#### Data Sources from the US Census Bureau

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Disclaimer: Any opinions and conclusions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information has been disclosed.



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Were changes at Marlin caused by trade or technology? What about changes at Marlin's competitors? What if Marlin imported its robots?

# Economic micro-data from the US Census Bureau

- Longitudinal Business Database (LBD)
  - Built from the Business Register (employer EIN admin data)
  - All private, employer, non-farm establishments from 1977 2019
  - Location, employment, payroll
  - Firm identifiers assign estabs to firms
  - Consistent NAICS codes from Fort and Klimek (2018)
  - ▶ See Jarmin and Miranda (2002) and Chow et al. (2021)
- Economic Censuses
  - Conducted in years that end in '2' and '7'
  - Sales and other detailed, industry-specific questions
- Longitudinal Foreign Trade Transaction Database
  - Customs data from 1992 2019 linked to LBD
  - Firm-level imports and exports by country and product
  - See Kamal and Ouyang (2020)
- BEA foreign direct investment data linked to Census data
  - Links BEA inward and outward FDI from 1997 to 2012
  - See Kamal, McCloskey, and Ouyang (work in progress)



• Import penetration rising from 1980s

• Chinese import penetration increases most in 2000s

Source: Fort, Pierce and Schott (2018)

Importing and Technology Adoption 1977-2012 60 Percent 40 20 0 2002 2007 2012 1977 1982 1987 1992 1997 Import Penetration --- Importers ---- Computers China Import Penetration --- Importers from China --- Electronic Networks

• Direct importing by manufacturers rises, esp in 2000s

Source: Fort, Pierce and Schott (2018)



• Huge surge in share of plants purchasing computers in early 2000s

• Plant use of electronic networks to control/coordinate shipments rises Source: Fort, Pierce and Schott (2018)



- Considerable rise in importing
- Concurrent increases in technology use

Source: Fort, Pierce and Schott (2018)

Decomposing employment losses across firm-level margins

- Net margins of firm adjustment, based on firm's 1977 status
  - Net firm birth since 1977
  - Continuing firms (birth/death of estabs and continuing estabs)
  - Also redefine firm and plant status by decade
- Gross margins of firm adjustment
  - Net margins mask differences in churn
  - Potentially different stories for low versus high churn gross margins

$$\begin{split} \Delta Emp_t &= (Emp_t^{FB} - Emp_t^{FD}) + (Emp_t^{CFBE} - Emp_t^{CFDE}) + \\ & (Emp_t^{CFCE^+} - Emp_t^{CFCE^-}) \end{split}$$





• Continuing firm-plants account for 12% of aggregate decline Source: Fort, Pierce and Schott (2018)



• Employment changes at firm births minus deaths are 25% of total Source: Fort, Pierce and Schott (2018)



• Continuing firms' net plant closures account for 63% of aggregate Source: Fort, Pierce and Schott (2018)

# Manufacturing firms grow outside manufacturing



#### Manufacturing Firms' Employment and Payroll by Sector

Source: Ding, Fort, Redding, and Schott (2022)

#### Firm margins can be examined by 9 Census regions



# Manufacturing employment margins differ across regions



• Majority of emp loss from firm death in NE and Mid-Atlantic

• Mountain and Pacific have net emp gains from firm births

Source: Fort, Pierce and Schott (2018)

# Non-manufacturing employment margins across regions



- Net firm birth emp growth concentrated in a few regions
- Net plant birth within continuers dominates margins

Source: Fort, Pierce and Schott (2018)

# Micro data access and Public sources

- Applying for Census data access
  - Helpful to examine questions on the Economic Census forms
  - Project proposals accepted from all nationalities (except BEA data)

- Public Versions of available data from the Business Register/LBD
  - Business Dynamics Statistics
  - Statistics of US Businesses
  - Country Business Patterns data
  - Imputed values for the CBP data
- Public Versions of the Economic Census data
  - Available by geography and industry in EC years

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#### Appendix

Does plant closure within firms relate to trade or tech?

