Factor Income Distribution and Capital Accumulation in Peru, 1940-2019

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Contents

National Accounts and Factor Income Distribution in Peru

Factor income shares: data availability

Technical reports	Wage share	Profits share	Mixed-income share
Cuentas Nacionales del Perú 1950-1965, 1950-1967, 1960-1969,1960-1973,1960-1974	1950-1974	1950-1974	1950-1974
Renta Nacional del Perú (1951, 1961)	1942-1961	1942-1961	1942-1961
BCRP Yearly Reports (1983, 1986, 1989, 1990)	1974-1990	1974-1990	1974-1990
Cuentas Nacionales INE (1981)	1970-1981	1970-1981	
Oferta y demanda global 2012 INEI (2013)	1991-2006	1991-2006	
Norberto García (2013)	1990-2010	1990-2010	1990-2010
INEI National Accounts Report (2013-2021)	1990-2019	1990-2019	1990-2019

Table: Source: BCRP (1951), BCRP (1952), BCRP (1959), BCRP (1962), BCRP (1966), BCRP (1968), BCRP (1970), BCRP (1974), BCRP (1976), BCRP (1984), BCRP (1987), BCRP (1990), BCRP (1991), Garcıa (2013), INE (1980), INE (1981), INE (1990), INEI (2013), INEI (2021), Ministerio de Hacienda y Comercio (1951), Ministerio de Hacienda y Comercio (1959), Ministerio de Hacienda y Comercio (1969).

National Accounts and Factor Income Distribution in Peru

Methodological summary

- **Discontinuity in factor income distribution**: political (policy-making, indirect taxation and foreign trade) and ideological reasons (political economy changes of the 1980s-1990s, neoliberalism).
- Methodology for the data reconstruction in Castillo (2015):
  - Overlapping split time series following the criteria suggested by Pedagua (2009).

$$\hat{y}_{t-n,base_{t_1}} = y_{t-n,base_{t_0}} * \epsilon_{t_1,t_0}^{\frac{(t-n)-t_0}{t_1-t_0}}; \ where \ \epsilon_{t_1,t_0} = \frac{y_{t,base_{t_1}}}{y_{t,base_{t_0}}}$$

  - Obtaining a merged time series for the nominal GDP and taking care of the I-O base years for Peru (1963, 1973, 1979, 1994, 2007).
  - Profits share is a residual after reconstructing the wage share, the mixed-income share, the fixed capital consumption, and the net income taxes account (aggregate fiscal income minus subsidies).

National Accounts and Factor Income Distribution in Peru

Wage share and Hodrick-Prescott trend (1942-2019)

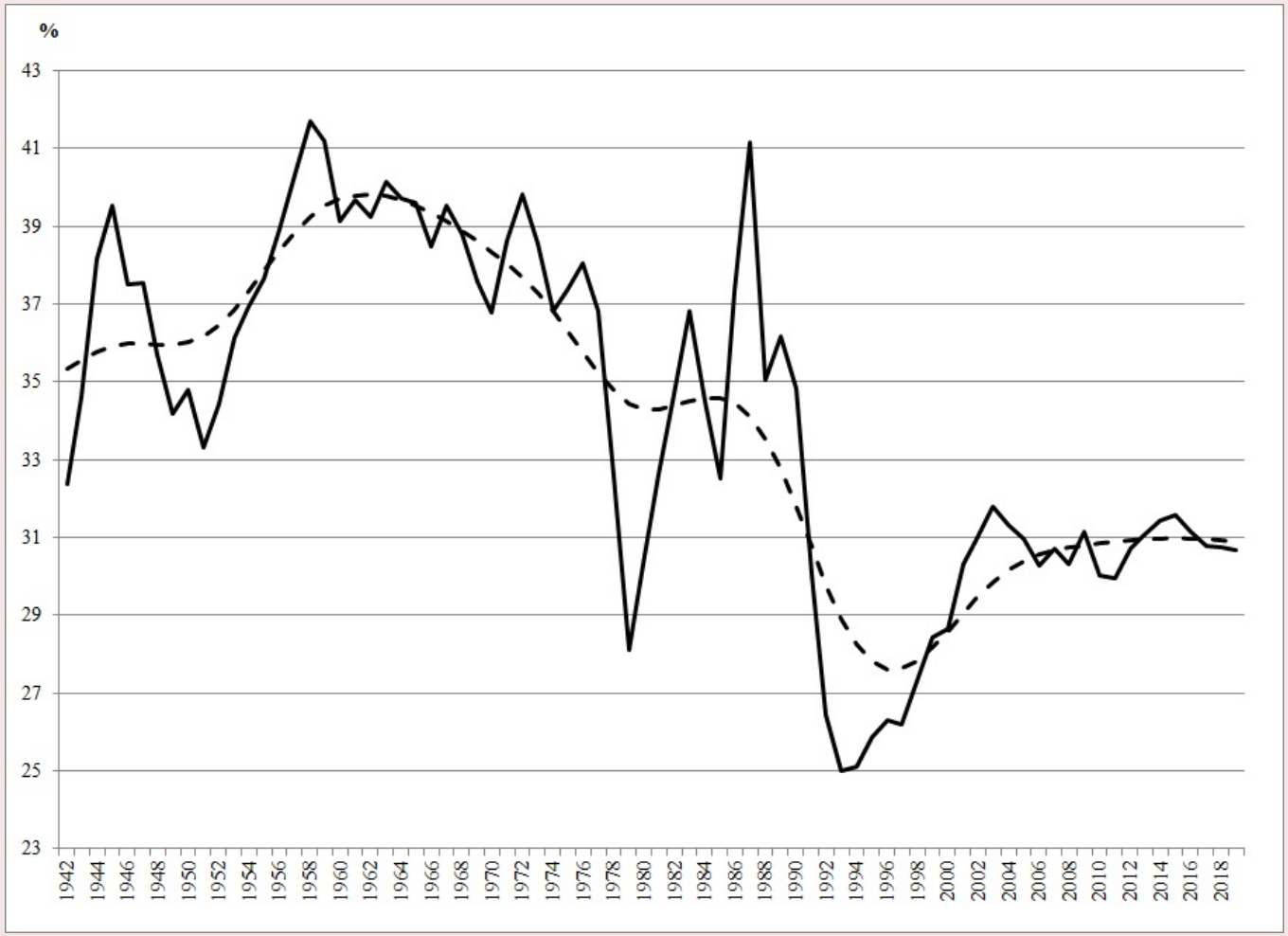


Figure: Source: Central Reserve Bank of Peru (BCRP); National Institute of Statistics and Informatics (INEI); National Institute of Statistics (INE); Economic Commission for Latin America and the Caribbean (ECLAC); and Ministry of Finance and Commerce.

