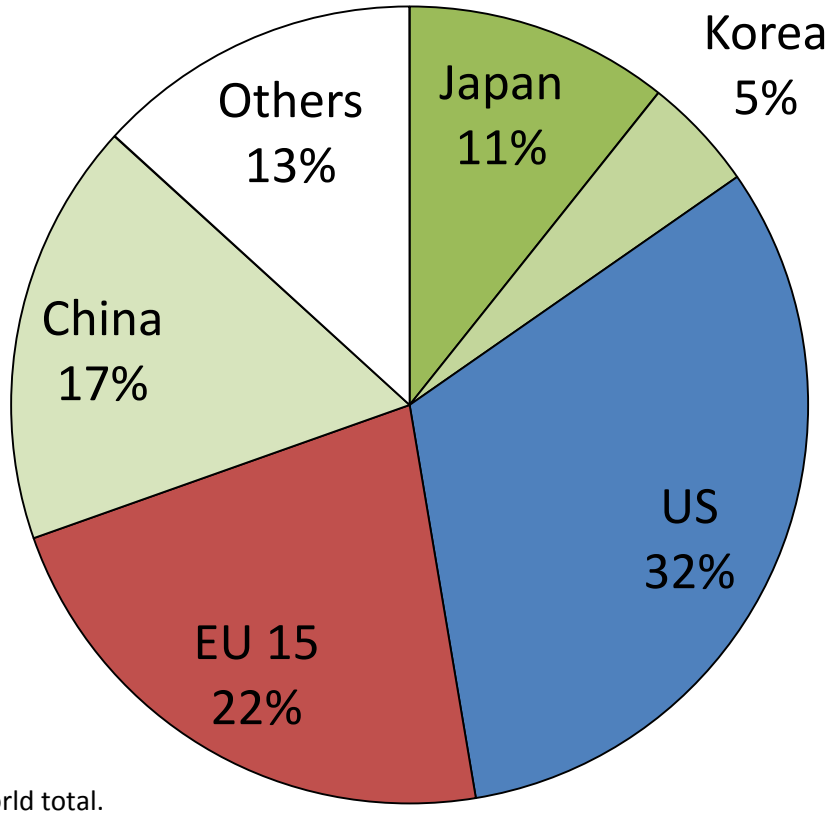
- Some structural European weakness well before the crisis in science, innovation and production

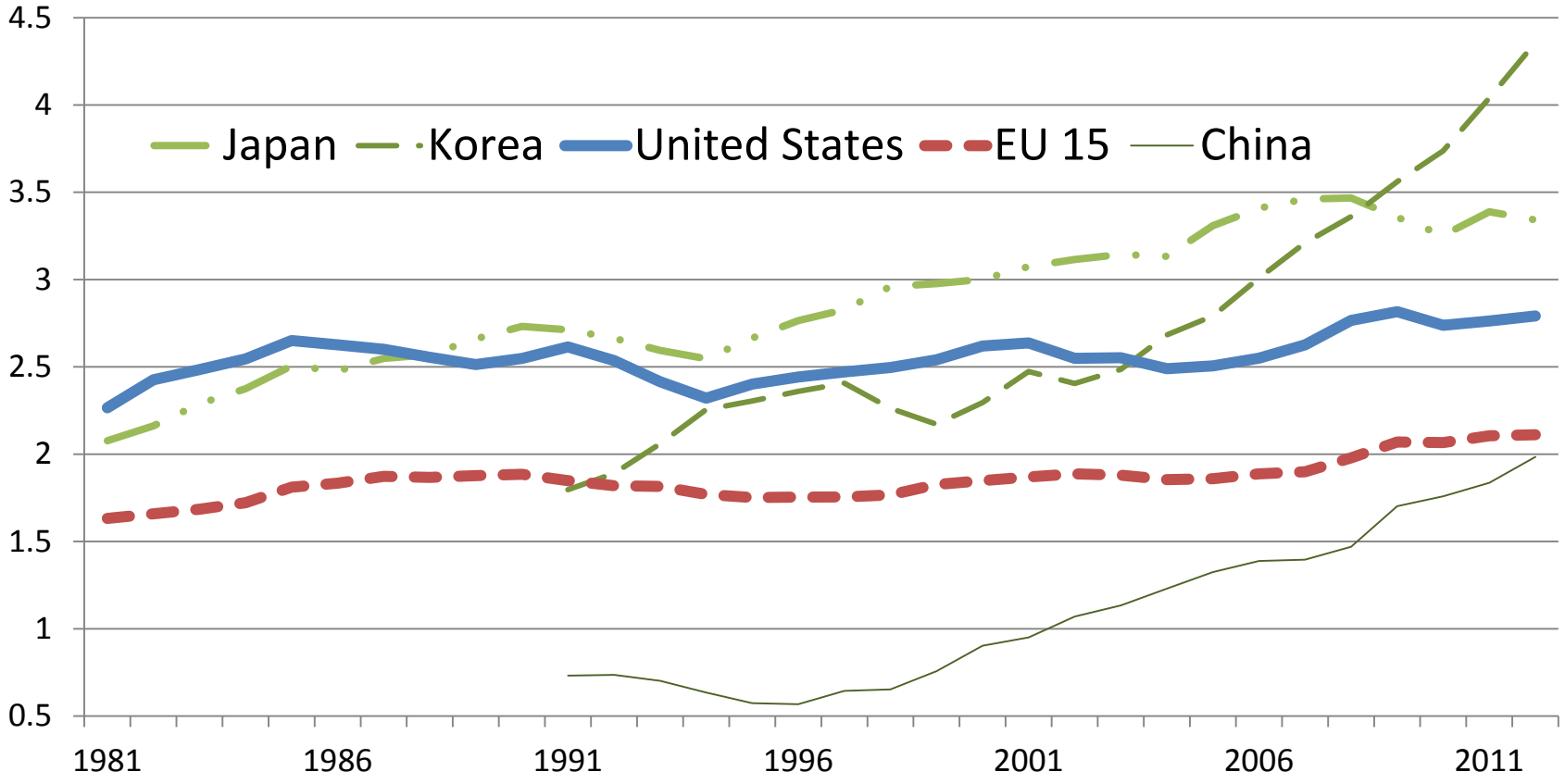
1. A broad look at the patterns of innovation internationally…

Gross expenditure on R&D 2012



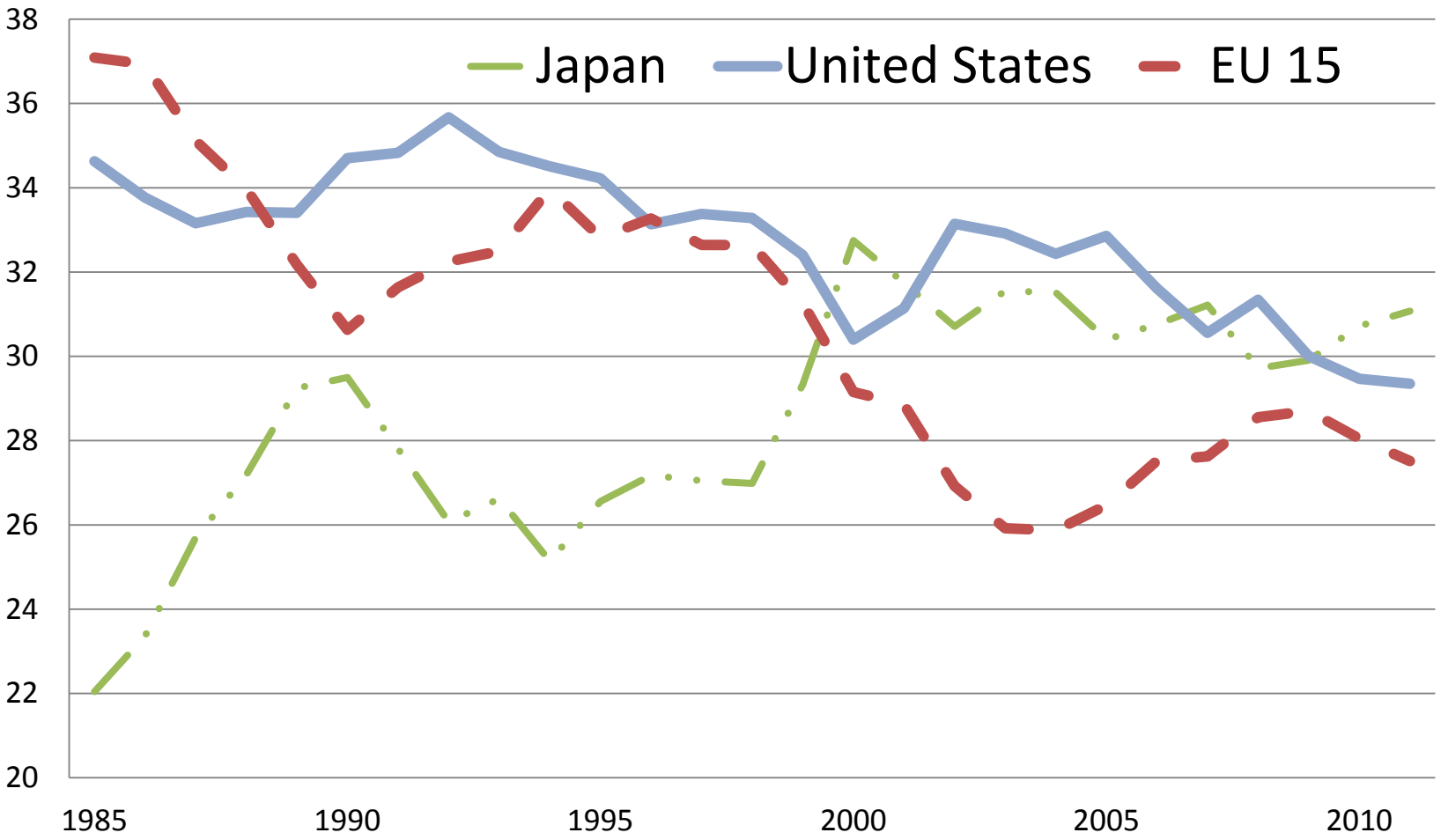
Note: shares are on world total.
Source: elaboration on OECD data.

Gross expenditure on R&D as % of GDP



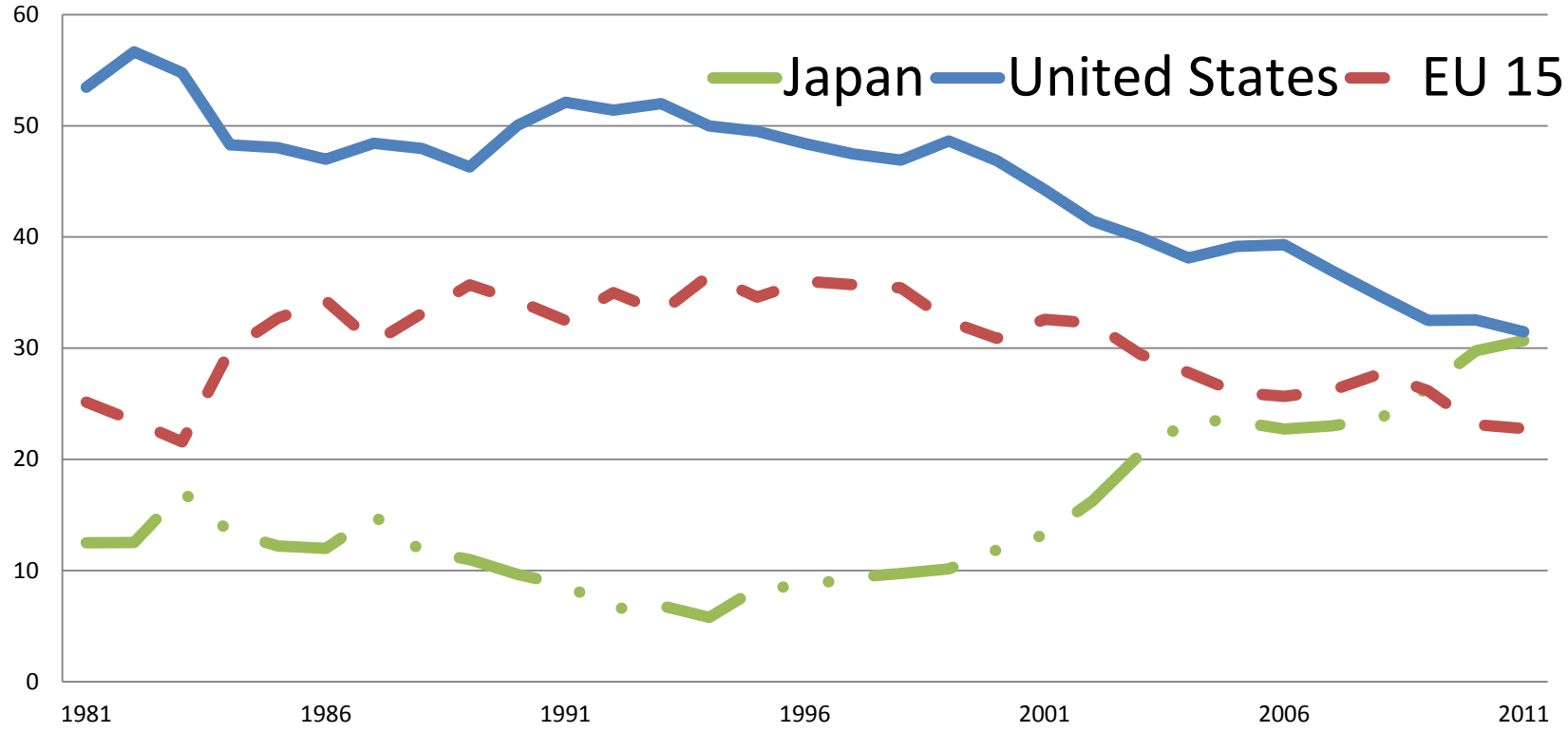
Source: elaboration on OECD data.

Share in "triadic" patents families (%)



Source: elaboration on OECD data.

