The Scale and Scope of Online Retail

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This Paper

- Studies the growth of online retail over the period 1999-2012, using firm and product level data from Canada
- Decomposes online retailers' revenue into the contributions of product scope (the number of product categories), and product scale (average revenue per product category)
- Main descriptive result: average product scope dropped from 51 to 3 product categories over the period 1999-2012
- Existing research suggests increased competition can induce firms to reduce product scope
- I test this theory by exploiting the staggered entry of Amazon.ca into different product categories over the period 2002-2012

Related Literature

Multi-Product Firms

- Arkolakis and Muendler (2010), Bernard, Redding and Schott (2010), Bernard, Redding and Schott (2011), Goldberg, Khandelwal, Pavcnik and Topalova (2010), Mayer, Melitz and Ottaviano (2014)

E-Commerce: The Long-Tail

- Anderson (2004), Anderson (2006), Bar-Isaac, Caruana and Cunat (2012), Brynjolfsson, Hu and Smith (2003), Brynjolfsson, Hu and Smith (2006), Brynjolfsson, Hu and Smith (2010), Brynjolfsson, Hu and Simester (2011)

Data

Statistics Canada's Annual Retail Non-Store Survey (RTNS), 1999-2012

- Survey population: "all non-store retail establishments from which the survey can realistically obtain information"
- An enterprise is included in the sample if more than 75% of its total operating revenue is generated from online sales
- Examples of RTNS product categories:
  - Televisions and audio/video equipment
  - Still cameras and related photographic equipment and supplies
  - Computers, components and related equipment
  - Computer software, business and entertainment
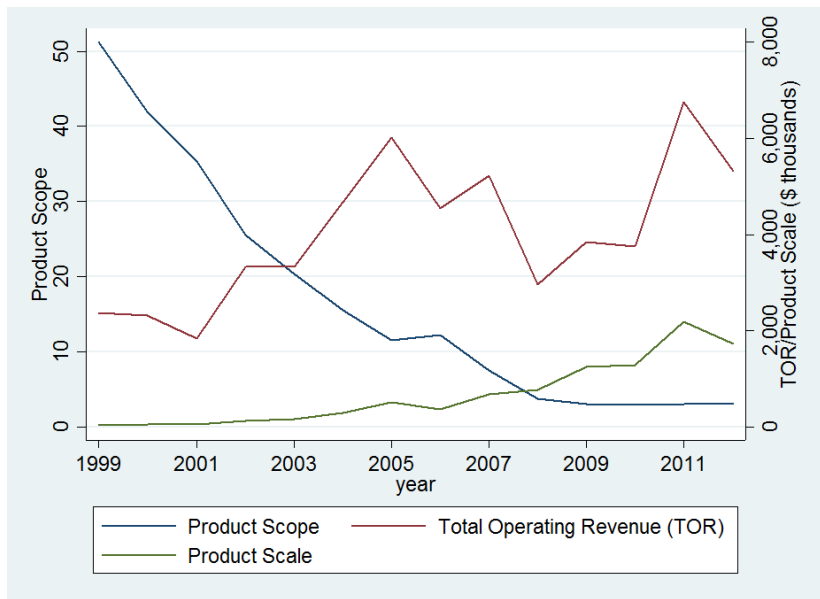 - Telephones and home office electronics

Framework for Descriptive Analysis

Product Scope and Scale Decomposition of Revenue:

$$\bar{p}q_t = \bar{N}_t \frac{\bar{p}q_t}{\bar{N}_t} \iff \underbrace{ln\left(\bar{p}q_t\right)}_{Revenue} = \underbrace{ln\left(\bar{N}_t\right)}_{Product\ Scope} + \underbrace{ln\left(\bar{p}q_t/\bar{N}_t\right)}_{Product\ Scale}$$

