Trade, Market Imperfections and Labour Share

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Overview

Evidences: Declining Labour Share

- A sharp decline from 1980s to 2008 (IMF, 2017).
  1. 55% to 50% in 35 advanced economies during 1991-2014.
  2. 75% on 1970s to 65% in the recent years in Europe (ILO, 2017)
  3. 64% to 59% during this period in OECD countries(Sweeney, 2017)
  4. In a sample of 54 emerging market and developing economies, the labour share declined in 32 economies, which accounted for about 70 percent of 2014 emerging market GDP (ILO, 2017).

- The sharpest decline in the labour share was in manufacturing

Labour Share in Selected Asian Countries 1960-2014

Labour Share in Selected Asian Countries during 1960-2014
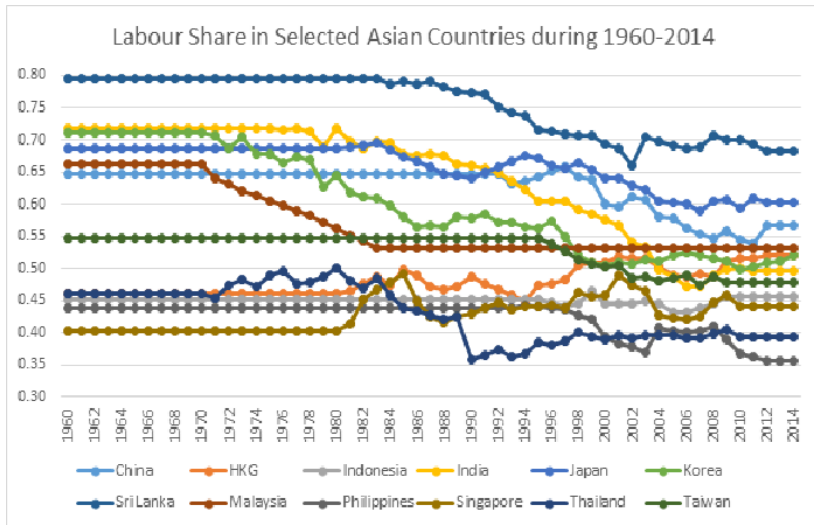
Source: Peen World Table Version 9.0

Responsible factors

- Technological progress, off-shoring, regulations of labour and product markets.
- Grossman et al. (2018) - slow-down of productivity growth in US.
- Price drop of capital goods due to automations, but such technology substitutes workers disproportionately (Karabarbounis and Neiman 2014).
- Piketty (2014) - rise in aggregate savings to national incomes - increase in capital-to-output ratios.
- Acemoglu and Restrepo (2018) - automation of tasks.
- Autor et al. (2017) and Kehrig and Vincent (2017) - rising industry concentration and the growing dominance of superstar firms.
- Tax reform encourages the industrial activities and raises inter-country competition (Rodrik 1998).
- This paper attempts to see whether trade could explain a part.

Melitz framework -Literature

- Workers benefit from - competition effects and labour reallocation effects (Melitz and Redding, 2014).

- Pro-competitive effects reduce market power (Melitz and Ottaviano, 2008; Arkolakis et al., 2015)). Restuccia and Rogerson (2008) and Hsieh and Klenow (2009) provided empirical supports of lower mark-up dispersion associated with less extensive distortion across firms.

- Edmond et al. (2015) and Arkolakis et al. (2015) point out negative possibility of pro-competitive effects that arises through joint movement of labour reallocation and markup distribution.

Is trade Responsible?

- Trade chances market conditions and hence may influence labour share.
- There are two distinct observations.
  1. Trade does not necessarily put pressure on labour union and wage (e.g., Dumont et al.(2006) in five European countries; Kamal et al., (2015) in China; Ashan and Mitra (2011) in India.
  2. Trade puts downward depresses the bargaining power of union. Hence, the labour market institution cannot be powerful as much as was in the pre-reform period (Wood, 1995; Rodrik, 1997). Slaughter (2001) found mixed evidences from the US. Similar results are also found by Brock and Dobbelaerre (2006)and Arbache (2004)respectively for Belgium and Brazil.
- Ashan and Mitra (2011): On average, trade increases the share of wages in total revenue for small, labour-intensive firms, but not for larger, less labour-intensive firms.
- Prachi and Hellbe (2018): Import tariff reductions have reduces labour only in labour rigid regions.

