

Trade, Migration, and Productivity: A Quantitative Analysis of China

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Essay Structure

I. Data, Facts, and Back-of-the-Envelope Calculation

- A. Spatial Distribution of Income
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- C. Trade Policies and Trade Patterns
- D. Potential Gains from Migration and Trade

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- B. Production, Trade, and Goods Prices
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III. Inferring Migration and Trade Costs

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- A. Further Reductions in Trade and Migration Costs
- B. Land Reform

Outline

1. Introduction
2. Theoretical Framework
3. Empirical Analysis
4. Critical Thinking

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 - *Understanding China's Growth: Past, Present and Future*
 - *Agriculture and Aggregate Productivity: A Quantitative Cross-Country Analysis*

Income Distribution and Migration Patterns

Panel A. Real GDP/worker, relative to mean



Relative real income
(Average = 1):

1 2 3

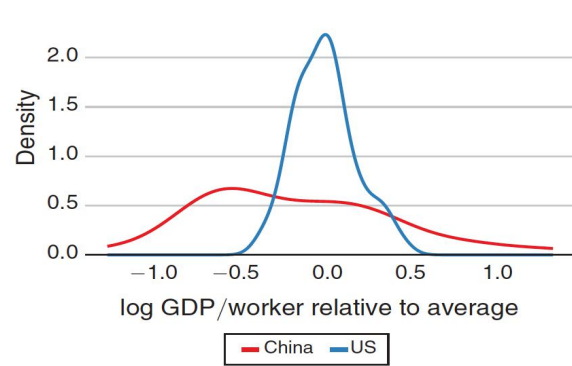
Panel B. Migrant share of total employment



Migrant share of
employment (%):

0 10 20 30

Panel A. Across regions within China and the US



Panel B. Across China's regions within ag and non-ag

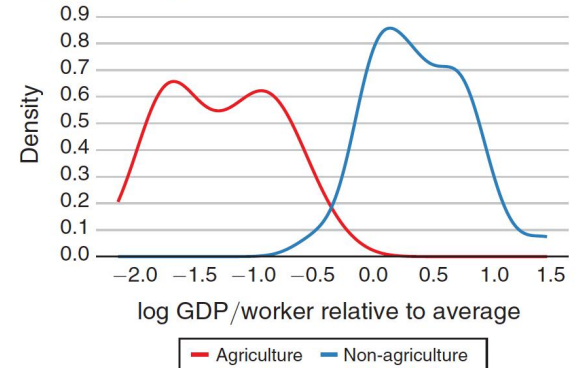


TABLE 1—STOCK OF MIGRANT WORKERS IN CHINA

	Inter-provincial		Intra-provincial	
	2000	2005	2000	2005
Total migrant stock (millions)	26.5	49.0	90.1	120.4
<i>Share of total employment (%)</i>				
Total migrants	4.2	7.2	14.3	17.7
Agriculture-to-non-agriculture migrants	3.4	5.6	13.1	16.4

- 地区间、部门间收入分配差异性大
- 户籍制度改革带来人口流动的提升

Trade Policies and Trade Patterns

TABLE 2—INTERNAL AND EXTERNAL TRADE SHARES OF CHINA

Importer	Exporter									Total other prov.
	Northeast	Beijing Tianjin	North Coast	Central Coast	South Coast	Central region	Northwest	Southwest	Abroad	
<i>Year 2002</i>										
Northeast	87.9	0.7	1.0	0.8	1.3	1.1	0.8	0.9	5.5	6.6
Beijing/Tianjin	3.9	63.4	9.4	3.0	2.6	3.3	1.4	1.2	11.9	24.8
North Coast	1.8	3.3	79.8	3.4	1.8	3.8	0.9	0.8	4.4	15.8
Central Coast	0.2	0.2	0.6	81.0	1.5	2.4	0.5	0.5	13.3	5.7
South Coast	0.5	0.4	0.5	2.6	72.3	1.9	0.4	1.5	19.8	7.9
Central region	0.6	0.3	1.1	4.8	2.3	87.8	0.7	0.7	1.8	10.4
Northwest	2.0	0.8	2.1	3.3	4.5	3.6	77.4	3.8	2.6	20.0
Southwest	0.9	0.3	0.4	1.8	4.3	1.4	0.9	88.0	2.0	10.0
Abroad	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	99.6	–
<i>Year 2007</i>										
Northeast	78.7	2.0	2.0	0.9	2.7	1.0	1.4	0.9	10.4	10.9
Beijing/Tianjin	3.8	62.3	10.1	1.5	2.4	1.8	2.1	0.7	15.5	22.2
North Coast	2.1	5.8	76.8	1.5	1.5	3.7	2.3	0.8	5.5	17.7
Central Coast	1.1	0.7	1.4	76.8	1.8	4.8	1.7	0.9	10.8	12.4
South Coast	1.5	0.9	1.7	5.2	68.5	3.6	1.8	2.8	14.1	17.4
Central region	1.7	1.4	4.5	4.9	4.0	73.0	2.9	1.8	5.9	21.1
Northwest	2.3	2.2	4.8	2.7	5.5	3.6	65.6	3.6	9.8	24.6
Southwest	1.6	1.2	1.7	1.7	8.4	1.9	3.2	73.8	6.6	19.6
Abroad	0.0	0.1	0.1	0.4	0.2	0.0	0.0	0.0	99.1	–

