"Multinationals, Markets, and Markups"
Keller and Yeaple

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Summary

- Multinational firms: large, market power, rich information on sales and employment in multiple countries

- Simple theory of markups and entry across host countries to motivate empirics

- New, interesting empirical facts on US multinationals

  - consistent with many qualitative implications of theory

Summary

- ▶ Multinational firms: large, market power, rich information on sales and employment in multiple countries

- ▶ Simple theory of markups and entry across host countries to motivate empirics

- ▶ New, interesting empirical facts on US multinationals
    - ▶ consistent with many qualitative implications of theory

- ▶ My discussion:
    - ▶ relation with ER pass-through literature
    - ▶ dealing with markup unobservability
    - ▶ are markups lower in high income countries?
    - ▶ other models consistent with entry facts

Markups across firms and host countries

- ▶ Variable markup model with linear demand (Melitz-Ottaviano)

- ▶ In practice, output of MN firms sold across markets with different demand. Restrict to sales in host country?

- ▶ Markup of firm f with marginal cost z_{fct} in host country c

$$\mu_{fct} = \frac{1}{2} \left(\frac{p_{ct}^{max}}{z_{fct}} + 1 \right)$$

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$$\mu_{fct} = \frac{1}{2}\left(\frac{p_{ct}^{max}}{z_{fct}} + 1\right)$$

▶ Up to a first order

$$\log(\mu_{f'ct}) - \log(\mu_{fct}) = -\left(1 - \frac{1}{2\mu_{cft}}\right)[\log(z_{f'ct}) - \log(z_{fct})]$$

1. lower cost (or larger size) firms charge higher markups

2. if markups are higher in country c than in c', then markup differences are larger in c

Connection to exchange-rate pass-through

$$\log\left(\mu_{f'ct}\right) - \log\left(\mu_{fct}\right) = -\left(1 - \frac{1}{2\mu_{cft}}\right)\left[\log\left(z_{f'ct}\right) - \log\left(z_{fct}\right)\right]$$

▶ Range of demand models consistent with 1. and 2. (Arkolakis-Morlacco, Burstein-Gopinath)

▶ Analogous relation studied in pass-through literature

   ▶ compare Δ markup over time (rather than between firms) between exporters (rather than across countries)

   ▶ extensive evidence that Δ markup larger for high markup (larger) exporters

      ▶ e.g. Berman-Martin-Mayer, Amiti-Itskhoki-Konings

Dealing with markup unobservability

▶ Descriptive representation of how US MP affiliate markups vary across countries c and firms f

$$\mu_{fct} = \beta_Y GDPW_{ct} + \beta_F PS_{ft} + \lambda GDPW_{ct} \times PS_{ft} + \varepsilon_{fct} \quad (1)$$

  ▶ GDD per worker interesting, but theory is silent
  ▶ Concentration? Entry barriers?

Dealing with markup unobservability

- Descriptive representation of how US MP affiliate markups vary across countries c and firms f

$$\mu_{fct} = \beta_Y\, GDPW_{ct} + \beta_F\, PS_{ft} + \lambda\, GDPW_{ct} \times PS_{ft} + \varepsilon_{fct} \quad (1)$$

  - GDD per worker interesting, but theory is silent
  - Concentration? Entry barriers?

- By cost minimization

$$\mu_{fct} = \log\left(\frac{S_{fct}}{W_{fct}L_{fct}}\right) + \log(\theta_{fct}) \quad (2)$$

  - θ_{fct} is output elasticity with respect to flexible input L

  - Authors use total affiliate labor
    - fixed overhead costs
    - materials vs labor

- Standard approach: estimate θ_{fct}, infer μ_{fct}

Dealing with markup unobservability

- ▶ Assume output elasticity:

$$\log(\theta_{fct}) = \theta_{i(f)t} + \alpha_0 \log(K_{fct}/L_{fct}) + \iota_{fct} \tag{3}$$

- ▶ Plugging (2) in (3)

$$\mu_{fct} = \log\left(\frac{S_{fct}}{W_{fct}L_{fct}}\right) + \theta_{i(f)t} + \alpha_0 \log(K_{fct}/L_{fct}) + \iota_{fct}$$