Is trade Responsible?

- The increased off-shoring and participation in global value chain (Feenstra and Hanson (1997).
- trade reduces wage of unskilled workers (Acemoglu, 2001).
- Guerriero and Sen (2012) - 89 countries for 1970-2009 - the trade openness along with technological innovation has positive on the labour share.
- Deon and Wan (2017) - increase in imports has a positive impact, but not the exports.
- Effect of trade on labour share is unambiguous.

Literature Review: Theory

- Trade redistributes the labour share by changing market conditions.
- Four theoretical paradigms:
  1. Stolper-Samuelson (1941): Workers in labour abundant country is benefited from trade.
  2. Krugman (1980): Removal of trade barriers promotes competitiveness and, is thereby expected to raise the demand for labour through the expansion of market and economies scale. Import competition on product prices could let the workers better off at least in real term.
  3. Melitz (2003): This could be true if labour moves from low to high productive sector under heterogeneity of firms
  4. Neary (2016): Wage rises, but labour share may decline if competition and comparative advantage dominate over market size effects under strategic competition and heterogeneity.

Market Imperfections - Growing evidences

- Using a disaggregated information over 43 countries, Loecker and Eeckhout (2018) - average mark-up exceeds one in 2016.
- It ranges from 2.84 (Denmark) to 1.19 (Portugal).
- the mark-up has gone up in most countries.
- Using a different dataset, Weche and Wambach (2018)and Calligaris, Criscuolo, and Marcolin (2017) - find similar results.
- In 33 advanced economies, Dez et al. (2018) mark-ups have been rising steadily since the 1980s, and at an accelerated pace since the mid-2000s.
- A relatively small number of superstar firms in the upper tail of the distribution
- Barkai (2016) and De Loecker and Eeckhout (2017) - gains in the profit share is reflected in the increased mark-ups.
- It is evident the workers engage certain degree of bargaining power (For example, 0.12 to 0.4 in Europe (Andrabi, 2003; Maiti, 2013).

Main findings

- The trade has negative effect both on wage and labour share when both product and labour markets are imperfect.
  1. market size effect
  2. competition effect
  3. specialisation (or comparative advantage) effect
  4. employment effect
- The market size effect exceeds the competition effect in the domestic economy.
- Unions gain power with the density and hence negates the net benefit from market size.
- Degree of comparative advantage dominates over others.
- Trade increases wage without union (Neary, 2016), but not with union.
- Labour share falls in both cases.
- An increase in domestic entry may raise the share.

The Model

- Built on Neary (2016), with introduction of labour union.
- Union has utility function, right-to-manage
- Unlike monopolistically competitive market (Melitz, 2003), it accommodates strategic competition.
- Consumer holds 'continuum-Pollak' preference over continuum of goods, denoted by z, $0 < z < 1$.
- A fixed number of firms producing the homogeneous goods in each sector, z.
- This allow them to draw positive surplus and labour finds scope to bargain a share over the surplus.
- The utility function of an individual:

$$U[x(z)] = \int_0^1 u(x(z))dz \qquad (1)$$

where $u(x(z)) = ax(z) - \frac{1}{2}bx(z)^2$

The Model (contd.)

- With the use of Lagrangian multiplier λ and income I, the inverse and direct demand functions are:

$$p(z) = \frac{1}{\lambda}[a - bx(z)]; x(z) = \frac{1}{b}[a - \lambda p(z)] \quad (2)$$

Integrating direct demand function, we can solve the value of λ.

$$\lambda = \frac{a\mu_1^p - bI}{\mu_2^p} \quad (3)$$

where I represents income and the effect of prices on λ are captured by two terms:

$$\mu_1^p = \int_0^1 p(z)dz; \mu_2^p = \int_0^1 p(z)^2 dz \quad (4)$$

- A rise in income and uncentered price variation and a fall in average prices lead to a drop in the marginal utility of money.
- The presence of such derivation helps to endogenise the income effect.

