Discussion of 'A Multisector Perspective on Wage Stagnation'

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Summary

Wage decoupling & low-skill wage stagnation well known.
This paper: Look at low-skill wage divergence (decoupling).

1. Empirical decomposition:

$$\frac{\text{labour productivity}}{\text{real low-sk wage}} = \frac{y/P_Y}{w_l/P_C} = \frac{P_C}{P_Y}\frac{y}{w_l} = \frac{P_C}{P_Y}\frac{\frac{w}{\beta}}{w_l} = \frac{P_C}{P_Y}\frac{w}{w_l}\frac{1}{\beta}$$

   - $\frac{P_C}{P_Y}$ – cost of living
   - $\frac{y}{w_l}$ – nominal divergence
     - ★ $\frac{w}{w_l}$ – wage inequality
     - ★ β – labour income share

2. Propose a mechanism:
   - Augment standard structural change model.
   + Nested CES of K, H, L with diff & changing intensities across sectors.
   + K and H complements, both are good substitutes for L.
   + ST comes from: TFP growth diff across sectors & falling price of K.

3. Calibrate to gauge magnitudes.

Empirical decomposition: 1968–2014

Decompose

- real divergence

into the contribution of

- increasing living costs
- increasing inequality
- decreasing labour share

Empirical decomposition: 1968–2014

Decompose

- real divergence **increasing over time**

into the contribution of

- increasing living costs
- increasing inequality
- decreasing labour share

Empirical decomposition: 1968–2014

Decompose

- real divergence — **increasing over time**

into the contribution of

- increasing living costs — **positive, decreasing, average: 30%**
- increasing inequality
- decreasing labour share

Empirical decomposition: 1968–2014

Decompose

- real divergence — **increasing over time**

into the contribution of

- increasing living costs — **positive, decreasing, average: 30%**
- increasing inequality — **positive, fluctuates, average: 49%**
- decreasing labour share

Empirical decomposition: 1968–2014

Decompose

- real divergence — **increasing over time**

into the contribution of

- increasing living costs — **positive, decreasing, average: 30%**
- increasing inequality — **positive, fluctuates, average: 49%**
- decreasing labour share — **pos/neg, fluctuates, average: 21%**

The model in a nutshell

- output $j = G, S$:

$$Y_j = A_j \left[\xi_j L_j^{\frac{\eta-1}{\eta}} + (1-\xi_j) \left[\kappa_j K_j^{\frac{\rho-1}{\rho}} + (1-\kappa_j) H_j^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

- P_j equals the marginal cost of production
- labour market: exogenous H and L
  wage equalisation across sectors
- C_g and C_s chosen to maximise homothetic utility, elasticity $\varepsilon < 1$
- market clearing: $Y_s = C_s$ and $Y_g = C_g + \phi K$

$\rightarrow$ Question: is K determined as a residual from accounting identity?

Exogenously changing:

- skill supply: H, L
- sectoral TFP: A_g, A_s
- price of capital: ϕ
- production "weights": $\xi_g, \xi_s, \kappa_g, \kappa_s$

Mechanism 1: Structural Transformation

- output $j = G, S$:

$$Y_j = A_j \left[\xi_j L_j^{\frac{\eta-1}{\eta}} + (1-\xi_j) \left[\kappa_j K_j^{\frac{\rho-1}{\rho}} + (1-\kappa_j) H_j^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

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Assumptions:

$\varepsilon < 1$ & $A_g \uparrow > A_s \uparrow$ (Ngai and Pissarides 2007)

Mechanism:

1. G more productive $\Rightarrow$ ceteris paribus $Y_g/Y_s \uparrow$ & $P_g/P_s \downarrow$
   demand for G goes up, but less than supply would due to $\varepsilon < 1$
   $\Rightarrow$ inputs reallocate towards S
2. increasing P_s/P_g & K comes from Y_g $\Rightarrow$ rising relative cost of living

Mechanism 2: Skill biased ST

- output $j = G, S$:

$$Y_j = A_j \left[\xi_j L_j^{\frac{\eta-1}{\eta}} + (1-\xi_j) \left[\kappa_j K_j^{\frac{\rho-1}{\rho}} + (1-\kappa_j) H_j^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

- P_j equals the marginal cost of production
- labour market: exogenous H and L
  wage equalisation across sectors
- C_g and C_s chosen to maximise homothetic utility, elasticity $\varepsilon < 1$
- market clearing: $Y_s = C_s$ and $Y_g = C_g + \phi K$

Assumptions:

$$\varepsilon < 1 \;\&\; A_g \uparrow > A_s \uparrow \;\&\; \xi_g > \xi_s \text{ (Buera et al. 2018)}$$

Mechanism:

inputs move to S, which more intensive in $H \Rightarrow$ demand for $H/L \uparrow$
$\Rightarrow$ skill premium $\uparrow$

Mechanism 3: Capital-skill complementarity

- output $j = G, S$:

$$Y_j = A_j \left[\xi_j L_j^{\frac{\eta-1}{\eta}} + (1-\xi_j) \left[\kappa_j K_j^{\frac{\rho-1}{\rho}} + (1-\kappa_j) H_j^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