■ 内陆地区的 *homeshare* 远远高于沿海地区

Potential Gains from Migration and Trade

总人均GDP及其相对增长：

$$y = \sum_{n,j} y_n^j l_n^j \quad \hat{y} = \sum_{n,j} \omega_n^j \widehat{y}_n^j \widehat{l}_n^j$$

那么：

$$g_y \approx \sum_{n,j} \omega_n^j g_{y_n^j} + \sum_{n,j} \omega_n^j g_{l_n^j}$$

而根据Arkolakis, Costinot, and Rodríguez-Clare (2012)的模型：

$$\widehat{y}_n^j = \widehat{A}_n^j (\widehat{\pi}_{nn}^j)^{-1/\theta}$$

$$\text{有： } g_y = \sum_{n,j} \omega_n^j \frac{1}{\theta} \frac{\Delta \pi_{nc}^j}{\pi_{nn}^j} + \sum_{n,j} \omega_n^j \frac{1}{\theta} \frac{\Delta \pi_{nw}^j}{\pi_{nn}^j} + \sum_{n,j} \omega_n^j g_{l_n^j} + \sum_{n,j} \omega_n^j g_{A_n^j}$$

D. Potential Gains from Migration and Trade

代入数据可以计算出各部分对于人均GDP增长率的贡献度：

$$g_y = \underbrace{\sum_{n,j} \omega_n^j \frac{1}{\theta} \frac{\Delta \pi_{nc}^j}{\pi_{nn}^j}}_{\substack{\text{Internal Trade} \\ 4.9\%}} + \underbrace{\sum_{n,j} \omega_n^j \frac{1}{\theta} \frac{\Delta \pi_{nw}^j}{\pi_{nn}^j}}_{\substack{\text{External Trade} \\ 0.5\%}} + \underbrace{\sum_{n,j} \omega_n^j g_{l_n^j}}_{\substack{\text{Migration} \\ 10.8\%}} + \underbrace{\sum_{n,j} \omega_n^j g_{A_n^j}}_{\substack{\text{Residual} \\ 40.9\%}}$$

遗留问题：

- 没有考虑到贸易和移民的内生性问题
- 缺乏结构化模型来量化贸易和移民的增加有多少是由于移民和贸易成本的减少
- 对称地对待农业和非农业，忽略了中间投入的作用
- 忽略了固定要素（土地）和区域比较优势的差异，使得移民的收益被高估

Outline

1. Introduction
- 2. Theoretical Framework**
3. Empirical Analysis
4. Critical Thinking

A. Worker Preferences

$$\max_{C_n^{j,ag}, C_n^{j,na}, S_n^{j,h}} u_n^j = \varepsilon_n^j [(C_n^{j,ag})^{\psi^{ag}} (C_n^{j,na})^{\psi^{na}}]^\alpha (S_n^{j,h})^{1-\alpha}$$

$$\text{s.t. } P_n^{j,ag} C_n^{j,ag} + P_n^{j,na} C_n^{j,na} + r_n^j S_n^{j,h} \leq v_{in}^{kj}$$

求解上述最优化问题: $C_n^{j,ag} = \frac{\alpha \psi^{ag} v_{in}^{kj}}{P_n^{j,ag}}$ $C_n^{j,na} = \frac{\alpha \psi^{na} v_{in}^{kj}}{P_n^{j,na}}$ $S_n^{j,h} = \frac{(1-\alpha)v_{in}^{kj}}{r_n^j}$

$$D_n^{k,j} = \sum_{m,i} P_n^{k,j} C_n^{k,j} L_{in}^{mk} = \sum_{m,i} \alpha \psi^j v_{in}^{mk} L_{in}^{mk} = \alpha \psi^j \sum_{m,i} v_{in}^{mk} L_{in}^{mk} = \alpha \psi^j v_n^k L_n^k$$

