

Potential Improvements in Retail Trade Productivity Measurement: Using Micro Data from the Statistical Agencies

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Insights and Challenges from Micro Data

- Structural Transformation in Retail Trade
 - ▶ Shift away from single-unit establishment to (large) multi-unit (MU) establishment firms
 - ▶ Large multi-units have multiple locations in many states
 - ▶ Many MUs-units with Retail Trade activity have auxiliaries
 - ▶ Many MUs with Retail Trade activity have activity in multiple NAICS broad sectors
 - ▶ Many MUs with Retail Trade activity have significant foreign sourcing
 - ▶ Transition from Big-box to e-commerce
- This structural transformation poses challenges for measuring output, inputs, prices and productivity in Retail Trade
- Building up from the micro data at the statistical agencies offers potential for quantifying extent of challenges and potential solutions
- Private sector data may be useful in this context as well

Key Objectives

① Definition of retail

- ▶ Final consumer facing
- ▶ Curation and marketing of products and services
- ▶ Involves minimal or no transformation

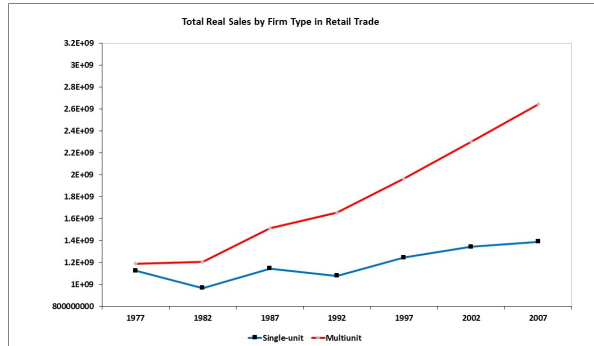
② How should support activities be included?

- ▶ All shipping (or HQ, or warehousing, etc) seems too expansive
- ▶ Can we collect information of sector served for all estabs?
- ▶ If we relabel wholesale as retail, will the head of that sector contact BLS next?

③ More accurate measures of productivity

- ▶ Collect information on COGS and operating expenses
- ▶ Incorporate information from auxiliaries as appropriate
- ▶ Identify appropriate output measure (sales, gross margins, etc)

Shift to Large, National Chains



Source: Foster et. al. (2016)

- Almost all of the increase in MU is from large, national (18+state) firms
 - ▶ SUs still play an important role. In 2012, SUs accounted for 58% of establishments and 28% of sales.
- Within narrow (6-digit NAICS) sectors, establishments of large, national chains have 25 log point higher labor productivity than single units.
 - ▶ Using accounting decomposition, this structural change accounts for substantial fraction of measured increase in real labor productivity growth in Retail Trade
 - ▶ Overstatement or understatement?
 - ★ Missing labor inputs from auxiliaries or other establishments from firm.
 - ★ Price indexes will not reflect quality differences across outlets.

Auxiliaries in 1997

NAICS	Description	Estabs M\$	Shipments M\$	Payroll 000	Empl
484	Truck transportation	1,084	928	4,008	74
4931	Warehousing & storage	4,800	4,109	17,749	327
514210	Data processing services	387	331	1,431	26
5411	Legal services	68	58	251	5
5412	Accounting, tax returns, payroll services, etc	1,285	1,100	4,751	88
5417	Scientific research & development services	1,048	897	3,875	71
5418	Advertising & related services	409	350	1,512	28
551114	Corporate, subd., & regional managing offices	35,263	30,184	130,390	2,403
5613	Employment services	196	168	725	13
56161	Investigation, guard, & armored car services	46	39	170	3
5617	Services to buildings & dwellings	76	65	281	5
811	Repair & maintenance	712	609	2,633	49
949999	Unclassified auxiliary establishments	2,819	2,413	10,424	192

Source: Fort and Klimek (2018)

Retail Sector Auxiliary Activity Shares in 1997

NAICS description	Estabs	Sales	Payroll	Empl
Truck transportation	0.00	0.00	0.01	0.00
Warehousing & storage	0.00	0.00	0.02	0.01
Data processing services	0.00	0.00	0.00	0.00
Legal services	0.00	0.00	0.00	0.00
Accounting, tax return prep, bookkeeping, & payroll services	0.00	0.00	0.01	0.00
Scientific research & development services	0.00	0.00	0.00	0.00
Advertising & related services	0.00	0.00	0.00	0.00
Corporate, subsidiary, & regional managing offices	0.01	0.00	0.15	0.05
Employment services	0.00	0.00	0.00	0.00
Investigation, guard, & armored car services	0.00	0.00	0.00	0.00
Services to buildings & dwellings	0.00	0.00	0.00	0.00
Repair & maintenance	0.00	0.00	0.00	0.00
Unclassified auxiliary establishments	0.00	0.00	0.01	0.00
Non-auxiliary establishments	0.99	0.99	0.80	0.93

Three important facts about 551114

- Largest AUX category
 - ▶ SU and MU without 551114 have in house management.
 - ▶ Implies some adjustment for management is required
- Includes all AUX estabs that perform more than one function
- Need a method to allocate employment and payroll across all establishments of the firm

What is feasible with auxiliaries?

