

# Misallocation Under Trade Liberalization

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# The contribution

- ▶ Extend Hsieh and Klenow (2009) with trade and misallocation due to selection
- ▶ Trade reforms with distortions can lead to lower aggregate TFP and lower welfare gains
- ▶ Very nice paper!

# Outline of discussion

- ▶ Model overview
- ▶ Relation to Melitz (2003) and Hsieh and Klenow (2009)
- ▶ Comments/suggestions

## The model in a few slides

- ▶ Two countries, with population  $L$  and  $L_f$
- ▶ Representative household (home) solve

$$\max \sum_{t=0}^{\infty} \beta^t u(C_t)$$

$$\text{s.t. } P_t C_t + q_{t+1} B_{t+1} = B_t + w_t L + \Pi_t + T_t$$

- ▶ In financial-autarky steady state,  $q = \beta$

## Final goods producers

- ▶ Perfect competition
- ▶ Aggregate intermediate goods using CES

$$Q = \left[ \int_{\omega \in \Omega} q(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \right]^{\frac{\sigma}{\sigma-1}}$$

$\sigma$ : EOS across intermediate goods

$\Omega$ : endogenous set of goods (domestic and imported)

- ▶ Demand for good  $\omega$ :  $q(\omega) = \frac{p(\omega)^{-\sigma}}{P^{-\sigma}} Q$   
with price index

$$P = \left[ \int_{\omega \in \Omega} p(\omega)^{1-\sigma} d\omega \right]^{\frac{1}{1-\sigma}}$$

## Intermediate goods producers

- ▶ Potential entrants pay fixed cost  $f_e$  to draw productivity  $\varphi$  and revenue wedge  $\tau$  from a joint distribution  $g$
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  - ▶ pay  $f$  to operate each period, die with probability  $\delta$
  - ▶ domestic profit maximization

$$\max_p \frac{pq(p)}{\tau} - w \frac{q(p)}{\varphi} - wf$$

- ▶ standard markup over marginal cost:  $p = \frac{\sigma}{\sigma-1} \frac{w\tau}{\varphi}$

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- ▶ standard markup over marginal cost:  $p = \frac{\sigma}{\sigma-1} \frac{w\tau}{\varphi}$
- ▶ zero-profit condition yields entry-exit threshold

$$\varphi^*(\tau) = A(\sigma, P, Q, w, f) \tau^{\frac{\sigma}{\sigma-1}}$$

⇒ endogenous correlation between productivity and wedges



## Intermediate goods exporters

- ▶ Exporters pay additional  $f_x$  to export each period
- ▶ Iceberg transportation costs  $\tau_x$
- ▶ Export profit maximization

$$\max_{p_x} \frac{p_x q_f(p_x)}{\tau} - w \frac{q_f(p_x) \tau_x}{\varphi} - w f_x$$

with foreign demand:  $q_f(p_x) = \left(\frac{p_x}{P_f}\right)^{-\sigma} Q_f$

- ▶ standard markup over marginal cost:  $p_x = \frac{\sigma}{\sigma-1} \frac{w \tau_x \tau}{\varphi}$
- ▶ optimal export threshold

$$\varphi_x^*(\tau) = A(\sigma, P, Q, w, f) \left( \frac{f_x P^\sigma Q}{f P_f^\sigma Q_f} \right)^{\frac{1}{\sigma-1}} \tau_x \tau^{\frac{\sigma}{\sigma-1}}$$

- ▶  $\varphi_x^*(\tau) > \varphi^*(\tau) \Leftrightarrow \left( \frac{f_x P^\sigma Q}{f P_f^\sigma Q_f} \right)^{\frac{1}{\sigma-1}} \tau_x > 1$

## Closing the model

- ▶ Free entry condition
- ▶ Labor market clearing
- ▶ Bond market clearing (financial autarky)
- ▶ Goods market clearing with balanced trade

## Relation to standard Melitz model

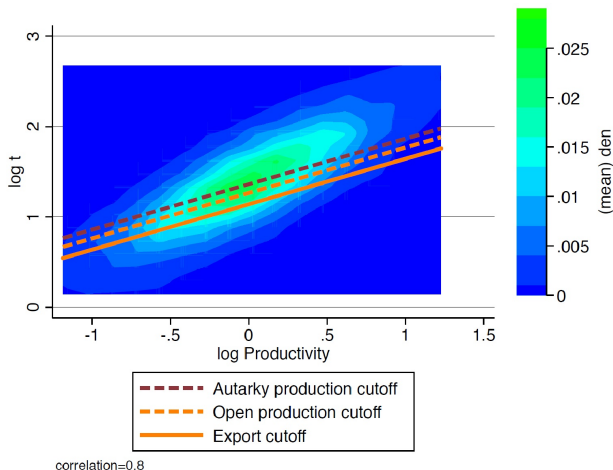
- ▶ In standard Melitz model

$$\begin{aligned}\tau_x \downarrow &\rightarrow \varphi_x^* \downarrow \text{ (expansion of exporters)} \\ &\rightarrow \varphi^* \uparrow \text{ (exit of least productive firms in GE)}\end{aligned}$$

- ▶ With distortions, trade reforms *can* lead to a transfer of market share from high wedge (productivity) firms to low wedge (productivity) firms  
 $\Rightarrow$  one needs to consider the joint distribution

# Selection Effects

- Larger expansion of low wedge (  $\log \text{wedge} = 1$  ) than high wedge (  $\log \text{wedge} = 1.5$  )