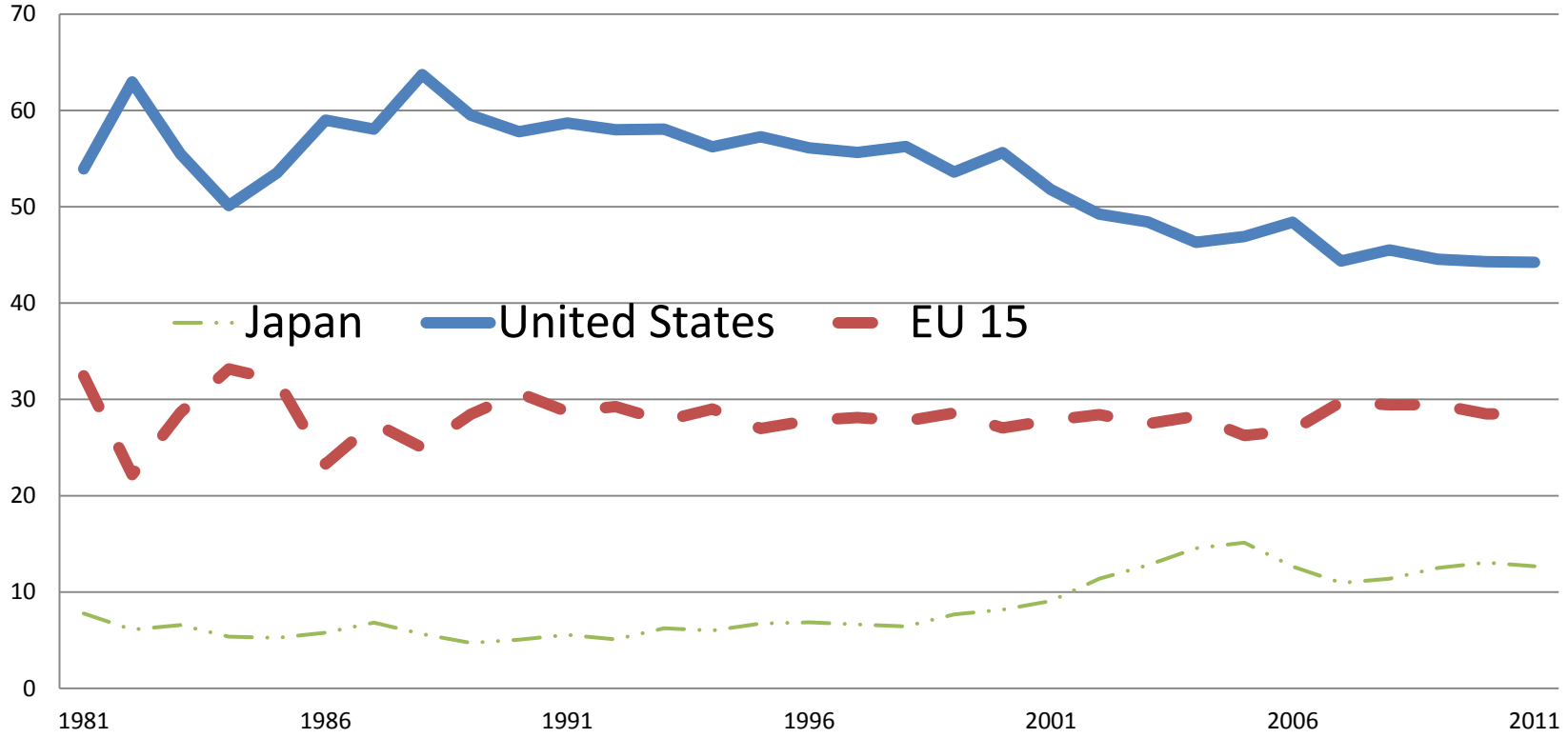
Share of patents in the ICT sector (%)



Note: shares are computed on OECD total.

Source: elaboration on OECD data.

Share (%) of patents in the biotech sector



Note: shares are computed on OECD total.

Source: elaboration o OECD data.

A broad look at the patterns of innovation… (cont.)

- The evidence pinpoint to continuing US leadership especially in ICT and newer technology paradigms and fast catch-up by Far Eastern countries

The European Paradox

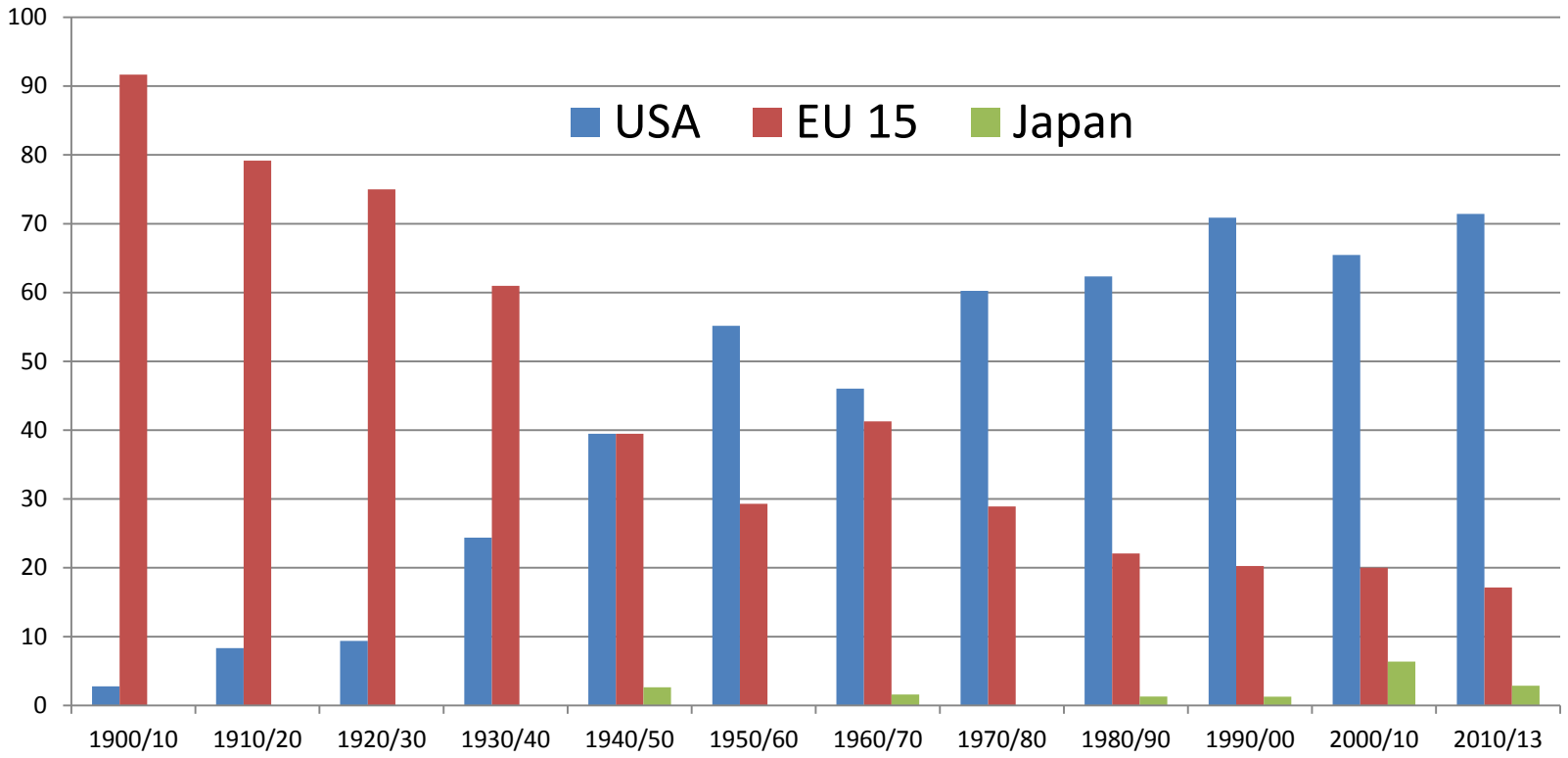
- Compared with the scientific performance of its principal competitors, that of the EU is excellent, but its technological and commercial performance in high-technology has deteriorated. One of Europe's major weaknesses lies in its inferiority in terms of transforming the results of technological research and skills into innovations and competitive advantages (EU, Green Paper on Innovation, 1995).
- European scientific publications cited in patents receive a lower average number of citations in scientific literature than the corresponding articles published by US authors. This evidence seems to suggest that high-quality European publications face more obstacles in translating into technological applications than comparable scientific output in the US (EU, Toward a European Research area - Key Figures 2007).

Dispelling a myth

- EU global excellence in science?

Share of Nobel prizes in science

(%, by affiliation of the recipient)



Source: elaboration on Nobel Foundation data.

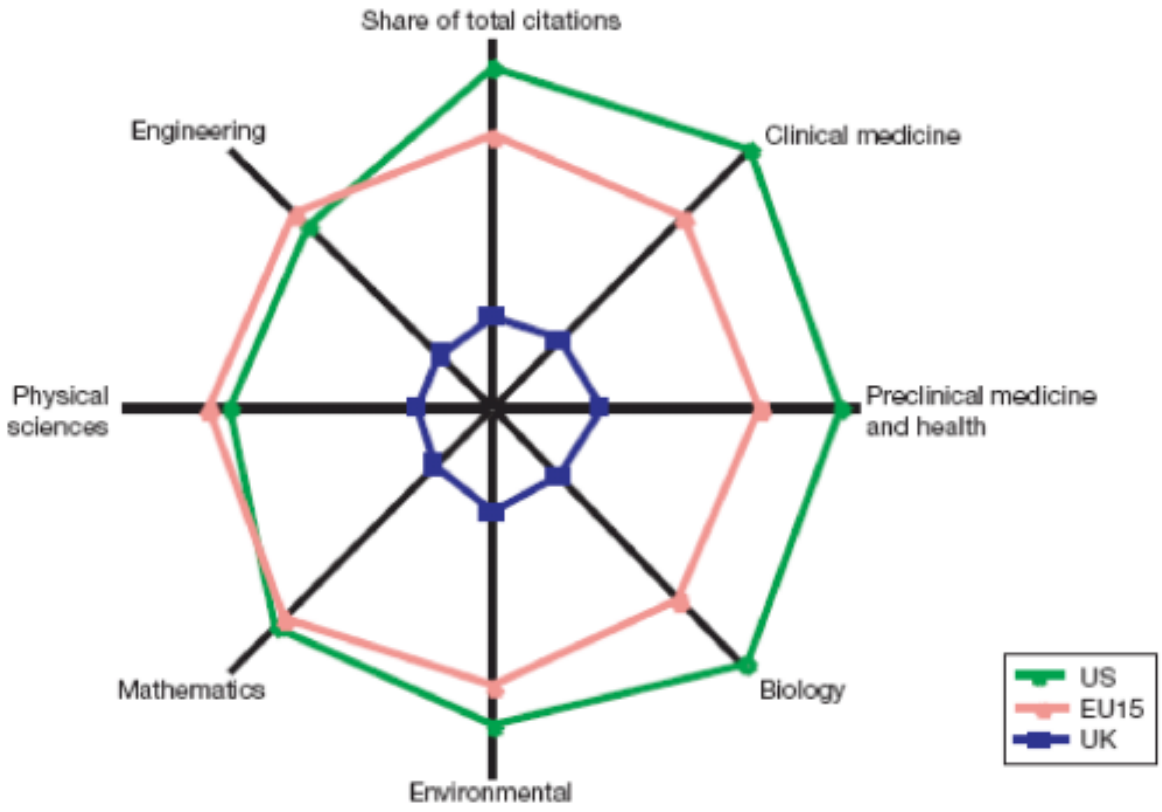
EU leadership in pubblications?

	$\frac{\text{Pubblications}}{Population}$	=	$\frac{\text{Publications}}{Researchers}$	×	$\frac{Researchers}{Population}$
US	**4.64**		**6.80**		**0.68**
EU-15	**3.60**		**4.30**		**0.84**
	$\frac{\text{Citations}}{Population}$	=	$\frac{\text{Citations}}{Researchers}$	×	$\frac{Researchers}{Population}$
US	**39.75**		**58.33**		**0.68**
EU-15	**23.03**		**27.52**		**0.84**
	$\frac{\text{Top1\%publications}}{Population}$	=	$\frac{\text{Top1\%publications}}{Researchers}$	×	$\frac{Researchers}{Population}$
US	**0.09**		**0.13**		**0.68**
EU-15	**0.04**		**0.04**		**0.84**

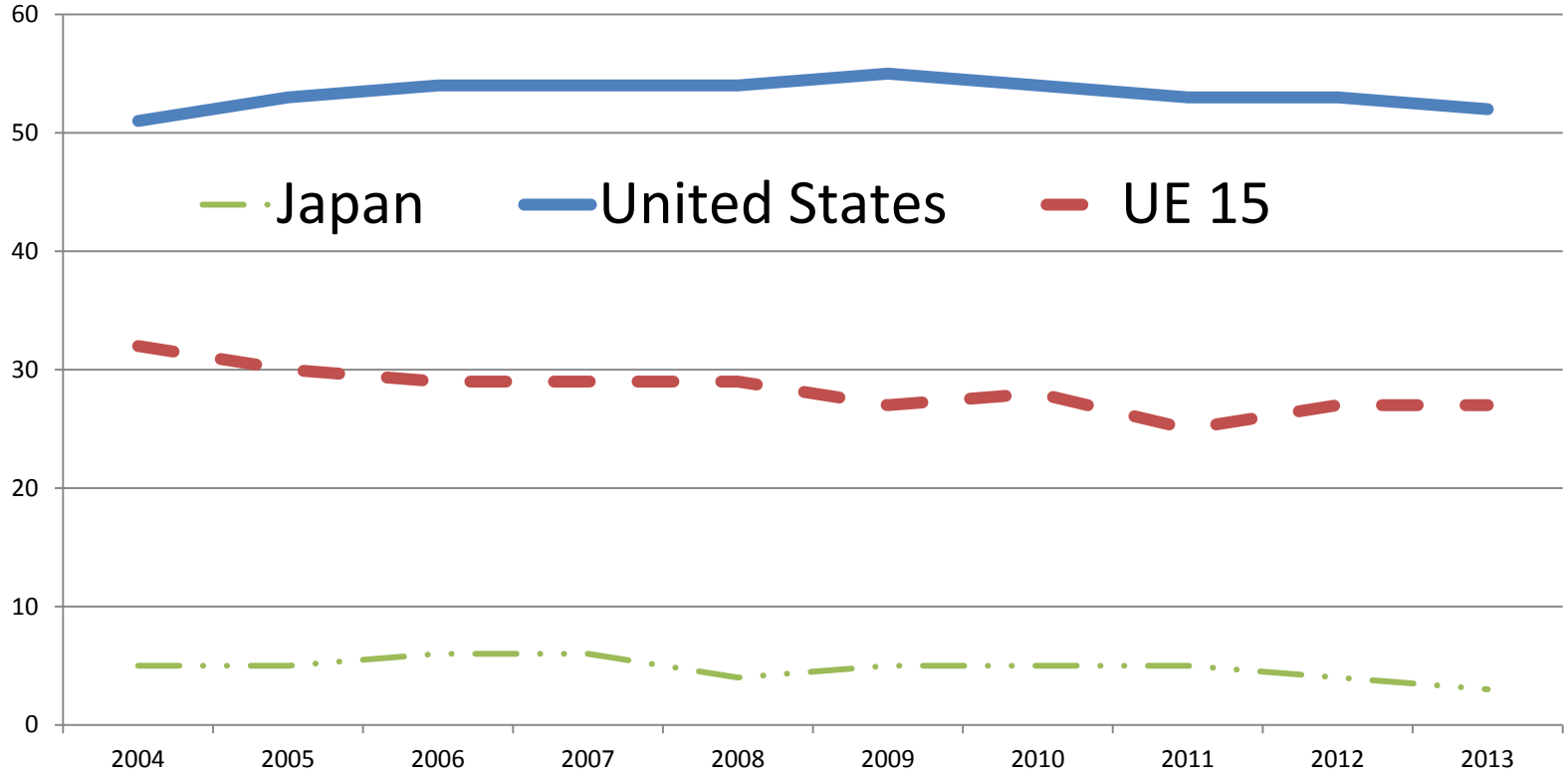
Notes: Our calculations based on numbers reported by King (2004) and OECD (2004). Number of publications, citations and top 1% publications refers to 1997-2001. Population (measured in thousands) and number of university researchers (measured in full time equivalent) refer to 1999.

