High-Skilled Immigration and Consumer Welfare

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Disclaimer

The conclusions drawn from the Nielsen data are those of the researchers and do not reflect the views of Nielsen. Nielsen is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

The results are very preliminary and subject to change.

Impact of Immigration on Product Prices and Varities

- Literature on impact of immigration on destination countries mainly focuses on wages and employment
- Hiring workers from abroad may allow firms to expand production at lower cost
- A shift out in firm supply will lower prices and introduce new varieties, raising:
  1. consumer surplus
  2. production in downstream firms that use inputs
- We study the impact of the H1B visa program on prices and varieties of products in the consumer goods sector
- Our end goal is to determine the effects on consumer welfare

What We Do In This Paper

- Combine two data sources at the firm-level:
  1. Labor Condition Applications for H1Bs
  2. Retail Scanner Data on Prices and Products

- Matched on firm name and location

- Use a firm-level shift-share style approach where we interact firm-level baseline immigrants with total national annual H1Bs certified

- Study the impact on:
  1. Firm revenues
  2. Laspeyre's Price Index on Products
  3. Number of Products

Research Design

Firm i and year t

$$y_{it} = \beta_0 + \beta_1 \left(H1B_{i0} \times TotalH1B_t \right) + \mu_t + \psi_i + \epsilon_{it}$$

- $H1B_{i0}$ baseline certified H1B applications at firm
- $TotalH1B_t$ country-wide total H1Bs in the year
- μ_t year fixed effects, ψ_i firm fixed effects

- Assumptions:
  1. Baseline share in H1Bs certified does not predict future differential trends
  2. Baseline HR depts and connections to firms abroad (India)
  3. Yearly trends capture policy changes, political and economic shocks

Literature Review

- High-skill immigration and firm-level innovation, productivity, and profits
  - Kerr and Lincoln (2010), Ghosh, Mayda and Ortega (2016), Doran, Gelber and Isen (2017)
- Implication of firm-level shocks on production in consumer goods sector
  - Argente, Lee and Moreira (2018), Fracassi, Previtero and Sheen (2017)
- Immigration and prices of nontradables and services
  - Cortes (2008), Saiz (2007)

1. Data

H1B Labor Certification Application

- Employment start date: Years 2005-6 to 2016-17
- Whether application certified, withdrawn or denied, but not lottery winners
  - Assume: Chance of winning lottery is random
  - Currently underway: FOIA data on actual H1B hiring (I-129s)
- Name of firm and location: Possible to match to Retail Scanner Data
- Case number, occupation, prevailing wage
- Drawback: Do not know whether new or H1B extension

What is a product?

- A "product" is uniquely identified by a 12-digit number called Universal Product Code (UPC), which is the finest level of disaggregation at the product level
  - Approximately 200 thousand on average every quarter
  - Examples: a 31-ounce bag of Tide Pods Detergent.

Baseline product- and firm-level dataset

- Source
  - Nielsen Retail Measurement Services scanner dataset 2006-2015
  - 40,000 food, drug and mass merchandising stores (90 retail chains)
  - $220 billion of transactions/year, representing roughly 30 percent of total U.S. expenditures on food and beverages
  - Report weekly sales and volume for every UPC with positive sales generated by point-of-sales systems.

  barcode datasets

- Our product dataset
  - Combines all sales at national and yearly level

- Our firm-product dataset
  - GS1 codes are part of the UPC code (first 6 or 10 digits of the code)

  upc structure
  - Our combined dataset allows us to identify the portfolio of products of each firm at annual level

Matching Firms

- We first harmonize Labor Condition Applications dataset, 2005-2017
  - name of employer is not consistent across applications in different years
- We then match firms in Labor Condition Applications dataset with the firms in Retail Scanner Data
  - by firm name and location
  - record linkage method, verified manually
- The matched dataset contains about 2,500 firms
  - Top 5 firms in retail revenue: The Kraft Heinz Company, General Mills, Campbell Soup Company, The J.M. Smucker Company, Dr Pepper/Seven Up
  - We will try to match more by manual matching

Three outcome variables in consumer goods sector

- Revenue
  - sums up revenue by all products in a year at national level
- Price Index
  - chained firm-level Laspeyres price index constructed from average UPC-level price and consumption basket at national level
- Number of Products
  - counts the number of all products in a year at national level

Descriptive Statistics

Table: Three dependent variables

	mean	std.dev.	10th per.	median	90th per.
Price Index	103.17	28.32	75.07	101.6	129.17
No. of Products	57.75	199.29	1	10	122
Revenue (in thousands)	27,851	165,958	1.16	331.3	36,466

2. Results

PRELIMINARY AND SUBJECT TO CHANGE!

