Neo–Kaleckian demand regimes and the personal distribution of income

Laura Carvalho

Department of Economics, University of Sao Paulo
21st FMM Conference

November 9, 2017

Functional distribution of income and aggregate demand

Kaldor (1955): different savings propensities between profit earners and wage earners make aggregate demand sensitive to the **functional distribution of income**.

Neo-Kaleckian models: combine differential savings, mark-up pricing and an independent investment function in an output adjusting short-run framework (Rowthorn, 1982; Dutt, 1984; Taylor, 1985; Bhaduri and Marglin, 1990)

Demand regimes can be wage-led or profit-led depending on the savings rate differential and on the sensitivity of investment to the profit share.

Reminder: a standard Neo-Kaleckian model

$$u = \frac{Y}{K}$$

$$\psi = 1 - \pi = \frac{wL}{PY} = \frac{\omega}{\epsilon}$$

$$r = \frac{\pi Y}{K} = \pi u$$

$$g^i = \frac{I}{K} = \gamma_0 + \gamma_u u + \gamma_r r = \gamma_0 + (\gamma_u + \gamma_\pi \pi)u$$

$$g^s = \frac{S}{K} = [s_\pi \pi + s_w(1 - \pi)]\, u = s(\pi)u$$

Reminder: a standard Neo-Kaleckian model

$$g^i = g^s$$

$$\implies u^* = \frac{\gamma_0}{-\left[\gamma_r \pi + \gamma_u - s_\pi \ \pi - s_w(1-\pi)\right]} \equiv \frac{\gamma_0}{\Delta}$$

$$\frac{\partial u^*}{\partial \pi} = \frac{\gamma_0 \left[\gamma_r - (s_\pi - s_w)\right]}{\Delta^2}$$

Wage-led: $\frac{\partial u}{\partial \pi} < 0 \iff \gamma_r < (s_\pi - s_w)$

Profit-led: $\frac{\partial u}{\partial \pi} > 0 \iff \gamma_r > (s_\pi - s_w)$

Empirical studies on demand regimes

Full estimations tend to show **profit-led demand** (Franke et al, 2006; Chiarella et al, 2004; Barbosa-Filho and Taylor, 2006)

Evidence on the role of **open economy effects**: economies may be wage-led domestically and profit-led with trade (Bowles and Boyer, 1995; Naastepad and Storm, 2007; Ederer and Stockhammer, 2007; Hein and Vogel, 2008).

Open economy extensions: Blecker (2004), Rezai (2011), Von Arnim et al (2012).

Problems

Models and estimations still tend to neglect the role of:

- household debt
- financialization
- non-linearities
- role of specific policies
- endogeneity of demand regimes
- personal distribution of income

Size vs functional distribution of income

Piketty and Saez (2003), Piketty (2014): data for the top shares of income and wages in the US from 1913 to 1998 show a rise in income inequality $+$ **working rich** have replaced rentiers at the top.

Mohun (2012): increase in the share of **supervisory workers** in total wages.

The question: *What is the effect of a rising income inequality among wage earners in the Neo-Kaleckian framework? How does it affect empirical results on demand regimes*?

Empirical Motivation
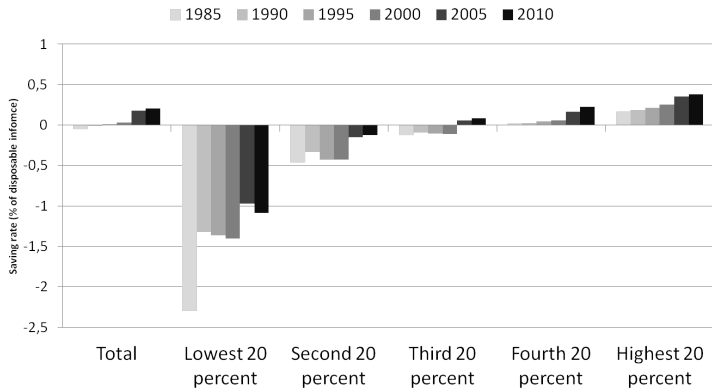
Savings rate increase with income, and the average savings rate at the top has itself increased over time.

Modeling strategy

Tavani and Vasudevan (2012) add an **unproductive managerial class** to the basic Neo-Kaleckian framework and investigate the role of wage inequality among managers and workers.

Carvalho and Rezai, 2016, CJE: savings rate as an increasing function of wage inequality.

Savings function

Personal saving from household i is assumed to be a function of its own income y_i, and that of the median household y_ν.

$$S_i = a_0 \ y_i + a_1(y_i - y_\nu).$$

Aggregate saving is then given by:

$$S_w = \int [a_0 \ y_i + a_1(y_i - y_\nu)] \ f(y) \ dy = \left[a_0 \ + a_1(1 - \frac{\nu}{\mu}) \right] \mu.$$

where μ is average income and ν is median income.

