THE EXCHANGE RATE, ASYMMETRIC SHOCKS AND ASYMMETRIC DISTRIBUTIONS

Calin-Vlad Demian (CEU)
and
Filippo di Mauro (ECB)

12th CompNet Workshop
Madrid, 27th March 2015

Introduction

- Large literature on exchange rate and exports
  - Consistent discrepancy between micro and macro estimates

- In this paper, we empirically re-examine the exchange rate elasticity of exports

- We incorporate firm-derived productivity statistics in a gravity-type equation

- We further look at exchange rate elasticity for:
  - Appreciation and depreciation
  - Relative to the size of the shock

Preview of results

- Inclusion of productivity statistics drastically affects the average observed elasticity
- There is a strong negative correlation between productivity dispersion and elasticity
- There are drastic differences between appreciation and depreciation episodes
- Exchange rate movements matter when they are relatively sizable

Related literature

- Heterogeneous response and aggregation
- Berman et al. (2013), Dekle et al. (2007), Dekle et al. (2013), Cheung and Sengupta (2013),

- Asymmetric shocks
  - Raham and Serletis (2009), Grier and Smallwood (2013), Fang et al. (2009)

- Exchange rate pass-through
  - Pollard and Coughlin (2004), Bussiere (2006) , Delatte and Lopez-Villavicencio (2012),

Data

- Productivity data : CompNet
  - BE, EE, ES, FI, HR, IT, LT, PT, RO, SI
  - 22 manufacturing sectors, 12 years
  - Sector level estimated TFP → higher order statistics

- Trade data: UN ComTrade
  - Data for all possible partners, aggregated to NACE 2 level

- Bilateral RER data
  - Catini et al. (2010)

Empirical specification

$$\ln(X^j_{ni,t}) = \alpha + \beta ln(RER_{ni,t}) + \gamma ln(RER_{ni,t}) \times \ln Prod\ Dispersion^j_{n,t} + \sigma ln(RER_{ni,t}) \times \ln Prod\ Skew^j_{n,t} + \delta_1 D^j_{ni,t} + \delta_2 GDP_{n,t} + \delta_3 GDP_{i,t} + controls^j_{ni} + \varepsilon^j_{ni,t}$$

First difference:

$$(1)\quad \Delta\ln(X^j_{ni,t}) = \alpha + \beta\Delta ln(RER_{ni,t}) + \gamma_1 \Delta ln(RER_{ni,t}) \times \ln Prod\ Dispersion^j_{n,t} + \sigma_1 \Delta\ln(RER_{ni,t}) \times \ln Prod\ Skew^j_{n,t} + \gamma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Dispersion^j_{n,t} + \gamma_3 \Delta\ln(RER_{ni,t}) \times \Delta\ln Prod\ Dispersion^j_{n,t} + \sigma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Skew^j_{n,t} + \sigma_3 \Delta ln(RER_{ni,t}) \times \Delta\ln Prod\ Skew^j_{n,t} + \delta_1 \Delta D^j_{ni,t} + \delta_2 \Delta GDP_{n,t} + \delta_3 \Delta GDP_{i,t} + \Delta\varepsilon^j_{ni,t}$$

