Regional Disparities of Industry Wages, Transport Costs and Trade Shocks

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Research Questions

1. Do transport costs help to understand differences in industry wages?
2. Did transport costs to markets change its explanation power after a trade shock?
3. What dispersion force was more effective to interfere in the Brazilian regional wages?

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Theoretical Background

Main Idea: Salaries tend to be higher closer to the Market

Explanation: New Economic Geography (NEG)

Agglomeration Forces

1. Transport Costs
2. Demand Externalities

Dispersion Forces

1. Competition

Generally, Trade Shocks reduce regional disparities through:

1. Providing goods to the new Market (Foreign Market)
2. Increasing Competition with Imports

Wage Differences at a Regional Perspective

Papers about this issue

1) Hanson (1996)

Transport Costs Affects Regional Wages Negatively

Conclusion: Wages Decrease with Distance to Markets

2) Puga and Venables (1996)

Dispersion Forces > Agglomeration Forces

Industries move to Another Region

Conclusion: Disparity in Wages Start to Reduce (not necessary a decreasing function of transport cost).

Suggestions are welcome

Why Brazil?

Trade Shocks => Increase of Dispersion Forces

1) Liberalization in 90's

- Reduction of Weighted Average Nominal Tariff from 37.7% to 10.2% from 1988 to 1994

Consequence: Competition with new products (imports)

2) Exchange Rate

- Real devaluation of 63% in January of 1999 (47% in 1999 as whole)

Consequence: Competition in the Labour Market.

So, it will be possible to evaluate which dispersion force had a greater impact on industry wages in Brazil

(different from Trade Agreements, like NAFTA)

Hypothesis

Wages are a decreasing function of transport costs, but they have reduced explanation power after trade shocks, in which competition in the labour market had a higher impact than competition with imports.

Data

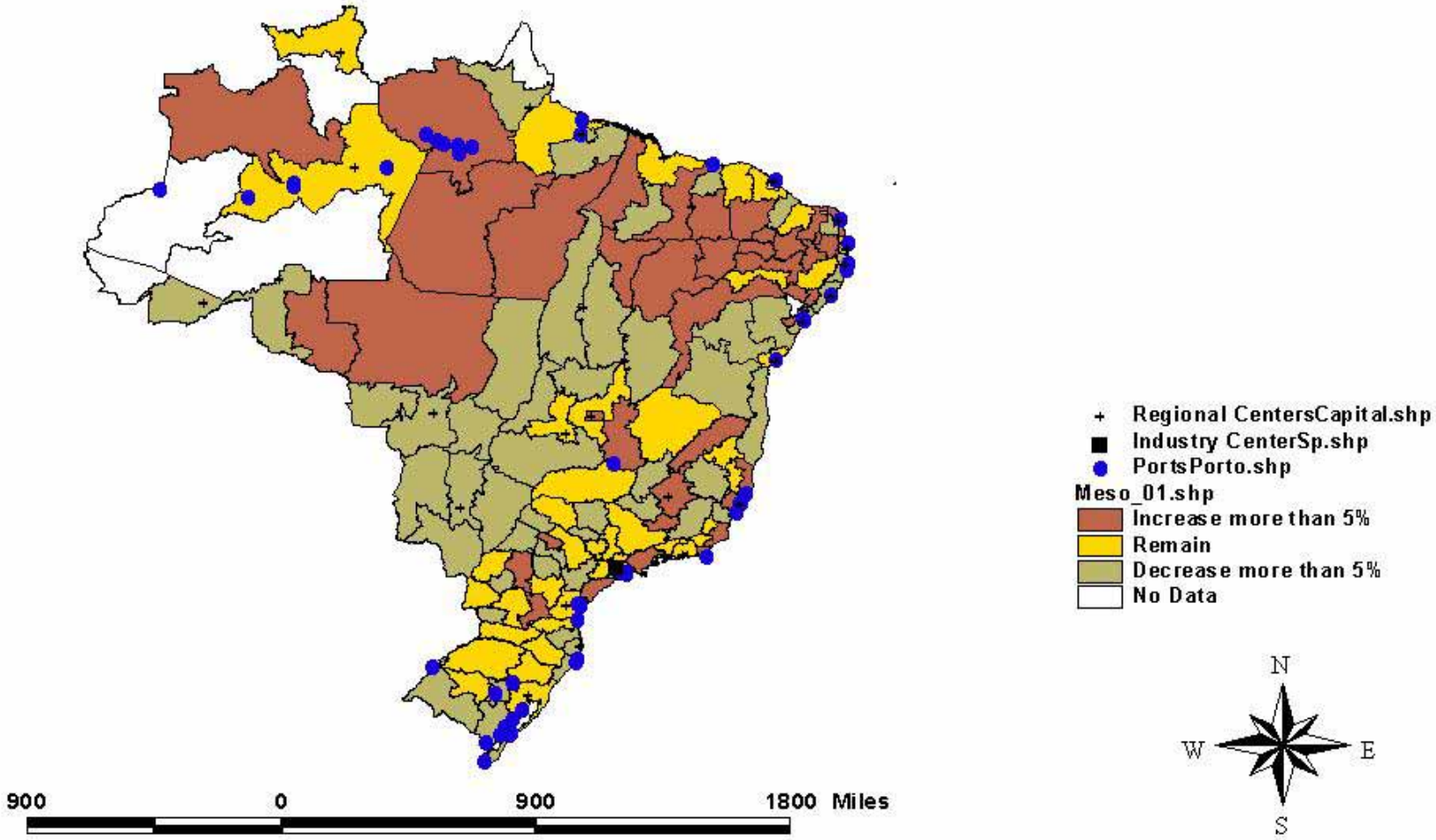
Brazil divided into 557 regions (microregion)