A few sectoral outliers

Figure 1: **Strengths in different disciplines**



Universities in the “Shanghai ranking” (number of top 100)



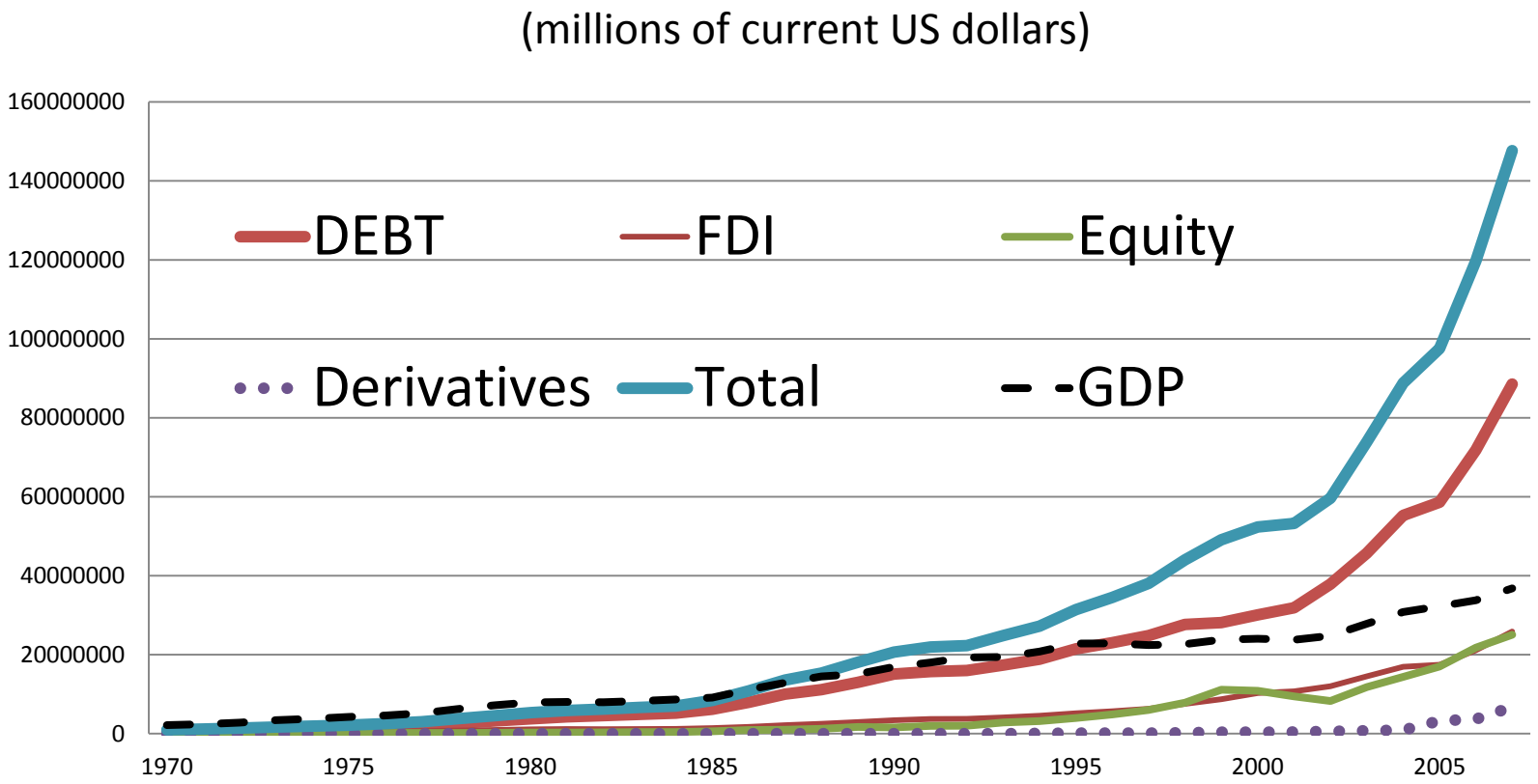
Source: elaboration on ARWU (Shangai) ranking.

- Innovation (and science) still largely non-globalized, but occurring in highly globalized economies

2 Globalization and its consequences

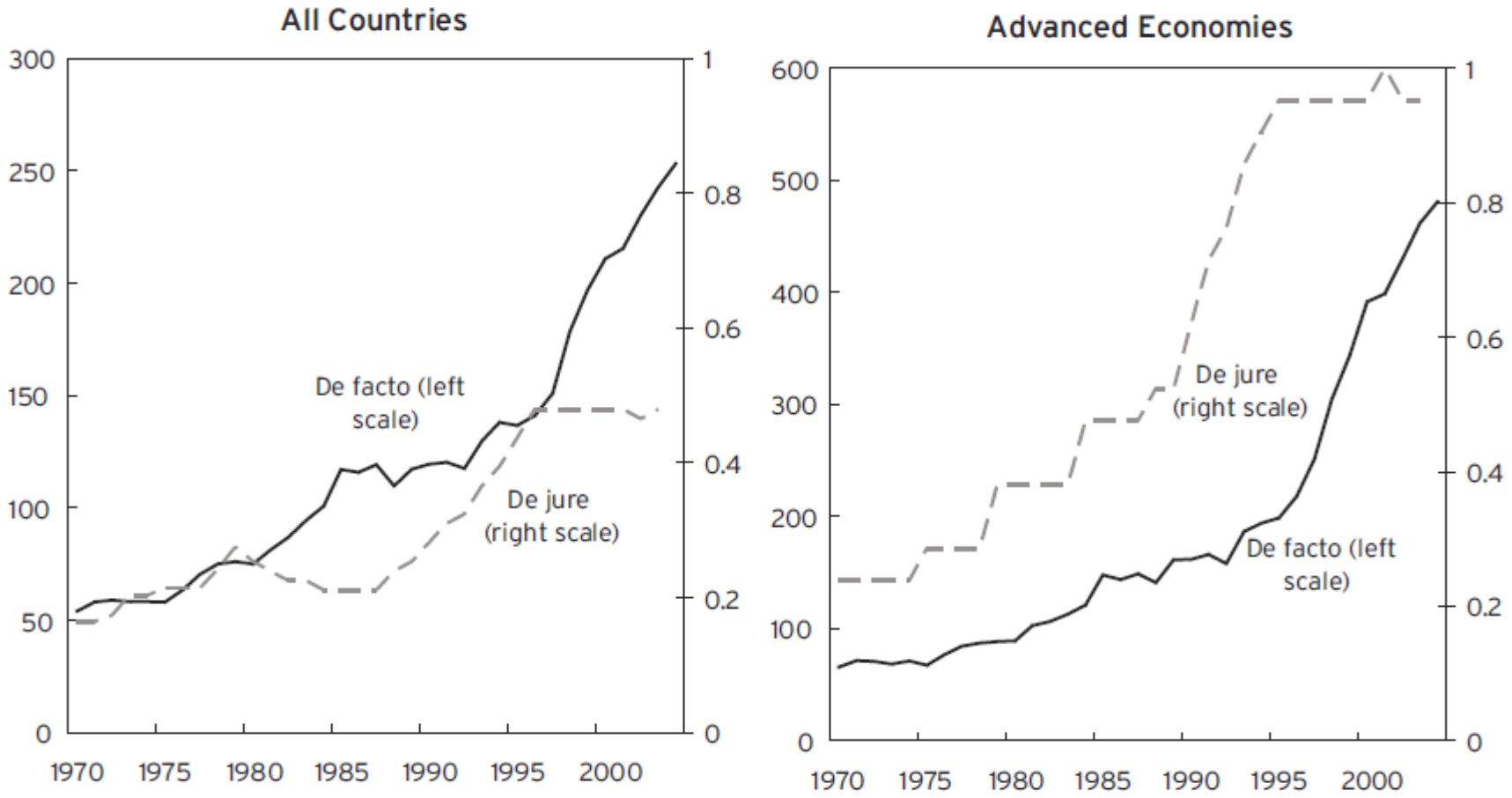
- Financial globalization and the weakening of policy setting power of States

Gross international financial assets of advanced countries



Source: updated and extended version of the database developed by Lane and Milesi-Ferretti (2007).

The evolution of international financial integration



Notes: This figure shows unweighted cross-country averages, within each group, of two measures of capital account openness. The time period of analysis is 1970-2004. The de jure measure is based on the IMF 0-1 capital account restrictiveness classification, with 1 representing countries that have open capital accounts. The de facto measure is based on the ratio of gross stocks of foreign assets and liabilities to GDP (in percent), with the raw data taken from Lane and Milesi-Ferretti (2006).

Source: Kose, Prasad, Rogoff and Wei (2009)

Globalization and the real economy

- Obviously, increase shares of current trade balances and current accounts on GDP
- But also lower "equilibrium" rates of growth consistent with foreign trade balances
- The weakening of the manufacturing base in the US and Europe

Imports and exports in goods and services

(% of GDP)

	1995	2000	2005	2008	2009
Japan	**30**	**28**	**31**	**38**	**30**
United States	**21**	**24**	**24**	**28**	**23**
EU 27	**21**	**20**	**26**	**33**	**27**
Germany	*58*	*51*	*70*	*88*	*73*
France	*55*	*46*	*59*	*69*	*55*
United Kingdom	*54*	*51*	*58*	*66*	*53*
Italy	*44*	*39*	*55*	*66*	*51*

Source: elaboration on OECD data.

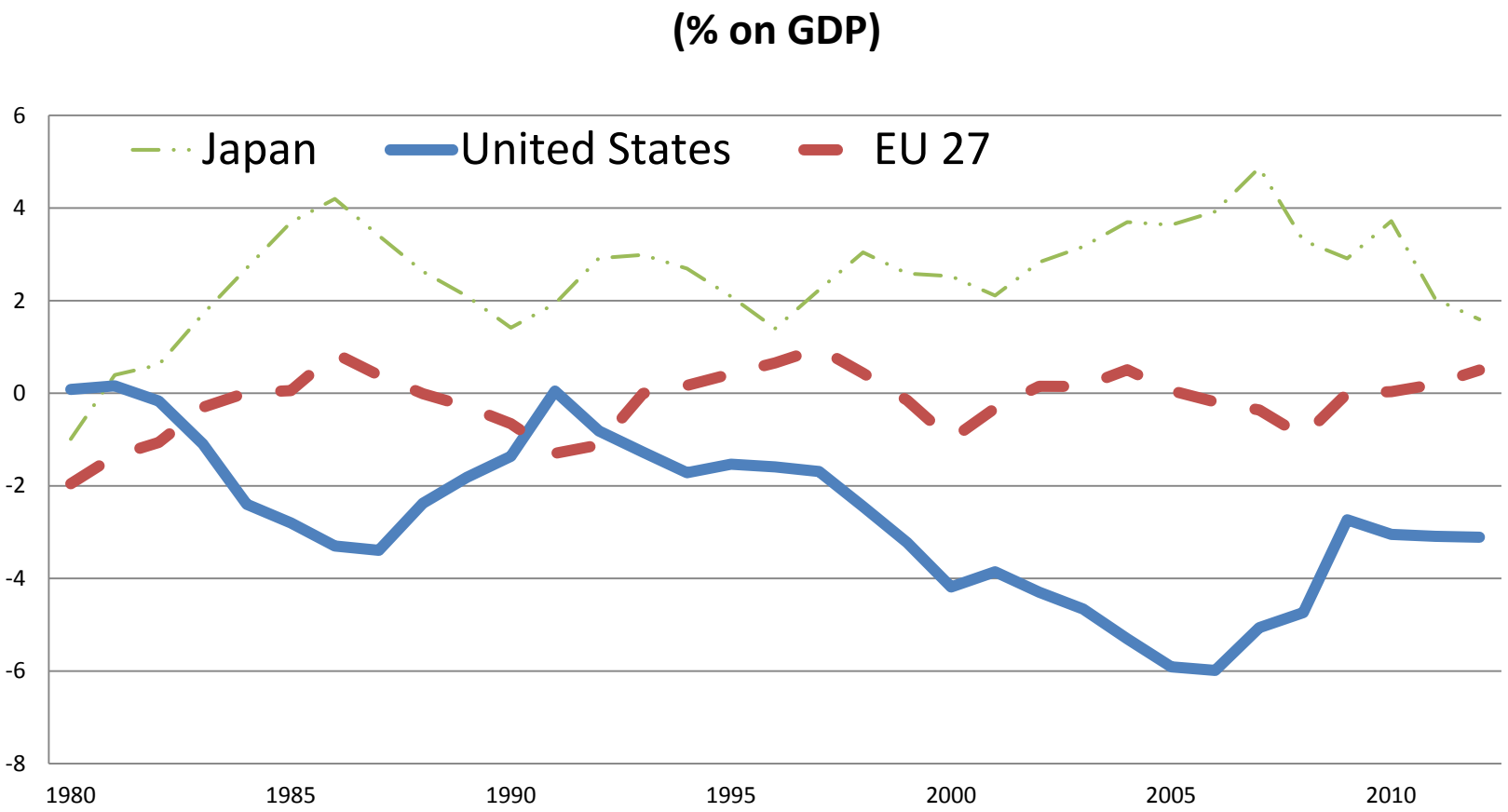
Balance of trade

(% of GDP)

	1995	2000	2005	2008	2009
Japan	**3**	**2**	**2**	**0**	**0**
United States	**-1**	**-4**	**-6**	**-5**	**-3**
EU 27	**2**	**0**	**1**	**0**	**1**
Germany	*1*	*0*	*6*	*7*	*6*
France	*2*	*1*	*-1*	*-3*	*-2*
United Kingdom	*0*	*-2*	*-4*	*-3*	*-2*
Italy	*4*	*1*	*0*	*-1*	*0*

Source: elaboration on OECD data.

