Grin and Bear It: Producer-Financed Exports from an Emerging Market

Banu Demir
Bilkent University

Beata Javorcik
Oxford, ESOP and CEPR

April 2016

Motivation

- Large amounts are spent on trade financing - $1.5 trillion annually.
- Shock to trade finance viewed as one of the drivers of the Great Trade Collapse.
- Trade financing is a key issue for policy makers and exporters, particularly in developing countries.

Background

- International trade is risky.
- Trade partners have to decide who bears the risk associated with the transaction:
  - open account (OA): exporter finances and bears the risk
  - cash in advance (CIA): importer finances and bears the risk
  - letter of credit (LC): neither of the trading partners bears the risk.
- Little is known about the determinants of trade financing choices.

This paper

- Does the level of competition in the destination market matter for the choice of financing terms?

Anecdotal evidence

Advice given to exporters by the US Department of Commerce:

- *"Open account terms may help win customers in competitive markets"*
- *"Insisting on cash-in-advance could, ultimately, cause exporters to lose customers to competitors who are willing to offer more favorable payment terms to foreign buyers"*

Literature

- Literature on trade finance (broader perspective): e.g. Amiti and Weinstein (2011, *QJE*); Chaney (2013); Manova (2008, *JIE*); Paravisini et al. (2015, *RStud*).

- Very recent literature on financing terms in international trade: Antràs and Foley (2015, *JPE*); Eck et al. (2012, *RWE*); Engemann et al (2011, *WE*); Hoefele et al. (*forthcoming, CJE*); Schmidt-Eisenlohr (2013, *JIE*).

Our contribution

- The first study to examine the role of competition in the destination market for the choice of financing terms.
- Identification strategy based on an exogenous shock.
- The first study based on information on the universe of a country's exports (as opposed to data for a single firm or indirect tests).

Preview of the results

- The choice of financing terms responds to exogenous shocks to competition.
- The share of OA exports in the affected products increased by about 4-5% pts (relative to exports of control products) after the shock.

Theory

Model in a nutshell

- A simple Nash bargaining model building on Schmidt-Eisenlohr (2013) and Antràs and Foley (2015).
- Price is chosen to maximize the geometric average of the importer's and the exporter's surpluses under each scenario

$$\max_{P^f} \Omega_f = \{E[\Pi_I^f]\}^{\alpha}\{E[\Pi_E^f]\}^{1-\alpha};\ f = \{CIA, OA, LC\}$$

  where $\alpha \in (0, 1)$ is a measure of the importer's bargaining power.
- The financing term generating the highest surplus is chosen.

▸ Go to model setup

Predictions for financing choices

- **OA becomes more attractive as the importer's bargaining power (α) increases.**

Predictions for financing choices

- **OA becomes more attractive as the importer's bargaining power (α) increases.**
- OA becomes more attractive as enforcement in the destination (λ_c) improves.

Predictions for financing choices

- **OA becomes more attractive as the importer's bargaining power (α) increases.**
- OA becomes more attractive as enforcement in the destination (λ_c) improves.
- OA becomes more attractive as the cost of financing in the destination (r_c) increases.

Data

Data

- Universe of Turkey's exports for the period 2003-2005.
- Data disaggregated by firm, product (HS6), destination, and financing term.
- For each observation, dataset reports both value (free-on-board) and quantity.

Data on financing terms

- Financing terms fall into four broad categories:
  1. Open account
  2. Cash in advance
  3. Letter of credit
  4. Documentary collection (bank intermediation without payment guarantee, less costly than letter of credit)

	2002	
	EU	Non-EU
Share of OA exports	0.60	0.58
Share of CIA exports	0.01	0.03
Share of LC exports	0.07	0.21
Share of DC exports	0.32	0.18

▸ General patterns

Empirical strategy and results

A large shock to competition: The End of the Multi-Fibre Agreement

- The MFA, a system of bilateral quotas governing the global trade in textiles and clothing since 1974, was dismantled in 2005. The decision to do so was taken during the Uruguay Round which finished in 1994.