National Accounts and Factor Income Distribution in Peru

Mixed-income share and Hodrick-Prescott trend (1942-2019)

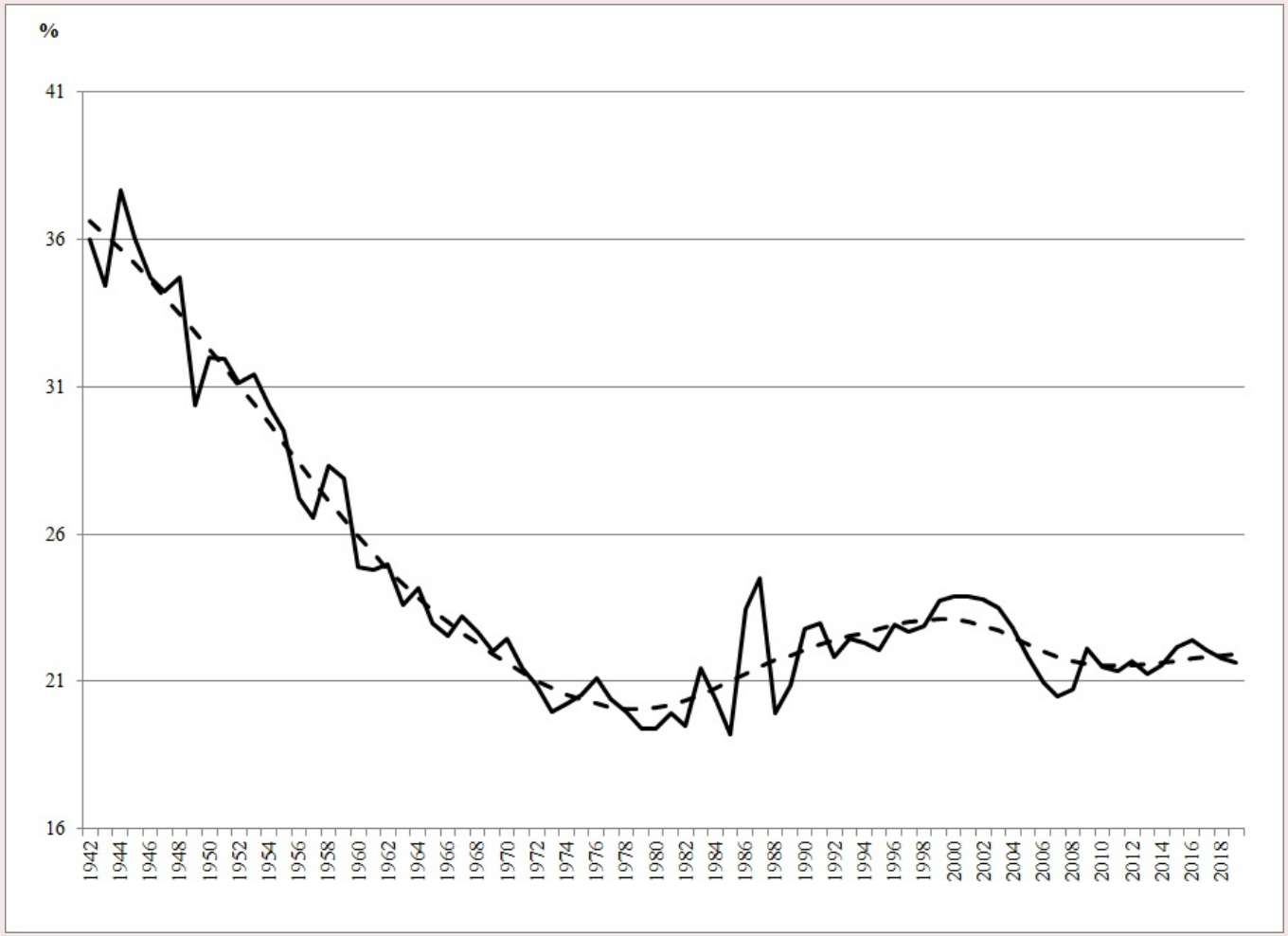


Figure: Source: Central Reserve Bank of Peru (BCRP); National Institute of Statistics and Informatics (INEI); National Institute of Statistics (INE); Economic Commission for Latin America and the Caribbean (ECLAC); Garcia (2013); and Ministry of Finance and Commerce.

National Accounts and Factor Income Distribution in Peru

Agriculture and non-agriculture mixed income shares (1942-2019)

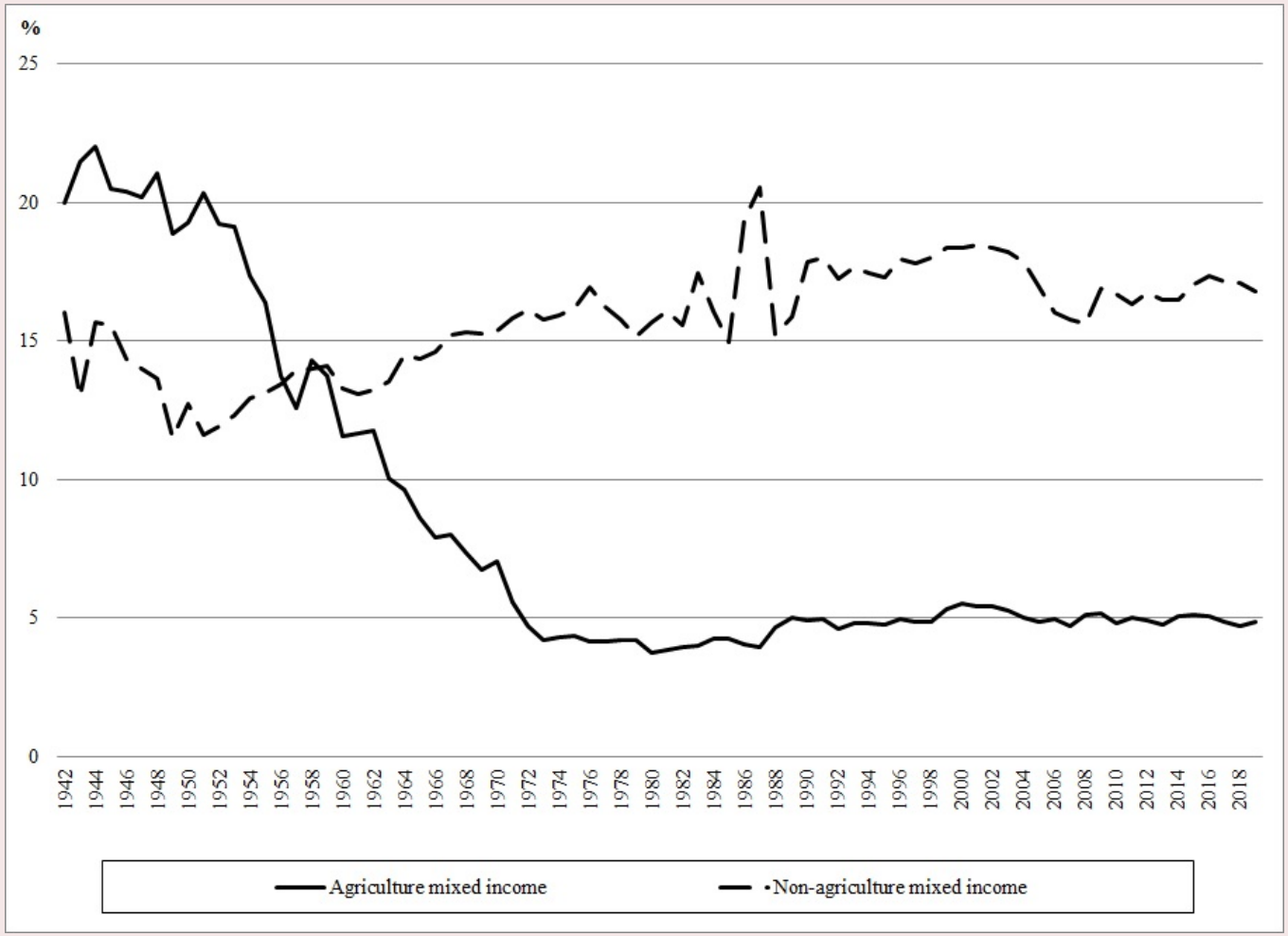


Figure: Source: Central Reserve Bank of Peru (BCRP); National Institute of Statistics and Informatics (INEI); National Institute of Statistics (INE); Economic Commission for Latin America and the Caribbean (ECLAC); Garcia (2013); and Ministry of Finance and Commerce.