• Estimate probability that plant *i*, in firm *f*, and industry *j* exits over next 5 years

$$\mathsf{Pr}(\mathsf{Death}_{ijf}^{t:t+5} = 1|X_{ijf}^t) = lpha + eta\mathsf{Activity}_{ijf}^t + \gamma \mathsf{ln}(\mathsf{emp}_{ijf}^t) + \eta_f^t + \delta^t$$

- Activities: purchasing computers, using electronic networks, concurrent changes in industry import penetration
- Estimate separately for pre and post 2000
- Control for plant size

Dep var is an	indicator eq	ual to one i	if a plant	exits in	the next 5	years
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	Plant I	Plant Death		
	Pre 2000	2000s		
CompPurch <sup>t</sup>	-0.057***	0.00		
,	(0.003)	(0.003)		

Initial log of firm emp Fixed Effects	Yes Firm a	Yes nd Year		
<i>Notes:</i> Each cell is a separate Standard errors for regres	arate regres sions with	sion. * p<0.10, ind import pene	** p<0.05, *** p<0.01	

	Plant	Plant Death		
	Pre 2000	2000s		
CompPurch <sup>t</sup> <sub>pf</sub>	-0.057***	0.00		
,	(0.003)	(0.003)		
ElecNetworks <sup>t</sup>		-0.039***		
		(0.003)		

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Dep var is an indic	ator equal to one	if a plant exits	in the next 5	years
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Initial log of firm emp	Yes	Yes	
Fixed Effects	Firm a	nd Year	
Notes: Each cell is a sep	arate regres	sion. * p<0.1	10, ** p < 0.05, *** p < 0.01
Standard errors for regre	ssions with	ind import pe	

	Plant Death		
	Pre 2000	2000s	
$CompPurch_{pf}^{t}$	-0.057***	0.00	
ElecNetworks <sup>t</sup>	(0.003)	(0.003) -0.039***	
A Imm Den <sup>t</sup> :t+5	0.051***	(0.003)	
ΔImpPen <sub>pi</sub>	(0.059)	(0.046)	

Dep var is an indicator equal to one if a plant exits in the next 5 years

Initial log of firm emp	Yes	Yes	
Fixed Effects	Firm a	nd Year	
Notes: Each cell is a sep	arate regres	sion. * p<0.1	0, ** p<0.05, *** p<0.01
Standard errors for regre	sions with	ind import pe	netration clustered at the ind level.

	Plant Death	
	Pre 2000	2000s
$CompPurch_{pf}^{t}$	-0.057***	0.00
ElecNetworks <sup>t</sup>	(0.003)	(0.003) -0.039***
P'		(0.003)
$\Delta$ ImpPen <sup>t:t+5</sup> <sub>pi</sub>	0.251***	0.06
,	(0.059)	(0.046)
$\Delta ChinaImpPen_{pi}^{t:t+5}$	0.721***	0.09
	(0.121)	(0.084)
Initial log of firm emp	Yes	Yes
Fixed Effects	Firm ar	nd Year
Notes: Each cell is a se	parate regress	sion. * p<0.1
Standard errors for regr	essions with i	nd import pe

Dep var is an indicator equal to one if a plant exits in the next 5 years

	Plant Death		Firm Death	
	Pre 2000	2000s	Pre 2000	2000s
CompPurch <sup>t</sup> <sub>pf</sub> ElecNetworks <sup>t</sup> <sub>nf</sub>	-0.057*** (0.003)	0.00 (0.003) -0.039***	0.060*** (0.00)	-0.019*** (0.00) -0.027***
$\Delta$ ImpPen $_{pi}^{t:t+5}$	0.251***	(0.003) 0.06		(0.00)
$\Delta ChinalmpPen_{pi}^{t:t+5}$	(0.059) 0.721***	(0.046) 0.09		
	(0.121)	(0.084)		Mar
Fixed Effects	Yes Yes Firm and Year		res Indust	res ry and Year

Dep var is an indicator equal to one if a plant or firm exits in the next 5 years

bep var is an indicater equal to one in a plant of initia side in the list of years						
	Plant Death		Firr	n Death		
	Pre 2000	2000s	Pre 2000	2000s		
$CompPurch_{pf}^{t}$	-0.057***	0.00	0.060***	-0.019***		
ElecNetworks <sup>t</sup>	(0.003)	(0.003) -0.039***	(0.00)	(0.00) -0.027***		
p,		(0.003)		(0.00)		
$\Delta ImpPen_{pi}^{t:t+5}$	0.251***	0.06	0.003	0.034		
$\Delta$ ChinaImpPen <sup>t:t+5</sup>	(0.059) 0.721***	(0.046) 0.09	(0.06) -0.036	(0.05) 0.204***		
' pi	(0.121)	(0.084)	(0.13)	(0.06)		
Initial log of firm emp Fixed Effects	Yes Firm a	Yes nd Year	Yes Indust	Yes ry and Year		
Notes: Each cell is a separate regression. * $p < 0.10$ , ** $p < 0.05$ , *** $p < 0.01$ Standard errors for regressions with ind import penetration clustered at the ind level.						

Dep var is an indicator equal to one if a plant or firm exits in the next 5 years