

# Heterogeneous Globalization: Offshoring and Reorganization

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# Big Picture

- Dramatic decrease in the manufacturing sector in all developed economies (and potentially premature de-industrialization in developing economies)

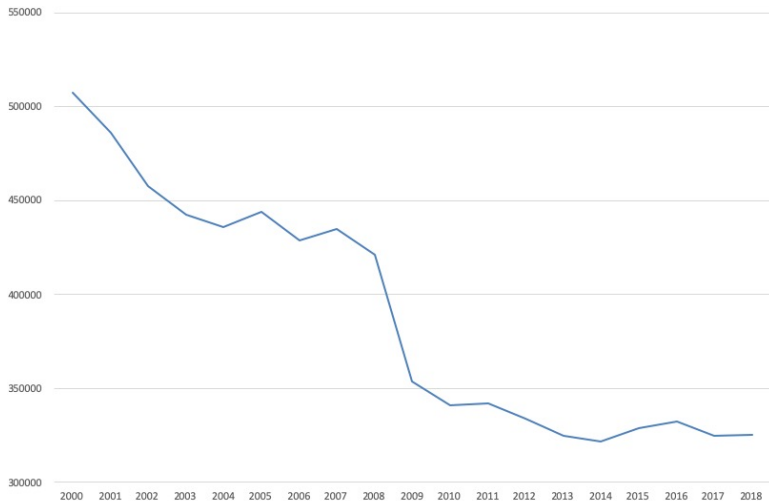
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- Recent studies conclude low-wage imports (**import competition**) are reducing manufacturing employment and may reduce innovation

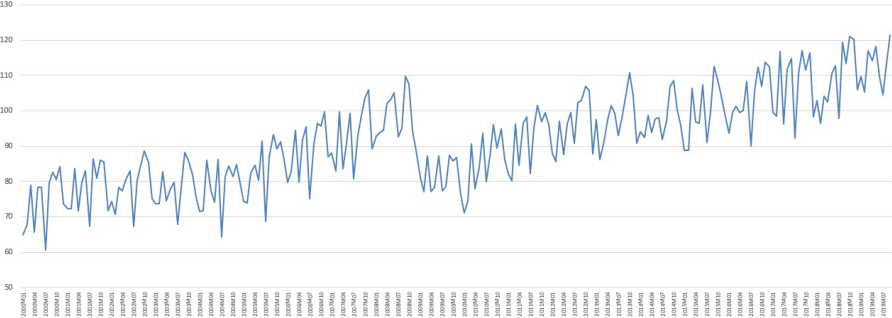
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# Manufacturing Employment - Denmark (headcounts)



# Manufacturing Turnover - Denmark (index, 2015=100)



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- Recent studies conclude low-wage imports (**import competition**) are reducing manufacturing employment and may reduce innovation
- But manufacturing output continues rising (in some of the same sectors facing low-wage imports)
- Production fragmentation has been increasing, esp across borders
- While increased import competition and offshoring opportunities related, they may have different effects



# Main Questions

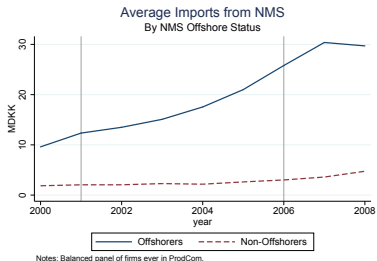
- 1 Do aggregate imports mask important differences?
  - ▶ Competition versus offshoring
- 2 What happens at firms after they offshore main activities?
  - ▶ Changes in import behavior
  - ▶ Foreign and domestic production
  - ▶ Does foreign production replace domestic production?
- 3 Does offshoring increase or reduce domestic innovation?
  - ▶ Firm reorganization
  - ▶ Changing occupational structure and workers' tasks
  - ▶ Changes in innovative output and R&D expenditures

# Data (Statistics Denmark)

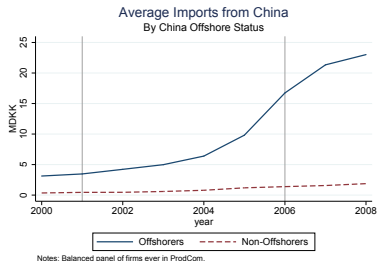
- Offshoring survey
  - ▶ Relocation of the firm's main activity to a foreign location over 2001-2006, around 4,000 firms
- International trade transactions (at the firm-CN8-country level)
- Production survey (at the firm-CN8 level)
- Population of workers (matched employer-employee data)
- Firm accounting information from value added statistics
- R&D survey

# What happens at firms after offshoring - Imports

- Majority of offshoring takes places in new EU countries (NMS), followed by China
- Offshorers reorient imports towards offshore regions



