A two-sector model with target-return pricing in a SFC framework

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Main aim and contribution

- The main aim of the paper is to see whether a generalized Kaleckian model retains the key results of SFC one-sector neo-Kaleckian models, for instance the Lavoie and Godley (2001-02) model.
- The main contribution is to build a more realistic growth model that helps to explain economic phenomena and to investigate drivers of economic growth in the real world, all of this within a framework that fully integrates the production and the financial sectors.

Main result

- A two-sector model produces the same results as a one-sector model.
- There is the paradox of thrift.
- The paradox of profit may or may not be recovered (wage-led and profit-led regimes can be observed).

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Key features

- There is a consumption good and an investment good (machine), the latter being used in both sectors (it is a basic commodity).
- A target-return pricing formula, that takes into account the interdependence between sectors (as in input-output analysis or Sraffian pricing theory).
- The investment function is more realistic as it takes into account financial variables, as in other SFC models.
- There is a conflicting-claims theory of inflation.
- There is an endogenous labour-saving technical progress.

Table 1. Balance-sheet matrix.

	Households	Firm 1 (Consumption good)	Firm 2 (Capital good)	Banks	$\sum$
Money	$+M_d$			$-M_s$	0
Equities	$+(e_{d,1}p_{e,1}+e_{d,2}p_{e,2})$	$-e_{s,1}p_{e,1}$	$-e_{s,2}p_{e,2}$		0
Capital		$+p_2K_1$	$+p_2K_2$		$+p_2(K_1+K_2)$
Loans		$-L_{d,1}$	$-L_{d,2}$	$+(L_{s,1}+L_{s,2})$	0
Wealth (balancing item)	$-V$	$-p_2K_1+(L_{d,1}+e_{s,1}p_{e,1})$	$-p_2K_2+(L_{d,1}+e_{s,2}p_{e,2})$	0	$-p_2(K_1+K_2)$
$\sum$	0	0	0	0	0

Table 2. Transaction matrix.

		Households (1)	Firm 1 (Consumption sector) Current (2)	Firm 1 (Consumption sector) Capital (3)	Firm 2 (Capital sector) Current (4)	Firm 2 (Capital sector) Capital (5)	Banks Current (6)	Banks Capital (7)
Consumption		$-C_d$	$+C_s$					
Investment	Firm1			$-p_2 I_{d,1}$	$+p_2 I_{s,1}$			
	Firm2				$+p_2 I_{s,2}$	$-p_2 I_{d,2}$		
Wages	Firm1	$+W_{s,1}$	$-W_{d,1}$					
	Firm2	$+W_{s,2}$			$-W_{d,2}$			
Net profits	Firm1	$+F_{D,1}$	$-(F_{U,1}+F_{D,1})$	$+F_{U,1}$				
	Firm2	$+F_{D,2}$			$-(F_{U,2}+F_{D,2})$	$+F_{U,2}$		
Interest on loans	Firm1		$-r_{l(-1)}L_{d,1(-1)}$				$+r_{l(-1)}L_{s,1(-1)}$	
	Firm2				$-r_{l(-1)}L_{d,2(-1)}$		$+r_{l(-1)}L_{s,2(-1)}$	
Interest on deposits		$+r_{m(-1)}M_{d(-1)}$					$-r_{m(-1)}M_{s(-1)}$	
Δ in loans	Firm1			$+\Delta L_{d,1}$				$-\Delta L_{s,1}$
	Firm2					$+\Delta L_{d,2}$		$-\Delta L_{s,2}$
Δ in money		$-\Delta M_d$						$+\Delta M_s$
Δ in equities	Firm1	$-\Delta e_{d,1} p_{e,1}$		$+\Delta e_{s,1} p_{e,1}$				
	Firm2	$-\Delta e_{d,2} p_{e,2}$				$+\Delta e_{s,2} p_{e,2}$		
$\sum$		0	0	0	0	0	0	0

Pricing

- There is target-return pricing when the price is set in such a way that the rate of profit that will be realized when the firm is operating at the standard rate of capacity utilization is equal to the target rate of return (the normal rate of profit).
- There is plenty of evidence that this is how markups are set.
- The target rate of return is endogenous:

$$r^S = \psi r_f^S + (1-\psi) r_w^S, \qquad r_f^S = \bar{r}_f^S + \tau u_{(-1)},$$