Dealing with markup unobservability

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- Plugging (2) in (3)

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- Combining with (1)

$$\log\left(\frac{S_{fct}}{W_{fct}L_{fct}}\right) = \beta_Y GDPW_{ct} + \beta_F PS_{ft} + \lambda GDPW_{ct} \times PS_{ft}$$

$$-\theta_{i(f)t} - \alpha_0 \log(K_{fct}/L_{fct}) + \varepsilon_{fct} - \iota_{fct}$$

  instrument K_{fct}/L_{fct} using parent K_{ft}/L_{ft} and K_{ct}

- Identification of β and λ without measuring markups!

Dealing with markup unobservability

► When can we identify the impact of any variable (e.g. $GDPW_{ct}$) on markups when we can only measure one of the components of markups?

► Variable that we are interested in cannot impact markups through unmeasurable components of markups

Dealing with markup unobservability

- When can we identify the impact of any variable (e.g. $GDPW_{ct}$) on markups when we can only measure one of the components of markups?

- Variable that we are interested in cannot impact markups through unmeasurable components of markups

- e.g. suppose that θ_{fct} depends on $GDPW_{ct}$

$$\log(\theta_{fct}) = \theta_{i(f)t} + \alpha_0 \log(K_{fct}/L_{fct}) + \chi\, GDPW_{ct} + \iota_{fct}$$

  - produce higher quality for richer countries, quality affects θ_{fct}

  - do not identify β_Y, but $\beta_Y - \chi$

$$\log\left(\frac{S_{fct}}{W_{fct}L_{fct}}\right) = (\beta_Y - \chi)\, GDPW_{ct} + \beta_F\, PS_{ft} + \lambda\, GDPW_{ct} \times PS_{ft}$$

$$-\theta_{i(f)t} - \alpha_0 \log(K_{fct}/L_{fct}) + \varepsilon_{fct} - \iota_{fct}$$

More standard endogeneity

$$\log\left(\frac{S_{fct}}{W_{fct}L_{fct}}\right) = \beta_Y\,GDPW_{ct} + \beta_F\,PS_{ft} + \lambda\,GDPW_{ct} \times PS_{ft}$$

$$-\theta_{i(f)t} - \alpha_0\log\left(K_{fct}/L_{fct}\right) + \varepsilon_{fct} - \iota_{fct}$$

- ▶ Correlation of errors across countries (and time)
    - ▶ $\varepsilon_{fct} - \iota_{fct}$ may be correlated across c (including US) within f
    - ▶ $\varepsilon_{fct} - \iota_{fct}$ correlated with f parent variables
    - ▶ could include firm×time FE, instrument using lagged variables, requires errors uncorrelated over time

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▶ Endogenous entry
  ▶ firm may know it has a high ε_{fct} and choose to enter there
  ▶ use model to correct for endogenous selection

Are higher income countries more competitive?

- ▶ Empirical results imply, through lens of model, that higher income per worker countries have lower markups
- ▶ Cross-country variation in aggregate markups does not reveal clear relation to GDP, e.g. Eekhout-De-Loecker (2020)

		Markup	
		2016	change*
Global aggregate		**1.61**	**+0.46**
Europe		**1.63**	**+0.62**
1	Denmark	2.84	+1.88
2	Switzerland	2.72	+1.63
3	Italy	2.54	+1.54
4	Belgium	2.06	+1.03
5	Greece	1.80	+0.85
6	United Kingdom	1.68	+0.67
7	Ireland	1.82	+0.66
8	Norway	1.60	+0.60
9	France	1.51	+0.53
10	Netherlands	1.46	+0.42
11	Austria	1.32	+0.41
12	Finland	1.36	+0.39
13	Sweden	1.31	+0.37
16	Germany	1.35	+0.30
13	Spain	1.34	+0.24
16	Portugal	1.19	−0.09
North America		**1.81**	**+0.57**
1	United States	1.84	+0.59
2	Canada	1.53	+0.49
3	Mexico	1.55	+0.21