National Accounts and Factor Income Distribution in Peru

Profits share and Hodrick-Prescott trend (1942-2019)

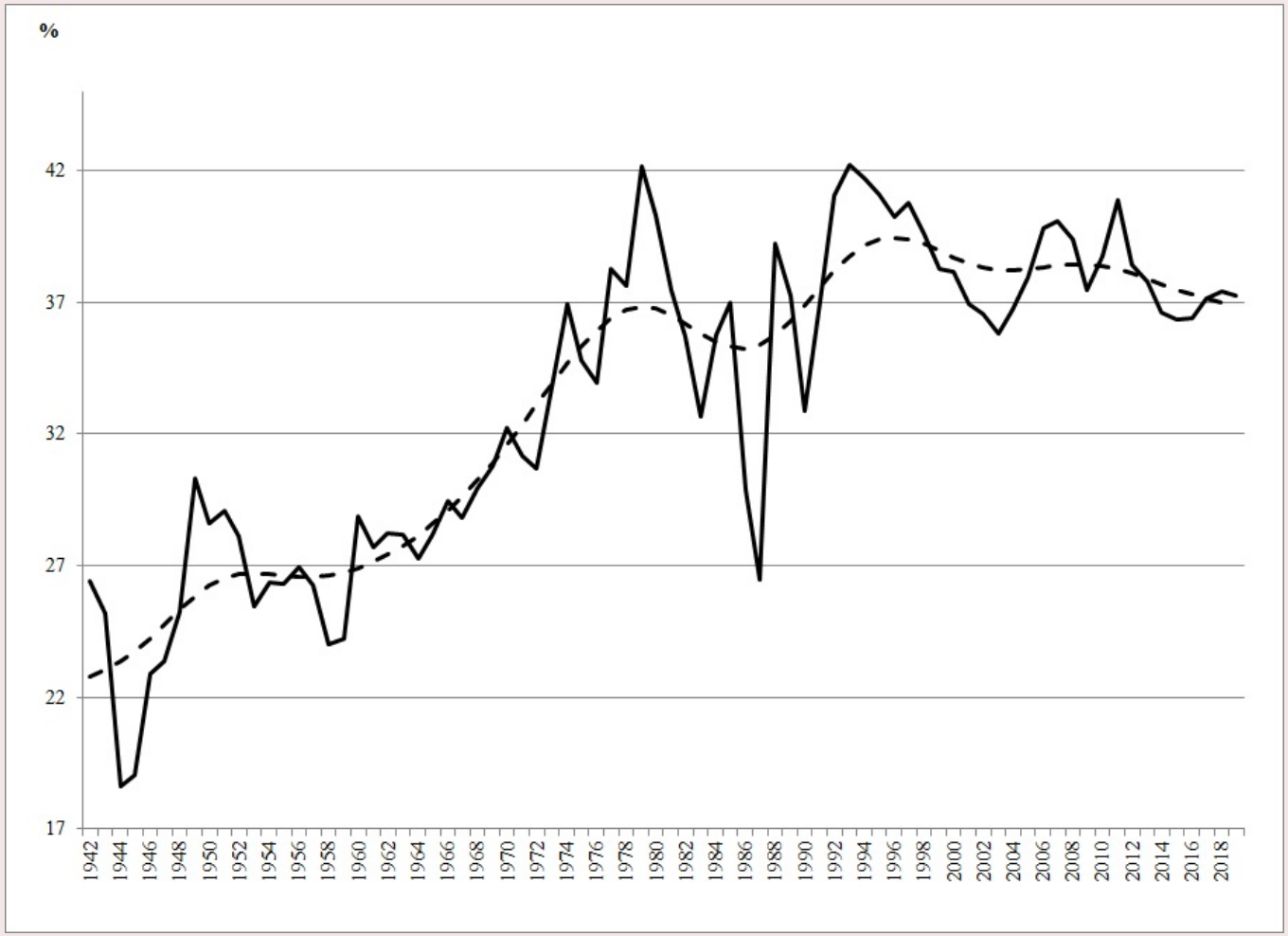
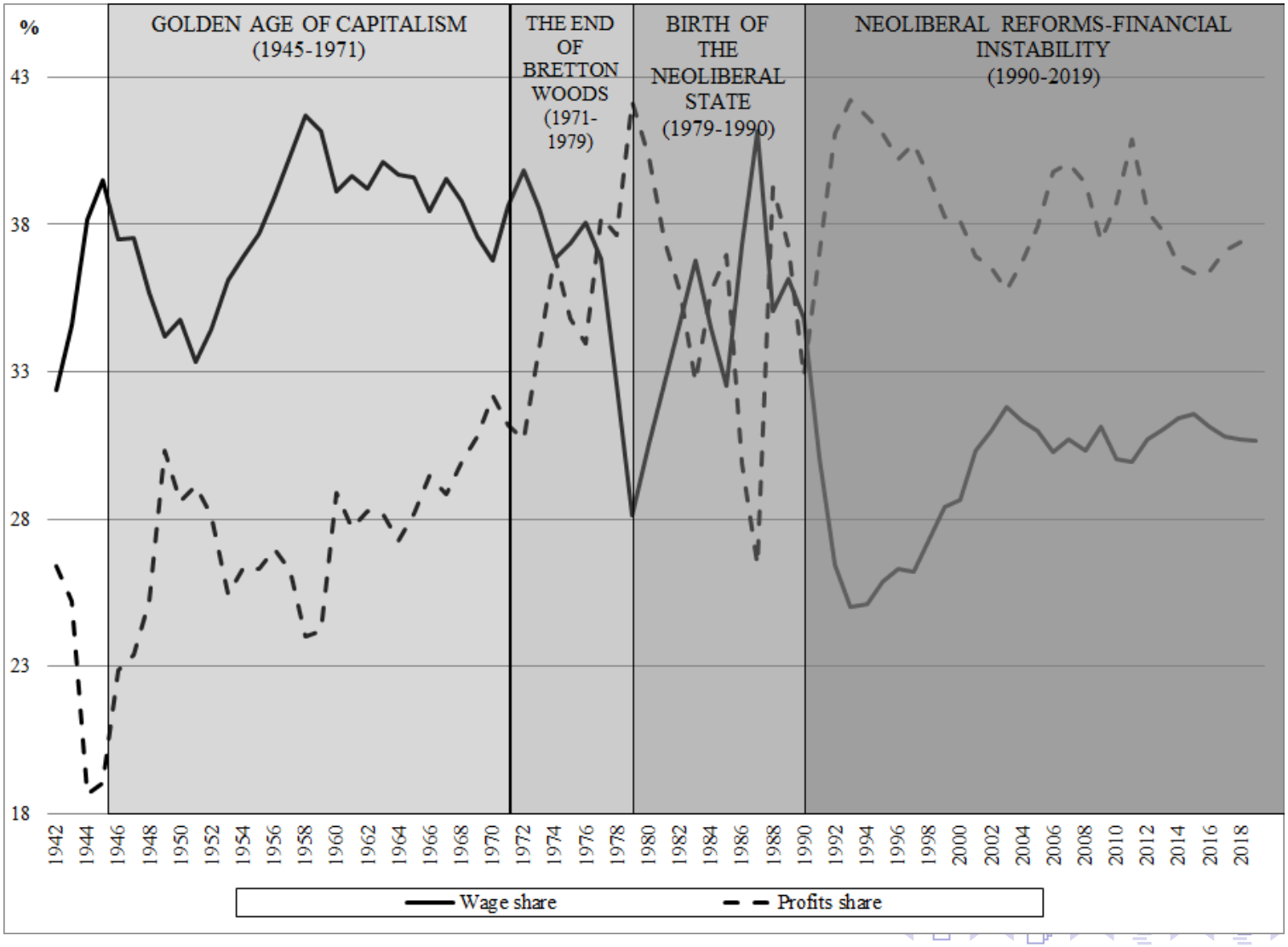


Figure: Source: Central Reserve Bank of Peru (BCRP); National Institute of Statistics and Informatics (INEI); National Institute of Statistics (INE); Economic Commission for Latin America and the Caribbean (ECLAC); and Ministry of Finance and Commerce.