对k求和:

$$D_n^j = \alpha \psi^j \sum_k v_n^k L_n^k$$

地区n对于产品j的需求函数

$$D_n^h = (1-\alpha) \sum_k v_n^k L_n^k$$

地区n对于housing的需求函数

B. Production, Trade, and Goods Prices

恒定替代弹性的CES生产函数:

$$Y_n^j = \left(\int_0^1 y_n^j(v)^{(\sigma-1)/\sigma} dv \right)^{\sigma/(\sigma-1)}$$

Caliendo and Parro (2015)的厂商的边际成本函数模型:

$$c_n^j(\varphi) \propto \frac{1}{\varphi} \left[(w_n^j)^{\beta^j} (r_n^j)^{\eta^j} \left(\prod_k (P_n^k)^{\sigma^{jk}} \right) \right]$$

不同地区之间存在运输损耗: $p_{ni}^j(\varphi) = \tau_{ni}^j c_i^j(\varphi)$

φ 满足Fréchet分布:

$$F_n^j(\varphi) = e^{-T_n^j \varphi^{-\theta}}$$

B. Production, Trade, and Goods Prices

消费者购买时总是选择价格最低的产品：

$$\pi_{ni}^j = Pr(p_{ni}^j(\varphi) \leq \min_{i'} \{ p_{ni'}^j(\varphi) \})$$

$$\pi_{ni}^j = \frac{T_i^j (\tau_{ni}^j c_i^j(\varphi))^{-\theta}}{\sum_{m=1}^{N+1} T_m^j (\tau_{nm}^j c_m^j(\varphi))^{-\theta}}$$

Total Revenue:

$$R_n^j = \sum_{i=1}^{N+1} \pi_{in}^j X_i^j$$

Total Expenditure:

$$X_n^j = D_n^j + \sum_k \sigma^{kj} R_n^k$$

作为最终消费品的需求

作为生产活动的中间投入品的需求

C. Incomes of Workers

基本假定：

- 土地作为固定要素不可交易
- 只有本地户口的本地劳动力才能获得固定要素收入

固定要素支出：

$$(1 - \alpha)v_n^j L_n^j + \eta^j R_n^j = (1 - \alpha)v_n^j L_n^j + \eta^j w_n^j L_n^j / \beta^j$$

作为最终消费品的需求

作为生产活动的中间投入品的需求

市场出清条件：

$$r_n^j \bar{S}_n^j = (1 - \alpha)v_n^j L_n^j + \eta^j w_n^j L_n^j / \beta^j$$

$$v_n^j L_n^j = (1 - \alpha)v_n^j L_n^j + \eta^j w_n^j L_n^j / \beta^j + w_n^j L_n^j$$

C. Incomes of Workers

地区n对于产品j的需求函数:

$$v_n^j L_n^j = \frac{\eta^j + \beta^j}{\alpha \beta^j} w_n^j L_n^j$$

$$r_n^j \bar{S}_n^j = \frac{(1 - \alpha)\beta^j + \eta^j}{\alpha \beta^j} w_n^j L_n^j$$

户口在n地区j部门, 工作在i地区k部门的劳动力收入:

$$v_{in}^{kj} = \delta_{ni}^{jk} w_i^k$$

其中:

$$\delta_{ni}^{jk} = \begin{cases} 1 + \left(\frac{(1 - \alpha)\beta^j + \eta^j}{\alpha \beta^j} \right) \frac{L_n^j}{L_{nn}^{jj}} & \text{if } n = i \text{ and } j = k \\ 1 & \text{if } n \neq i \text{ or } j \neq k \end{cases}$$

D. Internal Migration

实际工资率:

$$V_i^k = \frac{w_k^i}{[(P_i^{ag})^{\psi^{ag}} (P_i^{na})^{\psi^{na}}]^{\alpha} (r_i^k)^{1-\alpha}}$$

移民享受到的welfare:

$$\varepsilon_i^k \delta_{ni}^{jk} V_i^k / \mu_{ni}^{jk}$$

移民时总是倾向于welfare最高的地区:

$$m_{ni}^{jk} = Pr(\varepsilon_i^k \delta_{ni}^{jk} V_i^k / \mu_{ni}^{jk} \geq \max_{i',k'} \{ \varepsilon_{i'}^{k'} \delta_{ni'}^{jk'} V_{i'}^{k'} / \mu_{ni'}^{jk'} \})$$

$$m_{ni}^{jk} = \frac{(V_i^k \delta_{ni}^{jk} / \mu_{ni}^{jk})^{\kappa}}{\sum_{k'} \sum_{i'} (V_{i'}^{k'} \delta_{ni'}^{jk'} / \mu_{ni'}^{jk'})^{\kappa}}$$