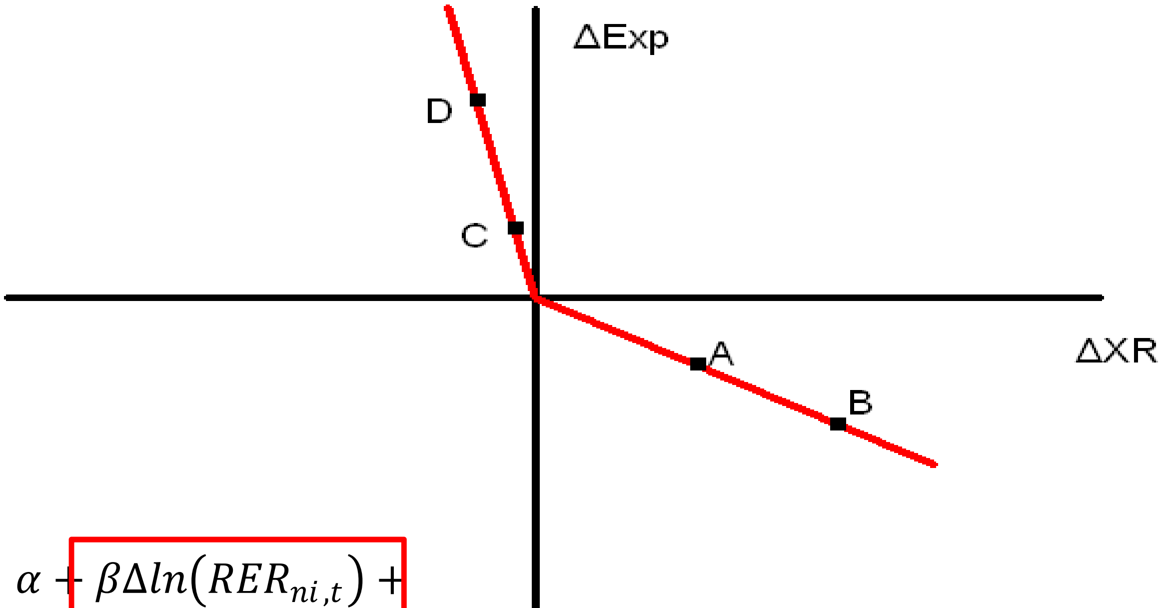
Baseline results

	No productivity statistics	Productivity statistics
Δln(XR)	-0.337***	-0.773***
	(0.0338)	(0.129)
Δln(XR) × ln(TFP) dispersion		0.157***
		(0.0435)
Δln(XR) × ln(TFP) skewness		-0.0173
		(0.0461)

Baseline results

- Similar results if we use other distribution statistics
- Similar results if we use apparent labor productivity instead of TFP
- Much better results than just including fixed effects
- Sector/country specific estimates

Asymmetric exchange rate



$$(1)\quad \Delta\ln(X^j_{ni,t}) = \alpha + \beta\Delta ln(RER_{ni,t}) +$$

$$\gamma_1 \Delta ln(RER_{ni,t}) \times \ln Prod\ Dispersion^j_{n,t} + \sigma_1 \Delta\ln(RER_{ni,t}) \times \ln Prod\ Skew^j_{n,t} +$$

$$\gamma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Dispersion^j_{n,t} + \gamma_3 \Delta\ln(RER_{ni,t}) \times$$

$$\Delta\ln Prod\ Dispersion^j_{n,t} + \sigma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Skew^j_{n,t} + \sigma_3 \Delta ln(RER_{ni,t}) \times$$

$$\Delta\ln Prod\ Skew^j_{n,t} + \delta_1 \Delta D^j_{ni,t} + \delta_2 \Delta GDP_{n,t} + \delta_3 \Delta GDP_{i,t} + \Delta\varepsilon^j_{ni,t}$$

Asymmetric exchange rate

	No productivity statistics	Productivity statistics
Appreciation		
Δln(XR)	-0.754***	-1.006***
	(0.0490)	(0.150)
Δln(XR) × ln(TFP) dispersion		0.0995**
		(0.0504)
Δln(XR) × ln(TFP) skewness		-0.0263
		(0.0563)
Depreciation		
Δln(XR)	0.261***	-0.212
	(0.0712)	(0.263)
Δln(XR) × ln(TFP) dispersion		0.148
		(0.0851)
Δln(XR) × ln(TFP) skewness		0.0244
		(0.0806)

Large shocks

- We split the sample in two: inner 50% and outer 50%
- ±3%: small changes

$$(1)\quad \Delta\ln(X^{j}_{ni,t}) = \alpha + \beta\Delta ln(RER_{ni,t}) +$$

$$\gamma_1\Delta ln(RER_{ni,t}) \times \ln Prod\ Dispersion^{j}_{n,t} + \sigma_1\Delta\ln(RER_{ni,t}) \times \ln Prod\ Skew^{j}_{n,t} +$$

$$\gamma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Dispersion^{j}_{n,t} + \gamma_3\Delta\ln(RER_{ni,t}) \times$$

$$\Delta\ln Prod\ Dispersion^{j}_{n,t} + \sigma_2 ln(RER_{ni,t}) \times \Delta\ln Prod\ Skew^{j}_{n,t} + \sigma_3\Delta ln(RER_{ni,t}) \times$$

$$\Delta\ln Prod\ Skew^{j}_{n,t} + \delta_1\Delta D^{j}_{ni,t} + \delta_2\Delta GDP_{n,t} + \delta_3\Delta GDP_{i,t} + \Delta\varepsilon^{j}_{ni,t}$$

Large shocks

	No productivity statistics	Productivity statistics
Small shocks		
Δln(XR)	-0.460***	-0.872
	(0.154)	(0.595)
Δln(XR) × ln(TFP) dispersion		0.153
		(0.200)
Δln(XR) × ln(TFP) skewness		-0.0350
		(0.219)
Large shock		
Δln(XR)	-0.333***	-0.772***
	(0.0343)	(0.132)
Δln(XR) × ln(TFP) dispersion		0.158***
		(0.0445)
Δln(XR) × ln(TFP) skewness		-0.0169
		(0.0472)

Concluding remarks

- New empirical estimation of the exchange rate elasticity
- When taking into account productivity statistics, the elasticity doubles
- The higher the concentration of productive firms, the lower the elasticity
- Considerable difference in elasticities depending on the sign and size of the exchange rate movement

Thank you