Stylized Facts and International Comparison

Peruvian factor distribution and global capitalism 1942-2019



Stylized Facts and International Comparison

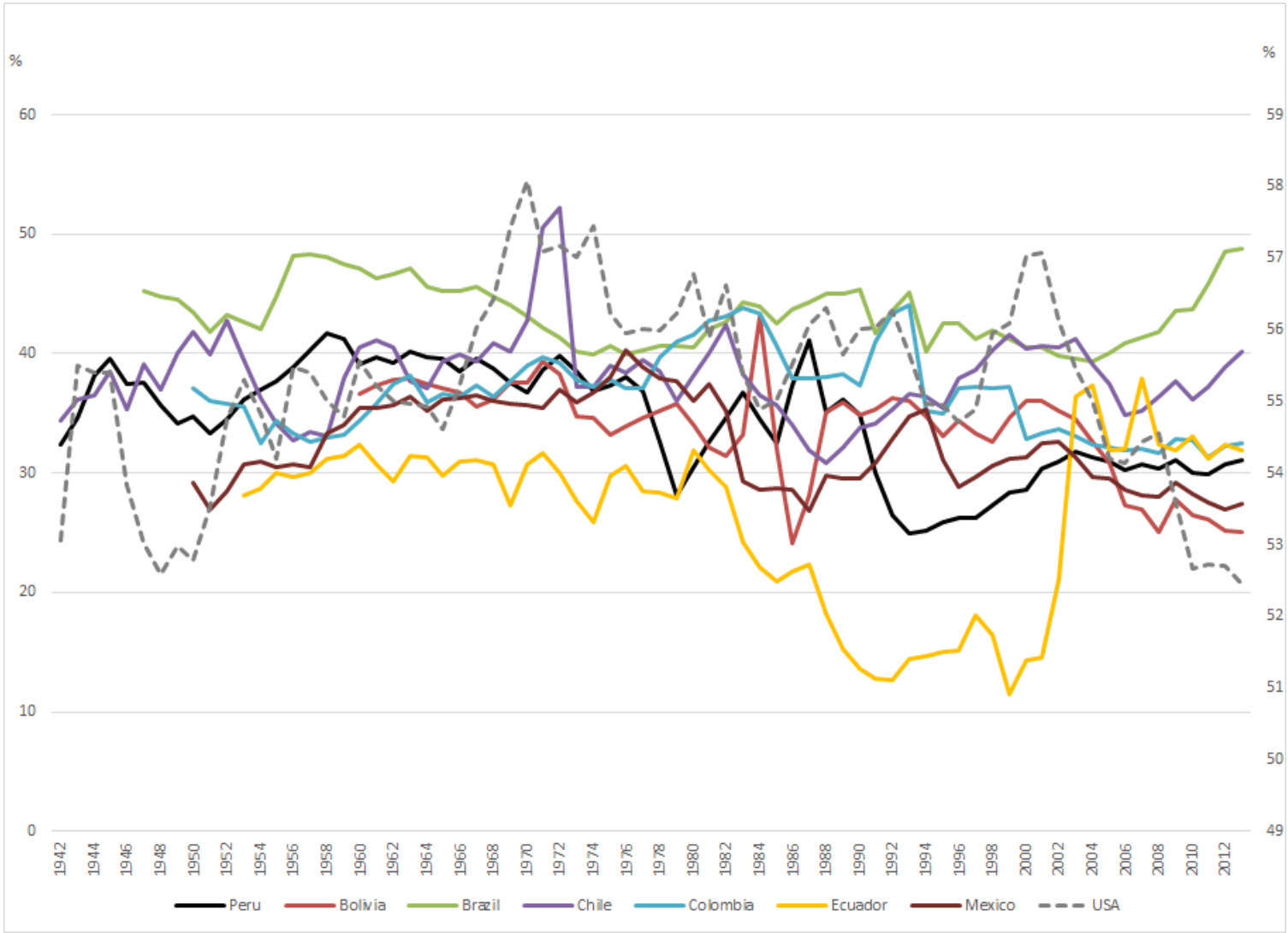
Aggregate demand components and income shares (1942-2019)

Main relations	Full period 1942-2019	Oligarchic State 1942-1956	Crisis of the Oligarchic State 1956-1968	Interventionist State 1968-1990	Neoliberal State 1990-2019
Consumption (% GDP)	65.55%	71.84%	69.92%	67.62%	64.04%
Exports (% GDP)	23.14%	14.90%	18.43%	16.95%	26.37%
Non-traditional /traditional exports (%)	31.33%	20.63%	8.81%	22.49%	36.52%
Imports (% GDP)	19.70%	10.25%	14.46%	13.97%	22.88%
Private investment (% GDP)	14.91%	7.64%	11.54%	10.54%	17.28%
Wage share (% GDP)	32.33%	36.07%	44.13%	36.79%	32.70%
Profits share (% GDP)	36.16%	25.75%	31.01%	35.78%	41.40%

Table: Source: World Bank; Central Reserve Bank of Peru (BCRP); National Institute of Statistics and Informatics (INEI); National Institute of Statistics (INE); and Ministry of Finance and Commerce.

Stylized Facts and International Comparison

Peruvian wage share in comparative perspective 1942-2013



Decomposing Wages and Profits Shares

Wage share decomposition

- Following Graña and Kennedy (2008) to obtain the real average wage or the average labor cost (alc), the average labor productivity (q), and the salaried employment rate (l_{sal}).

$$\frac{W}{Y} = \frac{w * AP_{salaried}}{Y}$$

$$\frac{W}{Y} = \frac{\frac{w}{deflator} * AP_{salaried}}{\frac{GDP}{deflator}} * \frac{AP_{employed}}{AP_{employed}}$$