- AUX estabs identified in BR and via Economic Censuses
 - ▶ During SIC years, Census of Aux
 - ▶ During NAICS years, embedded in sector
 - ▶ Asked via separate forms
- NAICS AUX variable captures the main 3-digit sector served
 - ▶ Some auxiliary data on payroll by function
 - ▶ No information on how functions shared across activities
 - ▶ NAICS AUX missing for some apparent AUX estabs
- AUX sales data generally only for external sales
 - ▶ In 1997 asked about internal and external sales—but lots of missing
 - ▶ After 1997 no information on internal sales
 - ▶ No idea how to deflate output for many of these sectors (e.g., Computer Systems Design)
 - ▶ Information from BEA on how they impute could be very helpful
- Assigning all AUX employment to retail is problematic
 - ▶ AUX estabs may serve multiple sectors within firms
 - ▶ E.g., how do you allocate Computer Systems Design services in Apple?

Tracking Auxiliaries Not the Only Challenge For Multi-Units

- Large, complex multi-units have establishments in many broad sectors
- Establishments in Trucking, Warehousing, Wholesale may provide inputs within firm and to other firms
- We don't know much about this (some sense from the 1997 EC data)
- Expanded Retail Trade sector should not include the B-to-B components of Trucking, Warehousing and Wholesale establishments

Main Takeaway on Challenges

- Challenge to allocate inputs from auxiliaries and other affiliated (within firm) establishments.
 - ▶ Economic Census excludes internal sales from auxiliaries.
 - ▶ Only the inputs that are directly related to distribution of goods?
 - ▶ Single-units have management and time and resources to organize delivery but pay for delivery/warehousing to external suppliers.
 - ▶ Need to treat single-units and multi-units in a consistent manner.
- With broader sectoral definition (e.g, including trucking/warehousing), then challenges:
 - ▶ For single units, need information on their use of such inputs
 - ▶ For multi-units, need both internal and external inputs
 - ▶ Challenging to break this information out for truckers, warehouses, etc.
 - ▶ Warehouse and Trucking establishments do both B-to-B and B-to-C

Next Step Suggestions

- Use Census firm IDs to quantify evolution of increased complexity of large multi-units (EINs not sufficient)
- Quantify sales, employment, payroll for activity outside of Retail Trade for firms with establishments in Retail Trade
- Even without data sharing, a joint BEA-BLS-Census research project using micro data and staff from all 3 agencies would be very useful.
 - ▶ Use research project to help guide quantify challenges including classification issues
 - ▶ Research project can help guide potential survey re-design
 - ▶ BLS already has Census firm IDs under CIPSEA
- Suggestions for the 2022 Economic Censuses
 - ▶ Clear need for COGS question on Census of Retail forms (already on ARTS)
 - ▶ Consider questions on potential auxiliary inputs (e.g., trucking expenses) by retailers
 - ▶ Ask all establishments in potential aux sectors the main industry served

Current costs question on the Annual Retail Trade Survey

SA-44 (08-22-2019) Page 6

9 TOTAL PURCHASES

INCLUDE

- Cash and credit purchases by this EIN
- Merchandise owned by, but in transit to, this EIN
- Purchases made by both warehouse(s) and establishment(s)
- Freight, delivery, and other transportation costs
- Import duties (if paid separately)
- Parts and supplies used in repair work or other services

If AUTOMOTIVE also include:

- Value of automotive and other trade-ins exclusive of rebates and discounts granted as an increase in trade-in allowance

EXCLUDE

- Expenditures for supplies, equipment, and parts purchased for this EIN's own use
- Purchases made by other firms' operating departments and concessions in this EIN's establishment(s)
- Purchases of merchandise held outside the U.S.
- Purchases of containers, wrappings, packaging, and selling supplies for this EIN's own use
- Trade and cash discounts, returns, and allowances

What was the total cost of all merchandise purchased for resale for which this EIN took title, whether or not payment was made, in 2019?

If purchases are greater than sales, explain in **13**. ☐

Mark "X" if None

2019			
\$ Bil.	Mil.	Thou.	Dol.

- Business Expenditure Survey (BES) exists in the EC years
- Provides additional expense information for subset of firms

AUX question on the sector served by the establishment

ITEM 8: SUPPORT SERVICES - PRINCIPAL BUSINESS OR ACTIVITY OF THE OPERATING ESTABLISHMENTS SERVICED

What principal kind of business or activity is performed by the establishments of your enterprise that are managed or serviced by this establishment?

Example: If this establishment is a corporate, subsidiary, or regional managing office, data processing service center, or administrative/support office to a chain of clothing stores, please describe "clothing stores" below.

What about quality-adjusted prices that reflect changing bundle of services in Retail Trade?

- Challenge is related to outlet substitution bias
- However, more complex as bundled services (e.g., delivery time, purchase mode) vary within and across platforms.
- How would we implement hedonics in this context?
- New P&Q data (e.g., Nielsen, NPD, etc.) has potential but not clear helpful on bundled services
- Amazon Price project (Bajari, Chernozhukov) uses Big Data methods to identify attributes (but not bundled services)
- Redding and Weinstein (2020) highlight importance of taking into account increased variety

Alternative Productivity Measures

- BLS focuses on Sectoral output per unit of labor for Retail Trade.
- BEA produces gross margins and value added measures of output that can be used as alternatives for labor productivity (see, e.g., Manser (2005))
- Integrated BEA/BLS KLEMS data project worth considering
 - ▶ Source data for gross margins and input-output matrix for value-added has limitations for Retail Trade
 - ▶ Unclear whether these data are up to date in capturing structural change in Retail Trade on a timely basis
- Are there private sector sources/case studies that could be used to provide guidance or adjustment factors?
- What priority should be given to alternative productivity measures?