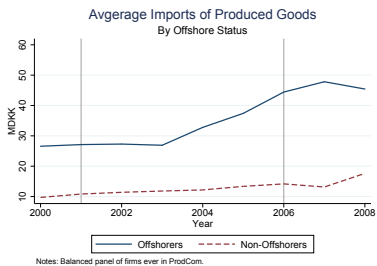
NMS Offshorers



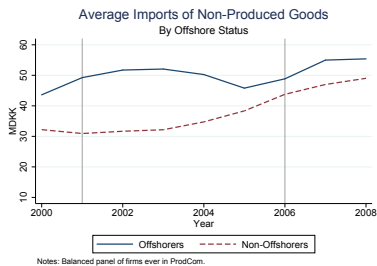
China Offshorers

# What happens at firms after offshoring - Imports

- **Offshorers** increase **imports of goods produced domestically**
- Non-offshorers increase non-produced good imports



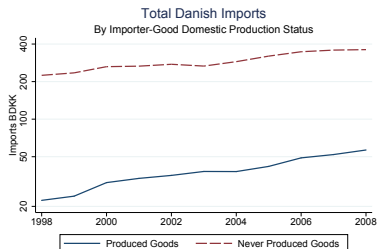
Produced Goods



Non-Produced Goods

# Aggregate imports

- Total imports contain different types of goods
  - ▶ Produced goods (associated to offshoring) vs. non produced goods (non associated with offshoring)
- Produced-good imports have grown in importance



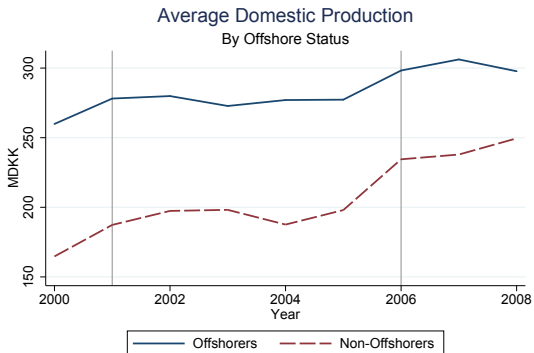
Notes: Produced Goods are HS6 products made domestically by the importer.



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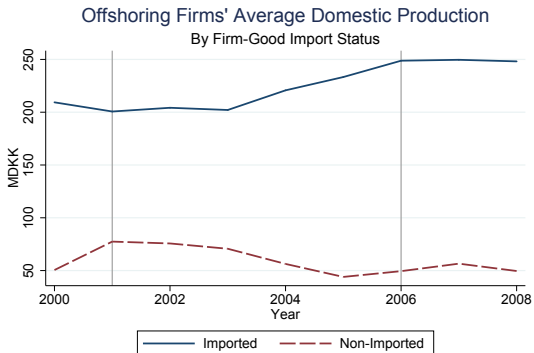
# What happens at firms after offshoring - **Production**

- Offshorers' average domestic production does not fall



# What happens at firms after offshoring - **Production**

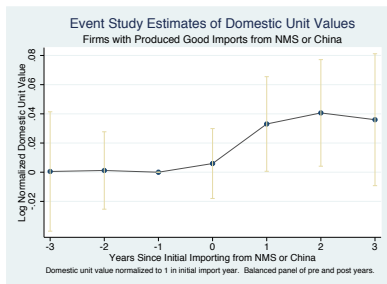
- Produced and imported goods' production larger and more resilient



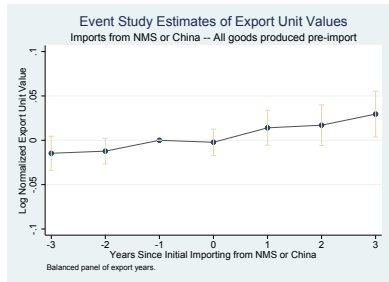
Notes: Balanced panel of firms ever in ProdCom.

# What happens at firms after offshoring - Products

- Domestic unit value rises after offshoring to low-cost countries
- Export unit value rises after offshoring to low-cost countries
- Suggest quality upgrading of domestic production and exports



Domestic unit values

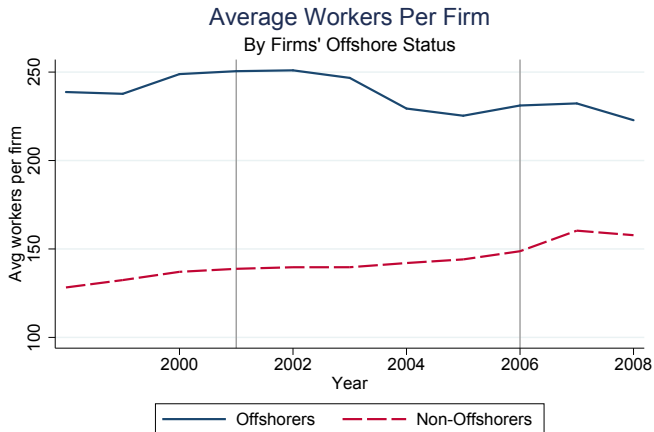


Export unit values



# What happens at firms after offshoring - **Workers**

- Offshorers decrease employment during offshoring period



# What happens at firms after offshoring - Tasks

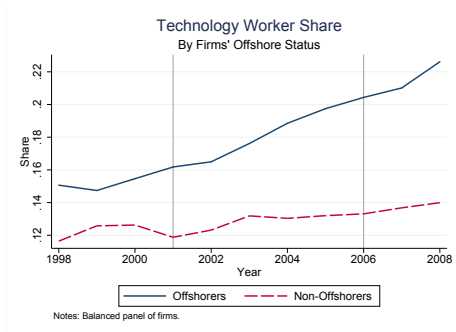
## Worker occupation shares by offshore status

