Why Do Some Firms Export So Much More Than Others?

Miklós Koren
CEU, KRTK, and CEPR

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Four facts

1. Global exposure differs across firms, even conditional on size

1. Export shares vary widely, mostly independently of size. (next slide, Kee and Krishna 2008)
2. Size is a minor determinant of becoming an exporter. (Armenter and Koren 2015: pseudo-$R^2 = 0.05$)
3. Size is a minor determinant of importing intermediate inputs. (Halpern, Koren and Szeidl 2015)

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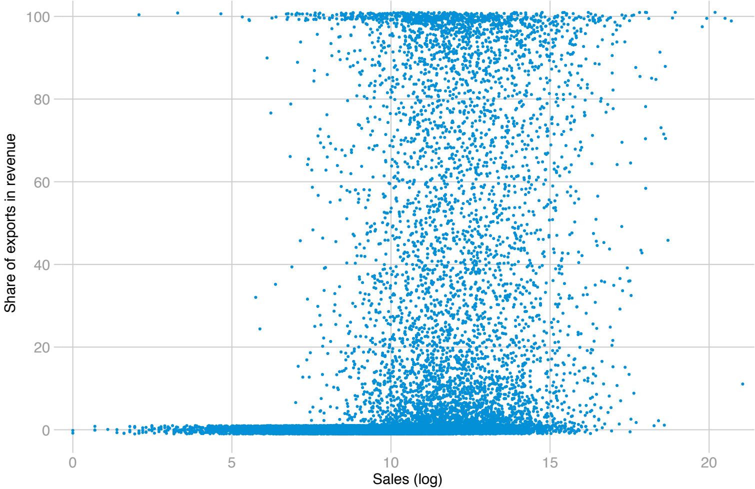
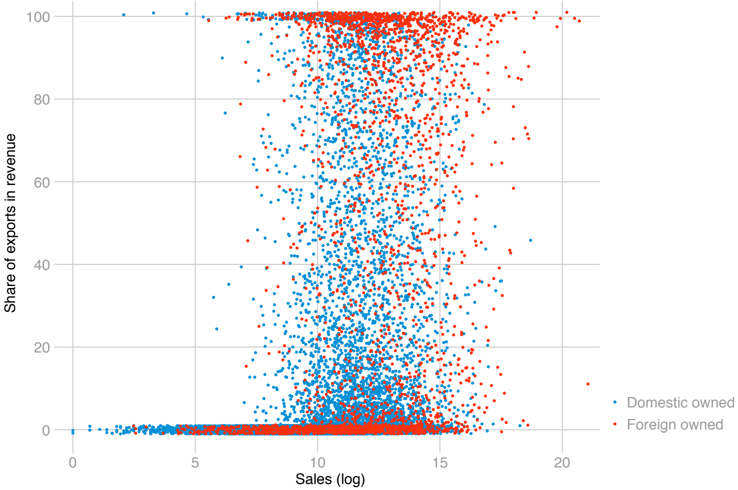


Variation not fully explained by foreign ownership (Hungary, manufacturing, 2003)



2. Measures of global exposure are correlated

1. Firms with *anything* foreign are more likely to export (next slide, Bernard, Jensen and Schott 2009)
2. Foreign *owned* firms import more intermediate inputs (Halpern, Koren and Szeidl 2015) and machines (Halpern, Hornok, Koren and Szeidl 2019)
3. Exports and capital imports increase after foreign *manager* takes over firm (Koren and Telegdy 2019)