The Model: Aukarky

- n firms producing similar goods in the zth sector.
- Each has an exogenously fixed labour requirement per unit of output, denoted by $\alpha(z)$.
- If each produces $y_i(z)$ and w being wage paid to the workers, the profit of a representative firm in the sector:

$$\pi(z) = n[p(z)y_i(z) - \alpha(z)y_i(z)] \tag{5}$$

- Assuming $\acute{a} = a/\lambda$ and $\acute{b} = b/\lambda$, we find that the sectoral output and price are:

$$y(z) = n\frac{\acute{a} - w\alpha(z)}{\acute{b}(n+1)}; p(z) = \frac{\acute{a} + nw\alpha(z)}{n+1} \tag{6}$$

Aukarky: Without Union

- L is labour force available, then

$$L = \int_0^1 n\alpha(z)y(z)dz \qquad (7)$$

Substituting the value $y(z)$, we get

$$L = \frac{n}{b(n+1)} \int_0^1 \alpha(z)[a - w_a\alpha(z)]dz \qquad (8)$$

- From this equilibrium condition, the wage rate

$$w_a^N = \left(a\mu_1 - \frac{1+n}{n}bL\right)\frac{1}{\mu_2} \qquad (9)$$

- Market size, defined by n, encourages wage
- Competition $(1 + n)$ depresses it.

Autarky: Union

- With outside option of informal wage, w_0, the union's utility function:

$$H_a^C = (w - w_0) \int_0^1 \alpha(z) n y(z) dz \qquad (10)$$

- The equilibrium wage:

$$w_a^C \equiv (\lambda w)_a = \frac{1}{2} \left(\frac{a \mu_1}{\mu_2} + \lambda w_0 \right) \qquad (11)$$

- Market size and competition effects mutually cancel out.
- *Lemma 2:* $w_a^C > w_a^N$, where $a \frac{\mu_1}{2\mu_2} < \frac{w_0}{2} + \frac{n+1}{n} \frac{bL}{\mu_2}$.

Trade

- The aggregate demand would be:

$$\bar{x}(z) \equiv x(z) + x^*(z) = \frac{\lambda + \lambda^*}{b}\left(\frac{a + a^*}{\lambda + \lambda^*}\right) - p(z)) \qquad (12)$$

- Two changes
  1. Slope of perceived demand curve dropped from $\frac{b}{\lambda}$ to $\frac{b}{\lambda + \lambda^*}$.
  2. $\bar{x}(z)$ is much bigger now than $x(z)$ under autarky.
- They affect the market prices through market size and strategic competition.
- There is comparative advantage effect as well.

Specialisation and comparative advantage

- Sectoral specialisation depends on the labour costs - wage and productivity.
- The ratio $\frac{\alpha(z)}{\alpha^*(z)}$ is increasing in z.
- Home country is more efficient at lower value of z vice versa. item The sectoral profits of domestic and foreign firms are: $\Pi_T(z) = n(y_T(z))^2$ and $\Pi_T^*(z) = n^*(y_T^*(z))^2$.
- Plot the threshold costs in the plane of marginal cost ($w\alpha(z)$) of domestic economy against that ($w^*\alpha^*(z)$)of foreign economy.

$$w\alpha(z)|_{\Pi(z)=0} = \frac{\acute{a}}{n^*+1} + \frac{n^*}{n^*+1} w^*\alpha^*(z) \qquad (13)$$

- Since the ratio of $\alpha(z)/\alpha^*(z)$ is higher above the locus, the foreign firm would still produce in this region (say F).
- The foreign country specialise on the sectors $\tilde{z} > z > 1$.