- During 1993-2003, Turkey and China were the leading exporters of textiles and clothing into the EU market (together accounting for 30% of imports to the EU).

- Turkish exports have not been subject to any quota restrictions since 1996 (when Turkey formed a customs union with the EU).

- Chinese exports were subject to MFA quotas which were abolished (with some exceptions) on 1 January 2005.
  - Exclude HS2 codes 61 & 62 as most of these products were subject to a dispute between China and the EU in the first half of 2005.

But some MFA quotas were not fully filled and hence not binding

- Treated products: HS6 product with binding quotas in 2004

$$\begin{aligned} Treat_p &= 1 \text{ if } fill\_rate_{p,2004} > 0.8 \\ Treat_p &= 0 \text{ if } fill\_rate_{p,2004} \leq 0.8 \end{aligned}$$

- Robustness checks with alternative definitions of treatment.

Difference-in-differences approach

- Did exports on OA terms increase disproportionately in the post-MFA period for products where quotas were binding in 2004?

Difference-in-differences approach

- Did exports on OA terms increase disproportionately in the post-MFA period for products where quotas were binding in 2004?

- Focus on Turkish exports of T&A to EU members in 2004 and 2005

$$\Delta Sh_{ipct}^{OA} = \gamma_0 + \gamma_1 Post_t * Treat_p + \eta_{ct} + \alpha_p + \delta_{it} + \varepsilon_{ipct}$$

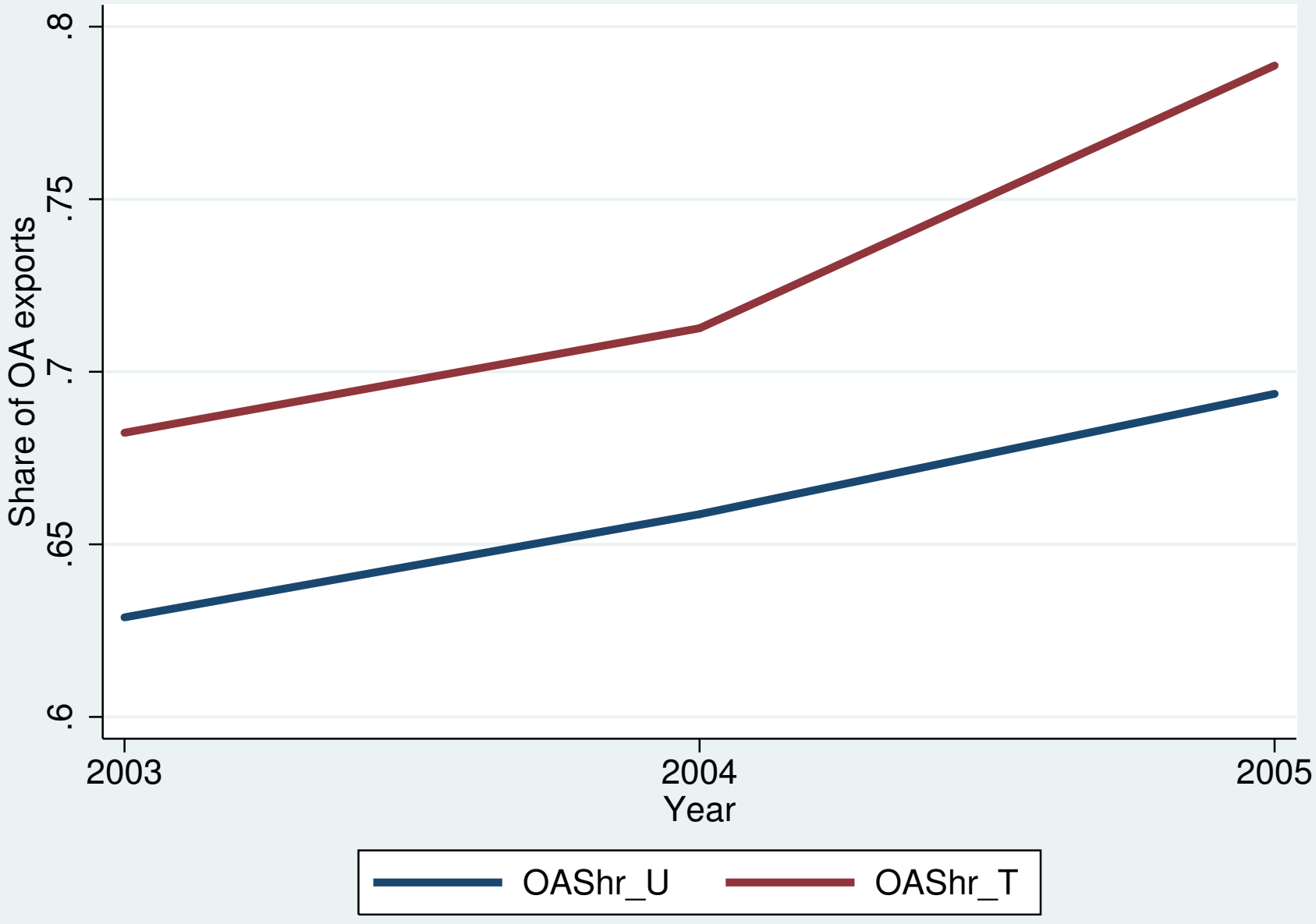
  where ΔSh_{ipct}^{OA} denotes a change in the share of firm i's exports on OA terms, measured in physical units, of HS6 product p to country c time t and $t-1$.