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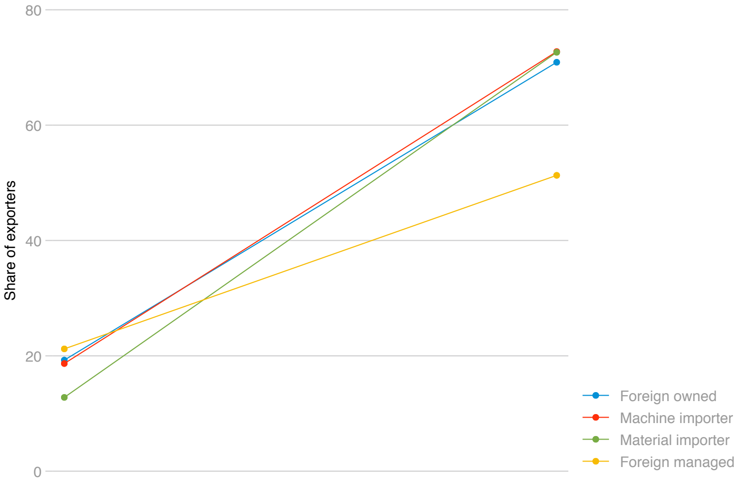

3. Firms enter new markets small

1. New exporters grow gradually (next slide from Ruhl and Willis 2017)
2. Young firms grow gradually (Arkolakis, Papageorgiou and Timoshenko 2018)

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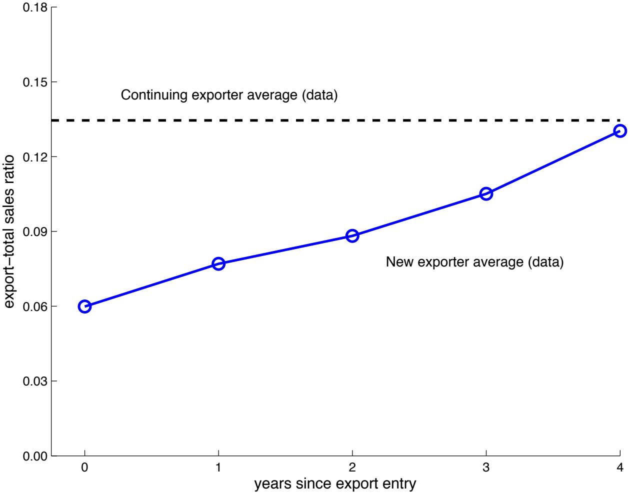
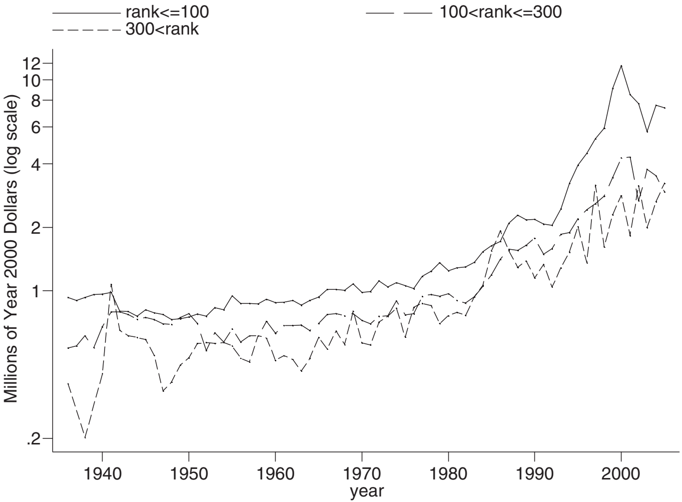


4. Managers earn high wages, especially at large firms

1. CEOs earn *high* wages, especially at large firms (next slide from Frydman and Saks 2010)
2. Managers with special experience earn more (Bertrand and Schoar 2003, Mion and Opromolla 2014)

CEOs earn *high* wages, especially at large firms (Frydman and Saks 2010)



Model

Production function

Firm j, market i

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Firm characterized by (A_j, K_{Hj}, K_{Fj})

Market access skills

Manager m, market i

$$\kappa_{im} p_i \text{ with } \kappa_{im} \in (0,1)$$

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Manager characterized by $(\kappa_{Hm}, \kappa_{Fm})$

Net revenue per market

$$\kappa_{im} p_i A_j K_{ij}^{\alpha} L_{ij}^{1-\alpha} - w L_{ij}$$

Labor frictionlessly hired,

$$R_{ijm} = \left(\frac{1-\alpha}{w} \right)^{1/\alpha - 1} (\kappa_{im} p_i)^{1/\alpha} A_j^{1/\alpha} K_{ij}$$

