

Productivity Growth and Class Struggle in a Growth Regime Framework

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Motivation: Empirical puzzle

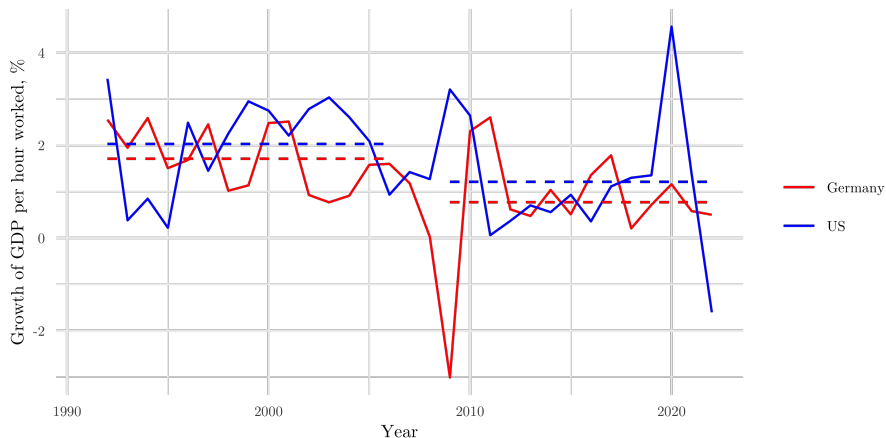


Figure 1: Productivity growth, Germany and the US, %, 1992–2022

Notes: Own calculation and depiction; data from OECD (2024c). Dashed lines depict averages pre- and post-GFC. Pre-GFC: 1992–2006; post-GFC: 2009–2022.

Motivation: Theoretical interest

- High relevance of productivity growth in history of economic thought
- **Growth Regime approach** (Hein, 2023; Stockhammer, 2023) shows variety of possible regimes in political economy
 - Emphasis on **employment effects** of technological change (Hein, 2023) or **path dependency** (Stockhammer, 2023)
 - Productivity: underlying factor, not the focus itself
- Large presence in heterodox research with **endogenous technical progress**
 - Kaldorian theories e.g., technical progress function (Kaldor, 1957), Verdoorn's law (Kaldor, 1966), cumulative causation models (Setterfield & Cornwall, 2002)
 - Classical approaches e.g., cost-induced technical change (Kemp-Benedict, 2022)
 - Kaleckian approaches e.g., demand and wage channel (Hein & Tarassow, 2010)

- Main arguments:
 - Rejection of production functions (Kaldor, 1957)
 - ‘Real’ endogeneity of technical progress (Kaldor, 1957, 1961, 1966)
 - Historical time (Robinson, 1962, ch. 2)
- Main assumption: **Harrod-neutral technical progress**
- Channels:
 - **Demand:** Verdoorn’s law with positive connection between output and productivity growth (Kaldor, 1966)
 - **Wages:** Marx-Hicks effect with induced technical change (Duménil & Lévy, 1992; Duménil & Lévy, 2010; Kemp-Benedict, 2022; Cassetti, 2003; Naastepad, 2006; Hein & Tarassow, 2010; Hartwig, 2014)

- **Bhaduri and Marglin (1990) model**
- Extension by Setterfield and Cornwall (2002) and Hein and Tarassow (2010)
- Demand regime in terms of capacity utilization:

$$u^* = \frac{\alpha + \tau h + \omega \hat{y} + \psi e^r(h)}{[s_W + (s_\Pi - s_W)h]^{\frac{1}{v}} - \beta + \phi}$$

- Productivity regime in terms of capacity utilization:

$$\hat{y} = \eta + \rho u - \theta h, \quad \eta, \rho, \theta > 0$$

Graphical illustration: Capacity utilization

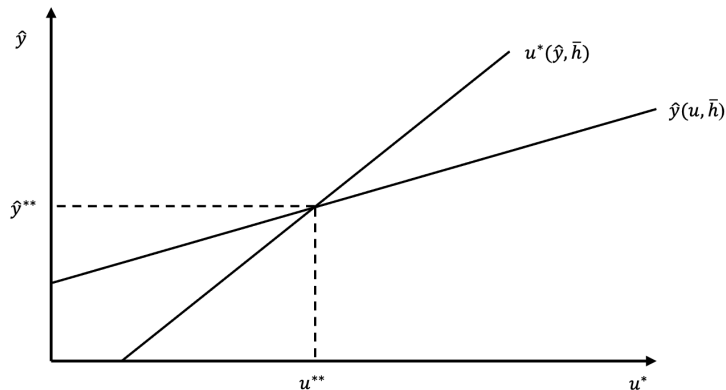


Figure 2: Long-run equilibrium of the demand and the productivity regime, capacity utilization

Source: Own depiction based on Hein (2014, ch. 8).