Some Descriptive Analysis

Wages in microregion i / Wages SP	Before Shock (1985)	After the 1st Shock (96-98)	After the 2nd Shock (99-03)
Average	-	0.41	0.40
Standard Deviation	-	0.23	0.21
Minimum	-	0.08	0.10
Maximum	-	2.14	1.63
Average of obs. per year	-	401	421

Spatial Descriptive Analysis

Figure 1: After the 2nd Shock
Wages in Mesoregion / Wages in Industry Center



Econometric Specification

$$\ln(W_{it}/W_{ct}) = \beta_0 + \beta_x \ln(TC_{xit}) + \delta_t \theta_x \ln(TC_{xit}) + \gamma_t \rho_x \ln(TC_{xit}) + \alpha_k (Control_k) + \varepsilon_{it}$$

Error Term

$$\varepsilon_{it} = c_i + v_t + \eta_{it}$$

W_{it}/W_{ct} is the ratio of nominal wage in region *i* with the wage in the industry centre *c*.

TC_{it} is the transport cost (distance) of region *i* to the industry centre or port (control for infrastructure here).

$Control_k$ will be education and government policy.

δ_t & γ_t are dummies for years after trade shock

Expected values of parameters, which are answers of my research questions

Q1) Do transport costs matters?

$\beta_x < 0,\ for \quad x=1,2$

Q2) Do trade shocks influence?

$\theta_x, \rho_x = 0$ Trade shock didn't affect

Q3) Which competition is stronger in this aspect?

$|\theta_1| < |\theta_2|$ and $|\rho_1| < |\rho_2|$ <=> Labour Demand > Competition with Imports

More Results

1) Using controls (Infrastructure, Educ. (+) and Subsidies (–))
2) FE with Distance varying from IC and RE for fixed

With Infra, Edu and Sub	RE TCic Fixed	FE TCic/GDP	FE TCic x GDP	**At the end**
TC to IC	< 0 and signif. 1%	< 0 and signif. 1%	< 0 and signif. 1%	**Matters**
TS to IC	Not significant	> 0 and signif. 5%	Not significant	**Less Important**
TC to Port	< 0 and signif. 1%	< 0 and signif. 1%	< 0 and signif. 1%	**Matters**
TS to Port	< 0 and signif. 10%	Not significant	Not significant	**More Important**

Further Results

1) Using controls (Infra, Educ. (+) and Dummies for States)
2) FE with distance varying from IC and RE for fixed distance

With Infra, Edu and Sub	RE TCic Fixed	FE TCic/GDP	FE TCic x GDP	**At the end**
TC to IC	< 0 and signif. 1%	< 0 and signif. 1%	< 0 and signif. 1%	**Matters**
TS to IC	Not significant	> 0 and signif. 1%	Not significant	**Less Important**
TC to Port	< 0 and signif. 1%	< 0 and signif. 1%	< 0 and signif. 1%	**Matters**
TS to Port	Not significant	Not significant	Not significant	**Didn't Change**

Econometric Specification with MP

$$\ln(W_{it}/W_{ct}) = \beta_0 + \beta_x \ln(MP_{xit}) + \delta_t \theta_x \ln(MP_{xit}) + \gamma_t \rho_x \ln(MP_{xit}) + \alpha_k (Control_k) + \varepsilon_{it}$$

Error Term

$$\varepsilon_{it} = c_i + v_t + \eta_{it}$$

W_{it}/W_{ct} is the ratio of nominal wage in region *i* with the wage in the industry centre *c*.

MP_{xit} is the market potential of region *i*

x = Internal using GDP or external using Exp + Imp.

$Control_k$ will be education and government policy.

δ_t & γ_t are dummies for years after trade shock

Results with Market Potential

Markets Internal or External	No Controls	Controls: Educ. and Subsidies	Controls: Educ. And Dummies	**At the end**
IM	> 0 and signif. 1%	> 0 and signif. 1%	> 0 and signif. 1%	**Matters**
EM	> 0 and signif. 1%	> 0 and signif. 1%	> 0 and signif. 1%	**Matters**
TS in IM	> 0 and signif. 1%	> 0 and signif. 1%	> 0 and signif. 10%	**More important**
TS in EM	Not significant	Not significant	Not significant	**Didn't Change**

PS.: Coefficients of EM are more than the double of IM even after TS

Preliminar Conclusions

1) TC and MP matters;
2) TS matters, but not so robust as TC and MP;
3) Control variables improved the results.

I will still....

1) Compare the two forces (I just got 85 data);
2) Use Hausman Test to compare the RE and FE estimators;
3) See what types of problem occur with unbalanced panel;
4) Put a variable to take into account % of manufacturing in each region (Value Added / GDP);
5) Use instruments;

Questions

1) Since the amenities natural-resource supplies and level of amenities are exogenous and location bias in government spending or tax policies (education with illiteracy reduction, local subsidies and infrastructure improvement), is there still any other control?

2) Instruments: i) Population for MP; ii) Education time lag for education; iii) Other government expenditure for subsidies. Any comments?

3) Some people advise me to use Market Potential instead of Transport Cost. However, I believe that Distance is more exogenous than MP to explain wages. Any comments?

4) Is there any problem of using a big time gap between observations (from 1985 to 1996) and then annually (from 1996 to 2004)?

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