Savings function: Pareto

Assuming a Pareto distribution for wage income (Yakovenko, 2012), we obtain an aggregate savings function of the form:

$$\frac{S_w}{K} = \left[a_0 + a_1(1 - \frac{2^{1/\alpha}\ \alpha - 1}{\alpha})\right]\psi\ u = s_w\left[\alpha\right]\ \psi\ u$$

with $s_w\left[\alpha\right]$ the average propensity to save (APS) and α the parameter of the Pareto distribution which captures the degree of income inequality. Note that:

$$\frac{ds_w}{d\alpha} < 0$$
$$\lim_{\alpha \to \infty} s_w \to a_0$$

Model Structure

Kaldorian-Steindlian investment function and two savings functions (out of wages and profits) determine the short-run equilibrium output:

$$
\begin{aligned}
g^i &= \frac{I}{K} = \gamma_0 + \gamma_u u + \gamma_r r = \gamma_0 + (\gamma_u + \gamma_\pi (1 - \psi)) u \\
g_w^s &= \frac{S_w}{K} = s_w[\sigma]\ \psi\ u \\
g_\pi^s &= \frac{S_\pi}{K} = s_\pi\ \pi\ u = s_\pi\ (1 - \psi)\ u
\end{aligned}
$$

Short-run equilibrium

Output adjustment for macroeconomic balance.

$$\dot{u} = g^i - g^s_w - g^s_\pi = 0$$

$$u^* = u|_{\dot{u}=0} = \frac{\gamma_0}{-(\gamma_u + \gamma_\pi(1 - \psi) - s_w[\sigma]\ \psi\ - s_\pi\ (1 - \psi))} = \frac{\gamma_0}{\Delta}$$

Reduction of inequality among wage earners **always stimulates demand** due to lower aggregate savings...

$$\frac{du^*}{d\sigma} = \frac{\gamma_0}{\Delta^2} \frac{d\Delta}{d\sigma} = -u^* \frac{\psi}{\Delta} \frac{ds_w[\sigma]}{d\sigma} < 0$$

... but the impact on the demand regime of the economy is **ambiguous**, due to the effect on the multiplier (the sign of the second term depends on the demand regime itself).

$$\frac{d\frac{du^*}{d\psi}}{d\sigma} = -\frac{u}{\Delta} \frac{ds_w}{d\sigma} - \frac{du^*}{d\psi} \frac{1}{\Delta} \frac{ds_w}{d\sigma} \lessgtr 0.$$
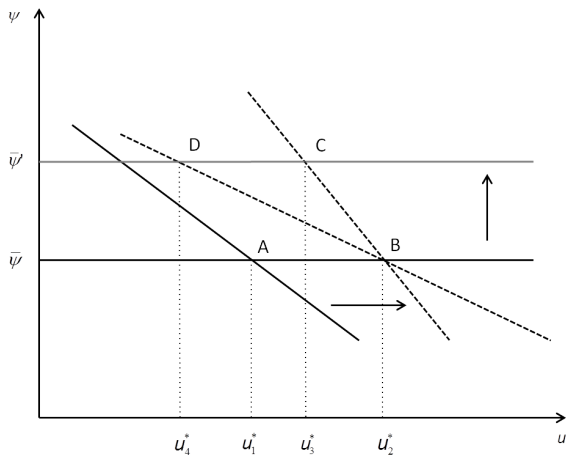
Reducing wage inequality...

... always pushes toward more *wage-ledness* if the economy is *wage-led* or *weakly profit-led*.
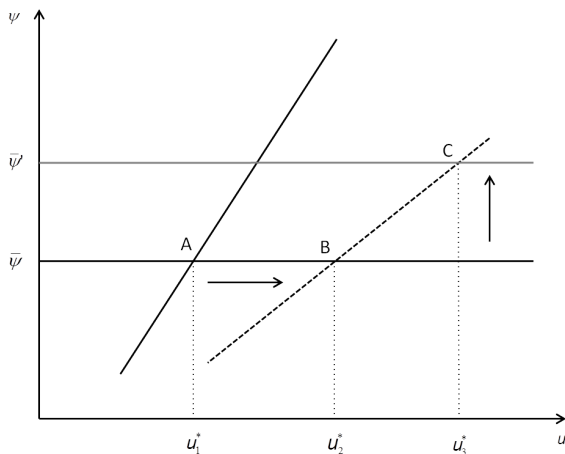
Reducing wage inequality...

... leads to more *profit-ledness* if the economy is *strongly profit-led*.

Size distribution of income and demand regimes

Since there is **theoretical indetermination**....

Empirical question: *How did changes in the size distribution of income affect demand regimes in different countries? Did this effect significantly bias previous empirical results?*

Empirical study: the case of the United States (1967-2010

Endogeneity problem: bi-directional causality between the wage share and capacity utilization.

A simple **two-dimensional VAR for capacity utilization and the wage-share** indicates that the US economy is **profit-led** (Barbosa-Filho and Taylor, 2006).

Question: *Did the increase in personal income inequality since 1980 in the US lead to an over- or to an under-estimation of such profit-led features?*

Econometric method

Tong (1990): **threshold autoregressive models** allow for a non-linearity in dynamic relationships.

Tsay (1998) extends it to the **multivariate** context: Threshold Vector Autoregression (TVAR).