- Acknowledgment of **institutions as crucial factor** and their effect on productivity
- Various examples:
 - Contest of economic policy orientation (Vergeer & Kleinknecht, 2010, 2014; Kleinknecht et al., 2014; Kleinknecht, 2015, 2020; Storm & Naastepad, 2012; Storm, 2022)
 - Labor markets (Storm & Naastepad, 2012, ch. 4)
 - Bargaining system (Cassetti, 2003; Bhaduri, 2006)
 - Direct effect of industrial policy (Mazzucato, 2011, 2018; Deleidi & Mazzucato, 2019)
 - Financialization and intellectual property rights (Pagano, 2014; Durand, 2020; Rikap, 2021, 2023)
- No **common framework** yet

- Main argument: **Necessary regulation** of the social sphere to fit mode of production (Aglietta, 2015; Lipietz & Jenson, 1987)
- **Historical sequences**, not diversity of regimes
 - Contradictions, shifts and development of regimes in Althusserian sense (Lipietz & Jenson, 1987)
 - Extension to diversity of regimes possible (Amable, 2023)
- Institutional context with five institutional forms (Petit, 1999):
 - **Forms of competition**
 - **Wage-labor relations**
 - **State apparatus**
 - International relations
 - Money

Adding institutions: My framework

Table 1: Theoretical effects of the institutional forms on the partial and overall regimes with a wage-led demand regime

Effect of	Wage-labor nexus		Forms of competition		Forms of the state	
	Labor market regulation	Bargaining power	Intellectual monopoly	Market power	Public investment	Social welfare
Effect on						
Productivity regime						
Profit share	+	+	-	-	/	+
Autonomous innovation	+	/	-	+	+	/
	+	+	-	+	+	+
Demand regime						
Profit share	+	+	-	-	/	+
Autonomous demand	/	/	/	/	+	+
Investment	-	-	+	+	+	/
Consumption	+	+	-	-	+	+
Net exports	-	-	+	/	+	-
	+	+	-	-	+	+
Overall regime with wage-led demand regime						
Capacity utilization	+	+	-	?	+	+
Capital accumulation	+	+	-	?	+	+
Productivity growth	+	+	-	?	+	+

Notes: Own depiction; a plus represents a positive effect on the respective regime through the respective variable, a minus a negative effect, a slash indicates no effect, a question mark an undetermined one.

Analysis: Macroeconomic indicators

Table 2: Averages and changes of macroeconomic indicators; Germany and the US; overall, before and after the GFC

	Germany				US			
	Overall	Pre-GFC	Post-GFC	Change	Overall	Pre-GFC	Post-GFC	Change
Output growth (%)	1.28	1.39	1.08	-0.31	2.43	3.13	1.83	-1.30
Productivity growth (%)	1.22	1.71	0.77	-0.94	1.61	2.03	1.21	-0.82
Profit share (%)	42.20	41.64	42.39	0.75	41.62	39.98	43.50	3.52
Change in capacity utilization (%)								
– Conventional calculation	-0.10	-0.23	-0.06	0.17	0.08	0.23	0.05	-0.18
– Non-conventional calculation	0.06	0.01	0.10	0.09	0.10	0.05	0.55	0.50
Capital accumulation rate (%)	1.23	1.71	0.74	-0.98	2.39	2.86	1.83	-1.03
Net exports share (% of GDP)	3.83	1.80	5.78	3.98	-3.04	-2.73	-3.11	-0.38

Notes: Own calculations based on OECD (2024b, 2024c), European Commission (2023), and OECD (2024a), . Overall: 1991–2022; pre-GFC: 1991–2006; post-GFC: 2009–2022; change: difference between the pre- and post-GFC period. Rates of change calculated from 1992 onwards. Conventional data for capacity utilization refers to output gap estimations, while non-conventional data to survey data in manufacturing.