Pricing

$$p_1 = (1 + \theta_1) w \alpha_1,$$

$$p_2 = (1 + \theta_2) w \alpha_2,$$

$$\theta_1 = \sigma_1 \alpha_2 r_1^s u_2^s / [\alpha_1 u_1^s (u_2^s - \sigma_2 r_2^s)]$$

$$\theta_2 = \sigma_2 r_2^s / (u_2^s - \sigma_2 r_2^s)$$

α_i is labour per unit of output

σ_i is machine per unit of output

Investment decisions and the technical progress function

$$g_i = \gamma_{i0} + \gamma_{i1} r_{cf,i(-1)} - \gamma_{i2} r_{l(-1)} l_{i(-1)} + \gamma_{i3}(q_{i(-1)} - 1) + \gamma_{i4} u_{i(-1)} + \gamma_{i5} g_{T,i(-1)},$$

$$g_{T,i} = \bar{g}_{T,i} + \varphi_{i1} g_{w(-1)} + \varphi_{i2} g_{i(-1)},$$

Webb effect and Kaldor-Verdoorn effect

Nominal wage determination

$$w = (1 + g_w) w_{(-1)},$$

$$g_w = \mu_1 (r_{(-1)} - r^s_{w(-1)}) + \mu_2 \pi^e,$$

$$\pi^e = \pi_{(-1)},$$

$$r^s_w = \bar{r}^s_w - \varepsilon g_{nd(-1)},$$

$$g_{nd} = \frac{\Delta N_d}{N_{d(-1)}},$$

The consumption function

$$C_d = a_1 W^e + a_2 FI^e + a_3 V_{(-1)},$$

$$W^e = (1 + g_{y(-1)})(W_{s,1(-1)} + W_{s,2(-1)}),$$

$$FI^e = (1 + g_{y(-1)})(F_{D,1(-1)} + F_{D,2(-1)} + r_{m(-2)} M_{d(-2)}),$$

Portfolio equations

$$\frac{M_d^e}{V^e} = \lambda_{10} + \lambda_{11} r_m - \lambda_{12} r_{e,1(-1)} - \lambda_{13} r_{e,2(-1)} + \lambda_{14} \left(\frac{Y_{hr}^e}{V^e} \right),$$

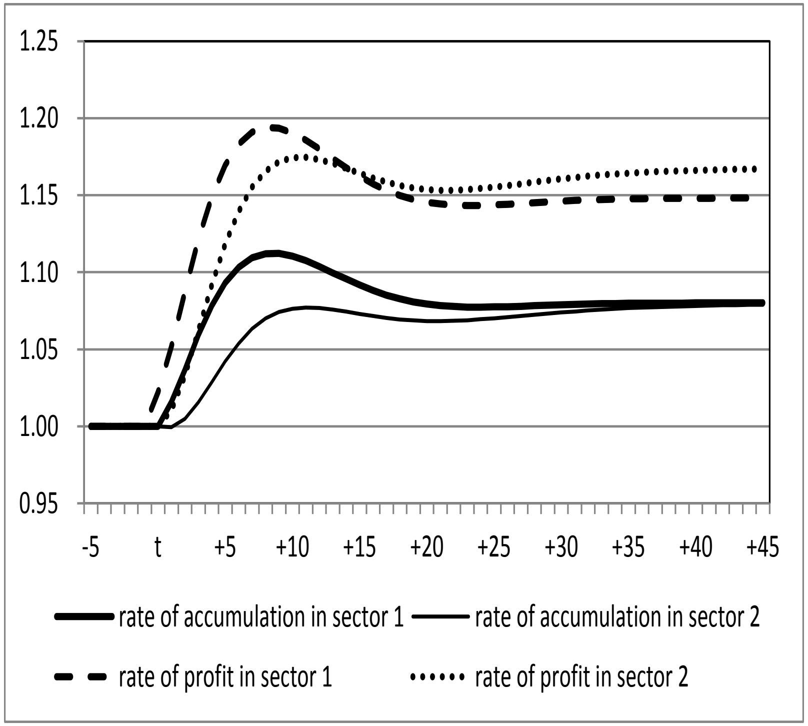
$$\frac{p_{e,1}^e e_{d,1}^e}{V^e} = \lambda_{20} - \lambda_{21} r_m + \lambda_{22} r_{e,1(-1)} - \lambda_{23} r_{e,2(-1)} - \lambda_{24} \left(\frac{Y_{hr}^e}{V^e} \right),$$