- We expect $\gamma_1 > 0$
- Standard errors clustered at the product level.

Summary statistics

	2004		2005	
Avg product per firm	8.620		8.940	
	(10.548)		(11.223)	
Avg destination per firm	5.755		5.748	
	(4.093)		(4.046)	
Avg product per firm-destination	4.520		4.682	
	(5.109)		(5.302)	
Avg value per firm-product-dest (USD)	279,866		262,621	
	(1,226,811)		(1,153,157)	
	Treat	Untreat	Treat	Untreat
Number of firms	240	1700	267	1843
Number of products	57	351	54	359
Share of OA exports	0.713	0.659	0.789	0.694
	(0.416)	(0.436)	(0.375)	(0.425)
Log of unit value	1.081	1.782	1.019	1.794
	(0.528)	(1.139)	(0.522)	(1.144)
Log of value	10.118	10.349	9.967	10.311
	(1.928)	(2.286)	(1.935)	(2.243)

Financing of Treated vs Control products



Baseline results: First differences

$$\Delta Sh^{OA}_{ipct} = \gamma_0 + \gamma_1 Post_t * Treat_p + \eta_{ct} + \alpha_p + \delta_{it} + \varepsilon_{ipct}$$

	(1)	(2)	(3)	(4)
$Post * Treat$	**0.0487*** **	**0.0520*** **	**0.0362***	**0.0410***
	(0.0159)	(0.0163)	(0.0191)	(0.0227)
$Treat$	-0.0280**			
	(0.0104)			
N	17900	17900	17900	17900
R^2	0.0034	0.0273	0.196	0.296
FE	cxt	cxt,p	cxt,p,i	cxt,p,ixt

Standard errors clustered at the product level.

Falsification tests: Placebo date, placebo destinations

	2002-2004,EU	2003-2005,NonEU
	(1)	(2)
$Post * Treat$	0.0058	0.0195
	(0.0352)	(0.0233)
N	8563	21309
R^2	0.325	0.317
FE	cxt,p,ixt	cxt,p,ixt

Standard errors clustered at the product level.

Robustness check: Alternative treatment

	$FR_{p,2004} > 0.5$	$FR_{p,2004} > 0$	$FR_{p,2004}$
	(1)	(2)	(3)
$Post * Treat$	**0.0375***	**0.0314***	**0.0467***
	(0.0207)	(0.0192)	(0.0253)
N	17900	17900	17900
R^2	0.296	0.296	0.296
FE	cxt,p,ixt	cxt,p,ixt	cxt,p,ixt
Standard errors clustered at the product level.			