地区i部门k的Total Employment: $L_i^k = \sum_j \sum_{n=1}^N m_{ni}^{jk} \bar{L}_n^j$

E. Comparison

关于Trade和Migration的模型类比：

	Trade	Migration
Utility Function	$p_{ni}^j(\varphi) = \tau_{ni}^j c_i^j(\varphi) = \frac{C_i^j \tau_{ni}^j}{\varphi}$	$\varepsilon_i^k \delta_{ni}^{jk} V_i^k / \mu_{ni}^{jk}$
Decision Making	$\min_{i'} \{p_{ni'}^j(\varphi)\}$	$\max_{i',k'} \{\varepsilon_{i'}^{k'} \delta_{ni'}^{j k'} V_{i'}^{k'} / \mu_{ni'}^{j k'}\}$
CDF	$F_n^j(\varphi) = e^{-T_n^j \varphi^{-\theta}}$	$F_\varepsilon(x) = e^{-x^{-\kappa}}$
Target index	π_{ni}^j	m_{ni}^{jk}
Linear Solving	$\pi_{ni}^j = \frac{T_i^j (\tau_{ni}^j c_i^j(\varphi))^{-\theta}}{\sum_{m=1}^{N+1} T_m^j (\tau_{nm}^j c_m^j(\varphi))^{-\theta}}$	$m_{ni}^{jk} = \frac{(V_i^k \delta_{ni}^{jk} / \mu_{ni}^{jk})^\kappa}{\sum_{k'} \sum_{i'} (V_{i'}^{k'} \delta_{ni'}^{j k'} / \mu_{ni'}^{j k'})^\kappa}$
Sum	$R_n^j = \sum_{i=1}^{N+1} \pi_{in}^j X_i^j$	$L_i^k = \sum_j \sum_{n=1}^N m_{ni}^{jk} \bar{L}_n^j$

F. Preparation for the Empirical Analysis

由 m_{ni}^{jk} 和 m_{nn}^{jj} 解出 Migration Cost:

$$\mu_{ni}^{jk} = \frac{1}{\delta_{ni}^{jk}} \left(\frac{V_i^k}{V_n^j} \right) \left(\frac{m_{nn}^{jj}}{m_{ni}^{jk}} \right)^{1/\kappa}$$

由 π_{ni}^j , π_{ii}^j , π_{nn}^j 和 π_{in}^j 解出 Trade Cost:

$$\bar{\tau}_{ni}^j = \sqrt{\tau_{ni}^j \tau_{in}^j} = \left(\frac{\pi_{nn}^j \pi_{ii}^j}{\pi_{ni}^j \pi_{in}^j} \right)^{1/2\theta}$$

总福利的变化:

$$\widehat{W} = \sum_j \sum_{n=1}^N \omega_n^j \widehat{V}_n^j \widehat{\delta}_{nn}^{jj} (\widehat{m}_{nn}^{jj})^{-1/\kappa}$$

实际GDP的变化:

$$\widehat{Y} = \sum_j \sum_{n=1}^N \phi_n^j \widehat{V}_n^j \widehat{L}_n^j$$

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Calibration

TABLE 3—CALIBRATED MODEL PARAMETERS AND INITIAL VALUES

Parameter	Value	Description
(β^{ag}, β^{na})	(0.29, 0.22)	Labor's share of output
(η^{ag}, η^{na})	(0.28, 0.03)	Land's share of output
$(\sigma^{ag,na}, \sigma^{na,ag})$	(0.60, 0.06)	Intermediate input shares
ψ^{ag}	0.095	Agriculture's share of final demand
α	0.87	Goods' expenditure share
θ	4	Elasticity of trade
κ	1.5	Elasticity of migration
π_{ni}^j	Data	Bilateral trade shares
m_{ni}^j	Data	Bilateral migration shares
\bar{L}_n^j	Data	Hukou registrations

■ 估计生产要素占产出的份额等参数

■ 双边贸易规模、移民规模和户口登记等来自数据

Calibrating Elasticity of Migration κ

$$m_{ni}^{jk} = \frac{(V_i^k \delta_{ni}^{jk} / \mu_{ni}^{jk})^\kappa}{\sum_{k'} \sum_{i'=1}^N (V_{i'}^{k'} \delta_{ni'}^{jk'} / \mu_{ni'}^{jk'})^\kappa},$$

$$\ln\left(\frac{m_{ni}^{jk}}{m_{nn}^{jj}}\right) = \kappa \ln(V_i^k) + \gamma_{ni} + \gamma_n^j + \zeta_{ni}^{jk}, \quad \text{for } (n, i) \neq (i, k),$$