Specialisation

- Similarly, for zero profit of foreign firm the threshold value of domestic marginal cost against that of foreign firm (along the locus C^*C^*):

$$w\alpha(z)|_{\Pi^*(z)=0} = -\frac{\acute{a}}{n} + \frac{n+1}{n}w^*\alpha^*(z) \tag{14}$$

- C^*C^* is rising faster than CC. Because, $\frac{w\alpha(z)}{w^*\alpha^*(z)}|_{\Pi^*(z)=0} > \frac{w\alpha(z)}{w^*\alpha^*(z)}|_{Pi(z)=0}$.

- Define the threshold value of z along the locus C^*C^* by $\tilde{z}^*$, where the domestic economy specialise $0 < z < \tilde{z}^*$ in the region H.

- Between CC and C^*C^*, both foreign and domestic firms will compete within each sector for $\tilde{z}^* < z < \tilde{z}$.
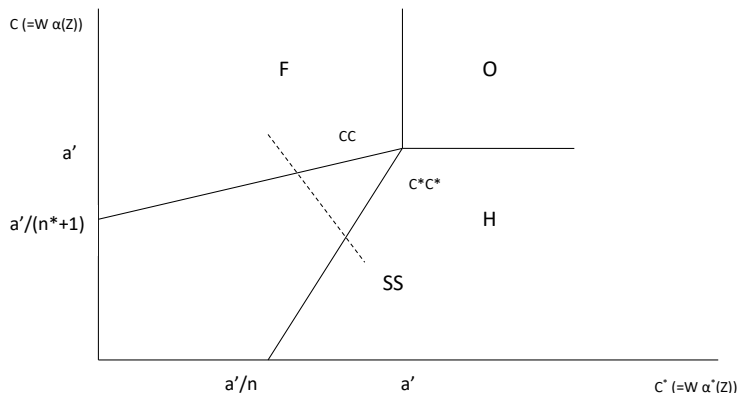
Trade under Symmetry

- Both countries are symmetric: $L = L*$; $a = á$; $n = n*$; $\mu_1 = \mu_1^*$, $\mu_2 = \mu_2^*$. $\lambda = \lambda^* = \frac{1}{2}\bar{\lambda}$, $w = w^*$.
- Technology distribution is each sector may not be the same. The uncentered covariance of the two technology distribution as:

$$\gamma \equiv \int_0^1 \alpha(z)\alpha^*(z)dz \tag{15}$$

- The centered covariance as:

$$\omega \equiv \int_0^1 [\alpha(z) - \mu_1][\alpha^*(z) - \mu_1^*]dz = \lambda - \mu_1\mu_1^* \tag{16}$$

- Degree of technology dissimilarity (comparative advantage):

$$\delta \equiv \int_0^1 \alpha(z)\big(\alpha(z) - \alpha^*(z)\big)dz = \mu_2 - \gamma = \sigma^2 - \omega \tag{17}$$

Trade

- The sectoral output of domestic producers and price are respectively:

$$y(z) = \frac{2n}{b(2n+1)}[a - \lambda n w[\alpha(z) - \alpha^*(z)] - \lambda w \alpha(z)] \qquad (18)$$

$$p(z) = \frac{1}{\lambda(2n+1)}[a + \lambda n(w(\alpha(z) - \alpha^*(z)) + 2\lambda n] \qquad (19)$$

- We can derive the wage in both countries:

$$w_T^N = \left(a\mu_1 - \frac{2n+1}{2n}bL\right)\frac{1}{\mu_2 + n\delta} \qquad (20)$$

1. Market size effect has not doubled from $\frac{1}{n}$ to $\frac{1}{2n}$.
2. Competition pushes down the price from $-(n+1)$ to $-(2n+1)$. These two forces together make favourable impact on wage and hence it goes up after trade.
3. Degree of comparative advantage, defined by δ, has adverse implication on the wage.

- The net effect of trade on wage in this case in seems favourable.

