Relative City Price Convergence in Pakistan: Empirical Evidence from Spatial GLS

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3. Relative City Price convergence in Pakistan

- PPP: Once converted to common currency, national price levels should be equal.

- Consensus estimates: speed of convergence to PPP is very slow: Rogoff (1996)

- Cities or regions in country have no trade barriers and nontrade able goods, single currency.

- The literature on price convergence recently focuses on country studies e.g. Cecchetti (2002), Morshed (2006), Das and Bhatacharia (2008), Chmelarova and Nath (2010) and Lan and Sylwester (2010), Sonara Robert (2010).

The relative city price convergence in Pakistan

- This study uses data on CPI of 35 Pakistani cities July 2001 to June 2008.

- Karachi and Lahore used as numeraire cities

- Questions: Overall prices in Pakistani cities converge with 2 numeraire cities or not?

- How long it takes to converge?

- Estimation of half life of relative price shock.

- Applied OLS and Spatial GLS and compared results

Model and Estimation

$$RP_{it} = P_{it} / P_{bt}$$

$$rp_{it} = p_{it} - p_{bt}$$

$$rp_{it} = \alpha_i + \rho_i rp_{it,-1} + \varepsilon_{it}$$

$$H_0 : \hat{\rho_i} = 1$$

$$H_a : \hat{\rho_i} < 1$$

$$OLS : E[\varepsilon / X] = 0, E[\varepsilon\varepsilon' / X] = \sigma^2 I$$

Model and Estimation

- Apply GLS using Variance estimated covariance matrix

$$V^{-1/2}rp_{it} = V^{-1/2}\alpha_i + \rho_i V^{-1/2} rp_{it,-1} + V^{-1/2}\mu_{it}$$

- Estimate the transformed model:
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$$rp^*_{it} = \alpha^*_i + \rho^*_i rp^*_{it,-1} + \mu^*_{it}$$

- Here $\mu^*_{it} \sim N(0,I)$

- GLS is BLUE as compared to OLS in hetroscadesticity (contains spatial correlations)
- compute half life $H(\rho^*)=\log(0.5)/\log(\rho^*)$

The RCPC with Lahore-Half life

1-3 Months	4-6 months	7-9 months	10-12 months	> 12 months
Abbotabad	Bannu	Jhelum	Jhang	Attock ,
Bahawalpur	Faisalabad	Okara		Gujranwala ,
DG Khan	Kunri	Samundri		Hyderabad,
DI Khan	Larkana			Islamabad,
MP Khas	Multan			Loralai,
Peshawar	Rawalpindi			Nawabshah
Quetta	Sargodha			Vehari,
Shadadpur	Sukkur			Bahawalnagar
Turbat	Karachi			Mardan
	Khuzdar			
	Mianwali			

The RCPC with Karachi-Half life

1-3 Months	4-6 months	7-9 months	10-12 months	> 12 months
Abbotabad	Bannu	Multan	Bahawalnagar	Attock
Bahawalpur	Jhang	Rawalpindi	Faisalabad	Gujranwala
DG Khan	Khuzdar			Hyderabad
DI Khan	Kunri			Islamabad
Jhelum	Larkana			Lahore
Mianwali	MP Khas			Loralai
Peshawar	Okara			Nawabshah
Sialkot	Quetta			Vehari
	Sargodha Turbat			
	Shadadpur			
	Samundri			
	Sukkur			

Provincial comparison of half life

Province	OLS-Karachi	GLS-Karachi	OLS-LHR	GLS-LHR
Punjab	5.64	4.8	6.54	5.4
Sindh	4.6	5.8	4.81	3.6
KP	4.82	3.5	4.97	8.3
Baluchistan	8.9	5.7	5.95	5.4
Pakistan	5.42	4.98	5.94	4.82

Conclusion

- The estimated half life is lower with GLS than OLS

- Lahore (5.94 vs 4.82), Karachi (5.42 vs 4.98)

- Pakistani cities are spatially more associated with Lahore than Karachi on average.

- The prices in the bordering cities are convergent with Lahore and Karachi.

- The overall half life of relative price shock is estimated to be higher than Morshed (2006) but less than Das and Bhatacharia (2008) in the case of India.