■ κ : 移民的收入弹性

■ 估计方法: 利用固定效应, 用工具变量做两阶段回归

■ 回归结果: 取 $\kappa=1.5$

First Stage

$$\tilde{v}_n^{IV,j} = \sum_{k \neq j} \bar{w}^k l_n^k$$

$$V_i^k = \tilde{v}_n^{IV,j} + \gamma_{ni}^{FS} + \gamma_n^{FS,j} + \zeta_{ni}^{FS,jk}$$

Second Stage

$$\ln\left(\frac{m_{ni}^{jk}}{m_{nn}^{jj}}\right) = \kappa \ln(\widehat{V}_i^k) + \gamma_{ni} + \gamma_n^j + \zeta_{ni}^{jk}$$

Migration Cost

TABLE 5—MIGRATION RATES AND AVERAGE MIGRATION COSTS

	Initial share of employment	Average migration costs μ_{in}^{kj}		
		Level in 2000	Level in 2005	Relative change
Overall	0.174	2.82	2.31	0.82
<i>Agriculture to non-agriculture migration cost changes</i>				
Overall	0.16	2.63	2.16	0.82
Within province	0.13	2.21	1.83	0.83
Between provinces	0.03	25.21	15.43	0.61
<i>Between provinces migration cost changes</i>				
Overall	0.04	24.75	15.08	0.61
Within agriculture	0.003	47.67	42.22	0.89
Within non-agriculture	0.01	21.02	12.2	0.58

成本变化背后的机制：

- 临时居住程序简化
- 户籍制度改革
- 高速公路建设

Migration Cost

- 将地区间移民成本系数与地理距离做回归，添加迁入地固定效应作为基准回归
- 其中距离项的系数可理解为移民成本系数对地理距离的弹性

$$\ln(\mu_{ni}^{jk}) = \rho \ln(d_{ni}) + \delta_n^j + \varepsilon_{ni}^{jk}$$

- 解释变量中增加两地间是否有高速公路，以及高速公路和远距离省份的交叉项
- 发现高速公路建设对距离远的省份有效，显著降低了移民成本

Table 19: Migration Costs and Distance Regressions

	Migration Costs μ_{ni}^{jk}		Change in Migration Costs $\hat{\mu}_{ni}^{jk}$		
	Year 2000	Year 2005			
Log Bilateral Distance, $\ln(d_{ni})$	1.01 [0.03]	0.94 [0.03]	-0.07 [0.02]	-0.07 [0.02]	0.03 [0.03]
New Highway Built				0.01 [0.03]	1.67 [0.29]
Distance : New Highway					-0.24 [0.04]
origin province-sector FEs	Yes	Yes	Yes	Yes	Yes
Obs.	3480	3480	3480	3480	3480
R^2	0.573	0.615	0.227	0.227	0.235

Notes: Displays the relationship between distance, migration costs, and migration cost changes. The "New Highway Built" dummy identifies whether a new highway was completed between 2000 and 2005 connecting the capital cities of the two provinces.