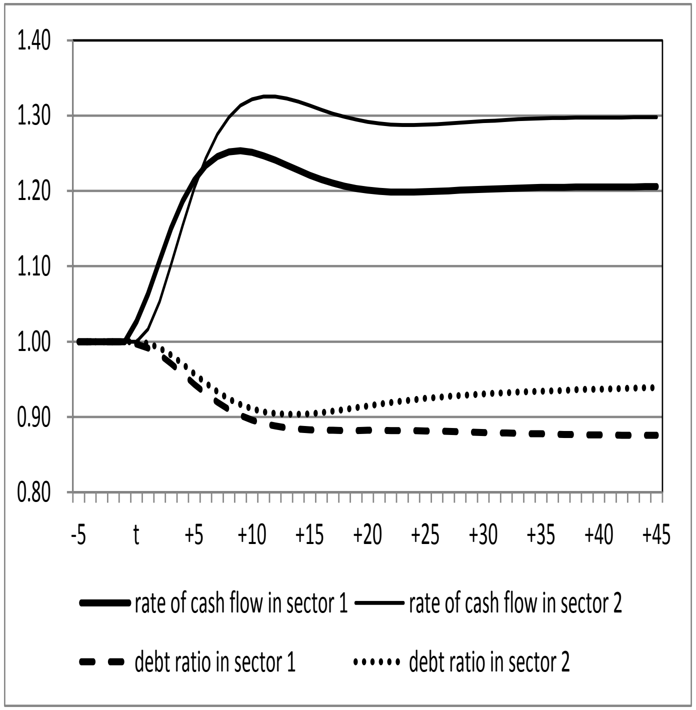
$$\frac{p_{e,2}^e e_{d,2}^e}{V^e} = \lambda_{30} - \lambda_{31} r_m - \lambda_{32} r_{e,1(-1)} + \lambda_{33} r_{e,2(-1)} - \lambda_{34} \left(\frac{Y_{hr}^e}{V^e} \right),$$

Calibration

- The model was calibrated.
- For the investment function, based on studies by Fazzari (1988), Ndikumana (1999), Arestis et al. (2012).
- For consumption out of wealth, based on Cutler (2002) and De Bonis and Silvestrini (2012).
- For consumption out of wages and profits, based on the studies of Storm and Naastepad (2012) and Onaran and Galanis (2012).
- The technical progress function is based on estimates by Hein and Tarrassow (2008) and Storm and Naastepad (2013).