## Relation to Hsieh and Klenow (2009)

- ▶ In the closed economy

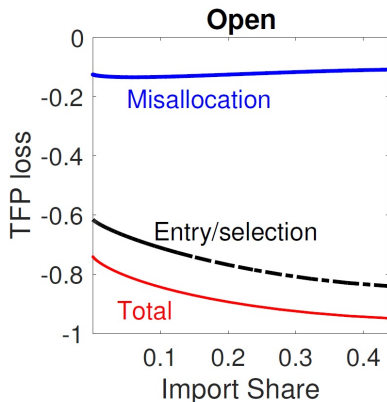
$$TFP = \frac{\sigma - 1}{\sigma} \left[ M \int \int_{\varphi^*(\tau)} \left( \varphi \frac{MPL}{MPL_i} \right)^{\sigma-1} \mu(\varphi, \tau) d\varphi d\tau \right]^{\frac{1}{\sigma-1}}$$

where  $M$  denotes mass of firms and  $MPL_i$  ( $MPL$ ) is the firm's (aggregate) marginal product of capital

- ▶ Distortions lead to misallocation
    - ▶ HK: dispersion in  $MPL/MPL_i$
    - ▶ selection:  $M, \varphi^*$  different from efficient levels
- ⇒ both reduce aggregate TFP

# Sizable misallocation due to selection

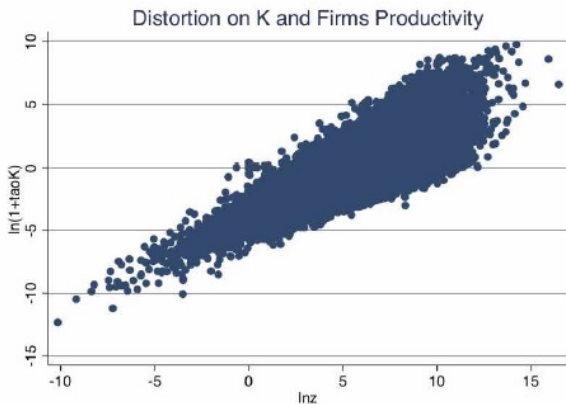
- ▶ Misallocation due to selection increasing in openness



- ▶ How? Trade reforms with distortions *can* lead to a transfer of market share from high to low wedge (productivity) firms

# Empirical results

- ▶ Positive correlation between measured MPK and TFP



- ▶ Estimate model to generate this relationship
- ▶ More on this later ...

## Quantitative results

- ▶ Welfare gains much smaller with distortions and TFP loss

	Open relative to close		
	Welfare	TFP	Import Share
<i>Home (%)</i>			
Benchmark	4.4	-2.9	30.8
No-distortion	9.8	13.3	20.8

- ▶ Very striking!



# Comments

- ▶ Very nice theoretical results
- ▶ Today, I will focus on quantitative results

# Are measured wedges = distortions?

- ▶ Selection → endogenous correlation between marginal (average) products and TFP
  - ▶ authors use model to control for this
  - ▶ does model generate entry/exit consistent with the data?
  - ▶ lack of endogenous exit may overestimate distortions

## Are measured wedges = distortions?

- ▶ Selection → endogenous correlation between marginal (average) products and TFP
- ▶ Fixed costs can also cause positive correlation
  - ▶ authors use model to control for this
  - ▶ are calibrated fixed costs consistent with the data?
  - ▶ calibrated continuation costs are very small  
 $f/f_e = 0.075 \ll 1.220$  (Barseghyan and DiCecio 2011)

## Are measured wedges = distortions?

- ▶ Selection → endogenous correlation between marginal (average) products and TFP
- ▶ Fixed costs can also cause positive correlation
- ▶ Alternative interpretations
  - ▶ non-convexities in production technology (Caunedo 2016)
  - ▶ uncertainty + adjustment costs (Asker et al. 2011)
  - ▶ and many others
  - ▶ David and Venke (2018): heterogeneous markups and technologies account for 27 percent of misallocation in China and informational frictions and adjustment costs account for 11 percent of misallocation in China

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- ▶ Selection → endogenous correlation between marginal (average) products and TFP
- ▶ Fixed costs can also cause positive correlation
- ▶ Alternative interpretations
- ▶ Measurement error
  - ▶ authors use Bils et al. (2017) to estimate that only 19 percent of variation in TFPR is due to measurement errors
  - ▶ However, since method cannot identify proportional measurement error, it is a lower bound on the magnitude of measurement error (Bils et al. 2017)

## Wedges and correlations exogenous?

- ▶ Wedges and associated correlations may not be exogenous
- ▶ Moreover, they may depend on reforms
  - ▶ Developing countries often have many distortions
  - ▶ Trade reforms are often undertaken with other reforms
  - ▶ The order of reforms can matter (Asturias, Hur, Kehoe, and Ruhl 2016)
  - ▶ In the presence of distortions to entry, trade, and financial frictions, AHKR find it optimal to reduce trade distortions first because it imposes selection early on

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  - ▶ In this paper, trade reforms impose the wrong selection. Then it would be optimal to first reduce distortions and then trade distortions. Transition paths?



## Wedges and correlations exogenous?

- ▶ Wedges and associated correlations may not be exogenous
- ▶ Moreover, they may depend on reforms
- ▶ Anecdotal examples through which trade improved allocation
  - ▶ Korea used exports to improve distortions in credit, foreign exchange and intermediate goods markets (Westphal 1990, Rodrick et al. 1995, and many others)

## Concluding remarks

- ▶ Very nice paper! Learned a lot.
- ▶ Provocative quantitative findings
- ▶ Would be useful to disentangle measured wedges vs. true distortions
- ▶ Would also be interesting to study how correlations change over time, especially during reforms