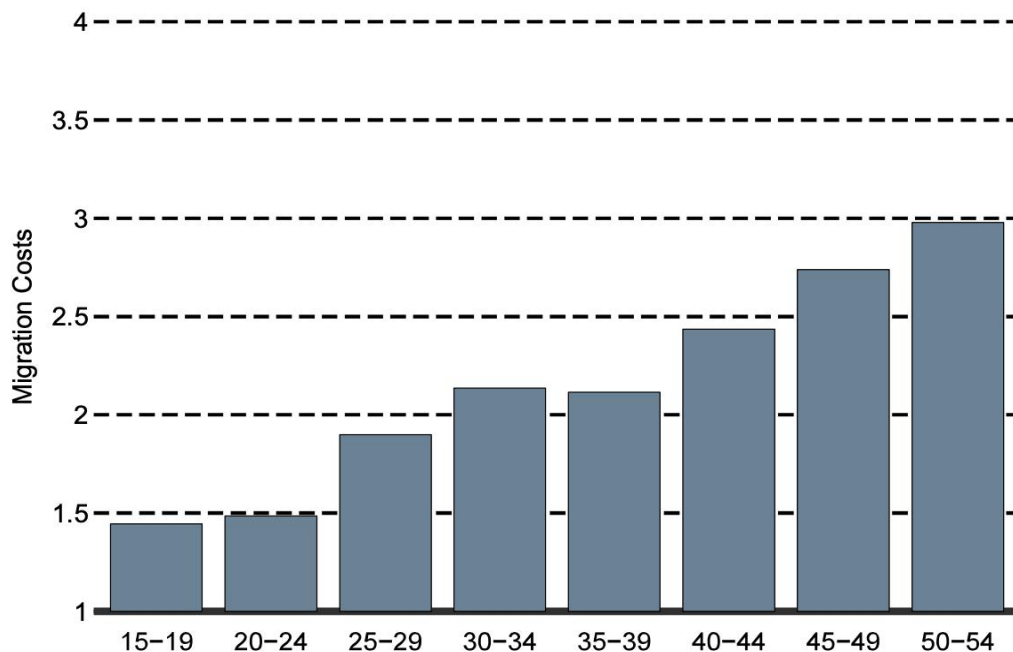
Migration Cost

- 考虑年龄异质性，将样本按年龄段划分，分别计算移民成本的系数大小

$$\mu_{ni,a}^{jk} = \frac{1}{\delta_{nn}^{jj}} \left(\frac{V_{i,a}^k}{V_{n,a}^j} \right) \left(\frac{m_{nn,a}^{jj}}{m_{ni,a}^{jk}} \right)^{1/\kappa} \quad \text{for } n \neq i$$

- 发现年龄越大，移民成本越高

Figure 4: Migration Costs μ_{ni}^{jk} , by Age Cohort in 2005



Trade Cost

不足:

■ 假设贸易成本估计是对称的, 这与Waugh (2010)的研究相矛盾

改进:

■ 贸易成本拆分成对称的贸易成本与地区特有的摩擦

■ 贸易成本的对称部分仅与省级的人口加权距离相关; 特有摩擦 (包括文化、地区竞争力等因素) 使用固定效应来捕获

$$\ln\left(\frac{\pi_{ni}^j}{\pi_{nn}^j}\right) = \delta^j \ln(d_{ni}) + \iota_n^j + \eta_i^j + \varepsilon_{ni}^j,$$

$$\ln\left(\frac{\pi_{ni}^j}{\pi_{nn}^j}\right) = S_i^j - S_n^j - \theta \ln\left(\tau_{ni}^j\right).$$

引入出口成本参数 t_i^j , 调整后 $\tau_{ni}^j = t_{ni}^j t_i^j$

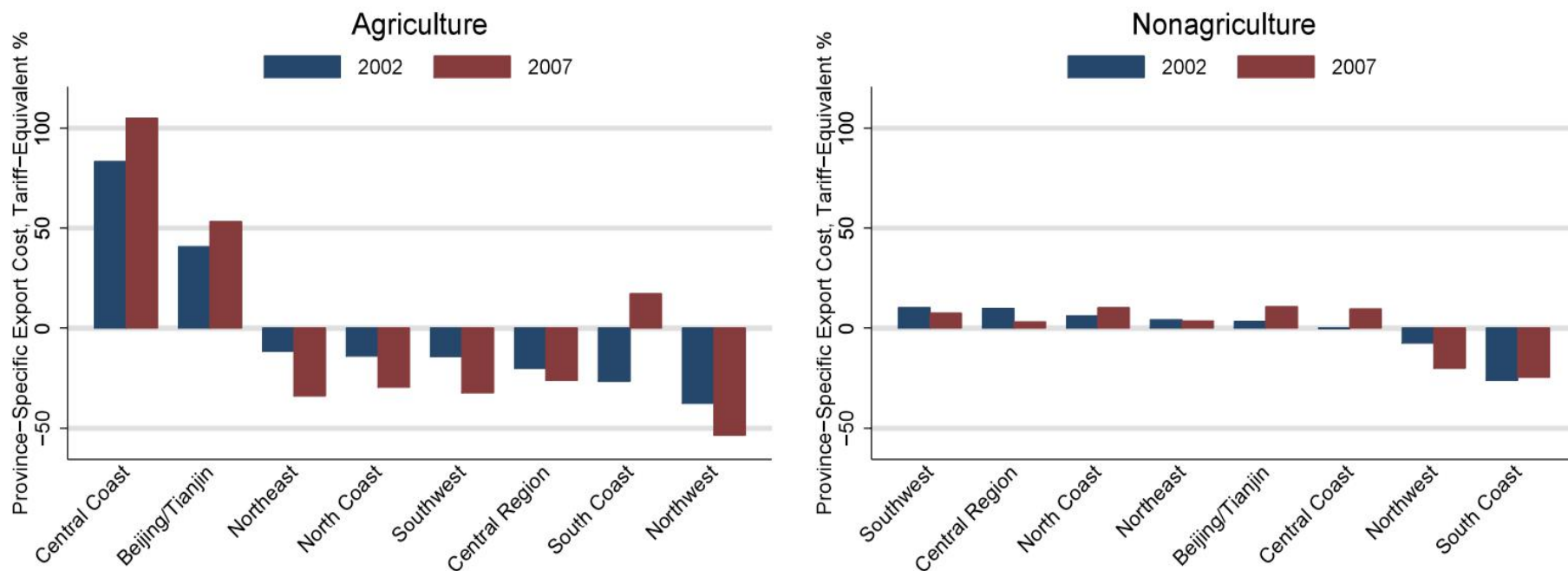
$$\tau_{ni}^j = \bar{\tau}_{ni}^j \sqrt{\frac{t_i^j}{t_n^j}}$$