Trade with union

- The union utility function :

$$H_T^U = (w-w_0)\frac{2n}{b(2n+1)}\int_0^1 \alpha(z)(a-\lambda nw[\alpha(z)-\alpha*(z)]-\lambda(w\alpha(z)))dz \tag{21}$$

- The union fixes the wage at:

$$w_T^U = \frac{a\mu_1}{2(n\delta+\mu_2)} + \frac{\lambda w_0}{2} \tag{22}$$

- The union wage falls after trade.
  1. Competition is compensated by the rise of the market size.
  2. When $\delta = 0$, we find $w_T^U|\delta = 0 = w_a^U$.
  3. For $\delta > 0$, we get $w_T^U < w_a^U$.

- δ after trade seems to be the detrimental in making the difference between the two regimes.

- These three forces on the wage appear to be negative.

Proposition

Proposition 1

The joint effects of market size, competition and comparative advantage arising out of trade have been favourable on the equilibrium wage in the absence of union, but negative in the presence of union.

Proposition

Proposition 2

The joint effects of market size, competition and comparative advantage arising out of trade have been ambiguous on the equilibrium employment in the presence of union. If $\frac{1}{2(n+1)}(a\mu_1 - \mu_2 w_0) < n\delta w_0$, then $L_T^U < L_a^U$.

Trade and Labour Share

- The ratio of wage to profits: $\frac{s}{(1-s)}(=\theta) = \frac{wL}{\Pi}$
- we get

$$dln\theta_T^* = dln(wL)_T^* - dln\Pi_T^* = dlnw_T^* + dlnL_T^* - dln\Pi_T^* \qquad (23)$$

- The aggregate profit across sectors is:

$$\Pi_T = \int_0^1 n\pi(z)dz \qquad (24)$$

Where, $\pi(z) = [p(z) - w_T^*]y(z) = \acute{b}y^2(z).$

Trade and Labour share when $\delta = 0$ without union

- In the absence of union, the wage and profits are:

$$w_T^N|_{\delta=0} = (a\mu_1 - \frac{2n+1}{2n}bL)\frac{1}{\mu_2} \qquad (25)$$

- Comparing these with respect to autarky, we get

$$w_a^N - w_T^N|_{\delta=0} = -\frac{b^2}{n\mu_2} < 0 \qquad (26)$$

Lemma 3: If $\delta = 0$, then $\theta_a^N/\theta_{T|\delta=0}^N < 0$.

Trade and Labour share when $\delta = 0$ with union

- $w_a^U = w_T^U|_{\delta=0} = \frac{a\mu_1}{2\mu_2} + \frac{w_0}{2}$. No change in wage rate.
- Similarly, $L_a^U = \frac{n}{b(n+1)}[a\mu_1 - \mu_2 w_a^U]$ and
  $L_T^U = \frac{2n}{b(2n+1)}[a\mu_1 - (\mu_2 + n\delta)w_T^U]$. Then, we get
  $L * U_{T|\delta=0}/L_a^U = \frac{2(n+1)}{(1+2n)} > 0$.

  Lemma 4: If $\delta = 0$, then $\frac{\theta_T^U|_{\delta=0}}{\theta_a^U} = \frac{2n+1}{n+1} > 1$.

Labour Share when $\delta \neq 0$ and no union

- The level of profits

$$Hdln\Pi_T^* = -2[a\mu_1 - \{\mu_2 + 2(n+1)n\delta\}w_T^*]w_T^*dlnw_T^* + 2n(n+1)\delta(w_T^*)^2dln\delta \tag{27}$$

where, $H = a^2 - 2a\mu_1 w_T^* + \{\mu_2 + 2n(n+1)\delta\}(w_T^*)^2$.

- Profit is inversely related to wage change and positively related to the degree of comparative advantage.