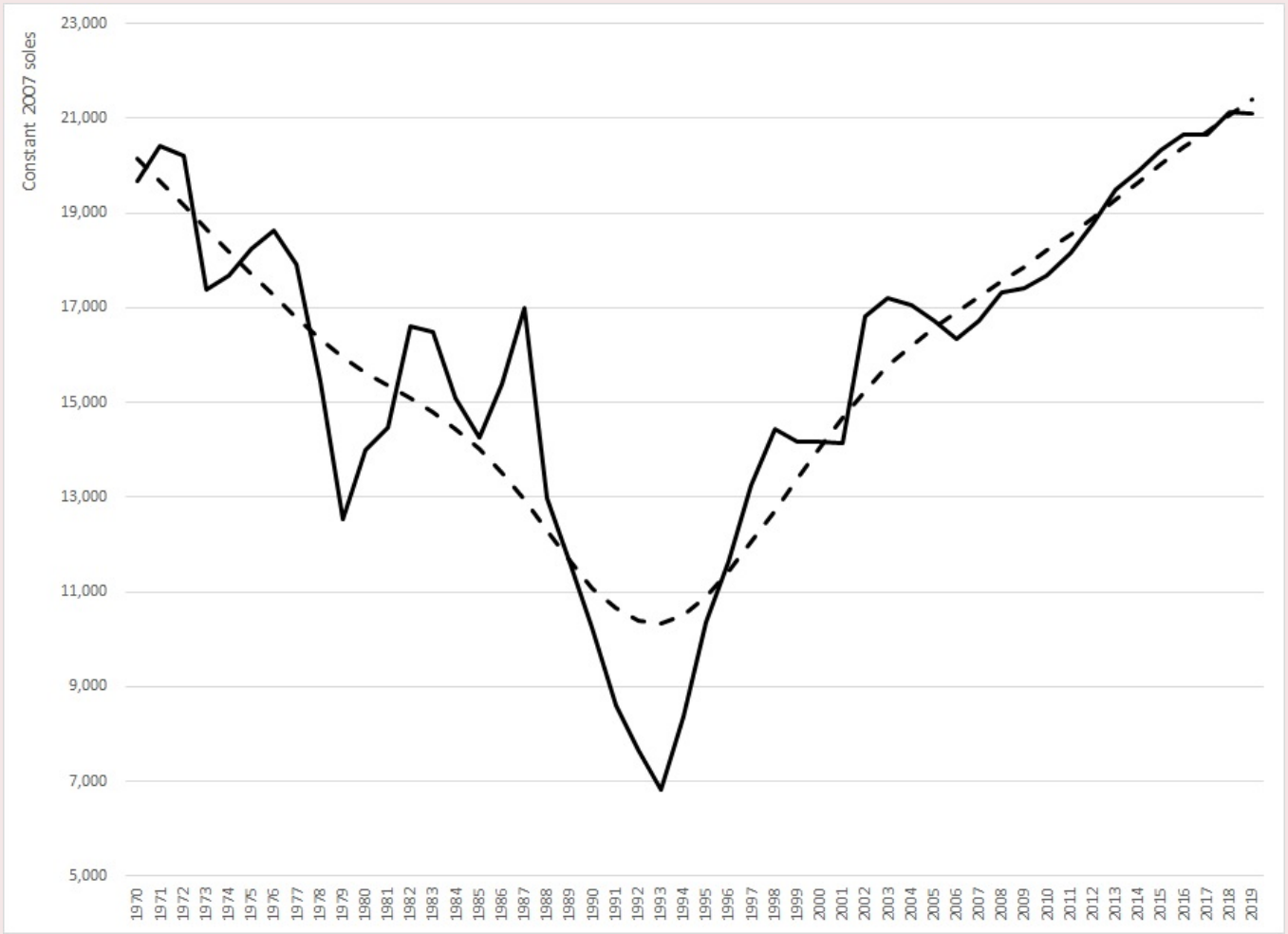
$$\frac{W}{Y} = \frac{w}{deflator} * \frac{1}{\frac{GDP}{deflator * AP_{employed}}} * \frac{AP_{salaried}}{AP_{employed}}$$

$$\frac{W}{Y} = alc * \frac{1}{q} * l_{sal}$$

Decomposing Wages and Profits Shares

Wage share decomposition

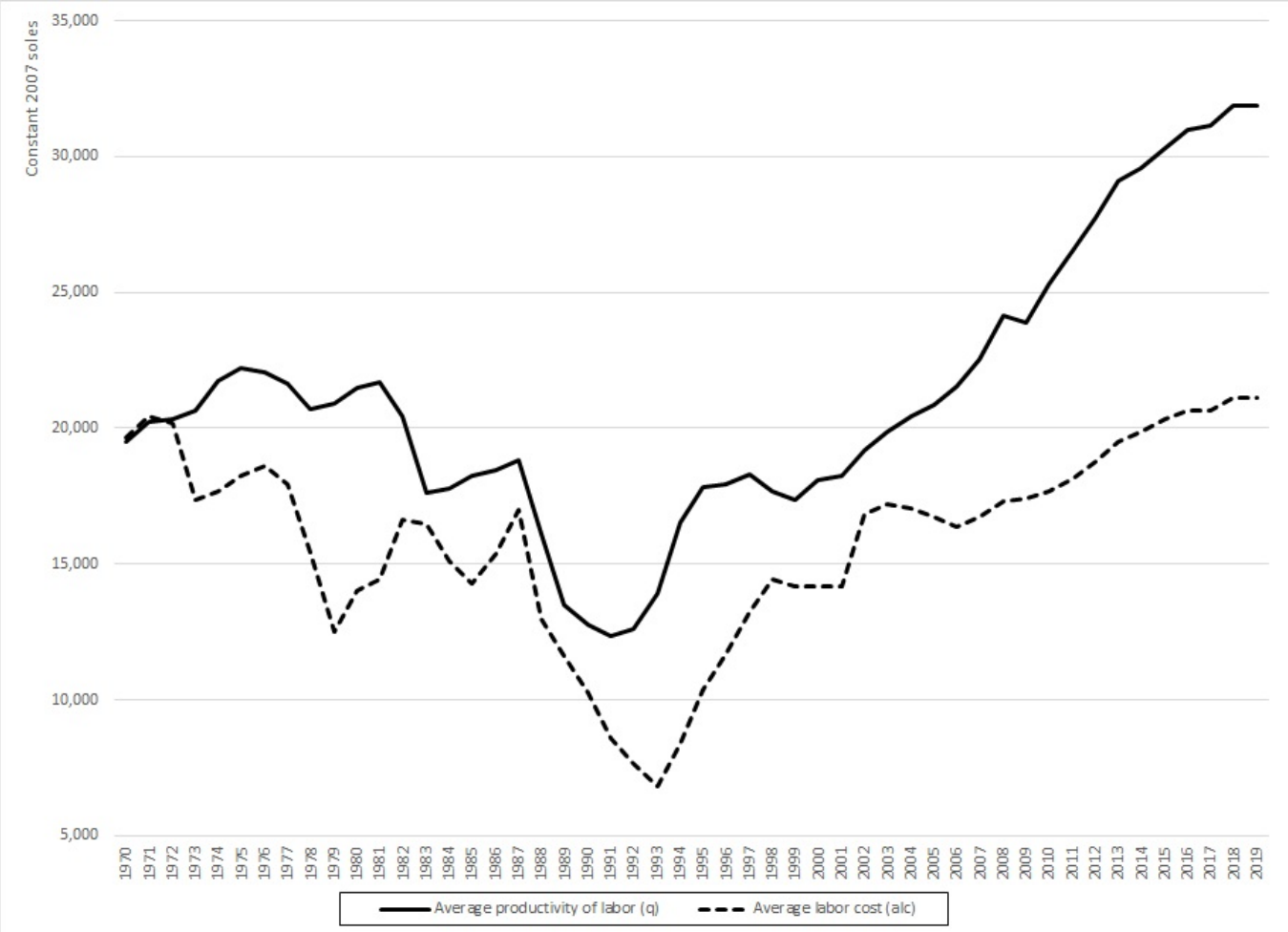
Average labor cost and Hodrick-Prescott trend (1970-2019)