A higher propensity to consume

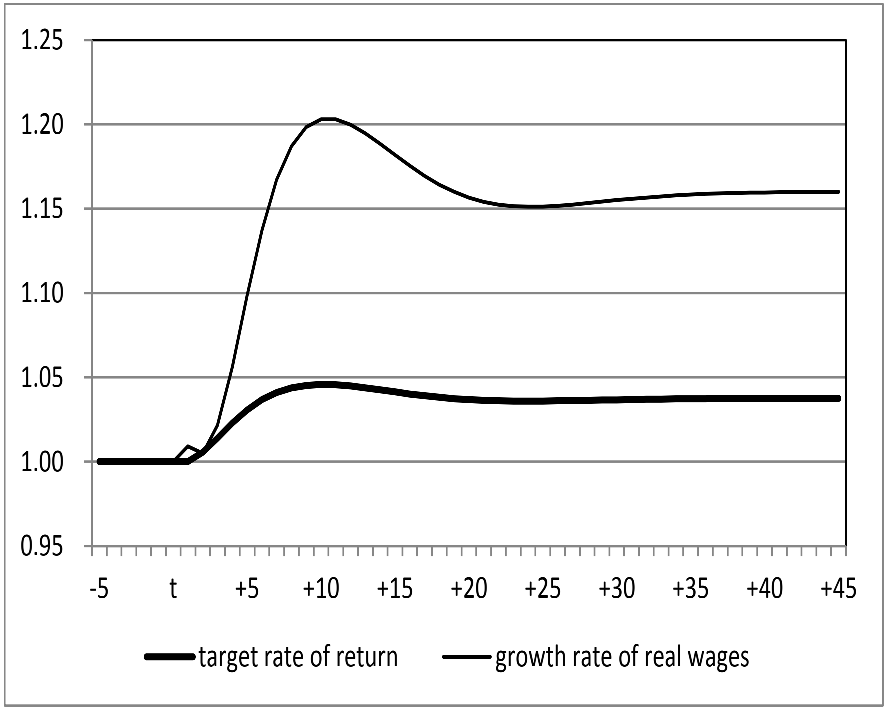


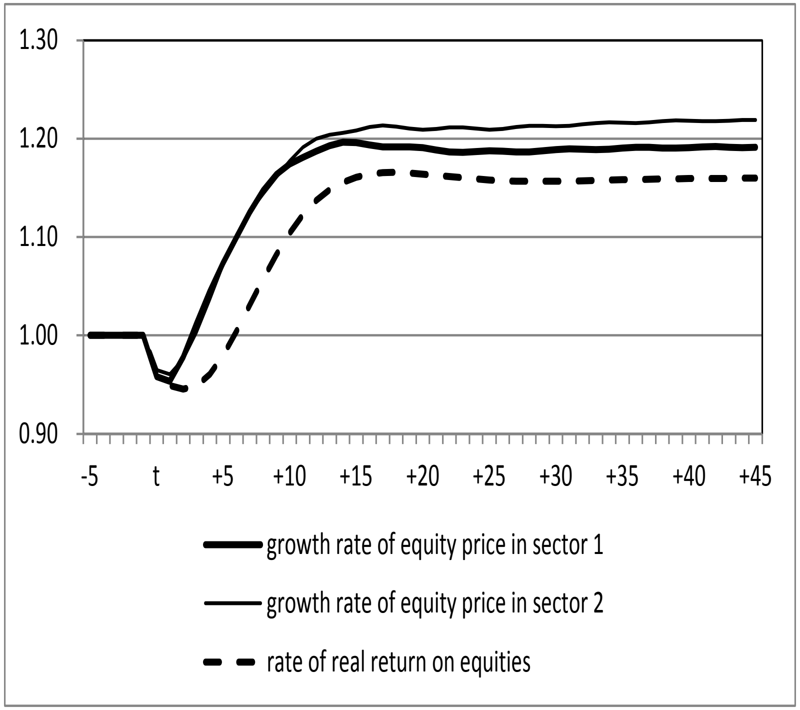


Growth rates and Profit rates

Cash flows and debt-ratios

A higher propensity to consume