		Markup	
		2016	change*
Asia		**1.45**	**+0.38**
1	South Korea	1.48	+0.51
2	Hong Kong	1.65	+0.41
3	India	1.32	+0.34
4	Indonesia	1.53	+0.26
5	Japan	1.33	+0.26
6	Thailand	1.44	+0.21
7	Malaysia	1.33	+0.03
8	Pakistan	1.17	−0.01
9	Taiwan	1.23	−0.15
10	Turkey	1.16	−0.32
11	China	1.40	−0.49
12	Philippines	1.50	−0.77
Oceania		**1.55**	**+0.47**
1	Australia	1.57	+0.46
2	New Zealand	1.35	+0.38
South America		**1.59**	**+0.01**
1	Argentina	1.45	+0.64
2	Colombia	1.56	+0.41
3	Brazil	1.61	-0.01
3	Peru	1.64	-0.04

Europe vs US, differences in market power?

▶ Covarrubias-Gutiérrez-Philippon (2019)
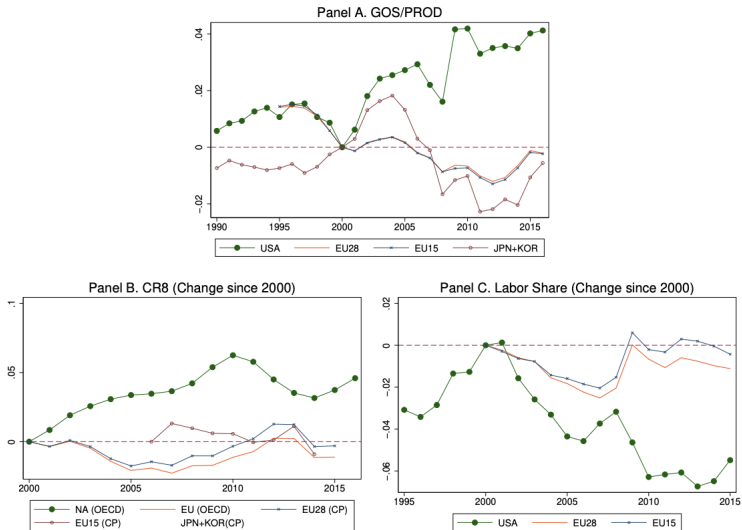
Multinational firm entry across markets

- Probability that US multinational firm f (with parent firm sales PS_f) enters in country c

$$Prob_{fc} = \alpha_c + \beta_c PS_f + \varepsilon_{fc}$$

- Estimate imposing $\beta_c = \beta_0 + \beta_1 GDPW_c$

- Key results:

  - $\beta_c > 0$: large firms more likely to do MP

  - $\beta_1 > 0$: large firms disproportionately more likely to do MP in high $GDPW_c$ countries

- Linear demand model with endogenous entry
  - $\beta_1 > 0$ if large countries have higher $GDPW_c$

- Alternative models that can generate this fact?

Multinational firm entry across markets

- ▶ Alternative 1: CES demand and fixed MP costs

  - ▶ even though firm productivity and aggregate price index are log additive, slope of linear regression changes with productivity cutoff, e.g. single fixed cost, slope rises when cutoff rises
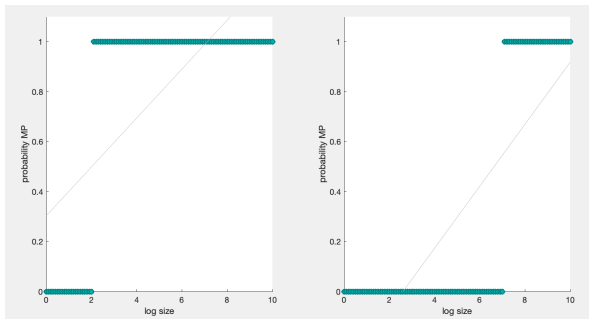
- ▶ Alternative 2: Fajgelbaum-Grossman-Helpman

  - ▶ low productivity firms produce lower quality goods, catered to lower income countries