地区特有出口摩擦:

$$-\left(\hat{\iota}_n^j + \hat{\eta}_n^j\right) / \theta.$$

Trade Cost

Figure 3: Asymmetries in Trade Costs: Exporter-Specific Costs



实证：落后地区确实面临了更高的地区特有贸易摩擦

Lower Migration Cost

- 贸易和移民的增加主要是由于移民成本和贸易成本的减少
- 土地作为固定要素，抑制了GDP的增长；区域比较优势意味着移民对GDP增长的贡献减少

TABLE 7—EFFECTS OF VARIOUS MIGRATION COST CHANGES

	Trade shares (p.p. change)		Migrant stock (%)		Real GDP per worker (%)	Aggregate welfare (%)
	Internal	External	Within province	Between province		
All	0.1	0.1	14.5	80.8	4.8	11.1
No land inputs	0.1	0.2	14.4	85.6	5.3	8.4
And no housing	0.1	0.2	13.8	90.4	6.5	7.6
And $\theta \rightarrow \infty$	-0.2	0.1	23.2	119.2	11.8	6.2
<i>Agriculture to non-agriculture migration cost changes</i>						
Overall	0.1	0.1	15.2	52.9	4.3	9.1
Within provinces	-0.0	-0.1	22.8	-9.7	2.0	5.9
Between provinces	0.1	0.2	-7.0	69.9	2.8	3.5
<i>Between provinces migration cost changes</i>						
Overall	0.2	0.3	-7.8	97.9	3.2	5.5
Within agriculture	-0.0	0.0	-0.1	2.3	-0.0	0.1
Within non-agriculture	0.1	0.1	-1.0	30.9	0.7	2.2

Lower Trade Cost

- 中间品要素放大了GDP和welfare的增长

TABLE 8—EFFECTS OF TRADE COST CHANGES

	Trade shares (p.p. change)		Migrant stock (%)		Real GDP per worker (%)	Aggregate welfare (%)
	Internal	External	Within province	Between province		
Internal trade	9.2	-0.7	0.8	-1.8	11.2	11.4
External trade	-0.7	3.9	1.8	2.4	4.0	2.9
All trade	8.2	2.8	2.5	0.5	15.2	14.1
<i>No Change in migration</i>						
Internal trade	9.1	-0.7	-	-	11.2	11.2
External trade	-0.7	3.9	-	-	3.4	3.4
All trade	8.2	2.8	-	-	14.5	14.5
<i>No intermediate inputs</i>						
Internal trade	8.6	-0.5	0.3	-1.4	3.0	3.3
External trade	-0.7	3.9	1.5	1.6	1.1	0.3
All trade	7.6	3.2	1.6	0.1	4.1	3.5
<i>No intermediate inputs and no change in migration</i>						
Internal trade	8.6	-0.5	-	-	3.1	3.1
External trade	-0.7	3.9	-	-	0.6	0.6
All trade	7.6	3.2	-	-	3.7	3.7

Decomposing China's Recent Economic Growth

TABLE 9—DECOMPOSING CHINA'S AGGREGATE LABOR PRODUCTIVITY GROWTH

	Marginal effects		
	Real GDP per worker growth (%)	Share of growth	Standard deviation (%)
Overall (all changes)	57.1	—	—
Productivity changes	36.9	0.64	1.3
Internal trade cost changes	10.2	0.18	0.3
External trade cost changes	4.5	0.08	0.7
Migration cost changes	5.6	0.10	0.9
<i>Of the migration cost changes</i>			
Between-province, within-non-agriculture	0.9	0.02	0.4
Between-province, within-agriculture	0.0	0.00	0.0
Between-province, agriculture-non-agriculture	3.2	0.06	0.9
Within-province, agriculture-non-agriculture	1.5	0.03	0.3