Current account balance



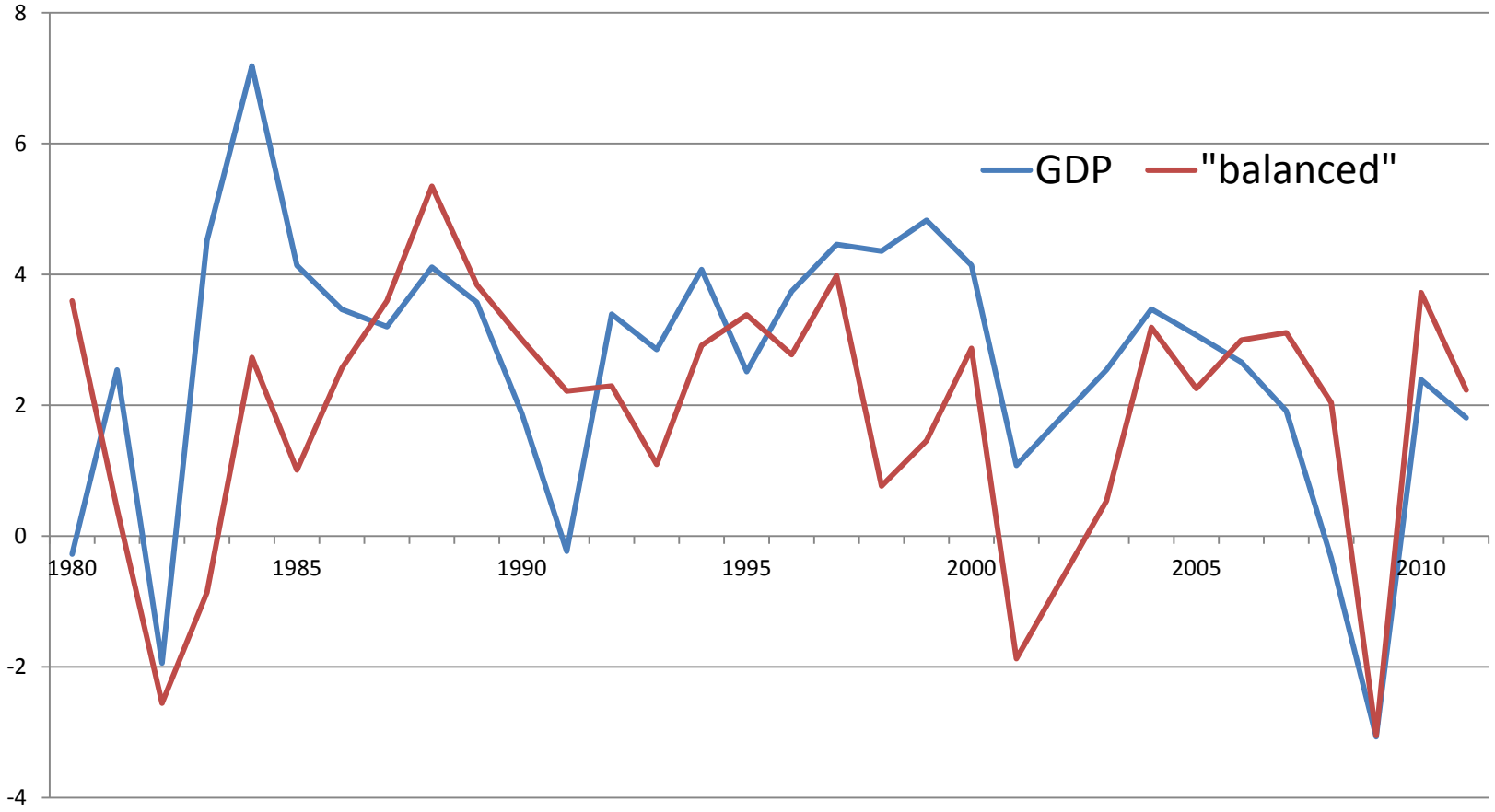
Source: IMF

The balance of payment (consistent with) equilibrium growth rate

- Assume *X=M*
- In a growing economy *gx=gm*
- If (among other things) import demand is a function of domestic income $M=Y^{\pi}$(where πisthe income elasticity of demand for imports)
- The «balanced» rate of growth becomes
  - *gy=gx*/π

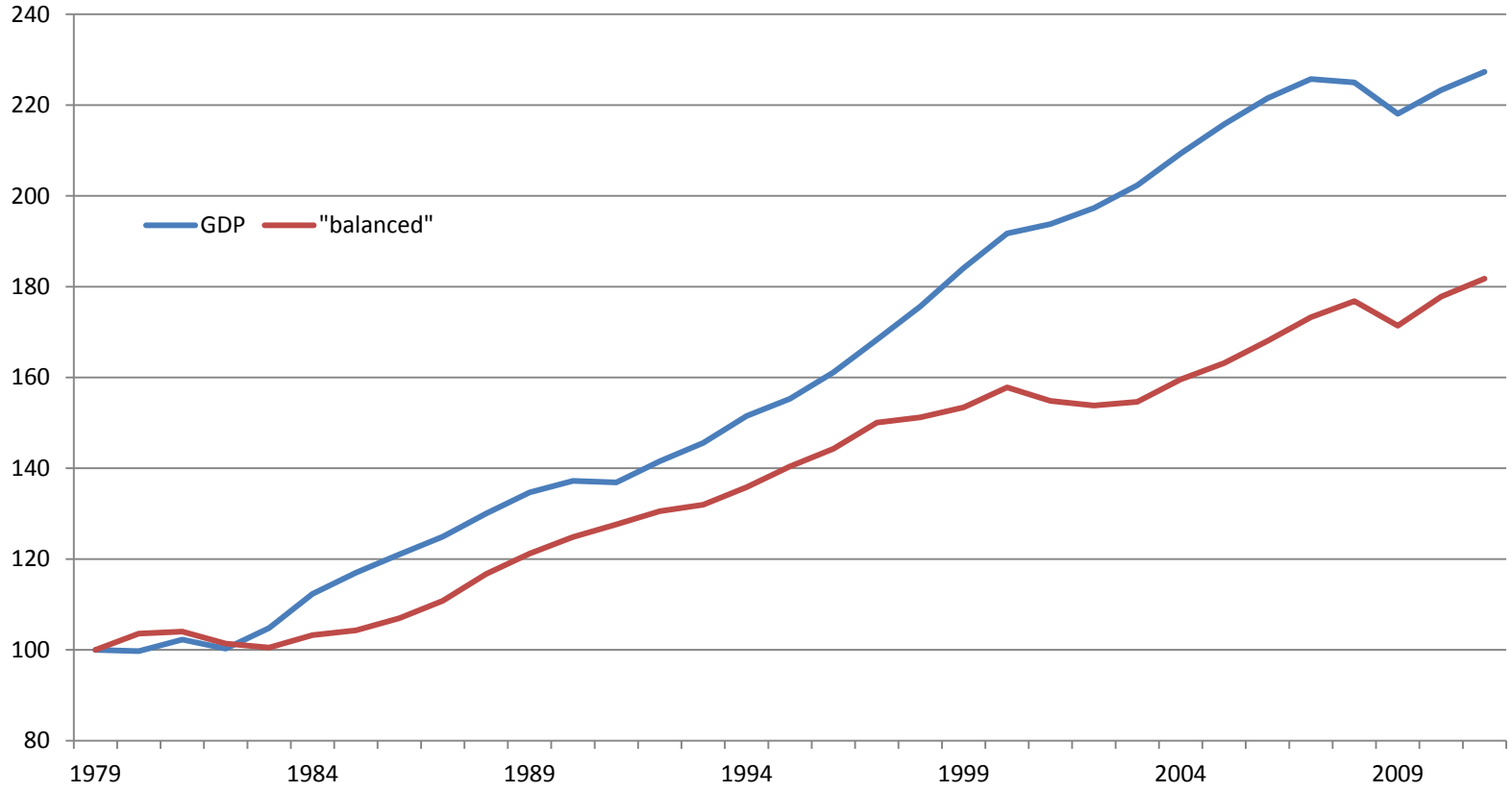
United States

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



Source: authors' calculation on IMF data.

United States
(GDP growth and predicted growth rates from the Harrod Trade Multiplier, 1979=100)



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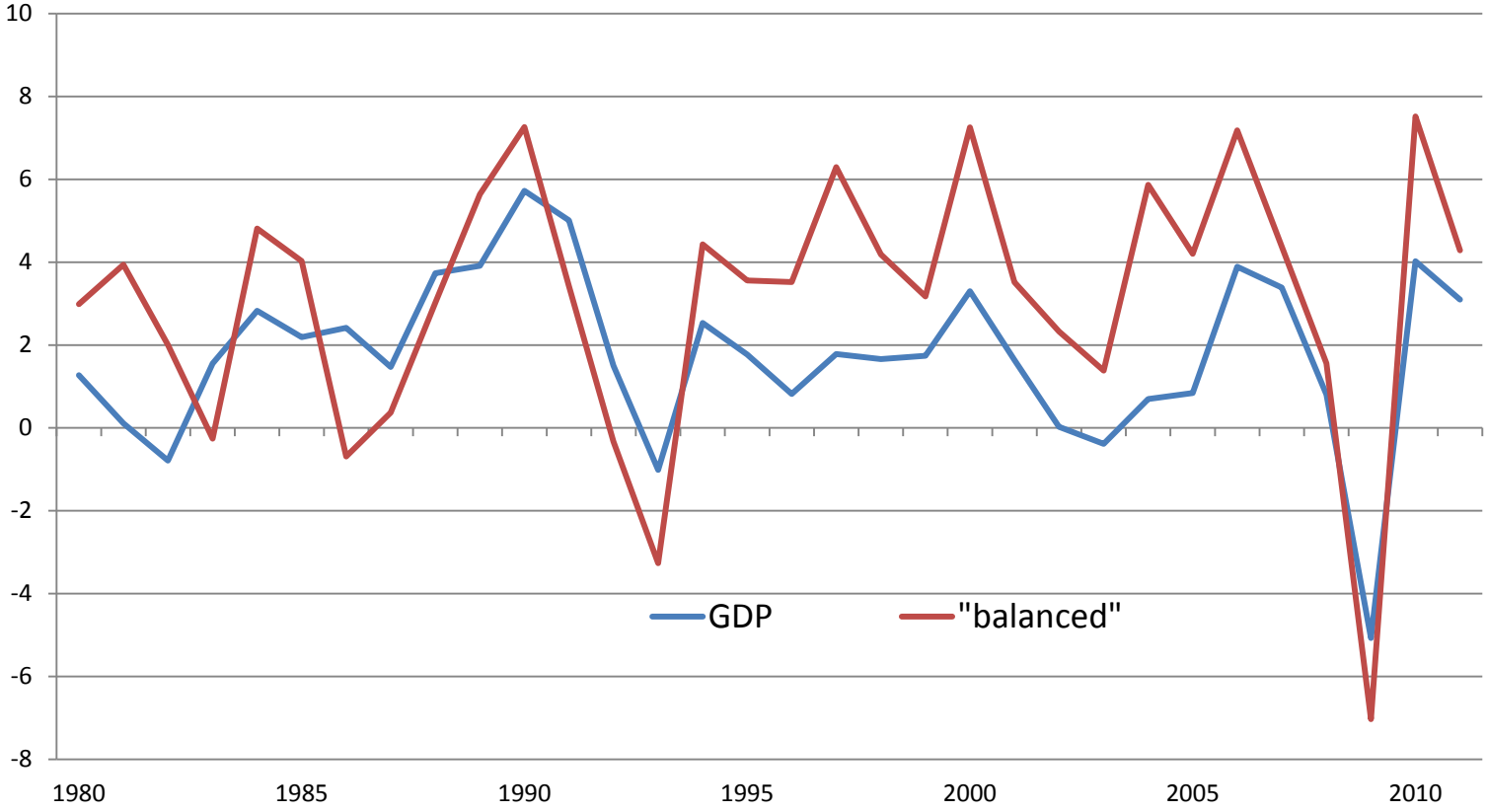
Germany