- In the absence of union, since $dlnL_T^* = 0$, we get

$$Hln\theta_T^N = [a^2 - \{\mu_2 + 2n(n+1)\delta\}(w_T^N)^2]dlnw_T^N - 2n(n+1)\delta(w_T^N)^2dln\delta \tag{28}$$

- After substituting $dlnw_T^N = -\frac{n\delta}{\mu_2 + n\delta}dln\delta$, we get

$$H\frac{dln\theta_T^N}{dln\delta} = -[a^2 + (2n+1)\mu_2(w_T^N)^2]\frac{n\delta}{\mu_2 + n\delta} < 0 \tag{29}$$

Labour Share when $\delta \neq 0$ and union

- $dlnL_T^* \neq 0$.
- At the w_T^U, $L = \frac{2n}{b(2n+1)}[a\mu_1(\mu_2 + n\delta)w_T^U]$.
- wage bulls changes

$$Gdln(wL)_T^U = [a\mu_1 - 2(\mu_2 + n\delta)w_T^U]w_T^U dlnw_T^U - n\delta(w_T^U)^2 dln\delta \quad (30)$$

$$dln\theta_T^U = \frac{[a\mu_1 - 2(\mu_2 + n\delta)w_T^U]w_T^U}{G}dlnw_T^U - \frac{n\delta(w_T^U)^2}{G}dln\delta$$
$$-\frac{2[a\mu_1 - \{\mu_2 + 2(n+1)n\delta\}w_T^U]w_T^*}{H}dlnw_T^U - \frac{2n(n+1)\delta(w_T^U)^2}{H}$$

- The direct effect of comparative advantage can be found:

$$\frac{dln\theta_T^U}{dln\delta} = -\frac{n\delta(w_T^U)^2}{G} - \frac{2n(n+1)\delta(w_T^U)^2}{H}$$
$$= -n\delta(w_T^U)^2(a(a+2n\mu_1 w_T^C) - (a+2n)\mu_2(w_T^U)^2) \quad (32)$$

$$\frac{dln\theta_T^U}{dln\delta} = -\frac{n\delta w_T^U(a^2 + (1+2n)\mu_2 w_T^U)(a\mu_1 - (n\delta + \mu_2))}{(n\delta + \mu_2)GH} < 0 \quad (33)$$

Hence, Net effect of direct effect and indirect effects of comparative advantages via wage on the labour share is negative

Proposition

Proposition 3

Even if the trade affects absolute wage differently between with and without union, the labour share falls unambiguously in both case due to direct and indirect effects of wage change via specialisation (or comparative advantage). But, the share does not fall without specialisation.

Ex-post specialisation

Ex-post Specialization (without union)

Ex-post Specialization (with union)

Competitive Policy
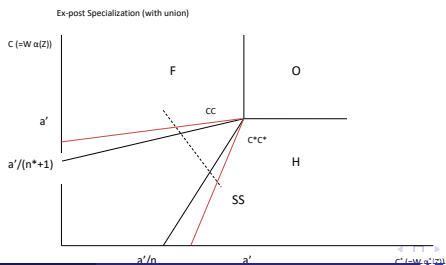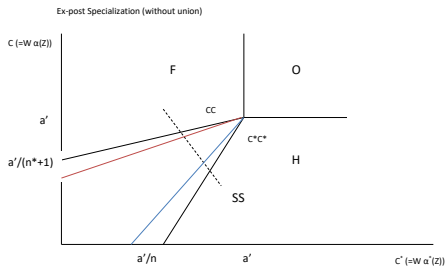
- Competitive policy would encourage entry
- This can increase both wage and employment
- Entry effect cannot be appropriated by the domestic economy
- The entry effect depends on
  1. Rise of domestic wage and employment
  2. It encourages foreign wage and employment as well and limits the first round effect
  3. Specialisation is endogenously changed and seems to fall

Entry and Specialisation

- Domestic specialises in $z \in [0, \tilde{z}^*]$ and compete over $z \in [\tilde{z}^*, \tilde{z}]$,

$$L(w, w^*; n) = \int_0^{\tilde{z}^*} n\alpha(z)y(z)|_{n*=0}dz + \int_{\tilde{z}^*}^{\tilde{z}} n\alpha(z)y(z)|_{n*>0}dz \quad (34)$$