Analysis: Institutional indicators

Table 3: Averages and changes of institutional indicators; Germany and the US; overall, before and after the GFC

	Germany				US			
	Overall	Pre-GFC	Post-GFC	Change	Overall	Pre-GFC	Post-GFC	Change
EPL _t (Index)	1.75	2.27	1.12	-1.14	0.25	0.25	0.25	0.00
Bargaining coverage (% of workers)	64.19	70.14	57.59	-12.55	14.15	15.57	12.38	-3.19
Change in patent applications (%)	1.11	4.87	0.25	-4.62	1.86	4.36	3.25	-1.11
Market concentration (%)	16.73	18.01	15.22	-2.78	39.62	36.00	42.33	6.33
Public investment (% of GDP)	2.38	2.47	2.34	-0.13	3.66	3.81	3.45	-0.37
Social welfare (% of GDP)	12.02	11.36	12.90	1.54	6.16	6.08	6.22	0.14

Notes: Own calculations based on OECD (2021), OECD and AIAS (2023), OECD (2023), Monopolkommission (2022), Fortune (2024), and European Commission (2023). Overall: 1991–2022; pre-GFC: 1991–2006; post-GFC: 2009–2022; change: difference between the pre- and post-GFC period. Rates of change calculated from 1992 onwards. For changes in patents, 2020 is excluded due to high distortion caused by Covid.

Analysis: Regression models I

Table 4: Regression results, Germany

	<i>Dependent variable:</i>		
	Productivity growth, moving average		
	(1)	(2)	(3)
Constant	5.18 (3.35)	1.17 (4.56)	-2.84 (12.57)
EPL_t	1.01*** (0.17)	0.49* (0.26)	0.44 (0.28)
Coverage rate	-0.02 (0.02)	-0.03 (0.05)	-0.01 (0.06)
Change in patents	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Market concentration	0.07 (0.06)	0.05 (0.05)	0.02 (0.07)
Public investment	-2.25*** (0.44)	-1.71*** (0.44)	-1.64*** (0.48)
Social expenditure	-0.04 (0.19)	-0.06 (0.17)	0.09 (0.35)
Manufacturing share		0.29 (0.33)	0.27 (0.45)
Gap to US		0.04 (0.02)	0.01 (0.03)
Profit share			-0.03 (0.10)
Capacity utilization			0.03 (0.03)
Observations	23	23	23
R ²	0.91	0.94	0.94
Adjusted R ²	0.87	0.90	0.89
Residual Std. Error	0.19 (df = 16)	0.17 (df = 14)	0.17 (df = 12)
F Statistic	26.11*** (df = 6; 16)	26.19*** (df = 8; 14)	19.19*** (df = 10; 12)

Notes: * p<0.1; ** p<0.05; *** p<0.01. Datasets: OECD (2024c), OECD and AIAS (2023), European Commission (2023), Monopolkommission (2022), OECD (2023). Future five-year moving average of productivity growth. Function: lm

Analysis: Regression models II

Table 5: Regression results, US

	<i>Dependent variable:</i>		
	Productivity growth, moving average		
	(1)	(2)	(3)
Constant	-4.16 (4.96)	-11.04** (5.17)	-0.39 (19.23)
EPL _t			
Coverage rate	0.02 (0.16)	-1.30** (0.55)	-0.50 (0.64)
Change in patents	-0.01 (0.02)	-0.005 (0.01)	0.01 (0.01)
Market concentration	-0.05 (0.05)	-0.05 (0.04)	-0.03 (0.04)
Public investment	1.48 (0.87)	1.61* (0.77)	1.03 (0.91)
Social expenditure	0.35 (1.16)	2.60* (1.37)	2.25 (2.47)
Manufacturing share		1.07** (0.43)	0.12 (0.61)
Profit share			-0.34** (0.16)
Capacity utilization			0.07 (0.08)
Observations	24	24	24
R ²	0.57	0.68	0.76
Adjusted R ²	0.45	0.57	0.64
Residual Std. Error	0.51 (df = 18)	0.45 (df = 17)	0.42 (df = 15)
F Statistic	4.74*** (df = 5; 18)	6.11*** (df = 6; 17)	6.06*** (df = 8; 15)