Robustness check: Controlling for selection

- Selection bias if exports on OA terms in 2004 were more likely to survive in the post-MFA period.
- Follow Mulligan and Rubinstein (2008, *QJE*) and Paravasini et al.(2015, *RStud*) to address the possible selection bias.
  - Estimate the probability that a given export flow $(icp, 2004)$ continued in 2005.
  - Divide the sample based on the 20th, 40th, and 50th percentiles of the estimated continuation probability.
  - Estimate the baseline specification in first differences for each subsample.

$$\Delta Sh^{OA}_{ipct} = \gamma_0 + \gamma_1 Post_t * Treat_p + \eta_{ct} + \alpha_p + \delta_i + \varepsilon_{ipct}$$

Robustness check: Controlling for selection

	Probit	OLS			
	(1)	(2)	(3)	(4)	(5)
	All	All	$> 20th$ pctl	$> 40th$ pctl	$> 50th$ pctl
$\ln X_{icp,2003}$	0.193***				
	(0.0104)				
$Sh^{OA}_{icp,2003}$	0.0024				
	(0.0590)				
$Treat$	-0.123*				
	(0.0669)				
$Post * Treat$		**0.0362***	**0.0379***	**0.0421***	**0.0447***
		(0.0191)	(0.0233)	(0.0217)	(0.0238)
N	8454	17900	11705	9266	7916
R^2		0.196	0.133	0.137	0.148
FE	c,i	cxt,p,i	cxt,p,i	cxt,p,i	cxt,p,i

Standard errors are clustered at the product level.

What about substitution between financing terms and prices?

Changes in unit values

- Estimate the baseline specification for unit values:

$$\Delta \ln UV_{ipct} = \beta_0 + \beta_1 Post_t * Treat_p + \eta_{ct} + \alpha_p + \delta_{it} + \epsilon_{ipct}$$

- We expect $\beta_1 < 0$.

	$\Delta \ln UV_{ipct}$	$\Delta \ln UV_{ipct}$	$\Delta \ln UV_{ipct}$
	(1)	(2)	(3)
$Post * Treat$	**-0.0986*** **	**-0.0964*** **	**-0.0847** **
	(0.0253)	(0.0294)	(0.0331)
N	17900	17900	17900
R^2	0.0547	0.248	0.373
FE	cxt,p	cxt,p,i	cxt,p,ixt

Standard errors clustered at the product level.

Evidence of substitution

Did prices of flows where $ShQ_{ipc}^{OA} = 0$ in both 2004 and 2005 decrease more compared to others?

	$\Delta \ln UV_{ipct}$	$\Delta \ln UV_{ipct}$	$\Delta \ln UV_{ipct}$	$\Delta \ln UV_{ipct}$
	(1)	(2)	(3)	(4)
$I\{ShQ_{ipc}^{OA} = 0\} * Post * Treat$	**-0.160****	**-0.154****	**-0.155***	**-0.206*****
	(0.0769)	(0.0773)	(0.0830)	(0.0788)
$Post * Treat$	**-0.0689*****	**-0.0772*****	**-0.0744****	-0.0544
	(0.0249)	(0.0252)	(0.0291)	(0.0335)
N	17900	17900	17900	17900
R^2	0.0156	0.0550	0.248	0.373
FE	cxt	cxt,p	cxt,p,i	cxt,p,ixt

Standard errors clustered at the product level. Double interactions with $I\{ShQ_{ipc}^{OA} = 0\}$ are included but not reported.

OA seems to substitute for LC

Shift from letter of credit to open account

	(1)	(2)	(3)
	ΔSh_{ipct}^{CIA}	ΔSh_{ipct}^{LC}	ΔSh_{ipct}^{DC}
$Post * Treat$	0.0087	**-0.0170***	-0.0327
	(0.0070)	(0.0104)	(0.0207)
N	17900	17900	17900
R^2	0.425	0.248	0.290
FE	cxt,p,ixt	cxt,p,ixt	cxt,p,ixt

Standard errors clustered at the product level.