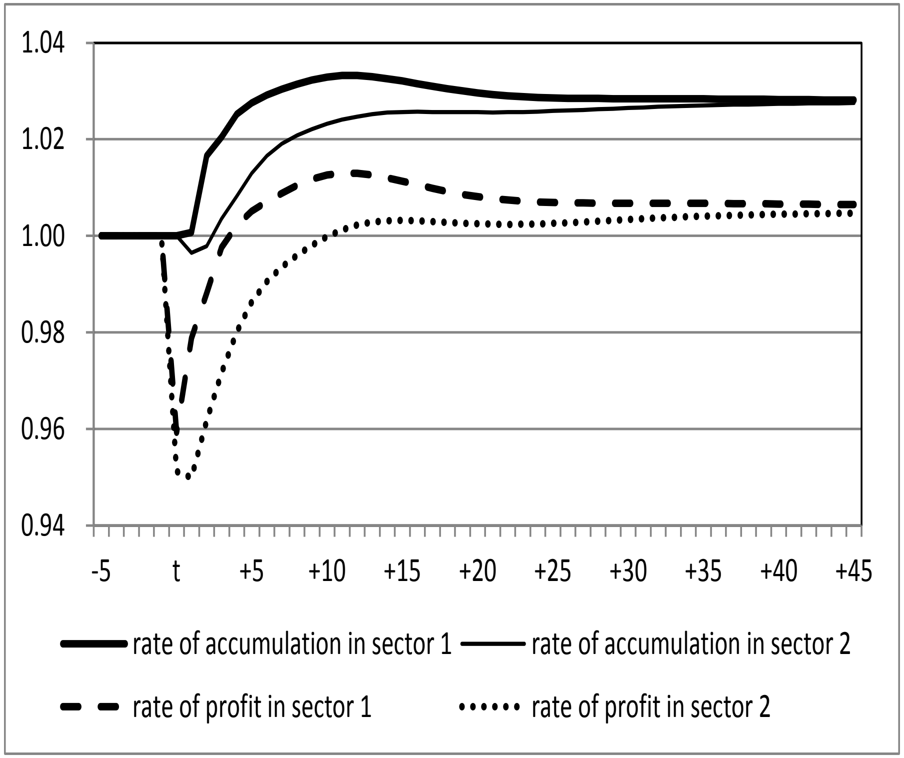




Target rate of return and growth rate of real wage

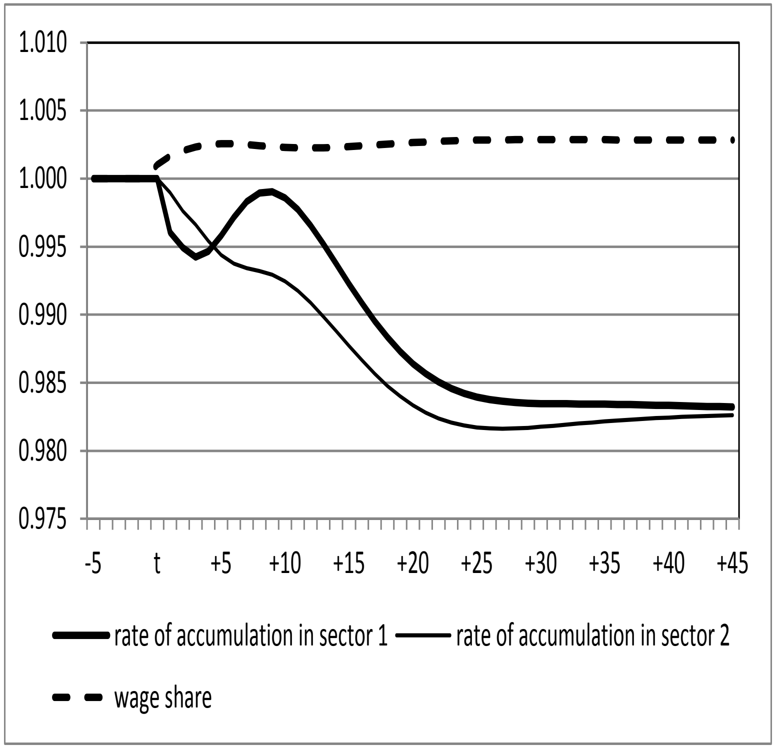
Growth rates of equity prices and rate of return on equities