Decomposing Wages and Profits Shares

Wage share decomposition

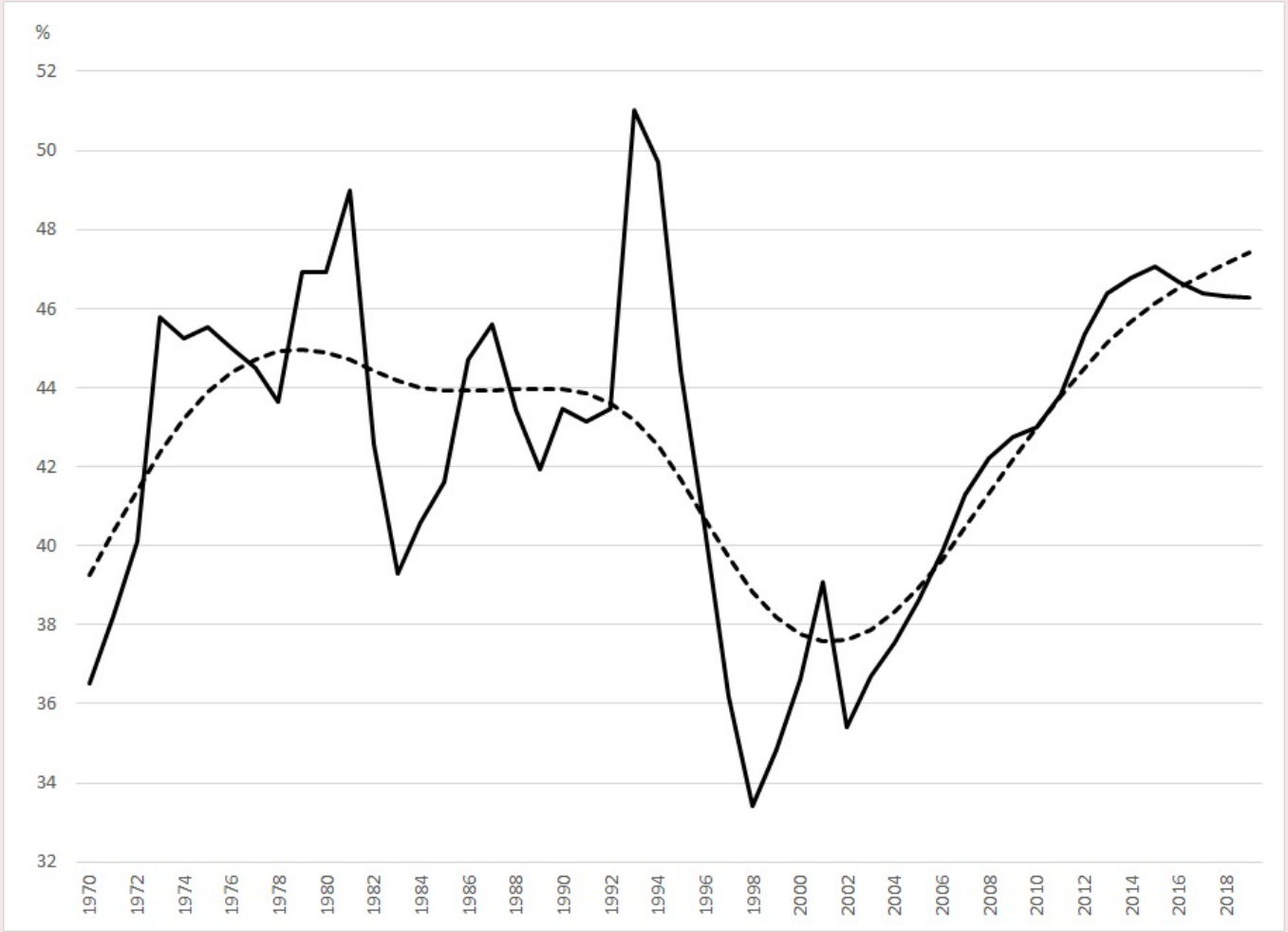
Average labor cost and average productivity of labor (1970-2019)



Decomposing Wages and Profits Shares

Wage share decomposition

Salaried employment rate and Hodrick-Prescott trend (1970-2019)



Decomposing Wages and Profits Shares

Profits share decomposition

- Comparing the gross rate of profit (r), which is the product of the profit share times the output-capital ratio, to the index of basic commodity prices.

$$r = \frac{\Pi}{Y} * \frac{Y}{K}$$

- Using other proxies for the profits rate: ROE (Returns on Equity) taken from the balance sheet of Peruvian firms.
- Sources: Vademecum of the Investor (Vademécum del Inversionista) and the Vademecum of Lima Stock Exchange (Vademécum bursátil).

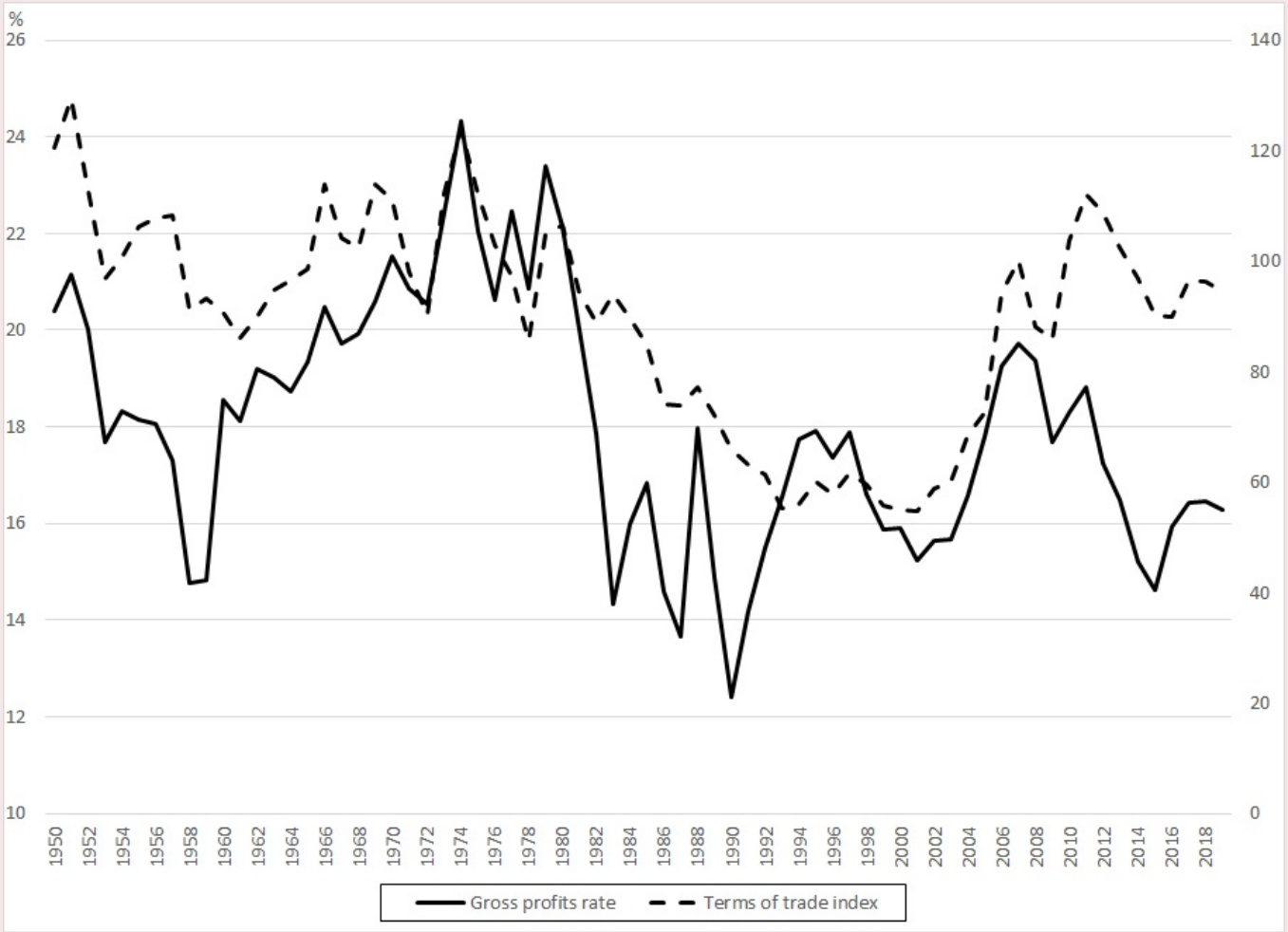
$$ROE_{1940-1959} = \frac{Net\ Benefits}{Capital + Reserves}$$