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



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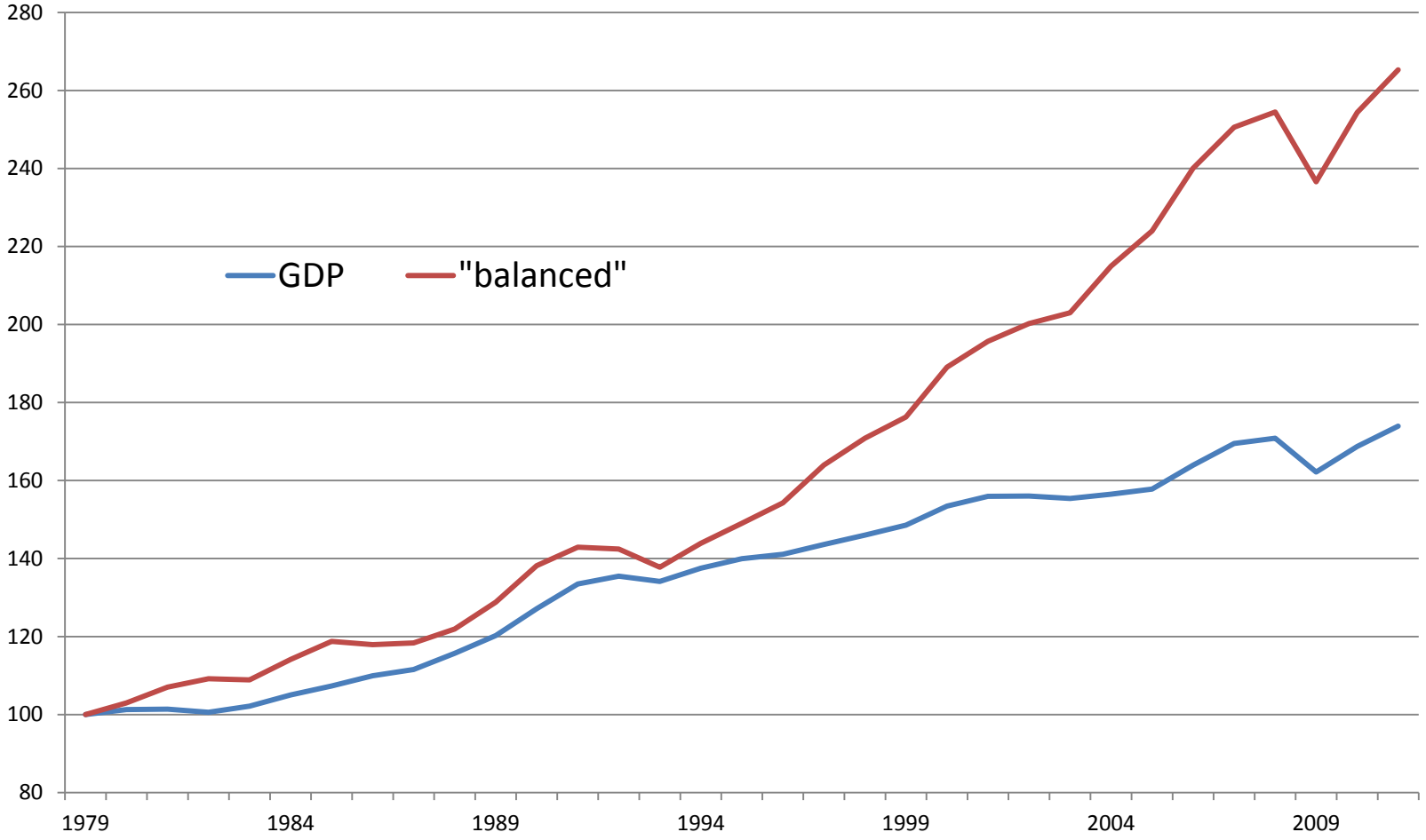
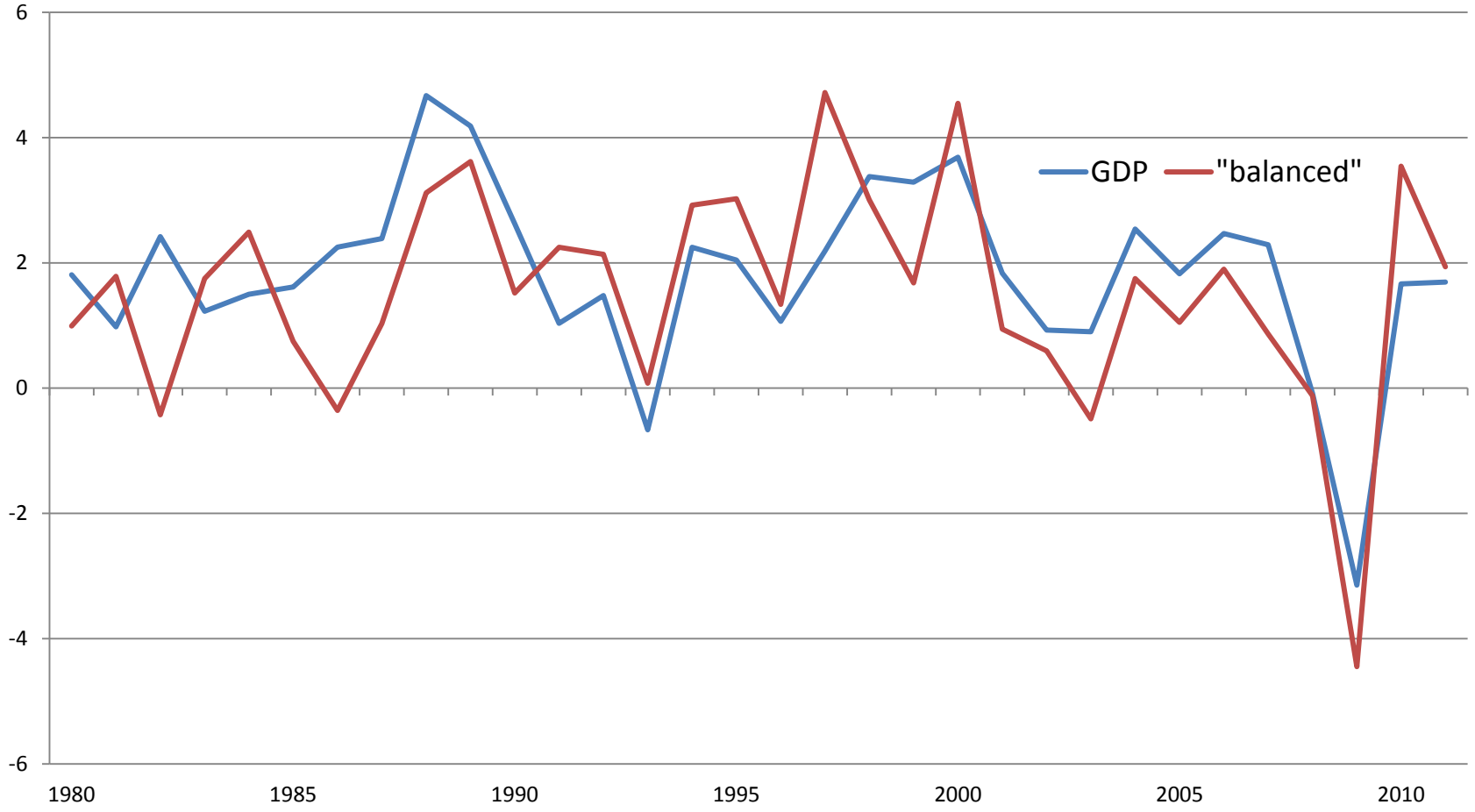


Source: authors' calculation on IMF data.

France

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



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France
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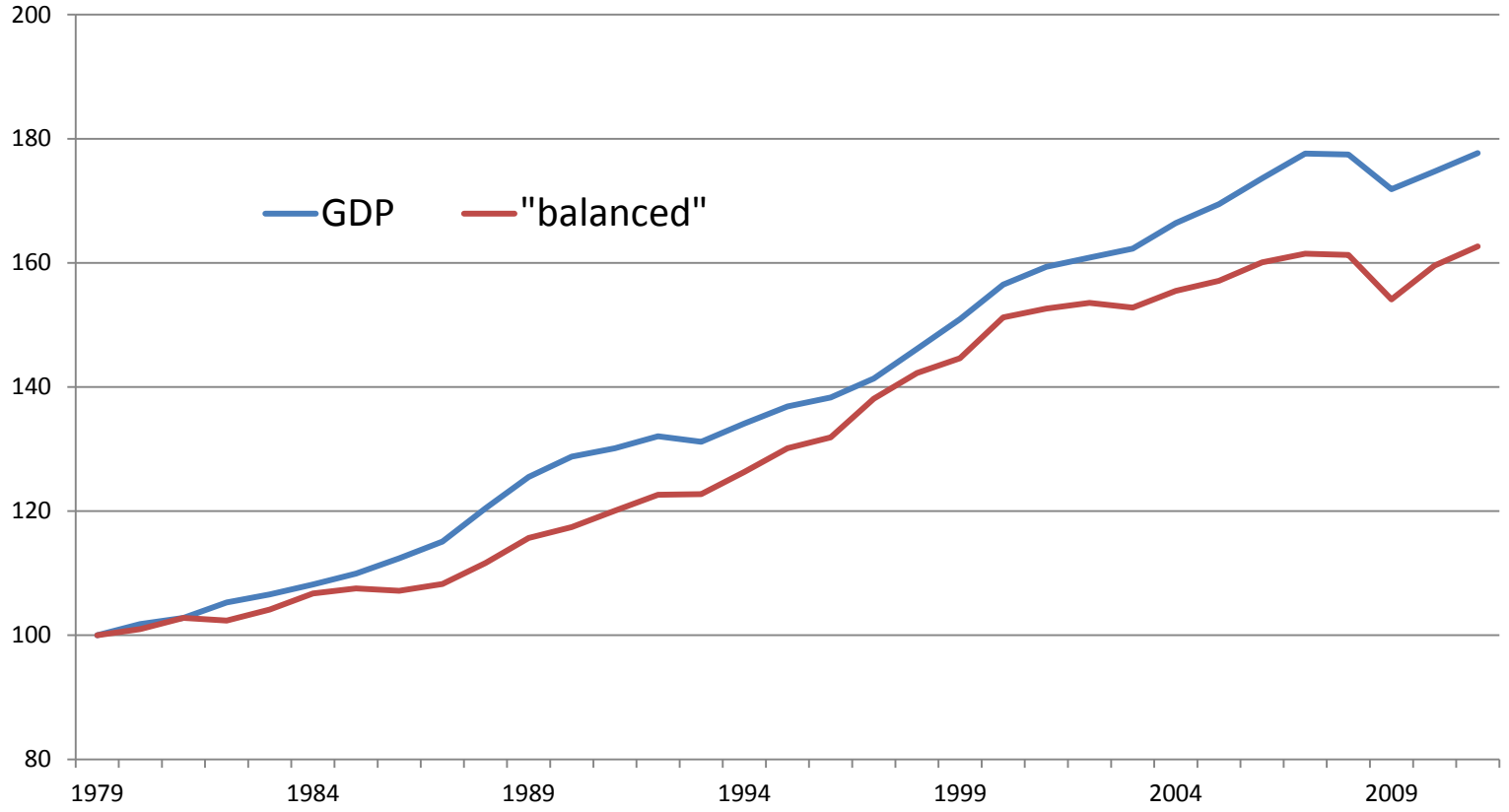
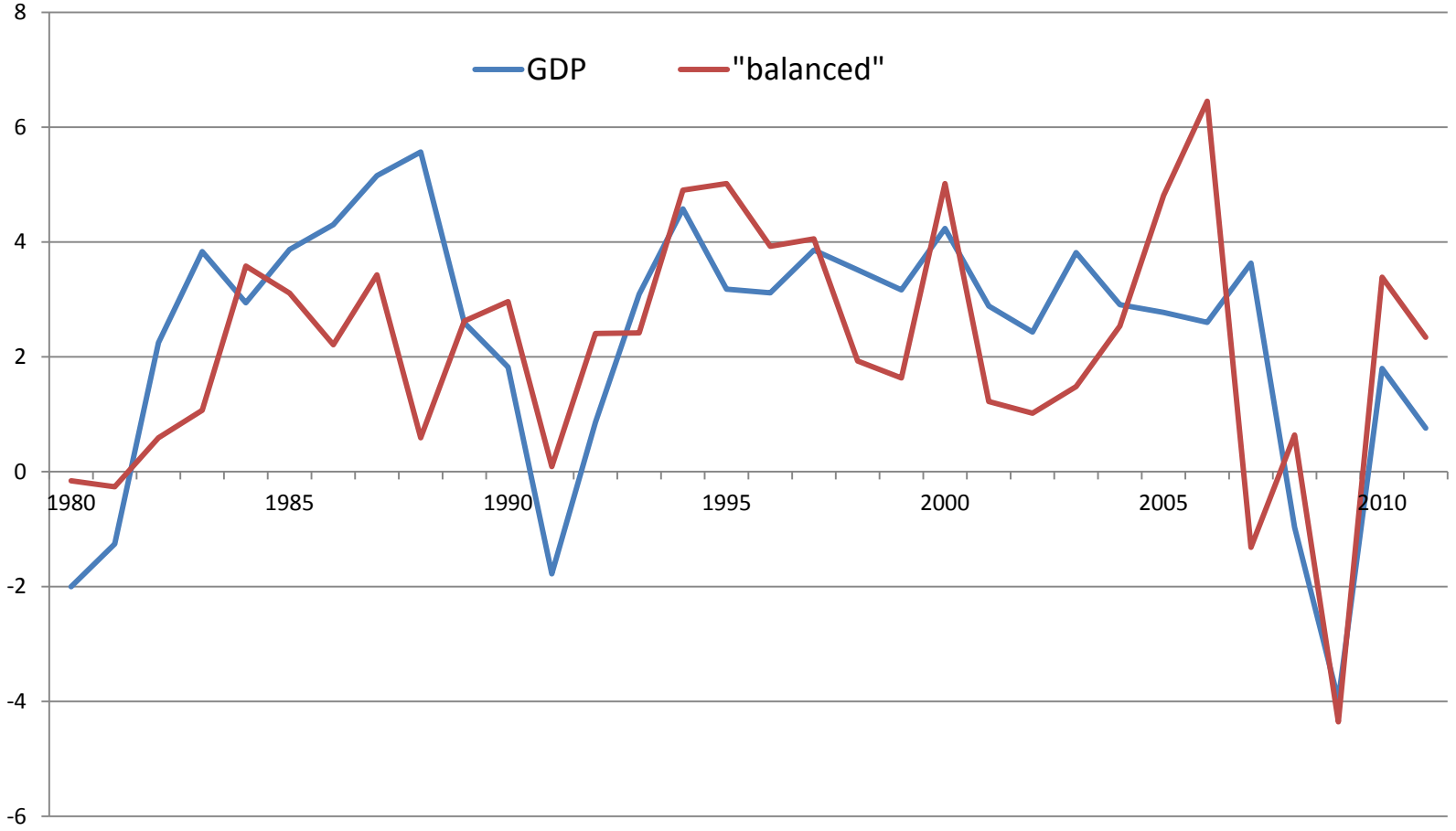


Source: authors' calculation on IMF data.