Stronger bargaining power of labour



Growth rates and profit rates

Fall in the markup



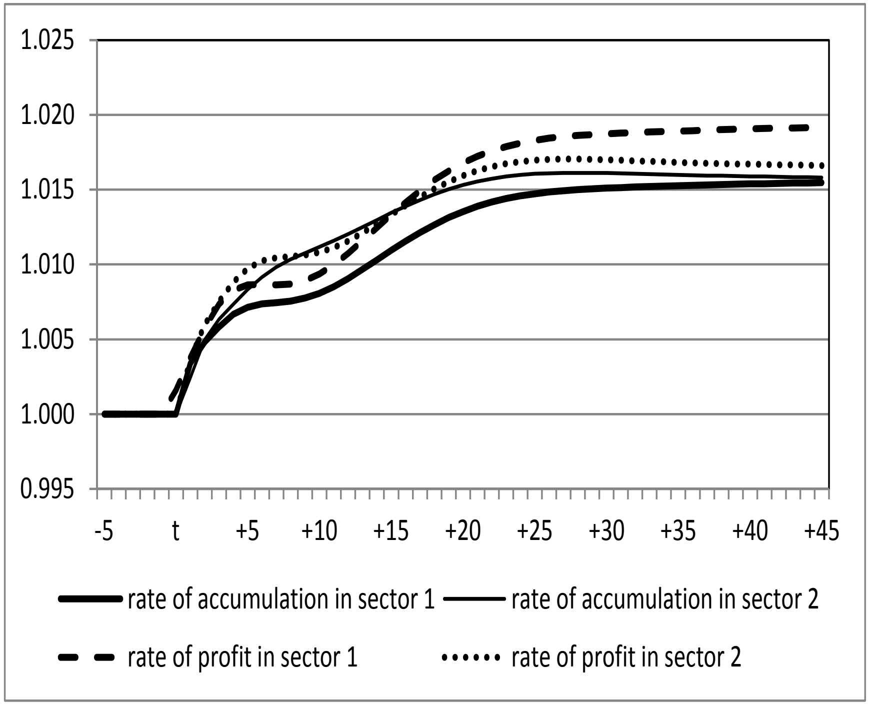
Growth rates and wage share

Rise in nominal wages

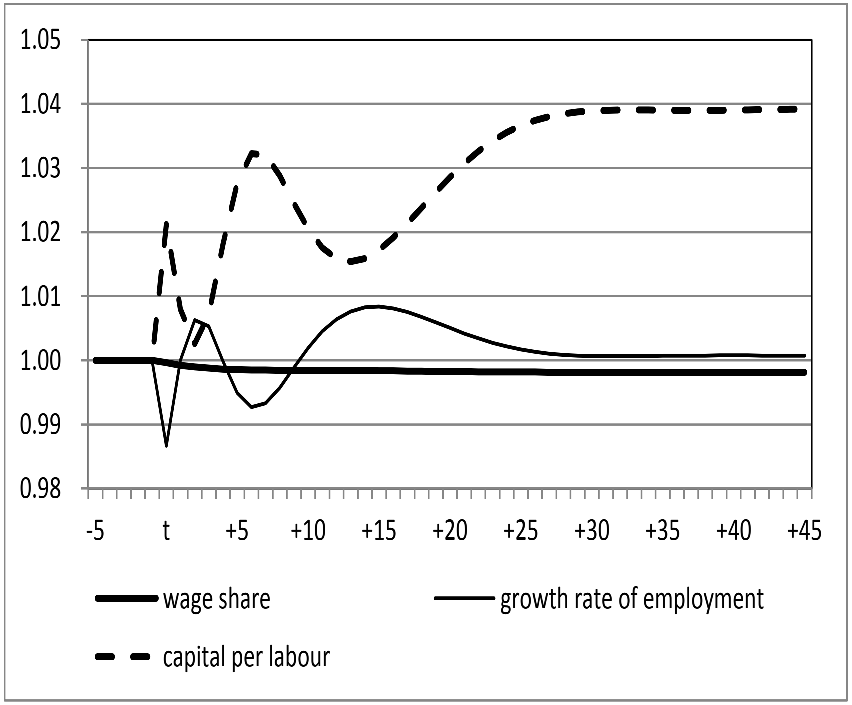
Technical progress

- We consider two cases of shocks to technical progress.
- Labour-saving technical progress, where the autonomous growth rate of labour productivity goes up in the same proportion in both sectors.
- Capital-saving technical progress, in which the required amount of fixed capital per unit of output decreases in both sectors, that is, we observe a decrease in the ratio of capital to full-capacity output.