Research Design, review

Firm i and year t

$$y_{it} = \beta_0 + \beta_1 \left(H1B_{i0} \times TotalH1B_t \right) + \mu_t + \psi_i + \epsilon_{it}$$

- $H1B_{i0}$ baseline certified H1B applications at firm
- $TotalH1B_t$ country-wide total H1Bs in the year
- μ_t year fixed effects, ψ_i firm fixed effects

Impact on Firm-Level H1B Hiring

	H1Bs	H1Bs
$H1B_{i0} \times TotalH1B_t$ per mill	1.751	
SE	(0.0781)***	
Firm Clustered	(0.777)**	
$H1B_{i0}$ as share $\times TotalH1B_t$		0.208
SE		(0.00927)***
Firm Clustered		(0.0922)**
Observations	31,850	31,850
R-squared	0.022	0.022
Number of firm	2,450	2,450
Fixed Effects	Year and Firm	Year and Firm

Impact on Firm Revenue (in thousand)

	Revenue	Revenue
$H1B_{i0} \times TotalH1B_t$ per mill	1,892.8	
SE	(588.6)***	
Firm Clustered	(1.204.8)	
$H1B_{i0}$ as share $\times$ $TotalH1B_t$		224.6
SE		(69.8)***
Firm Clustered		(143.0)
Observations	15,016	15,016
R-squared	0.043	0.043
Number of firm	2,234	2,234
Fixed Effects	Year and Firm	Year and Firm

Impact on Laspeyre's Price Index

	Price Index	Price Index
$H1B_{i0} \times TotalH1B_t$ per mill	-0.958	
SE	(0.492)*	
Firm Clustered	(0.530)*	
$H1B_{i0}$ as share $\times$ $TotalH1B_t$		-0.114
SE		(0.0584)*
Firm Clustered		(0.0629)*
Observations	14,623	14,623
R-squared	0.024	0.024
Number of firm	1,995	1,995
Fixed Effects	Year and Firm	Year and Firm

Impact on Number of Products Produced by a Firm

	Products	Products
$H1B_{i0} \times TotalH1B_t$ per mill	7.474	
SE	(1.349)***	
Firm Clustered	(4.789)	
$H1B_{i0}$ as share $\times TotalH1B_t$		0.887
SE		(0.160)***
Firm Clustered		(0.568)
Observations	15,016	15,016
R-squared	0.023	0.023
Number of firm	2,234	2,234
Fixed Effects	Year and Firm	Year and Firm

3. Next Steps

Next Steps

- Tests for shift-share approach (Goldsmith-Pinkham, Sorkin, Swift 2017)
  1. Correlates to baseline H1B share
  2. Parallel trends

- Market effects: effects on competitive firms

- Simple calculations on consumer welfare based on assumptions about the elasticity of substitution across varieties sketch

- OUR CURRENT RESULTS ARE PRELIMINARY!

4. APPENDIX

Comparison between Barcode-level Data-sets

	RMS	HMS	IRI
Time period	2006-2015	2004-2015	2001-2012
Coverage	1,071 modules 114 groups	1,077 modules 115 groups	31 categories*
Observational units	Store	Households	Store
# of stores	35,510 stores	61,557 households	2,945 stores
# of states	49	49	43
# of counties	2,550	2,699	503
# of products in 2006	724,211	392,455	50,434
Frequency	Weekly, average	Daily, by transaction	Weekly, average
Tag on temp. sales	none	deal flag by household	sales flag by IRI

* Categories in IRI are matched either with modules or groups in Nielsen data. 31 categories in IRI cover roughly 143 modules in Nielsen data.

main

GS1 Code: Example of a Company Prefix



Note: This figure shows examples of a 6-digit and a 9-digit firm prefix. The source is the GS1-US website (http://www.gs1-us.info/company-prefix).

main

Simple Framework

Utility maximization:

$$U = \left(\int^{N} q(i)^{\frac{(\sigma-1)}{\sigma}} di \right)^{\frac{\sigma}{\sigma-1}} \tag{1}$$

$$s.t. \int^{N} p(i)q(i)di \leq M \tag{2}$$

$$\tag{3}$$

This should imply an indirect utility and its derivatives as a function of individual prices and the number of product

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