United Kingdom

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



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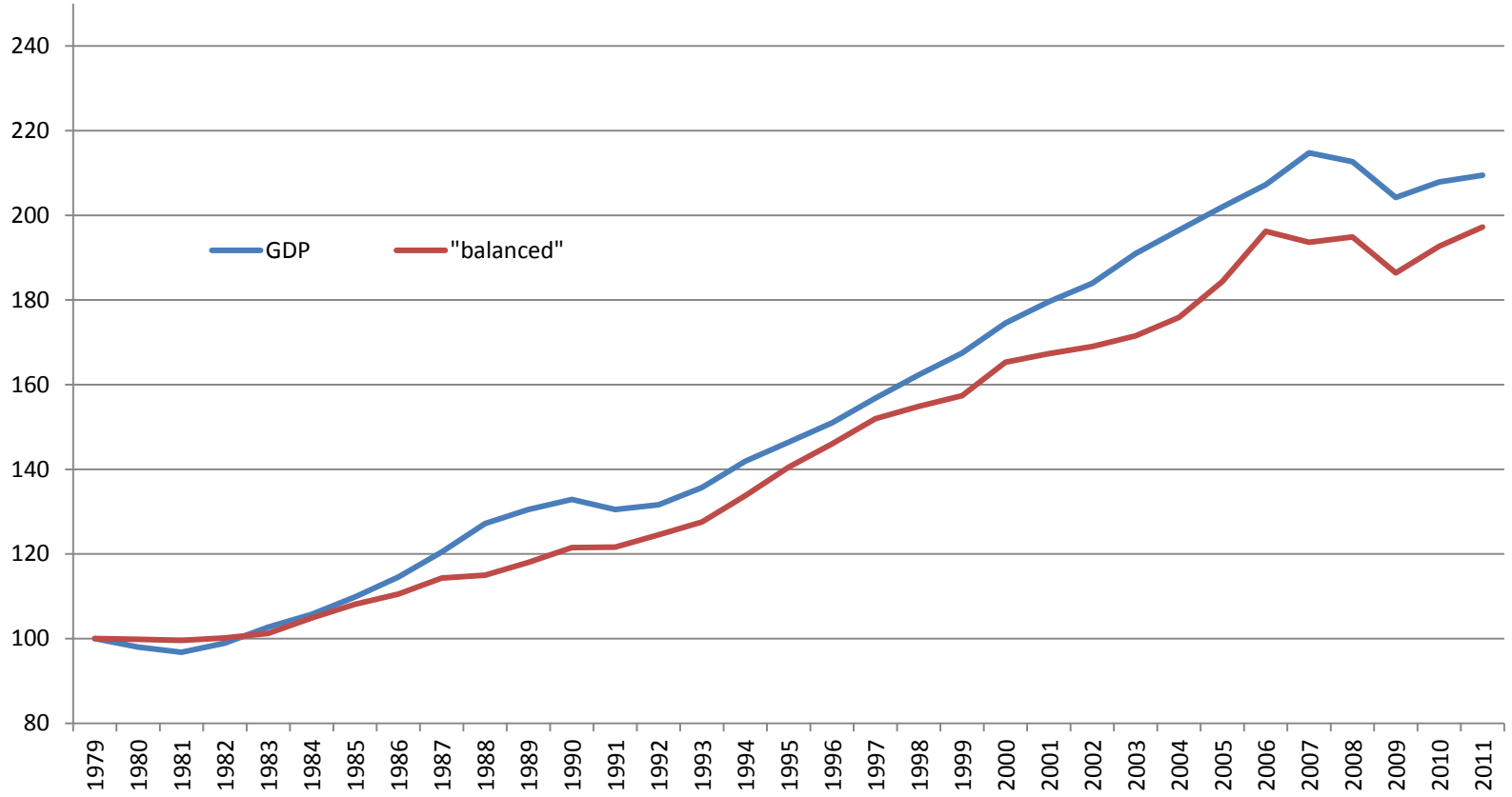
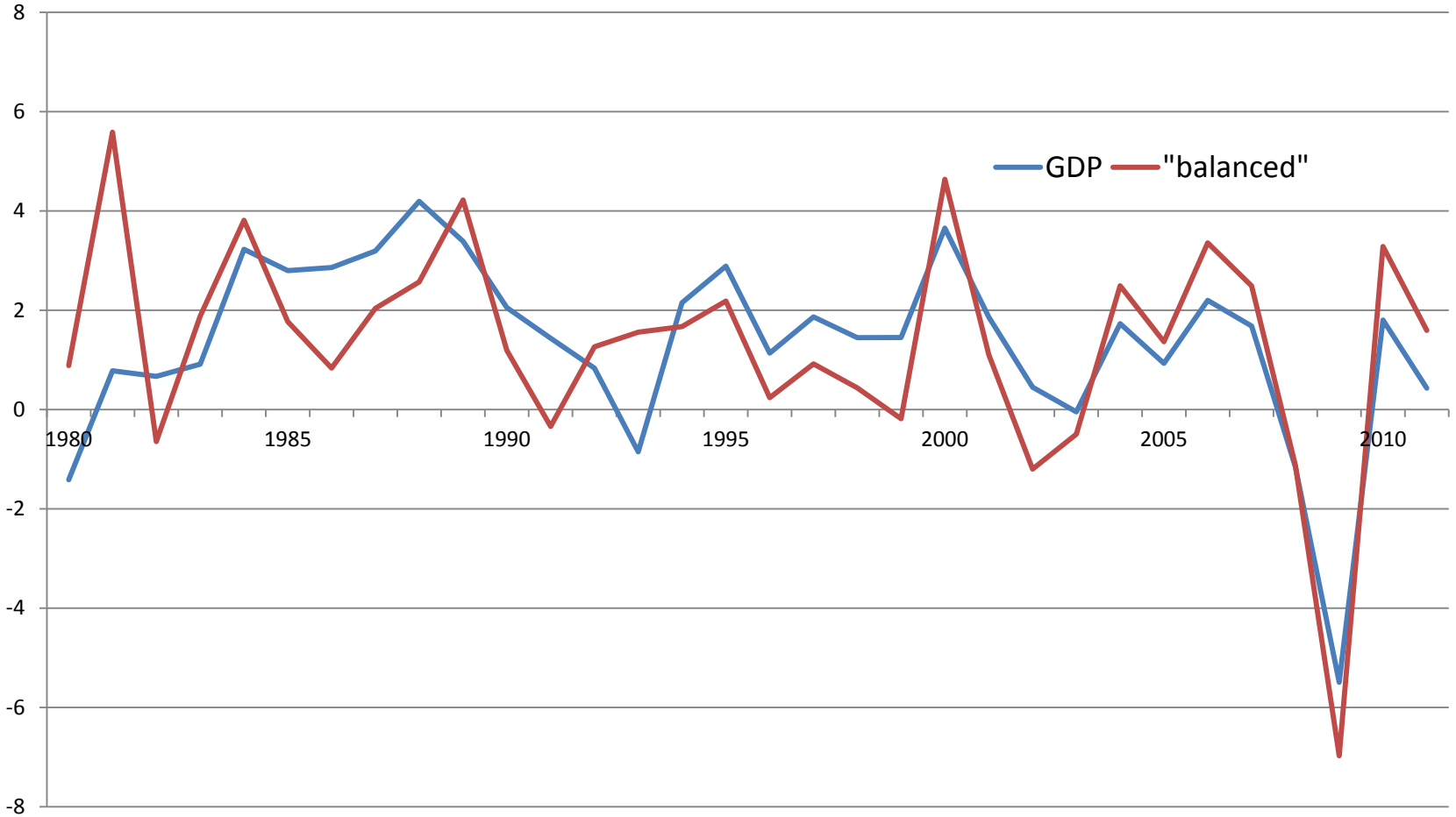


Source: authors' calculation on IMF data.

Italy

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



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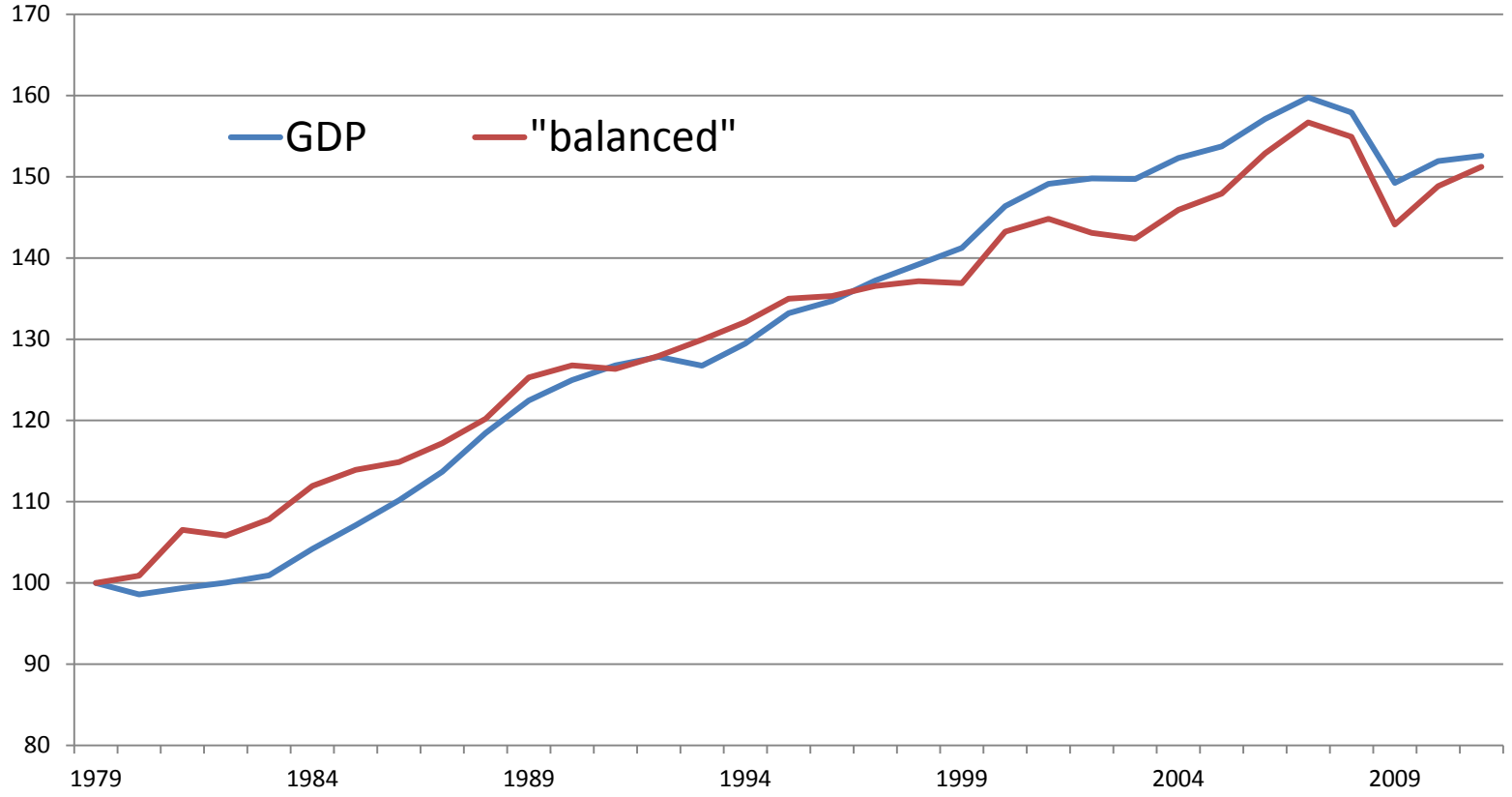
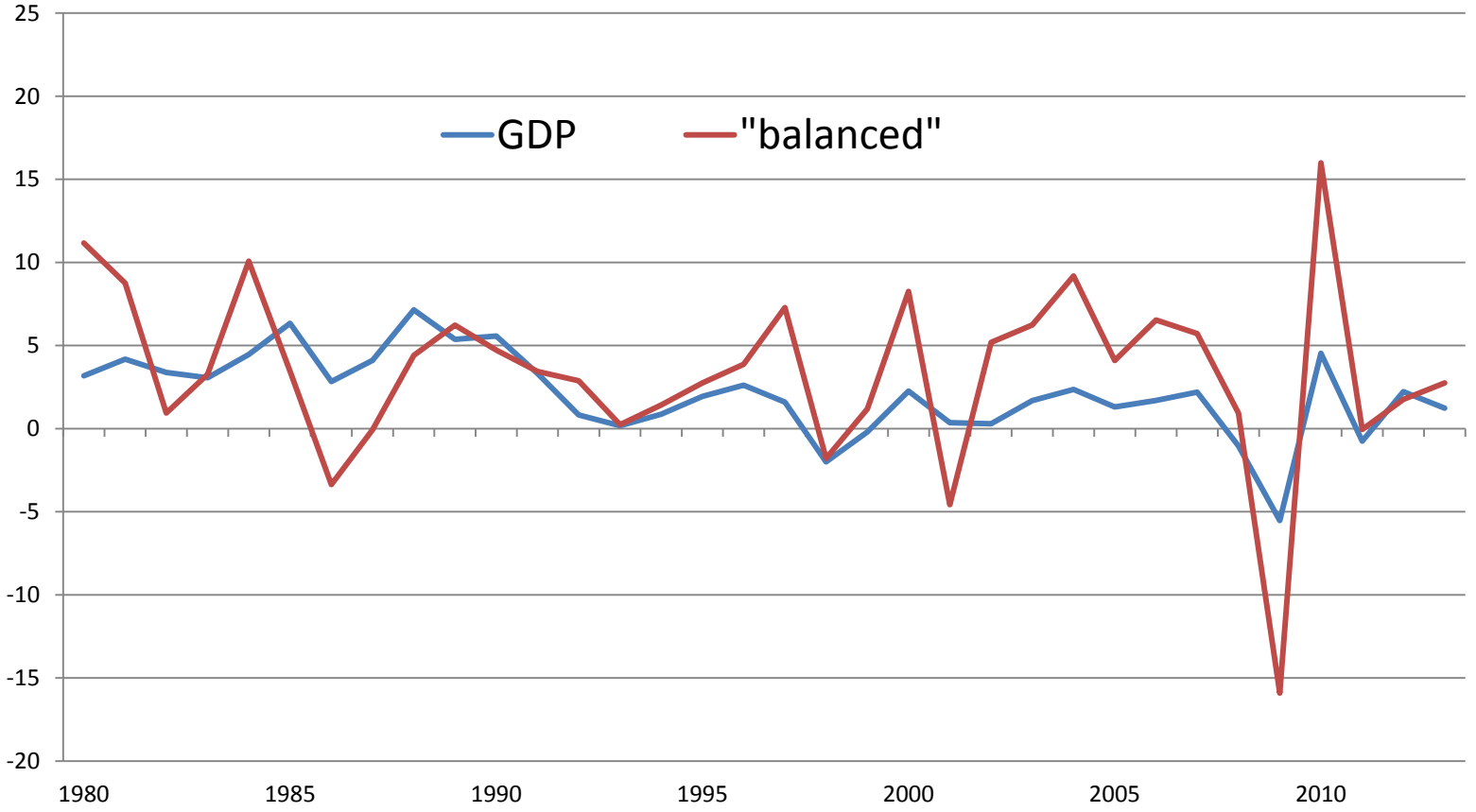


Source: authors' calculation on IMF data.

Japan

(GDP growth and predicted growth rates from the Harrod Trade Multiplier)



