

Trade-led Growth in Times of Crisis

Asia-Pacific Trade Economists' Conference

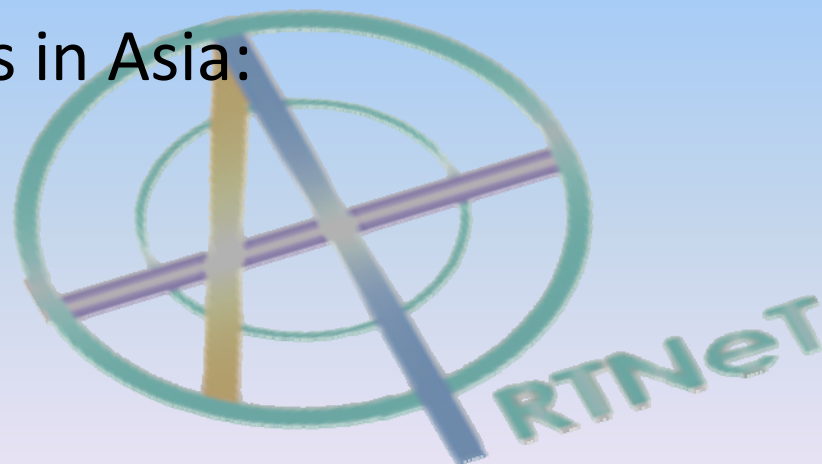
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Session 1: Trade-Led recovery and production networks

Resiliency of Production Networks in Asia: Evidence from the Asian Crisis

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Key issue in this paper

- ▶ The unprecedented development of international production networks in Asia, particularly in machinery industries
- ▶ The stability of such networks
- ▶ The resilience of the networks amid the Asian crisis in 1997-98

Recent global financial crisis and Asia

- ▶ The impact on Asian countries primarily through trade channel, despite its financial origins
- ▶ Concern about Asia's overdependence on external demand
- ▶ Adverse effects of the crisis spread through production networks across Asia...?
- ▶ Trade relationships within production networks appear to be rather lasting and resistant to the shocks

Transactions of intermediate goods within networks

- ▶ Difference from transactions of finished products made entirely in one country as well as goods sold on the open market
 - ▶ The need for coordination between production processes
 - ▶ Network setup costs (sunk costs of investing in newly fragmented production block)
- ▶ The network-forming firms would put priority not only on lowering production costs but on the stability of trade relationships

Due to such relation-specific nature...

- ▶ Once a trade relationship is established, the transaction of intermediate goods within production networks appears to be **more stable** and **resilient** to a short-term shock compared to other transactions

Objective

- ▶ To verify the stability of trade relationships within international production networks
- ▶ To shed light on its resilience amid the Asian crisis

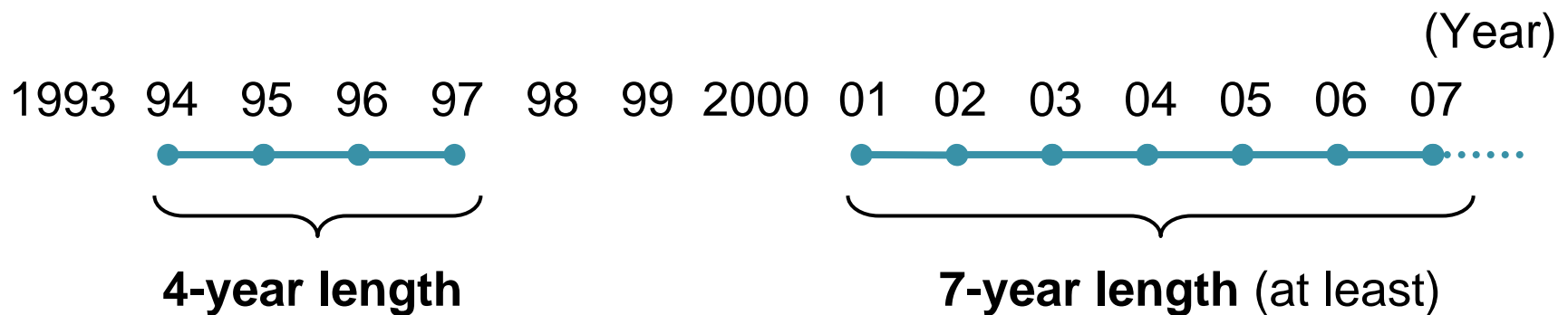
Method and data

- ▶ Survival analysis using the country-product level trade data
 - ▶ HS 6-digit level
 - ▶ 4013 product lines for all manufacturing industries (HS28-92)
 - ▶ 1124 product lines for machineries (HS84-92)
 - ▶ Intra-Asian trade during 1993-2007
 - ▶ ASEAN 10, China, Hong Kong, Japan, and Rep. of Korea
 - ▶ The probability of continuance once a trade relationship is established; the probability of recovering from a disruption