Notes: * p<0.1; ** p<0.05; *** p<0.01. Datasets: OECD (2024c), OECD and AIAS (2023), European Commission (2023), Fortune (2024), OECD (2023). Future five-year moving average of productivity growth. Function: lm

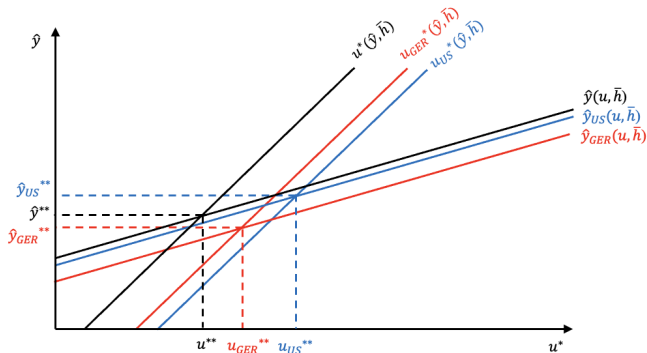
Analysis: Regression results

- Work in progress!
- Approach:
 - OLS regression of institutional variables on moving five-year average of productivity growth
 - Incremental addition of controls and demand and wage variable
- Germany:
 - Independent variables are mostly insignificant
 - \mathbf{EPL}_t is significantly positive and decreasing
 - Public investment is significantly negative
 - No Verdoorn or Marx-Hicks effect
- US:
 - Independent variables are mostly insignificant
 - Coverage rate is significantly negative
 - **Public investment** is significantly positive
 - No Verdoorn but significant **Marx-Hicks effect**

Discussion: Empirical results

- Classification:
 - Germany: **Labor-led productivity regime** in search of a new mode of régulation
 - US: **State-led productivity regime** that dampened the general downward trend
- Crucial factors:
 - Common downward trend
 - Labor market reforms in Germany
 - Public investment in the US
 - Demand structure
 - Diverging growth paths
- Limitations:
 - Various problems with the data
 - Time series characteristics

Discussion: Theoretical Integration I



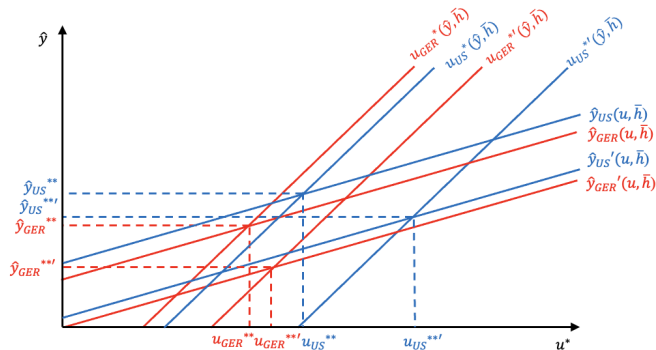
(a) Development during pre-GFC

Figure 3: Stylized long-run effects on capacity utilization, and productivity growth; Pre- and post-GFC; Germany and the US

Notes: \hat{y} : productivity growth, u : capacity utilization, h : profit share, x^* : goods market equilibrium of x , x^{**} : equilibrium of demand and productivity regime of x , \bar{x} : constant of x ; x' : post-GFC period. Black elements represent the common starting point, red elements the German development, blue ones that of the US. Country-specific economic deviation from the stylized common starting point before the analyzed period.

Source: Own depiction based on Hein (2014, ch. 8).

Discussion: Theoretical Integration II



(b) Development during post-GFC

Figure 3: Stylized long-run effects on capacity utilization, and productivity growth; Pre- and post-GFC; Germany and the US (continued)

Notes: \hat{y} : productivity growth, u : capacity utilization, h : profit share, x^* : goods market equilibrium of x , x^{**} : equilibrium of demand and productivity regime of x , \bar{x} : constant of x ; x' : post-GFC period. Black elements represent the common starting point, red elements the German development, blue ones that of the US. Country-specific economic deviation from the stylized common starting point before the analyzed period.

Source: Own depiction based on Hein (2014, ch. 8).

- **Institutional extension** of the post-Keynesian model of endogenous technical change
 - Wage and demand channel
 - Classification of productivity regime regarding institutions
- Application to **Germany and the US**
- Integration in overall regime change possible
- Limitations:
 - Theory of sectoral change
 - Innovation through finance
 - Focus on developed countries

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