We run a **two-dimensional TVAR** for capacity utilization and the wage share using the **Gini Coefficient as threshold variable** for the period 1967-2010, with two lags.

Results

|	Equation for u		Equation for Ψ	
	Low Inequality	High Inequality	Low Inequality	High Inequality
u_{-1}	1.3095***	1.4477***	-0.0039	0.0732
u_{-2}	-0.5941***	-0.6297***	0.2071*	0.0948
Ψ_{-1}	0.8536***	0.2956**	0.5271***	0.7473***
Ψ_{-2}	-0.9124***	-0.3181**	0.1603	0.2652**
Intercept	0.2456	0.0932	1.3061***	-0.053

Signif. Codes: *** 1%; **5%; *10%

Threshold value: 0.406469

Percentage of Observations in each regime: 32.9% 67.1%

Results

Higher inequality has turned the US economy more 'profit-led'. Selected Threshold: 0.406 (approx. Gini index of 1981).

Accumulated Response of Utilization to Labor Share
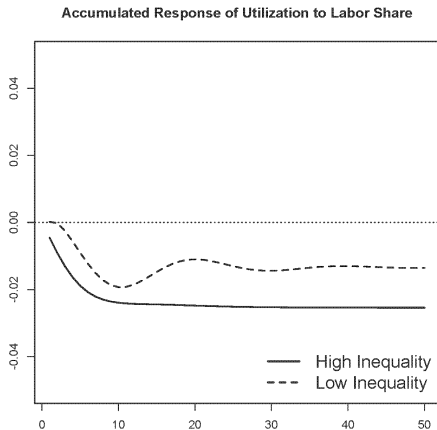
Discussion

Theoretical aspect: size distribution of income emerges as another omitted and important bias in the traditional Neo-Kaleckian framework (such as consumer debt, open economy issues and financialisation).

Policy implication: taxes-and-transfer schemes can prove effective to boost aggregate demand due to high savings differentials, and may also tilt the economy in a wage-led direction (thus reinforcing the economic argument for redistributing toward wages).

Carvalho e Rugitsky (2015)

Acceleration in growth with income redistribution in Brazil in the 2000s: **wage-led demand**?

Recent slowdown and crisis: wrong model (profit-led), wrong policies, or wrong commodity prices?

New elements for the theoretical and empirical debate on Neo–Kaleckian **demand regimes**.

Minimum wage and income distribution

Effects on wage inequality and the wage share.
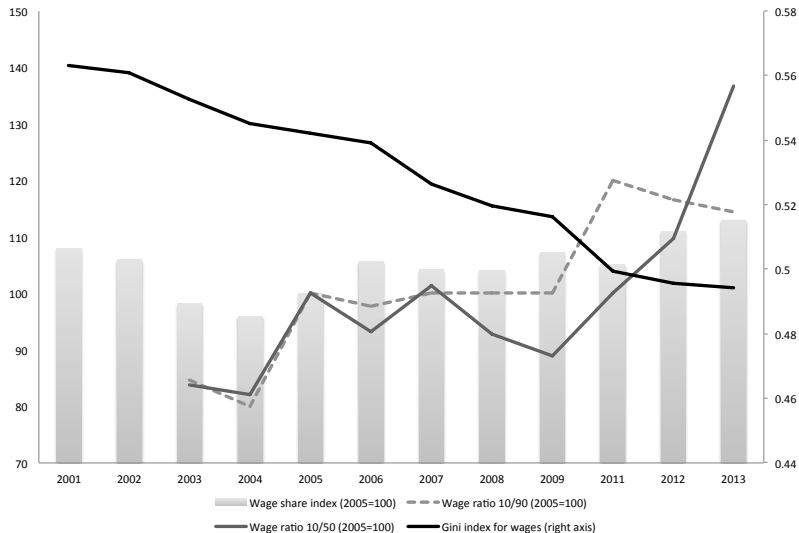
$$\Psi = \frac{\delta W_{min}/P}{Y/L} \tag{1}$$

$$\hat{\Psi} = \hat{\delta} + \hat{W}_{min} - \hat{P} - (\hat{Y} - \hat{L}) \tag{2}$$

where $\delta > 1$ is the ratio between the average wage to the minimum wage.

Formal rule since 2011 stabilizes the term $(\hat{W}_{min} - \hat{P} - \hat{Y})$.

Micro-econometric studies show a **reduction in wage disparity** at the bottom of the distribution $(\delta \downarrow)$

Distribution in Brazil (PNAD, IBGE)

Legend:
- Wage share index (2005=100)
- Wage ratio 10/90 (2005=100)
- Wage ratio 10/50 (2005=100)
- Gini index for wages (right axis)

The bottom and the top

Conditional **cash transfers** (*Bolsa Família*): from 6.5 million families in 2004 to around 14 million in 2012.

Studies show a contribution to the **reduction in the total Gini index** between 17 and 40%.

Stability in the **share of income going to the top 1%**: no reform in the tax system, high interest rates.

Redistribution at the bottom boosted consumption in the 2000's; investment grew even more

Lower inequality moved the **consumption pattern** toward more demand for services

Limits: **lower productivity growth and inflationary pressures**; external imbalance; no redistribution at the top