- ▶ Intra-Asian trade of machinery parts & components is compared with that of finished products

Trade relationships of exporter-importer-product pair

- ▶ Spell - where a certain product is continuously traded between countries
- ▶ Trading is not a once-and-forever phenomenon
- ▶ Multiple spells are treated as independent



This exporter-importer-product pair experiences **two spells**

Cox proportional hazard estimation

	All spells	Without 1993-origin spells	1-year-gap- adjusted	The first spells only	Single spells only	Excl. Japan
P&C dummy	0.725**	0.790**	0.734**	0.702**	0.623**	0.734**
Exporter's GDP	0.952**	0.919**	0.956**	0.968**	1.042**	0.944**
Importer's GDP	0.989**	0.953**	0.993**	0.988**	1.025**	0.989**
Abs. diff. in PCGDP	0.961**	0.935**	0.964**	0.982**	0.984**	0.974**
%change in RER	0.985**	0.978**	0.999	0.984**	1.025**	0.983**

- ▶ Hazard ratio > 1: **Negative effect on duration of trade**
- ▶ Hazard ratio < 1: **Positive effect**
- ▶ Hazard ratio = 1: **No impact**

- ▶ Estimated coefficients are expressed in terms of hazard ratios

Cox proportional hazard estimation

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Parts & components face a **27% smaller** probability of discontinuance (higher probability of continuance) with respect to finished products

- ▶ Estimated coefficients are expressed in terms of hazard ratios

Possible effects of the Asian crisis

	Excl. trade relationships ceased in 1998	Trade relationships started in and after 1998 only
P&C dummy	0.722**	0.794**
Exporter's GDP	0.948**	0.895**
Importer's GDP	0.988**	0.927**
Abs. diff. in PCGDP	0.958**	0.902**
%change in RER	0.994**	1.013**

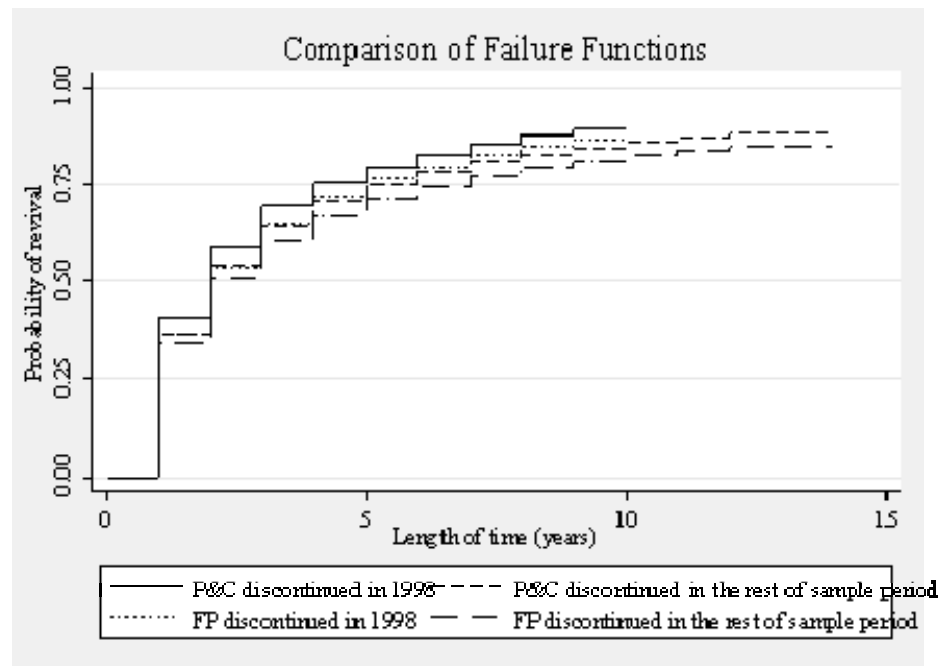
Even after considering the impact of the Asian crisis, parts & components still face a **21-28%** higher probability of continuance

The Asian crisis and the discontinuance of trade

P&C				FP			
Continued in the next year		Discontinued (no trade) in the next year		Continued in the next year		Discontinued (no trade) in the next year	
N.	Share (%)	N.	Share (%)	N.	Share (%)	N.	Share (%)
Trade relationships active in 1997							
21,766	84.0	4,133	16.0	23,347	75.8	7,462	24.2
Average value in the rest of sample period							
23,373	87.1	3,352	12.9	25,338	80.3	6,027	19.7