$$ROE_{1974-2016} = \frac{NetBenefits}{Equity}$$

Decomposing Wages and Profits Shares

Profits share decomposition

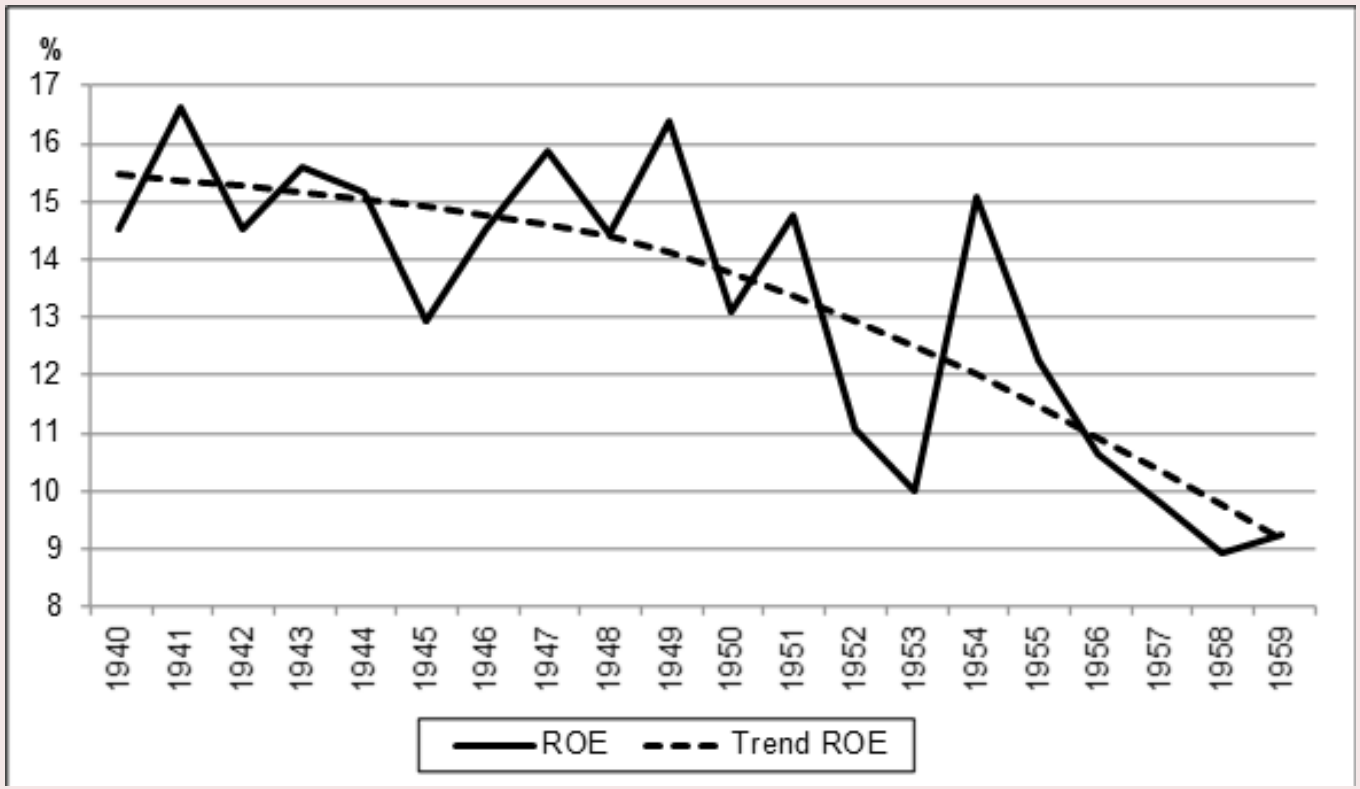
Gross profits rate and terms of trade index (2007=100) (1950-2019)



Decomposing Wages and Profits Shares

Profits share decomposition

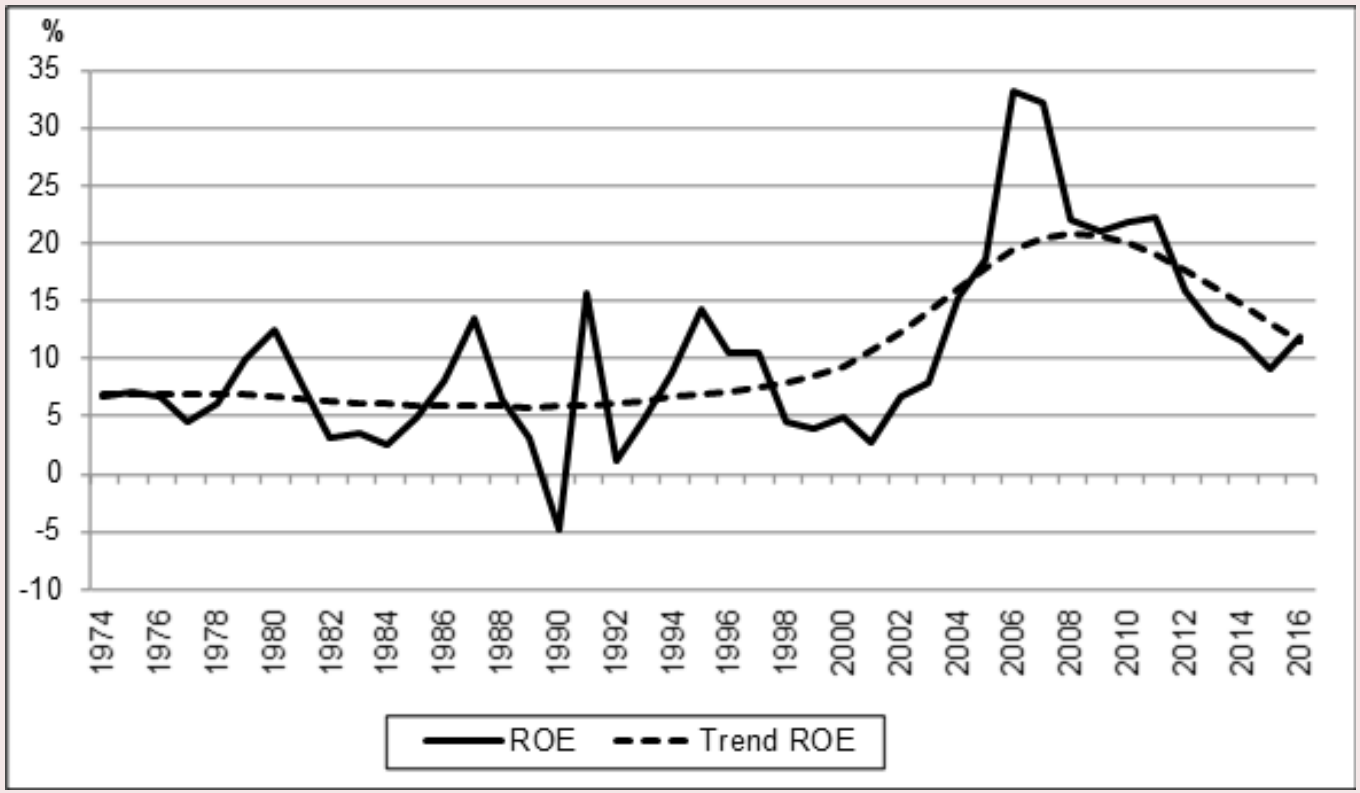
Average ROE for the main companies in the Lima Stock Exchange (1940-1959)