- Foreign specialises in $z \in [\tilde{z}, 1]$ and competes over $z \in [\tilde{z}^*, \tilde{z}]$,

$$L*(w, w^*; n*) = \int_{\tilde{z}}^1 n*\alpha*(z)y*(z)|_{n=0}dz + \int_{\tilde{z}^*}^{\tilde{z}} n*\alpha*(z)y*(z)|_{n>0}dz \quad (35)$$

- outputs in domestic and foreign economy

$$\tilde{a} - (n*+1)w\alpha(\tilde{z}) + n*w*\alpha*(\tilde{z}) \geq 0, \tilde{z} \leq 1 \quad (36)$$

$$\tilde{a} - (n+1)w*\alpha*(\tilde{z}*) + nw\alpha(\tilde{z}) \geq 0, \tilde{z} \geq 0 \quad (37)$$

- To obtain the effect of domestic entry, we get

$$\frac{d\tilde{z}}{dn} = \frac{\delta\tilde{z}}{\delta w}\frac{dw}{dn} + \frac{\delta\tilde{z}}{\delta w*}\frac{dw*}{dn} \quad (38)$$

Entry effect without union

- No Union

$$\frac{\hat{w} - \hat{w^*}}{\hat{n}} = \frac{1}{nww^*A}[L_n^*(wL_w + w^*L_w^*) - L_n(w^*L_{w^*}^* + wL_w^*)] \quad (39)$$

- If If $L_n^*(wL_w + w^*L_w^*) > 0$ and $L_n(w^*L_{w^*}^* + wL_w^*) < 0$, then $\frac{\hat{w} - \hat{w^*}}{\hat{n}} > 0$.

Entry effect with union

- No Union

$$\frac{\hat{w} - \hat{w^*}}{\hat{n}} = \frac{n}{ww^*A}[(2wL_w + w^*L^{w^*})(L_n^* + (w^* - w_0)L_{w^*n}^*) - (2w^*L_w^* + wL_w^*)$$

(40)

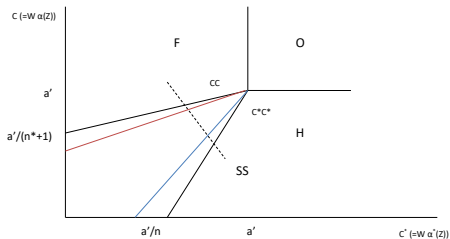- In this case, wage effect would be stronger.

Proposition

Proposition 4

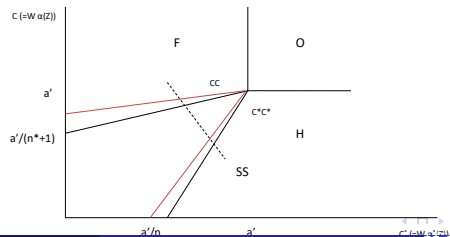The domestic entry raises the domestic wage relative to the foreign level. The union wage gain is not unambiguously higher than that without union due to the cross-wage and specialisation effects between countries. In both, the wage cannot reach upto the level of autarky for the same in response to the domestic entry.

Entry and specialisation

Entry and Specialization (without union)

Entry and Specialization (with union)

Empirical Framework

$$lnY_{st} = a_0 + a_{st}t + \sum_{i=1}^{N} \alpha_i lnp_{sit} + \sum_{k=1}^{M} \beta_k V_{sit} + \frac{1}{2}\sum_{i=1}^{N}\sum_{j=1}^{N} \gamma_{ij} lnp_{sit} lnp_{sjt}$$

$$+\frac{1}{2}\sum_{k=1}^{M}\sum_{l=1}^{M} \delta_{kl} lnV_{skt} lnV_{slt} + \sum_{i=1}^{N}\sum_{k=1}^{M} \theta_{ik} lnp_{sit} lnV_{skt} \qquad (41)$$