where, $\bar{x}$ denotes the sample average of x in period t
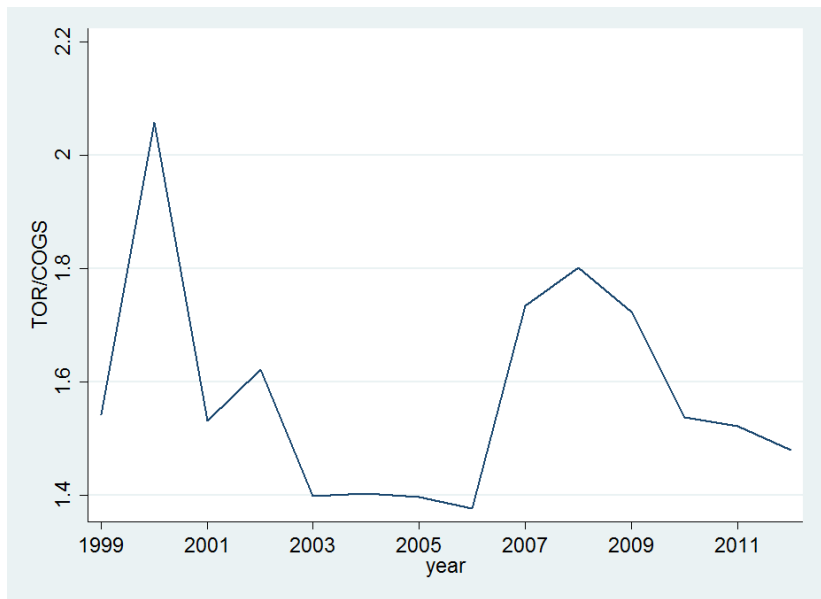
Average Revenue, Scale, and Scope

Analysis of the Revenue-Cost Ratio

The Revenue-Cost Ratio is defined:

$$\bar{\mu}_t = \bar{p}q_t / \bar{COGS}_t,$$

where $\bar{COGS}_t$ is the sample average cost of goods sold in period t

# (Total Operating Revenue)/(Cost of Good Sold)

Amazon.ca

Overview of Amazon.ca "store" openings:

- 2002: Books, Music, Videos, and DVDs
- 2003: Software, Computer/Video Games, Marketplace
- 2008: Electronics
- 2009: Home and Garden, Kindle
- 2010: Sports and Outdoors
- 2011: Tools and Building Supplies
- 2012: Baby

Amazon's staggered store openings are used to study the effect of foreign entry on Canadian online retailers' extensive and intensive margin of product sales

Product Scope: CND Online Retailers/Amazon.ca
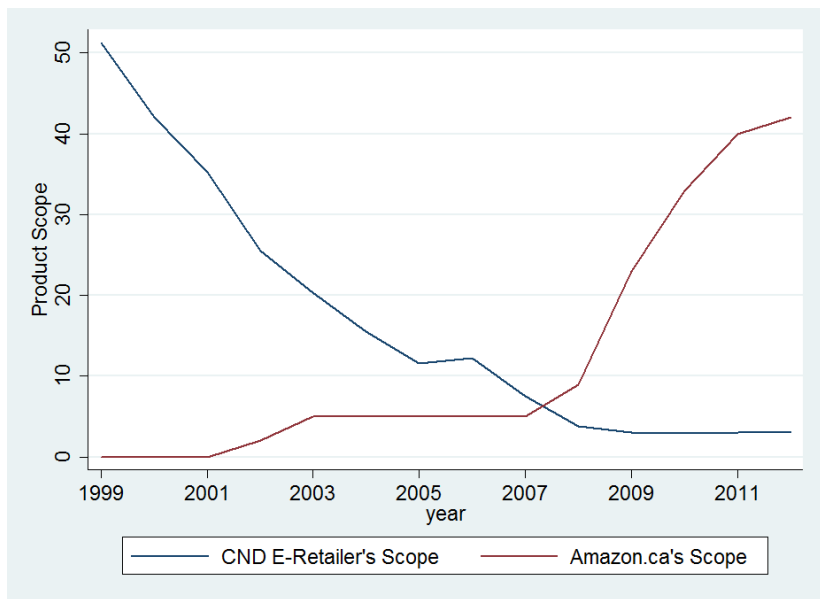
Econometric Framework

Difference-in-difference regression specification:

$$y_{i,j,t} = \eta_i + \delta_j + \alpha_t + \beta Amazon_{j,t} + u_{i,j,t}$$

$Amazon_{j,t} \equiv 1$ if Amazon.ca has entered product category j in year t, and 0 otherwise

Specifications of $y_{i,j,t}$:

- Extensive Margin (LPM), $y_{i,j,t} = 1(TOR_{i,j,t} > 0)$
- Intensive Margin (Poisson QML), $y_{i,j,t} = TOR_{i,j,t}$

Conclusion

- Average product scope of Canadian online retailers dropped from 51 to 3 product categories over the period 1999-2012
- This contrasts with Amazon.ca, whose product scope increased from 0 to 42 product categories during the same period
- Next step: difference-in-difference regression model will be used to estimate effect of Amazon.ca's entry on CND online retailers

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