- P_j equals the marginal cost of production
- labour market: exogenous H and L
  wage equalisation across sectors
- C_g and C_s chosen to maximise homothetic utility, elasticity $\varepsilon < 1$
- market clearing: $Y_s = C_s$ and $Y_g = C_g + \phi K$

Assumptions:

$$\eta > 1 > \rho \;\&\; \phi \downarrow \text{ (Krusell et al. 2000)}$$

Mechanism:

1. $\phi \downarrow \Rightarrow$ more K, complements H and substitutes $L \Rightarrow$ skill premium $\uparrow$
2. $\kappa_g > \kappa_s$ and $K \uparrow \Rightarrow$ G output grows faster $\Rightarrow$ ST

Calibration: 1980–2003

Calibration strategy largely follows Buera et al. (2018):

- ε, η, ρ: elasticities taken off the shelf
- $\gamma_{A_g}, \gamma_{A_s}, \gamma_\phi$: calibrated to match Δ in P_g/P_s, relative price of capital, aggregate lab prod growth
- $\xi_{g,t}, \xi_{s,t}, \kappa_{g,t}, \kappa_{s,t}, H_t/L_t$: calibrated to match income share of factors (K, H, L) within sectors, and overall income share of H and L

$\rightarrow$ How is the weight in the utility function calibrated? To match value added shares?

Quantification: 1980–2003

Model

- reproduces 75% of real divergence
- relative role of change in living costs, inequality and labour share in line with decomposition

Quantify importance of each channel by shutting down the rest:

- $\gamma_{A_g} > \gamma_{A_s}$: 1/3 of real div, half through living costs, but lab share $\uparrow$
- $\gamma_\phi < 1$: 1/4 of real div, almost all through inequality, but lab share $\uparrow$
- $\xi_j, \kappa_j \downarrow$: 55% of real div, 3/4 inequality, 1/4 labour share
- $H/L \uparrow$: suppresses real div, but reduces lab share

$\rightarrow$ Points to interaction between channels.

What is new in this paper?

- Model and calibration basically identical to Buera et al. (2018), with the addition of capital (as in Krusell et al. (2000))
- The question is different:
  - Buera et al: skill premium
  - this paper: divergence and its components
    1. inequality (very related to skill premium)
    2. labour share
    3. cost of living

  $\rightarrow$ 2. and 3. cannot be studied without capital

What do we learn from this paper?

1. Empirical decomposition of low skilled wage divergence into inequality, labour share and cost of living.
   $\rightarrow$ I find this very interesting.

2. Why do we want a model with three mechanisms that delivers all three components jointly?

   It could be that each of these is driven by different mechanisms.

   $\rightarrow$ However, model shows that each mechanism connects some components.

   - Diff sectoral TFP growth generates inequality and rising costs of living.
   - Changing "weights" generate inequality and decline in labour share.
   - Falling capital cost and changing capital "weights" less important.

Comments – Changing factor weights

- What do changes in the weights of various production factors mean?

$$Y_{j,t} = A_{j,t}\left[\xi_{j,t} L_{j,t}^{\frac{\eta-1}{\eta}} + (1-\xi_{j,t})\left[\kappa_{j,t} K_{j,t}^{\frac{\rho-1}{\rho}} + (1-\kappa_{j,t}) H_{j,t}^{\frac{\rho-1}{\rho}}\right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

  - $A_{j,t}$ – between sector skill biased demand shift
  - $\xi_{j,t}$ – within sector skill biased demand shift

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  - $A_{j,t}$ – between sector skill biased demand shift
  - $\xi_{j,t}$ – within sector skill biased demand shift

- Equivalent to sector-specific factor-augmenting technologies.

$$Y_{j,t} = \left[(Z_{jL,t} L_{j,t})^{\frac{\eta-1}{\eta}} + \left[(Z_{jK,t} K_{j,t})^{\frac{\rho-1}{\rho}} + (Z_{jH,t} H_{j,t})^{\frac{\rho-1}{\rho}}\right]^{\frac{\rho}{\rho-1}\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

- Normalising the changing weights is not innocuous. $\Rightarrow$ The distinction of *between sector* and *within sector* demand shifts hinges on this.

- Alternative: calibrate sector-specific factor-augmenting technologies $\rightarrow$ extract sector and factor components from these (Bárány and Siegel (2019a)).

Comments – Low vs high-skilled labour

- Understanding the drivers of low-skilled wage growth is important.
- Here: model low- and high-skilled labour as different factors of production.

  Equivalent to high-skilled having different jobs than low-skilled.
- Alternative production function: occupational labour as diff inputs.
  - The mapping from education to occupations is not unique and is changing.
  - In particular composition of occupations among the low-skilled have changed and contributed to wage stagnation.

Comments

- Definition of sectors.
  - Makes sense from the production side.
  - Not justified from the consumption side. All industries within 'Goods' are perfect substitutes.
- Look at sub-periods.
  - Marked changes in relative role of cost of living, inequality, and labour share.
  - Could check whether the evolution of model implied sources, ϕ, changing weights, sectoral TFP are in line with this timing.

Summary

- Very interesting paper.
- Key novelty: Empirical decomposition and its connection to the various channels in the model.
  - Could be further developed by looking at sub-periods.
  - Consider looking at occupations.
  - Distinction of *between-* and *within-industry* shifters.