Conclusions

- Turkish exporters responded to an exogenous shock to competition by increasing the share of exports on OA terms.
- OA financing substituted for bank intermediation (LC) and thus Turkish exporters took on additional risk as their bargaining power decreased after the shock.
- The ability to provide financing can boost emerging markets' exports to highly competitive destinations.

Theory - setup

- A simple Nash bargaining model that builds on Schmidt-Eisenlohr (2013) and Antràs and Foley (2015).
- A Turkish exporter supplies an intermediate good p to an importer in destination country c, which uses it to produce a final good.
- The good's specifications are tailored to the exact needs of the importer.
- Exporter and importer share the surplus generated by the transaction.
- Both firms are risk-neutral.

Go back to model in a nutshell

Theory - setup

- Exporter incurs a constant marginal production cost that is normalised to unity.
- S denotes the value of the good to Importer.
- Timing:
  - Under CIA: importer pays at $t = 0$ $\rightarrow$goods arrive at c after t periods
  - Under OA: exporter produces and ships the goods at $t = 0$ $\rightarrow$importer pays after t periods
  - Under LC: importer's bank guarantees payment to the exporter after the arrival of goods at the destination.

Cash in advance

- Assume limited commitment: exporter may have an incentive to deviate from the specifications set in the contract.
- With probability $(1-\lambda)$ the exporter avoids a small effort cost and produces a good with an inferior quality.
- So, the value of the good to the importer falls to a fraction $\delta \in (0,1)$ of S.
- Expected profits of the exporter and the importer:

$$\begin{aligned} E[\Pi_E^{CIA}] &= P^{CIA} - 1 \\ E[\Pi_I^{CIA}] &= \frac{\lambda + (1-\lambda)\delta}{(1+r_c)^t} S - P^{CIA} \end{aligned}$$

where P^{CIA} the price agreed at $t=0$, and r_c the cost of financing in the importer's country.

Open account

- The exporter has no incentive to deviate.
- Assume limited commitment: contract enforcement probability $\lambda_c \in (0,1)$ in importing country c.
- If the contract is not enforced, the exporter can use courts and recover is a fraction $\gamma \in (0,1)$ of P^{OA} (original price less court fees, etc).
- Expected profits of the exporter and the importer:

$$
\begin{aligned}
E[\Pi_E^{OA}] &= \frac{\lambda_c P^{OA} + (1-\lambda_c)\gamma P^{OA}}{(1+r)^t} - 1 \\
E[\Pi_I^{OA}] &= \frac{S - P^{OA}}{(1+r_c)^t}
\end{aligned}
$$

Letter of credit

- Exporter receives payment with certainty.
- Exporter's incentive not to comply with the contract terms is negligible.
- Bank financing (almost) eliminates the moral hazard problem but it is costly.
- The importer has to pay its bank a processing fee $f^{LC} > 1$ which increases the cost of financing to $f^{LC}(1+r_c)^t > (1+r_c)^t$, and a fixed fee $F^{LC} > 0$.
- Expected profits of the exporter and the importer:

$$E[\Pi_E^{LC}] = \frac{P^{LC}}{(1+r)^t} - 1$$

$$E[\Pi_I^{LC}] = \frac{S - P^{LC}}{f^{LC}(1+r_c)^t} - F^{LC}$$

Choice of financing term

- $\forall f$, P^f is determined by Nash bargaining solution.
- Price is chosen to maximize a geometric average of the importer's and the exporter's surpluses:

$$\max_{P^f} \Omega_f = \{E[\Pi_I^f]\}^{\alpha} \{E[\Pi_E^f]\}^{1-\alpha};\ f = \{CIA, OA, LC\}$$

where $\alpha \in (0, 1)$ is a measure of the importer's bargaining power.