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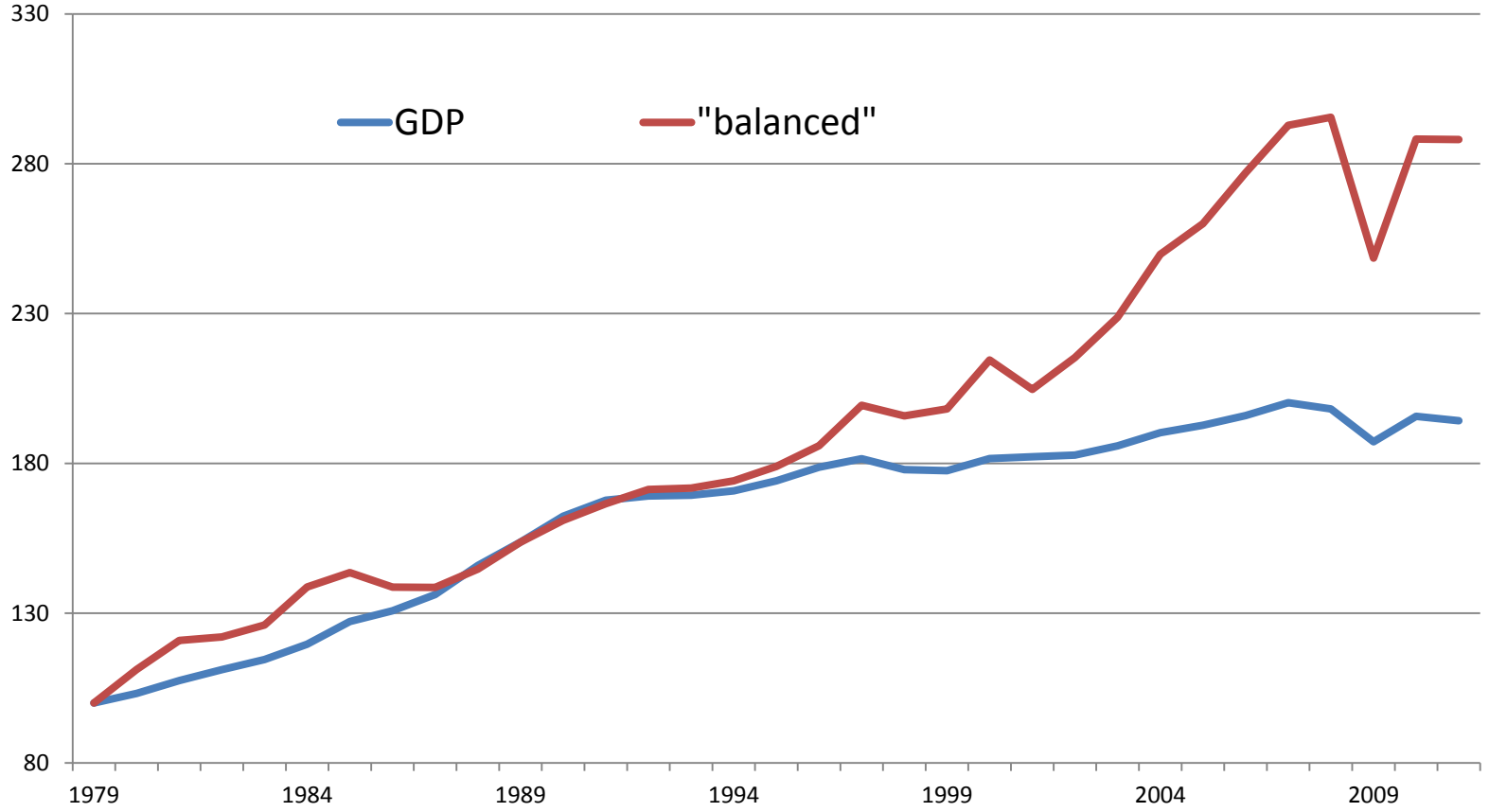
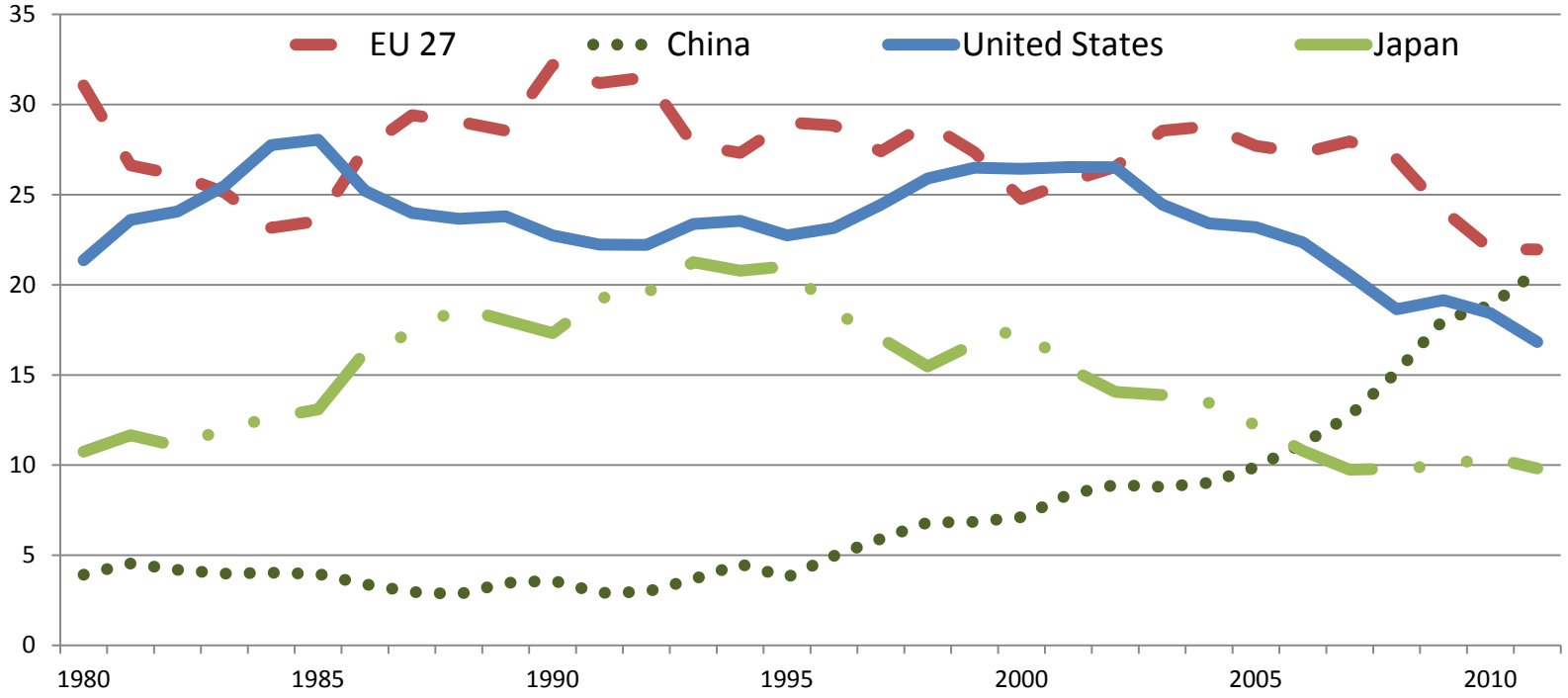


Source: authors' calculation on IMF data.

Manufacturing value added

(% of world v.a. in manufacturing)



Source: elaboration on UN data.

Manufacturing Value added
(% growth rates, constant 2005 prices in US $)

	1970's		1980's		1990's		2000's		2011
	annual averages	cumulate	annual averages	cumulate	annual averag	cumulate	annual averages	cumulate	
China	9,5	143,3	9,7	149,1	14,0	266,8	12,8	231,3	9,7
WORLD	3,5	40,7	2,9	32,8	2,8	32,1	3,2	35,4	3,8
United States	1,8	18,0	2,6	28,0	3,9	45,5	2,0	19,7	2,2
Japan	4,4	52,5	4,8	59,9	0,9	8,6	1,7	13,8	-4,1
Germany	1,8	18,3	1,7	18,3	0,8	7,5	1,6	11,3	8,3
EU 27	3,1	35,0	2,0	21,1	1,7	17,8	1,0	8,2	4,6
France	3,4	39,4	1,1	11,6	2,2	23,5	0,1	0,7	0,8
Spain	4,8	58,4	2,2	23,9	2,4	25,8	-0,5	-6,0	2,9
United Kingdom	1,3	12,5	2,0	20,7	0,9	9,3	-0,8	-8,3	2,1
Italy	6,3	81,6	2,2	24,3	1,3	13,7	-0,7	-8,9	1,2
Source: United Nations.									

What is so special about manufacturing?

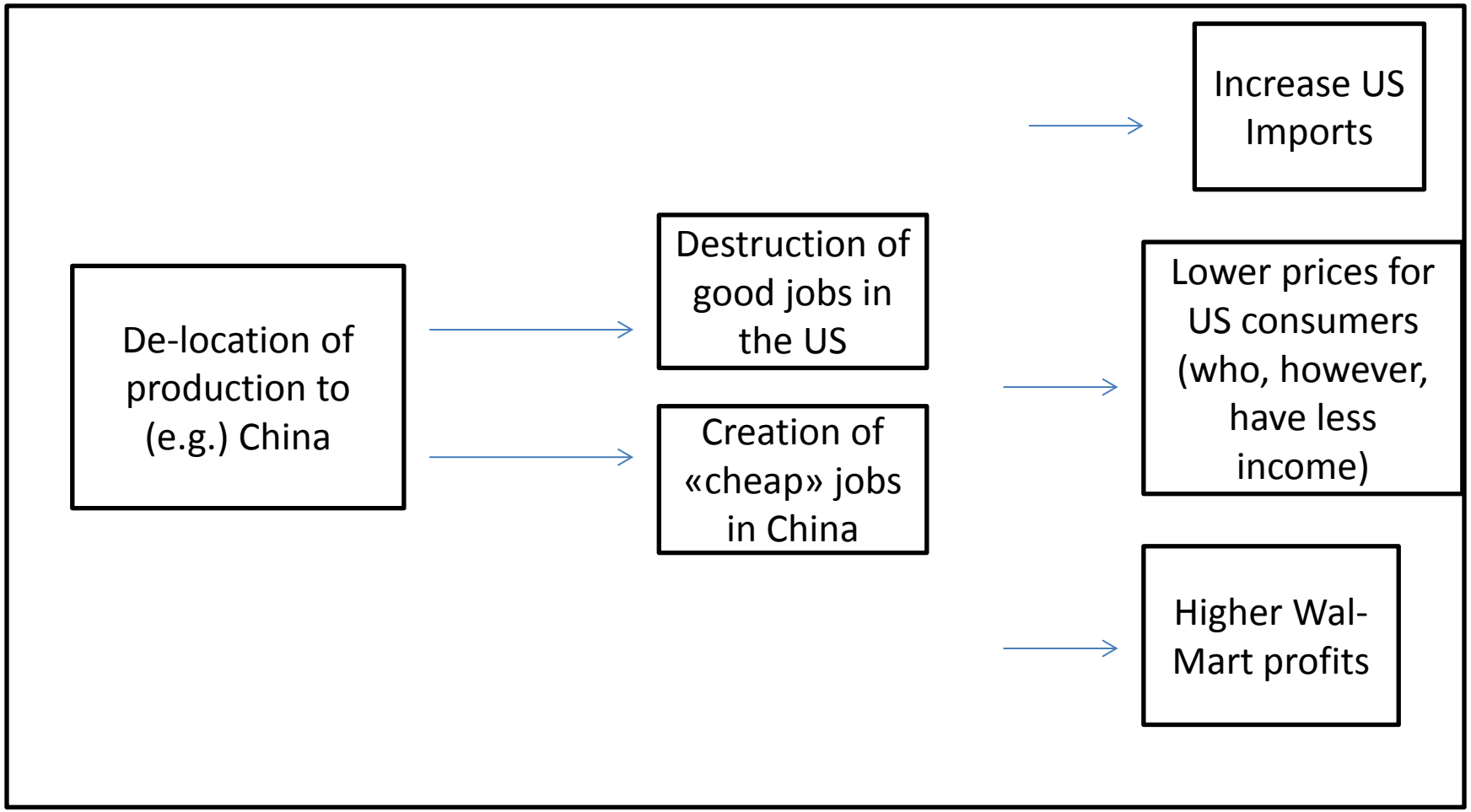
- Innovation opportunities
- Dynamic increasing returns
- Large base of decent jobs and the relatively egalitarian and inclusive society
- Crucial contribution to foreign accounts

Most R&D activity is in manufacturing

(2009)

	% R&D manufacturing	% VA manifacturing	R&D intesity manufacturing
Germany	**89**	23	8
Japan	**87**	18	11
Italy	**70**	16	3
United States	**70**	13	11
France	**59**	12	10
Spain	**44**	13	3
United Kingdom	**39**	12	7
Source: OECD			

The Wal-Mart archetype



The Wal-Mart archetype

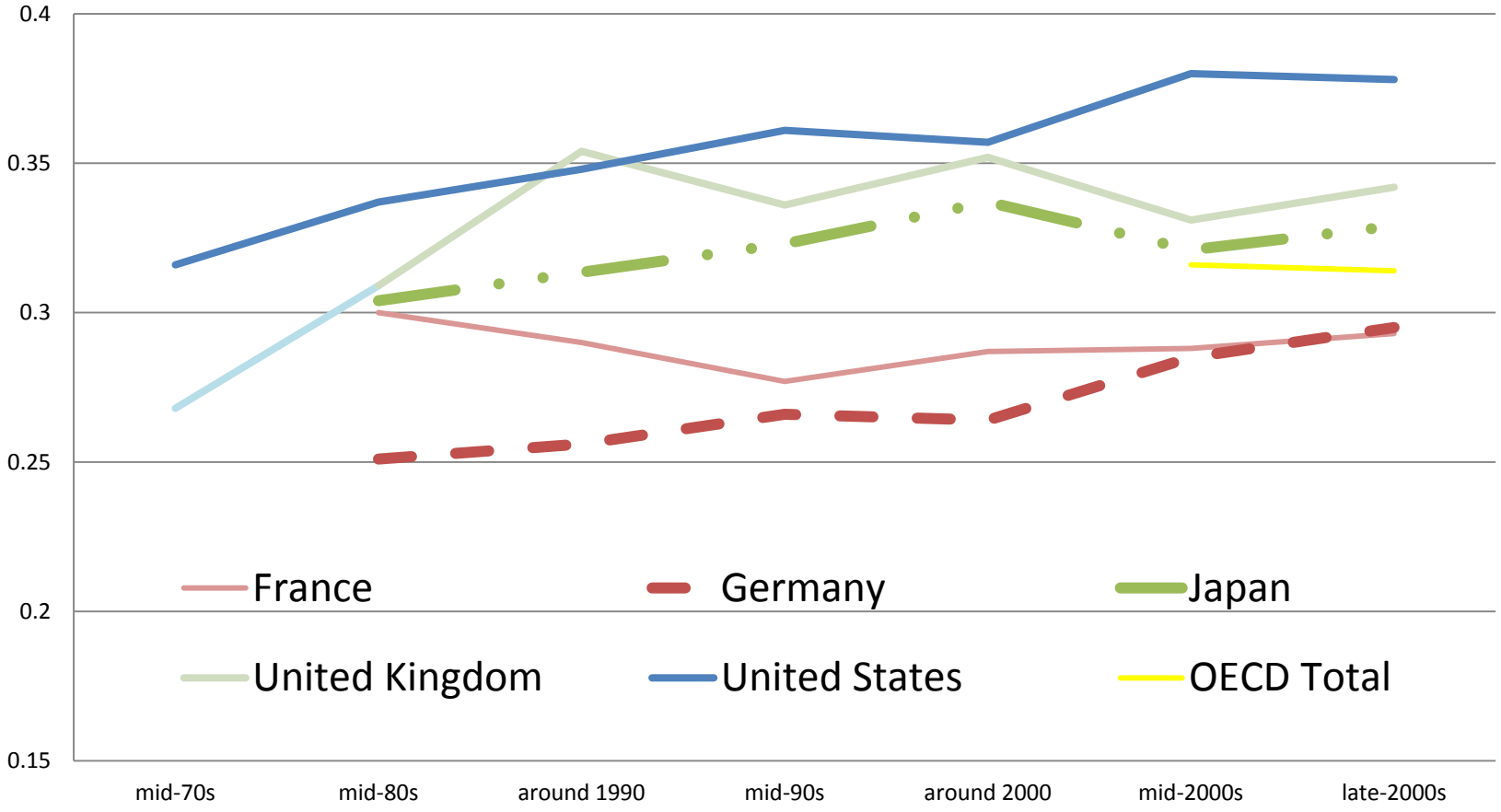
- 1.3 mln employees (largest retailer in the US)
- over 15% of U.S. imports of consumer goods from China
- political involvement to reduce trade barriers
- each Wal-Mart worker replaces 1.4 retail workers (-2.7% reduction in retail employment)
- Wal-Mart store openings lead to declines in county-level retail earnings of about 1.5%
- NB: all this, net of the effects on US manufacturing employment