- ▶ A nonnegligible portion of trade relationships was actually broken off amid the Asian crisis irrespective of product type

Revival of trade amid the Asian crisis



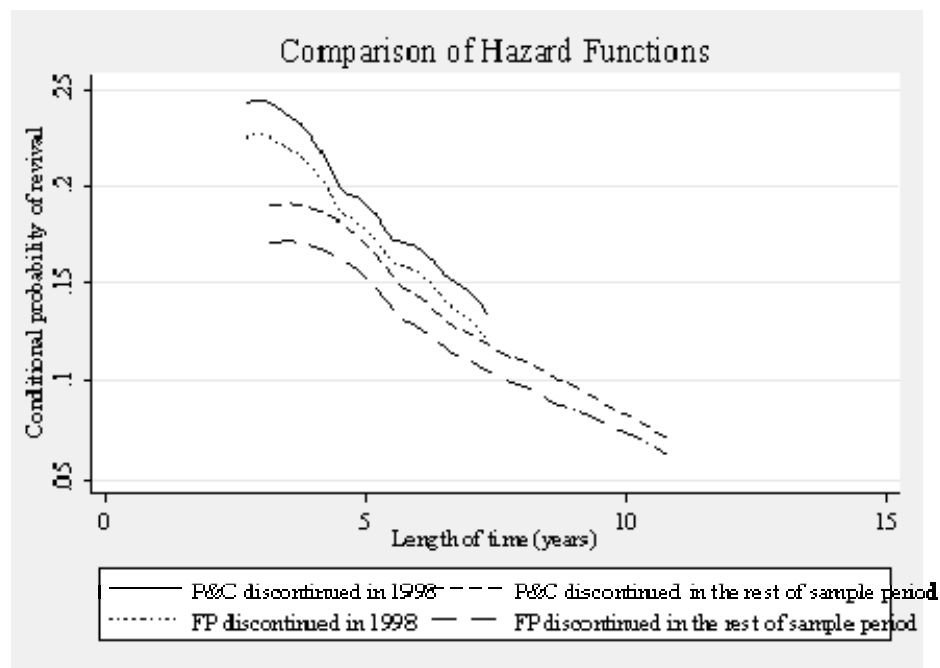
- ▶ The failure rate $F(t) = 1 - S(t)$
 - ▶ The probability of **revival** (recovering from a disruption) until the t -th year

Revival of trade amid the Asian crisis

	Estimated K-M failure rate				Obs.
	1 st year	2 nd year	4 th year	7 th year	
Trade relationships discontinued in 1998					
P&C	0.41	0.59	0.75	0.85	4,133
FP	0.37	0.54	0.72	0.82	7,462
Trade relationships discontinued in the rest of sample period					
P&C	0.37	0.54	0.71	0.81	43,570
FP	0.34	0.51	0.67	0.77	78,356

- ▶ The trade relationships of parts & components that were discontinued in 1998 face the **highest** failure rates

Revival of trade amid the Asian crisis



- ▶ The hazard rate $h(t) = \Pr(T=t|T \geq t)$
 - ▶ The conditional probability of failure (**revival**) in the t -th year
- ▶ The hazard curve is **steeper** for the trade relationships discontinued in 1998

Conclusion

- ▶ A higher probability of survival and revival for parts & components in intra-Asian machinery trade
 - ▶ Parts & components are more likely to be traded through long-lived relationships
 - ▶ A nonnegligible portion of trade relationships was broken off amid the Asian crisis; however, trade relationships of parts & components are more likely to be restored shortly afterward
- ▶ Stability and resiliency of trade relationships within production networks in Asia

The Asian crisis and the recent global crisis

- ▶ Transactions within production networks were hardly affected by the Asian crisis because they depend largely on ultimate demand from outside the region centering on the US?
- ▶ The increasing importance of Asia's own market for machinery parts & components
- ▶ Asia's reliance on the US market has been diminishing even for machinery finished products

		Share (%)		
		1993	2000	2007
P&C	Intra-Asia	44.6	49.1	57.1
	US	29.2	24.9	13.5
	EU	15.8	15.9	13.7
	Other regions	10.4	10.1	15.8
FP	Intra-Asia	27.9	26.7	24.7
	US	31.4	35.3	25.9
	EU	19.8	21.0	20.6
	Other regions	20.8	17.0	28.7

Implications for the impact of the global recession

- ▶ The diversified destinations for the Asian exports of machinery finished products
- ▶ A country can switch between potential markets for certain products; the transactions of the relevant intermediate goods that are traded within production networks do not appear to be severely affected by the decreased final demand even in the US
- ▶ Even if broken off, trade relationships built on production networks would still be resilient to a temporary disruption