Effect of labour-saving technical progress



Growth rates and profit rates

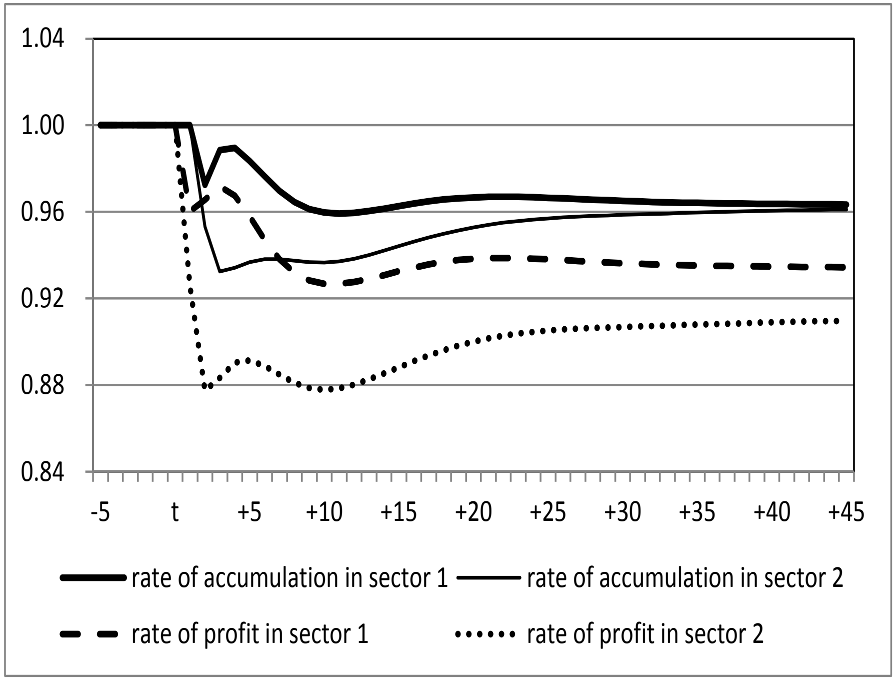


Wage share, growth rate of employment and capital per worker

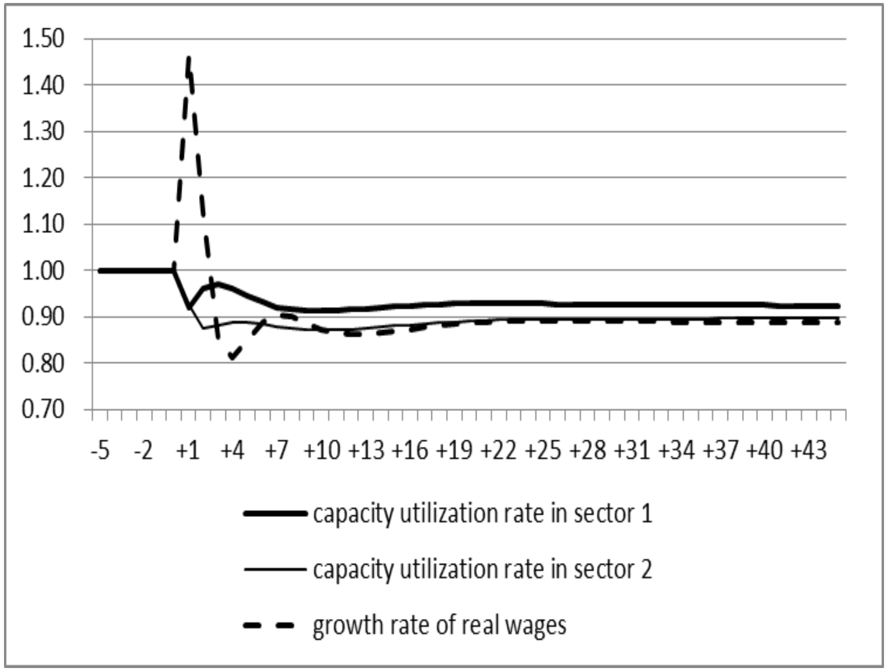
Labour-saving technical progress

- These results might explain the phenomenon of the ‘New Economy’ that developed countries experienced in the second half of the 1990s: high output growth, high profit rates and low rates of inflation, accompanied by growing real wages but decreasing wage shares.

Effect of capital-saving technical progress



Growth rates and profit rates



Capacity utilization and growth rate of real wages

Capital-saving technical progress

- It turns out that a decrease in the ratio of capital to full-capacity output results in lower growth rates and lower profit rates.
- In the short run, as less machines are needed to produce the same output, this leads to a sharp drop in the rate of capacity utilization and hence in the rate of capital accumulation.
- Also, as less funds are required to finance the acquisition of the machines needed to sustain output, there is a decrease in the costing margin set by firms. This slows down the rate of inflation, and it generates a temporary sharp rise in the growth rate of the real wage rate.

Conclusion

- The model provides a consistent integration of the financial system and of the real economy, taking into account portfolio decisions, balance-sheet effects and dealing with flows of funds within a (highly) simplified input-output model where machines are produced in an investment sector which is distinct from the consumption sector.
- Our simulations with a two-sector model roughly retrieve the main analytical results achieved with a one-sector Kaleckian model, albeit with some differences on details.