Where, $\sum_i^N \alpha_{it} = 1$; $\sum_k^M \beta_{it} = 1$, $\sum_{it}^N \gamma_{it} = 0$ and $\sum_{kt}^M \delta_{kt} = 0$;
$k = 1, ..., M$ and $i = 1, ..., N$.
The function enables us to derive a flexible expression for labour share.
Taking derivative with respect to lnV_{it}, we get

$$s_{skt} = \beta_k + \sum_{skt}^{M} \delta_{kl} lnV_{slt} + \sum_{it}^{N} \theta_{kl} lnp_{sit} + u_{sit} \qquad (42)$$

Table : Trade on Labour Share across countries during 1954-2014: Dynamic Panel Regression

VARIABLES	(1) labsh	(2) labsh	(3) labsh
Capital (log)	0.005***	0.035***	0.042***
	(0.001)	(0.001)	(0.001)
Labour (log)	-0.007***	-0.035***	-0.043***
	(0.001)	(0.001)	(0.002)
Consumpt. goods price (log)	-0.008***	-0.001	-0.002*
	(0.001)	(0.001)	(0.001)
Invest. good prices (log)	0.011***	0.001*	0.002**
	(0.001)	(0.001)	(0.001)
Trade (log)	-0.004***	-0.001***	0.001***
	(0.000)	(0.000)	(0.000)
Human Capital	-0.045***	0.002	0.004**
	(0.001)	(0.002)	(0.002)
Exchange rate	0.001***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
LR		-0.000	0.050***
		(0.001)	(0.004)
BR		-0.081***	-0.066***
		(0.001)	(0.001)
LR x Trade (log)			-0.002***
			(0.000)
BR x Trade (log)			-0.002***
			(0.000)
Constant	0.678***	0.590***	0.462***
	(0.006)	(0.009)	(0.012)
Observations	5,953	5,839	3,088
Number of country	116	116	63
Model	GMM-DPD	GMM-DPD	GMM-DPD

$$max_{w,L}\Omega = (Lw + (\bar{L} - L)w_0 - \bar{L}w_0)^\theta (PY - wL)^{1-\theta} \qquad (43)$$

Differentiating with respect to wage and employment, substituting $\frac{\delta(PY)}{\delta L} = \frac{P\delta Y}{\mu\delta L}$, where $\mu = \frac{e}{e-1}$ and $e = \frac{P}{Y}\frac{dY}{dP}$, then rearranging the terms, we get:

$$s_L^U = \frac{\theta}{1-\theta}(1 - s_L^U) + \frac{s_L}{\mu} \qquad (44)$$

Table : Trade and market powers across countries during 1954-2014

	(1)	(2)	(3)
VARIABLES	sr	sr	sr
LR	0.435***	0.436***	0.649***
	(0.002)	(0.003)	(0.003)
BR	-0.961***	-0.969***	-0.923***
	(0.001)	(0.001)	(0.001)
Capital (log)	0.481***	0.471***	0.622***
	(0.001)	(0.001)	(0.002)
LR* TR_SHARE		-0.048***	0.088***
		(0.004)	(0.004)
BR*TR_SHARE		0.003***	0.036***
		(0.001)	(0.001)
Human Capital			-0.378***
			(0.004)
Government Exp. (%)			0.179***
			(0.007)
TFP	0.487***	0.491***	
	(0.002)	(0.002)	
Constant	3.984***	4.112***	3.394***
	(0.007)	(0.008)	(0.014)
Observations	5,953	5,953	5,953
Number of countries	116	116	116
Model	GMM-DPD	GMM-DPD	GMM-DPD

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
sr = Solow Residual; LR = lnY- lnK; BR = $(S^U_L -1)(lnL-lnK)$

Concluding Observations

1. Trade changes both product and labour markets, and hence the distributive share of labour.

2. We extend Neary (2016) by introducing the labour union.

3. The joint effects of competition and comparative advantage affect adversely and go against the market size effect with union.

4. The comparative advantage effect accentuates the fall as the most productive firm gets greater market share leading to a drop of labour demand.

5. This dominates over other forces.

6. An increase in domestic competitiveness leads to a rise in domestic specialisation and drop in labour share in the presence of union.

7. Trade weakens labour market rigidity and that leads to the declining labour share.

8. Trade restriction cannot benefit much for employment