Decomposing Wages and Profits Shares

Profits share decomposition

Average ROE for the main companies in the Lima Stock Exchange (1974-2016)



Economic Growth Regime Evaluation: econometric analysis

Equation system based on Naastepad and Storm (2006), Lavoie and Stockhammer (2013), Alarco (2016), and Alarco and Castillo Garcıa (2019)

$$Y = C + I + G + X - M \cdots (1)$$

$$V = \frac{W}{P}(\gamma^{-1}) = w\gamma^{-1} \cdots (2)$$

$$\Pi = 1 - w\gamma^{-1} = 1 - V \cdots (3)$$

$$C = [(\delta_w V + \delta_\pi \Pi) Y]$$

$$C = [(\delta_w V + \delta_\pi (1 - V)) Y] \cdots (4)$$

$$M = a_0 + a_1 Y \cdots (5)$$

$$I = f(\pi, Y) = A_I + \theta_0 \pi + \theta_1 Y \cdots (6)$$

$$X = g(Z, \pi) = A_X + \epsilon_0 Z + \epsilon_1 \pi \cdots (7)$$

Economic Growth Regime Evaluation: econometric analysis

Elasticity of the GDP regarding the wage share in (8')

$$E_{YV} = \frac{C}{Y}E_{CV} + \frac{I}{Y}E_{IV} + \frac{X}{Y}E_{XV} - \alpha_1 E_{YV} \cdots (8)$$

$$\frac{C}{Y}E_{CV} = (\delta_w + \delta_\pi)\frac{W}{Y} + \delta_\pi E_{YV}$$

$$\frac{I}{Y}E_{IV} = (\theta_0 + \theta_1)E_{YV} - \theta_0\frac{W}{Y}$$

$$\frac{X}{Y}E_{XV} = \epsilon_1 E_{YV} - \epsilon_1\frac{W}{Y}$$

$$\frac{M}{Y}E_{MV} = \alpha_1 E_{YV}$$

$$E_{YV} = \left(\frac{1}{1 - \delta_\pi - (\theta_0 + \theta_1) - \epsilon_1 + \alpha_1}\right)[(\delta_w - \delta_\pi) - \theta_0 - \epsilon_1]\frac{W}{Y} \cdots (8')$$

Economic Growth Regime Evaluation: econometric analysis

Methodology

- For estimating the simultaneos equation system (4)-(7), the paper considers the 3SLS method.
- Significant estimated coefficients allows for calculating the elasticity E_{YV}.
- To assess Nikiforos (2014) criticisms on economic growth regime literature $\Rightarrow$ estimation for different time periods (1942-2019, 1942-1990, 1990-2019).
- The presence of unit-root in aggregate time series: necessity to present a second estimation of (8') based on the cointegration coefficients for each equation of the system.

Economic Growth Regime Evaluation: econometric analysis

Results: 3SLS estimations for three different time periods

	1942-2019				1942-1990				1990-2019			
	C	Ipriv	X	M	C	Ipriv	X	M	C	Ipriv	X	M
Wages	0.9997**				0.9380**				0.8151**			
	(19.48576)				(39.99824)				(9.83257)			
Π	0.4545**	0.0760	0.4614**		0.4974**	0.0418	0.2497**		0.6929**	0.0599	0.1623**	
	(4.966540)	(1.36769)	(5.4027)		(10.00208)	(0.75390)	(4.63026)		(4.82434)	(1.08038)	(2.46896)	
GDP		0.1954**		0.2679**		0.0892**		0.1440**		0.2299**		0.3059**
		(9.87032)		(44.12716)		(5.00236)		(18.43513)		(12.63941)		(38.42915)
Z			0.0009**				0.0005**				0.0024**	
			(5.51813)				(5.28304)				(13.55337)	
constant		-9.68E+09**	-1.11E+10**	-1.29E+10**		-1.24E+09**	1.65E+9	-8.05E+08		-2.04E+10**	-6.81E+10**	-2.39E+10**
		(-6.07183)	(-5.78043)	(-9.35366)		(1.68024)	(1.88111)	(-0.99981)		(-5.56336)	(-16.10389)	(-8.94039)
R^2	0.9925	0.9194	0.9423	0.9620	0.9934	0.8261	0.9011	0.8740	0.9864	0.9424	0.9898	0.9797
N	78	78	78	78	49	49	49	49	30	30	30	30

Note: $^{*}\ p < 0.05$; $^{**}\ p < 0.01$

Economic Growth Regime Evaluation: econometric analysis

Results: 3SLS estimations and elasticities

Elasticity	Full period 1942-2019	Cohort I 1942-1990	Cohort II 1990-2019
E_{YV}	0.1730	0.2267	-0.0548
$\frac{C}{Y}E_{CV}$	0.2549	0.2738	-0.0012
$\frac{I}{Y}E_{IV}$	0.0338	0.0202	-0.0126
$\frac{X}{Y}E_{XV}$	-0.0694	-0.0347	-0.0578
$\frac{M}{Y}E_{MV}$	0.0463	0.0327	-0.0168
Multiplier	6.3883	3.2500	4.5296

Economic Growth Regime Evaluation: econometric analysis

Augmented Dickey-Fuller test results

Variables	Test statistics	Test Critical Value at 5%	P value*	Unit Root Test
GDP	0.5494	-3.4700	0.9993	Non-stationary
ΔGDP	-5.3212	-3.4700	0.0002	Stationary
C	1.252460	-3.4709	1.000	Non-stationary
ΔC	-5.4648	-3.4709	0.0001	Stationary
Ipriv	-0.8880	-3.4700	0.9516	Non-stationary
ΔIpriv	-6.3078	-3.4700	0.0000	Stationary
X	1.1695	-3.4692	0.9999	Non-stationary
ΔX	-7.0648	-3.4700	0.0000	Stationary
M	-0.0902	-3.4692	0.9942	Non-stationary
ΔM	-8.5704	-3.4700	0.0000	Stationary
Z	0.7241	-3.4692	0.9996	Non-stationary
ΔZ	-7.2432	-3.4700	0.0000	Stationary
W	0.7506	-3.4709	0.9997	Non-stationary
ΔW	-6.7680	-3.4709	0.0000	Stationary
Π	-0.8879	-3.46924	0.9517	Non-stationary
ΔΠ	-4.2205	-3.4717	0.0068	Stationary

Economic Growth Regime Evaluation: econometric analysis

Cointegration coefficients and economic growth regime

Equation	*Constant*	W	Π	GDP	Z
C_{priv}		0.9807	0.5760		
I_{priv}			0.0514	0.0042	
X			0.2656		0.0060
M	-1.29E+09			0.2026	

E_{YV}	$\frac{C}{Y}E_{CV}$	$\frac{I}{Y}E_{IV}$	$\frac{X}{Y}E_{XV}$	$\frac{M}{Y}E_{MV}$	Multiplier
0.0929	0.1844	-0.0114	-0.0612	0.0188	3.2755

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