One of the consequences of the patterns of technical change, globalization, de-industrialization, and financialization:

- Growing inequalities

Growing unequal

(Gini coefficient, total population after taxes and transfers)



Source: OECD

Mostly about top incomes

(% of top-incomes)												
		1975			1985			1995			2005	
	Top 10%	Top 5%	top 1%	Top 10%	Top 5%	top 1%	Top 10%	Top 5%	top 1%	Top 10%	Top 5%	top 1%
France	33,41	22,06	8,48	31,05	19,96	7,2	32,41	20,93	7,7	32,89	21,88	8,73
Germany	30,8	21,6	10,1	31,37	21,24	9,64	31,4	20,84	8,84	.	.	.
Italy	31,2	20,04	7,24	26,83	17,5	6,81	30,57	20,58	8,13	33,19	22,78	9,35
Japan	30,52	19,58	7,08	31,92	20,25	7,03	34,02	21,47	7,3	40,56	25,96	9,42
United Kingdom	27,82	17,4	6,1	32,65	20,75	7,4	38,51	25,8	10,75	41,62	29,57	14,25
United States	32,62	21,03	8,01	34,25	22,38	9,09	40,54	28,46	13,53	44,94	33,12	17,68
Source: the World top-incomes database												

Globalization and inequality in the US

- The ratio of redistribution-to-efficiency gains (calculations based on standard economic assumptions!): a move to (complete) free trade would reshuffle more than $50 of income among different groups for every $1 of net gain (Rodrik, 2012)
- A ten percent increase in occupational exposure to import competition is associated with nearly a 3 percent decline in real wages for workers who perform routine tasks (Ebenstein et al. 2013)
- Rising Chinese import competition between 1990 and 2007 explains one-quarter of the contemporaneous aggregate decline in U.S. manufacturing employment (Autor and Dorn, 2012)

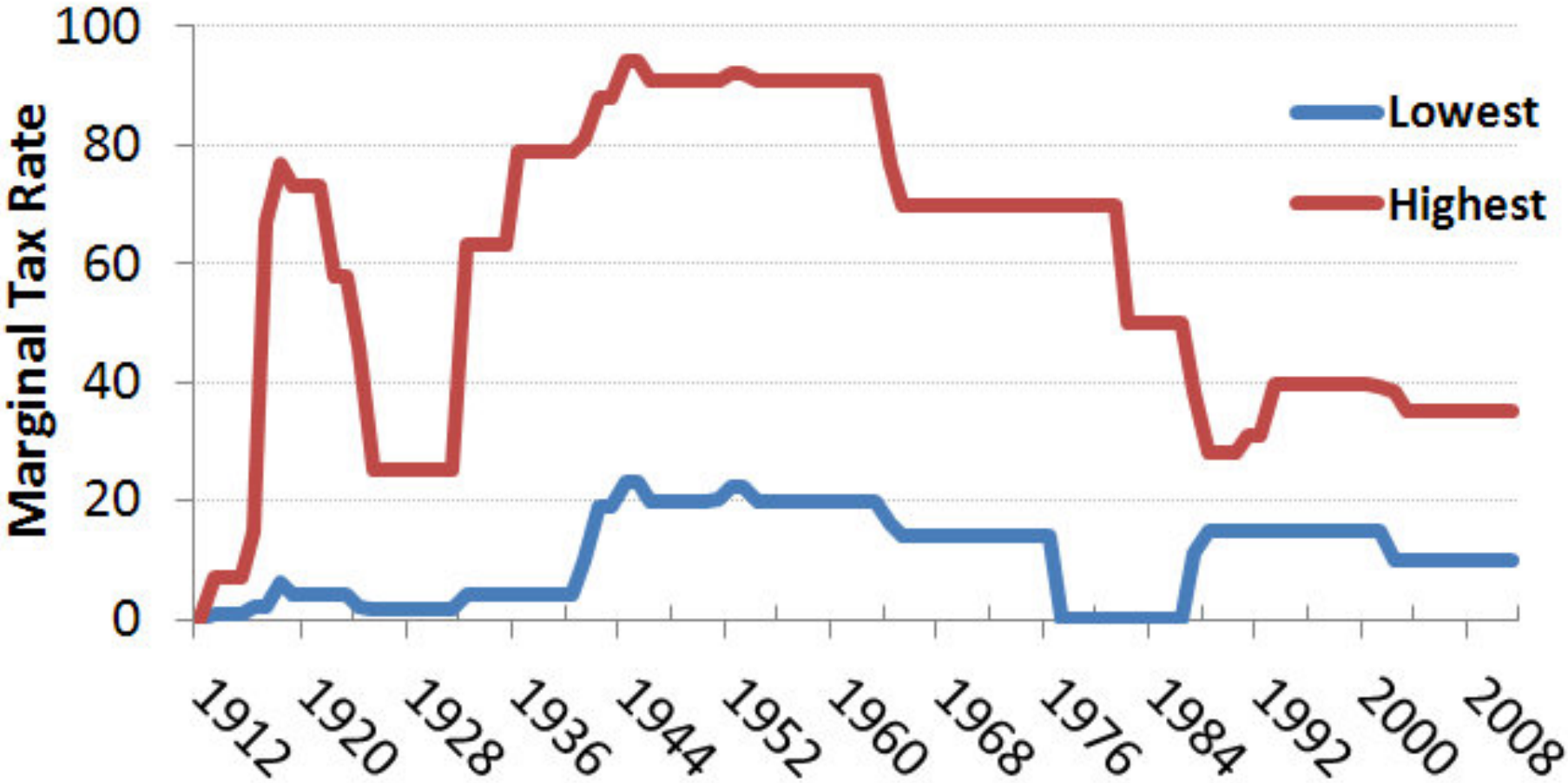
Scenarios and policy options

- (a) Business as usual
  - Further weakening of the manufacturing base
  - Low rate of growth
  - Increasing inequalities
    - at best a 2/3 Vs 1/3 society

Scenarios and policy options

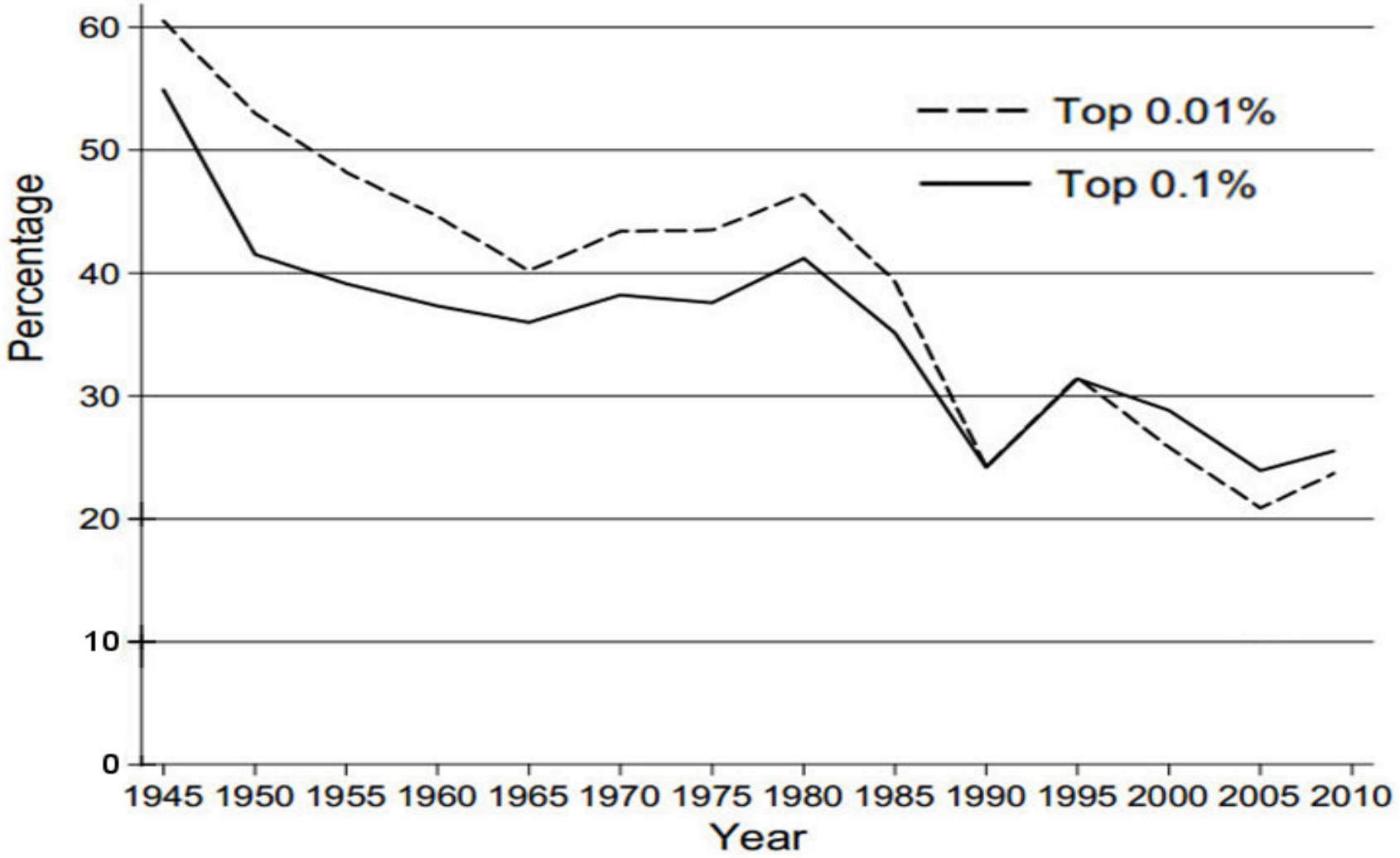
- (b) Managing globalization
  - Science policy
  - Industrial policy
    - Mission oriented programs (equivalent to Apollo/ military space programs)
    - Pragmatic use of competition policy
    - Strengthening European ventures such as EADS/Airbus (…Eurofighter Vs F35…)
  - Heavy taxation on financial rents (including, but not only Tobin tax)
  - Heavy progressive taxation in general
  - Stop a race-to-the-bottom in European fiscal polices
    - Examples: FIAT in London!

Historical Marginal Tax Rates for Highest and Lowest Income Earners (US)



Source: Tax Foundation

Average Tax Rates for the Highest-Income Taxpayers, 1945-2009

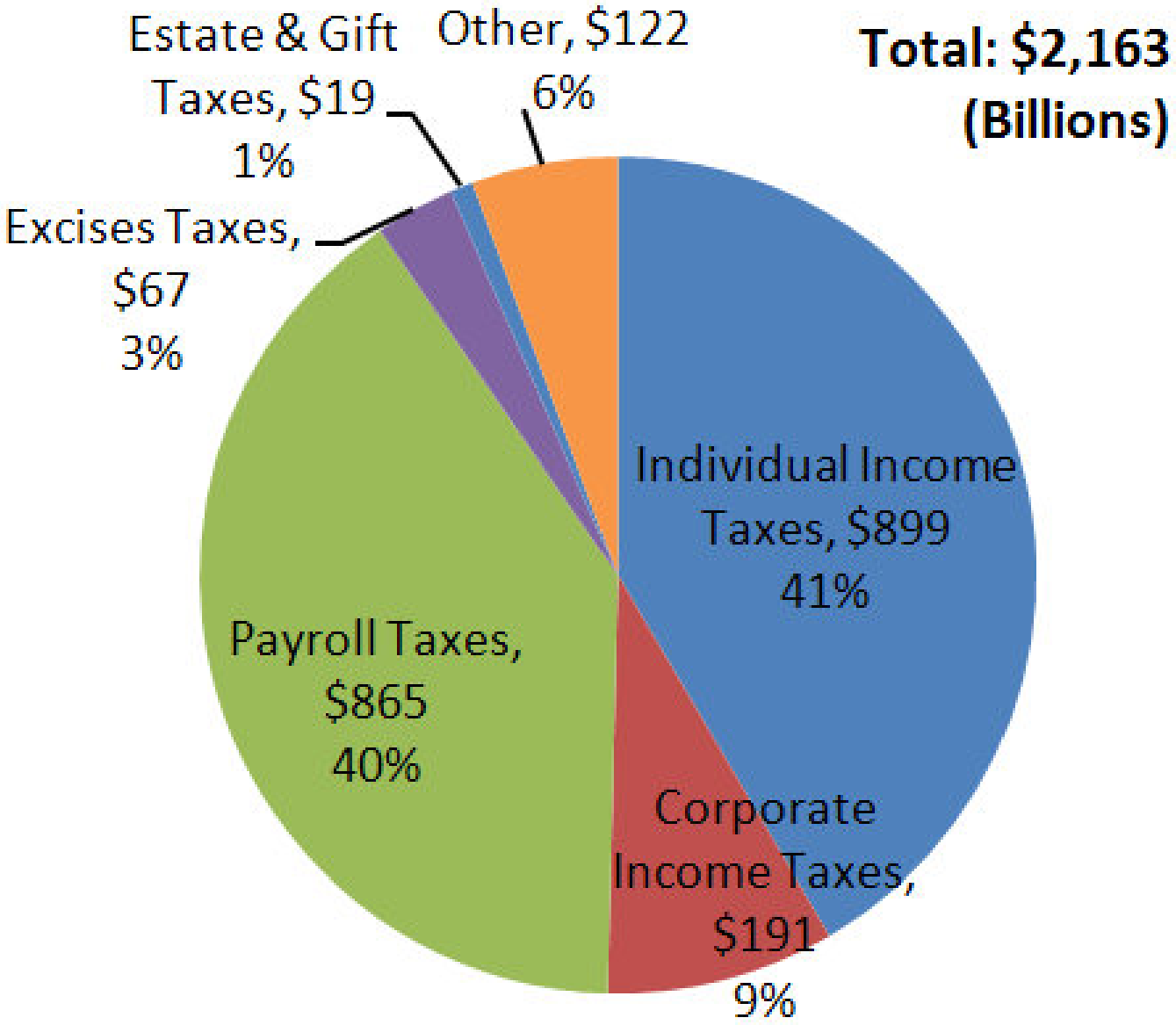


Source: CRS calculations using Internal Revenue Service (IRS) Statistics of Income (SOI) information.

U.S. Effective Corporate Tax Rate 1947-2011

Source: Federal Reserve

Federal Receipts by Source, 2010



Source: Joint Committee on Taxation

Scenarios and policy options

- (c) Shielding Europe from wild globalization
  - (b) +
  - Managed trade
    - Pragmatic use of tariffs and quotas
      - It would also help the expansion of Chinese internal market and Chinese wages…
    - A pollution-related tax
    - Tariffs modulated on differential union protection of workers