中国GDP增长的分解：

- 生产力参数的变化
- 内部贸易成本降低
- 国际贸易成本降低
- 移民成本降低

Further Reductions in Trade and Migration Costs

TABLE 10—POTENTIAL GAINS FROM FURTHER TRADE AND MIGRATION LIBERALIZATION

	Relative to 2005 equilibrium	
	Change in real GDP (%)	Aggregate welfare (%)
Average internal trade costs as in Canada	12.5	16.3
A 1/3 inter-provincial migrant share	12.8	45.6
Both together	26.0	69.2

■ 移民和贸易政策有待持续改革，潜在收益空间巨大

Land Reform

现在，我们探讨允许劳动力保留土地所有权的影响($\delta_{ni}^{jk} > 1$)

TABLE 11—EFFECT OF INDIVIDUAL OWNERSHIP LAND REFORM

	Percent change	
Welfare	11.8	
Real GDP	-2.4	
Migration, within-province	96.3	
Migration, between-province	38.0	
	Share of population (%)	
	Initial equilibrium	New equilibrium
Agricultural workers	52.9	56.6
Stock of migrants, urban-rural	2.1	10.9
Stock of migrants, rural-urban	14.0	19.1

- 土地改革增加总福利和移民数量，但是减少了实际产出
- 背后原因是农业部门劳动力数量增加
- 居民可以自由选择居住地点，且可以选择低居住成本目的地

Conclusion

主要结论

- 相比于“入世”带来的贸易自由化与出口扩张，中国经济腾飞真正的核心驱动力是国内贸易的增长以及劳动力的优化配置
- 尽管国内贸易和移民成本下降巨大，但是仍有很大的进一步提升的空间

政策建议

- 土地和户籍制度改革能够有效地降低贸易成本和移民成本
- 中国应该更加关注减少内部的贸易冰山成本以及减少劳动力迁移的效用损失，这些改革举措会比降低外贸壁垒带来更多经济增长和效用提升

Outline

1. Introduction
2. Theoretical Framework
3. Empirical Analysis
4. Critical Thinking

模型推广

企业的产出仅是
劳动力和土地的函数

资本
流动

劳动
力偏
好

劳动力面临相同的
CD效用函数

收入差距
&
结构转型

模型仅关注实际GDP
和整体福利提升

模型推广

1. 考虑异质性的个人效用函数(Price Independent Generalized Linearity)

$$V_n^j(q) = \frac{1}{\epsilon} \left[\frac{e_n^j(q)}{(P_n^{ag\phi} P_n^{na1-\phi}) \alpha r_n^{j,h}{}^{1-\alpha}} \right]^\epsilon - \frac{B}{\gamma} \left(\frac{P_n^{ag}}{P_n^{na}} \right)^\gamma$$

其中 ϵ 衡量了农业品和非农业品支出比例对收入增加的敏感程度, B衡量相对价格的重要程度

2. 考虑资本要素的企业CES生产函数

$$Y_n^j = \left(\int y_n^j(v)^{(\sigma-1)/\sigma} dv \right)^{\sigma/(\sigma-1)}$$

s.t.

$$y_n^j(v) = z_n^j(v) l_n^j(v)^{\beta^{j,l}} k_n^j(v)^{\beta^{j,k}} h_n^j(v)^{\beta^{j,h}} \prod_{s=\{ag,na\}} m_n^j(v)^{\beta^{j,s}}$$

同时模型要求资本的边际成本等于边际收益, 资本市场出清

模型推广

Decomposing China's growth, income convergence, and structural change.

	Five-year change			Share of five-year change (%)		
	2005	2010	2015	2005	2010	2015
<i>Aggregate Real GDP Growth (%)</i>						
<i>Data</i>	63.1	65.0	36.3			
Overall	54.3	55.0	34.9	100.0	100.0	100.0
Productivity Changes	38.4	51.9	18.0	69.5	95.8	47.3
Internal Trade Costs	8.3	-1.8	-	15.9	-4.7	-
External Trade Costs	4.7	-0.1	-	9.2	-0.4	-
Migration Costs	4.1	5.5	6.5	8.0	10.6	20.3
Capital Wedges	0.5	-0.1	-0.5	0.7	-0.1	-1.7
Average Real Capital Cost Changes	-1.7	-0.5	10.9	-3.3	-1.2	34.1

推广的模型指出了三个新的发现：

- 2000-2005年间，贸易成本的降低对经济发展贡献显著，但此后的贡献为负
- 2005-2015的经济增长放缓与TFP的增长率下降有关，TFP增长从51.9%下降到18%
- 2010-2015年之间经济增长的主要推动力是资本积累和信用扩张，在此期间贡献了10.9%的经济增长

Thanks for Listening!

**Trade, Migration, and Productivity:
A Quantitative Analysis of China**

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