

Econ 706 Research Proposal

Impact of Ecommerce Development on Conventional US Retail Trade Firms

I. Introduction

In such an information-led society, rapid increase in E-commerce is widely believed to have created a huge impact on the traditional retail industry. Ascending number of people have started to embrace the more efficient online shopping experience since customers are able to access whatever they want without physically stopping by stores. In particular, the recent “Amazon Effect” states how Amazon disrupts the retail industry both online and in physical stores, causing a new challenge for traditional retailers like JCPenny and Macy’s to deal with. In fact, not only Amazon, but also numerous fast-growing E-commerce firms may have shaken previous status of retail industry and even pushed them to rethink the direction of their business. Thus we want to investigate the existence and the degree of ecommerce’s impact on conventional retail trade firms, and discuss the necessity for traditional retail industry to implement transformation and upgrading to retain profits.

In this paper we will use DID method to identify whether growth in Ecommerce firms’ market share has a substantial effect on conventional retail trade firms’ revenue growth. Ecommerce firms on behalf of establishments primarily engaged in the retail sale of products by television, catalog, and mail-order. These establishments do not ordinarily maintain stock for sale on the premises. (SIC 5961, Catalog and Mail-order Houses), typical examples include Amazon, eBay, etc. Conventional retail trade firms on behalf of establishments engaged in selling merchandise for personal or household consumption and rendering services incidental to the sale of the goods. (SIC 5200-5999, except for 5961)

II. A Brief Literature Review

Most literatures focus on the Ecommerce business mode itself as well as its effect on overall US economy, instead of its impact on conventional retail trade firms. Some

works of the latter topic include M.Goldmanis (2010), which examines the effect of the advent and diffusion of e-commerce on supply-side industry structure. They use size as proxy for measurement of producer type, then shifts in the size distribution are informative about heterogeneous effects of e-commerce within an industry. They also find growth in online purchases is linked to declines in the number of small establishments but has either no significant impact or even positive impact on growth in the industries' numbers of large establishments. Our research creatively applies DID method in this topic, hoping to perform better in controlling for business cycles and other time trends.

III Research Design

1. Data

Our dataset is 2000-2015 firm-level panel data of US retail trade firms (SIC: 5200-5999) from Compustat. The grouping of our firms is based on their different businesses, and this information is also shown by the 4-digit SIC code.

Dependent variable Y_{it} : Annual growth rate of revenue.

Controlling variables X_{it} : Firm level variables which have explanatory power for revenue growth.

Factor	Variable Name	Category	Definition	Expected Sign
Assets	LN_A	Size	$\ln(\text{Asset})$	+
Revenue	LN_REVT	Size	$\ln(\text{REVT})$	+
Employee	LN_EMP	Size	$\ln(\text{EMP})$	+
Employment Growth	EMPG	Growth	$(\text{EMP}_t - \text{EMP}_{t-1}) / \text{EMP}_{t-1}$	+
Capital Expenditure	r_CAPEX	Growth	$\text{CAPEX} / [(\text{Asset}_t + \text{Asset}_{t-1}) / 2]$	+
Firm Value	LN_FV	Value	Close Price * Common shares outstanding + long-term debt + Preferred stock total.	+
Cash Ratio	CR	Liquidity	Cash/Asset	+
Liquidity Ratio	CACL	Liquidity	Current Assets/Current Liability	+
Debt Ratio	TLTA	Solvency	Total liability/Total assets	-
Leverage	DLTT	Solvency	long term debt/FV	-
EBITDA Ratio	EBITDA_R	Profitability	EBITDA/REVT	+
Net Income	r_NI	Profitability	$\text{NI} / [(\text{Asset}_t + \text{Asset}_{t-1}) / 2]$	+

Operating Income	r_OIADP	Profitability	OIADP/[(Asset _t +Asset _{t-1})/2]	+
Dividend	r_DIV	Profitability	DIV/[(Asset _t +Asset _{t-1})/2]	+

2. Models

The goal of this research is to examine the existence and the degree of the expected negative effect of Ecommerce firms' growth in business total market share on retail trade firms' growth in revenue. Thus our treatment, ECit, is based on the annual growth rate of (Ecommerce shipment value/Total shipment value). Data1 shows that chemical manufacturing (C) in 2006, printing and related support activities (P) in 2005, and primary metal manufacturing (M) in 2004 experienced high growth rates ranging from 80%-102% while transportation equipment manufacturing (T) had little growth ($\leq 6\%$) in all three years.

First we conduct three DID analysis for these three businesses with transportation separately. The according model is:

$$Y_{it} = aEC_{it} + r_t + b_i + cX_{it} + u_{it}$$

Take Printing and related support activities (P) in 2005 for example. First we want to compare 2005 and 2004 growth rates, separately for treatment group P and controlling group T.

$$YP_{04} = aECP_{04} + r_{04} + b_p + cX_{ft} + u_{it} = a*0 + r*0 + b*1 + cX_{ft} + u_{it}$$

$$YP_{05} = aECP_{05} + r_{05} + b_p + cX_{ft} + u_{it} = a*1 + r*1 + b*1 + cX_{ft} + u_{it}$$

$$YP_{05} - YP_{04} = aECP_{05} + r_{05} - r_{04}$$

$$YT_{04} = aECT_{04} + r_{04} + b_t + cX_{ft} + u_{it} = a*0 + r*0 + b*0 + cX_{ft} + u_{it}$$

$$YT_{05} = aECT_{05} + r_{05} + b_t + cX_{ft} + u_{it} = a*0 + r*1 + b*0 + cX_{ft} + u_{it}$$

$$YT_{05} - YT_{04} = aECT_{05} + r_{05} - r_{04}$$

Then compare their difference:

$$(YP_{05} - YP_{04}) - (YT_{05} - YT_{04}) = a(ECP_{05} - ECT_{05})$$

If expected effect can be identified by these three experiments, we will conduct an analysis for various treatment levels in 2005, where treatment levels can be 0,1,2.

References

<https://www.census.gov/retail/index.html>

<https://www.census.gov/data/tables/2015/econ/e-stats/2015-e-stats.html>