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$$R_{ijm} = \tilde{\kappa}_{im} \tilde{K}_{ij}$$

Assignment

Firms hire managers in frictionless, competitive markets. Optimal manager maximizes net revenue minus her wage,

$$\max_m \alpha \sum_i R_{ijm} - \nu_m = \max_m \alpha \sum_i \tilde{\kappa}_{im} \tilde{K}_{ij} - \nu_m,$$

Equilibrium

Given fixed distributions over (A_j, K_{Hj}, K_{Fj}) and $(\kappa_{Hm}, \kappa_{Fm})$ (with $\#j = \#m$), determine

- firm-manager assignment: $\mu(j, m)$
- manager wages: ν_m
- firm profits: π_j
- revenue per market: R_{ijm}

Key ingredients

1. Diminishing returns within each market
2. Inelastic supply of manager skills
3. Complementarity of manager skills with firm capital

Optimal transport

Equilibrium assingment is equivalent to following optimal transport problem (Galichon 2016)

$$\int_{j,m} \mu(j,m)(\tilde{\mathbf{K}}_j - \tilde{\kappa}_m)^2 dj dm \to \min$$

s.t.

$$\int_j \mu(j,m) dj = \mu(j)$$

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Focus on discrete manager types, continuous firm types.

Predictions

Cross sectional predictions

1. Conditional on R_j, there is heterogeneity in R_{Fj}/R_{Dj}.
2. Managers at larger firms earn more.
3. Manager wages convex in $\mathbf{K}$.
4. Conditional on R_{Dj}, managers at high R_{Fj} firms earn more.

Export heterogeneity

$$\mathsf{Var}\ln R_{ij} = \mathsf{Var}\ln\tilde{\kappa}_{im} + \mathsf{Var}\ln\tilde{K}_{jm} + 2\mathsf{Cov}(\ln\tilde{\kappa}_{im}, \ln\tilde{K}_{jm})$$

- additional heterogeneity in managers: $\mathsf{Var}\ln\tilde{\kappa}_{im} > 0$
- complementarity of managers and firms: $2\mathsf{Cov}(\ln\tilde{\kappa}_{im}, \ln\tilde{K}_{jm}) > 0$

Comparative statics

Supply shock

Trade liberalization

Export markets become liberalized (p_F increases).

1. Managers with export skills earn more.
2. Net entry into exporting is zero (by assumption).
3. Export-skilled managers move from low export-intensity firms to high export-intensity firms. (magnifying export heterogeneity)

Measurement

(Potential) Data

- Panel of all Hungarian firms, 1992–2017.
- Panel of all CEOs active in Hungary, 1992–2017.
- Export and domestic revenue. (Also by destination country, 1992–2003.)
- CEO wages?

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and

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How to recover $\tilde{\kappa}_{im}$ and $\tilde{K}_{ij}$?

Option 1

Treat both as fixed effects (Abowd, Kramarz and Margolis 1999).

$$\ln R_{ijm} = \ln \tilde{\kappa}_{im} + \ln \tilde{K}_{ij}$$

Estimate separate firm- and manager-effects for each market.

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Estimate separate firm- and manager-effects for each market.
But

1. $\tilde{\kappa}_{im}$ changes over time (prices)
2. $\tilde{K}_i$ may change over time (capital accumulation)

Option 2

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Diff-in-diff in Koren and Telegdy (2019) consistent with $\tilde{\kappa}_{FF} \gg \tilde{\kappa}_{FD}$ and $\tilde{\kappa}_{DF} > \tilde{\kappa}_{DD}$.

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Instrument manager assignment with supply shocks (EU accession 2004, 2007, cohort effects).

Option 3

Exploit multi-dimensionality of problem. Assignment based on

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not R_{ijm}.
Shocks affecting R_{ijm} can be used to estimate revenue function in all markets $\neq i$.

Next steps

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1. Think more about measurement.
2. Having more fun with the model: Firms can change K with some adjustment cost. Could explain sluggish export market dynamics.
3. Think about zeros. But not fixed costs.