	1998	2001	2006	2008
Panel A: Non-offshoring firms				
Managers	1.05	1.03	1.00	1.00
Production workers	0.98	0.99	1.01	1.02
Other blue collar	1.04	1.03	1.06	1.05
Tech workers	0.94	0.93	0.93	0.92
Support workers	1.00	1.01	0.99	0.99
Sales workers	1.03	1.01	0.99	0.99
NEC	1.07	1.07	1.03	1.05
Panel B: Offshoring firms				
Managers	0.82	0.88	0.98	0.99
Production workers	1.09	1.06	0.97	0.89
Other blue collar	0.85	0.89	0.7	0.71
<b>Tech workers</b>	<b>1.20</b>	<b>1.30</b>	<b>1.38</b>	<b>1.43</b>
<b>Support workers</b>	<b>0.98</b>	<b>0.97</b>	<b>1.04</b>	<b>1.08</b>
Sales workers	0.90	0.95	1.05	1.05
NEC	0.74	0.70	0.81	0.73

Notes: Weighted shares are relative to a firm's industry average.

# What happens at firms after offshoring - Tech workers

- Offshorers disproportionately increase tech worker shares
- Offshorers' tech level rises, even as total emp falls



Share of tech workers



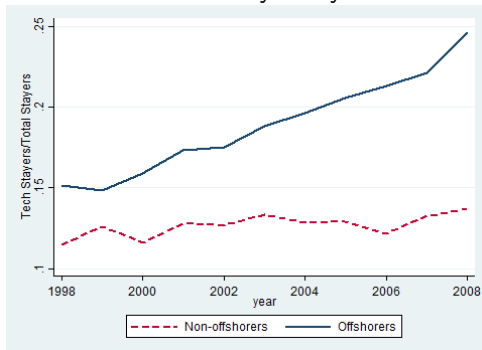
Level of tech workers

▶ Reduced form and IV estimates

# What happens at firms after offshoring - Tech workers

- Offshorers retain higher share of tech workers
- 1/3 of tech stayers switch occupation within the firm

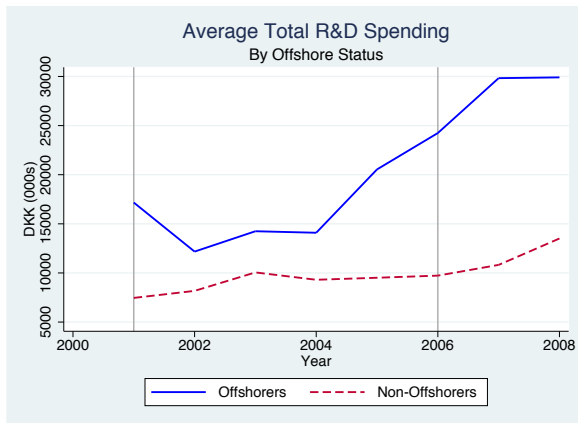
Share of tech worker stayers by offshore status



► Reduced form and IV estimates

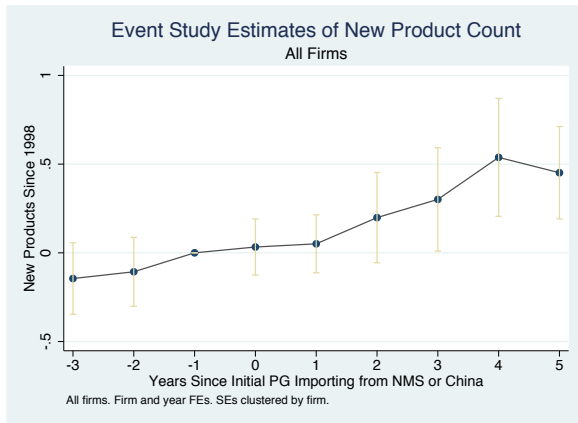
# What happens at firms after offshoring - **Innovation**

- Offshorers disproportionately increase R&D expenditures
- Especially product R&D



# What happens at firms after offshoring - Innovation

- Firms increase the number of new products after offshoring to low-wage countries



# Conclusion

- Offshoring entails imports of goods produced domestically
  - ▶ Increased imports of products also made domestically
  - ▶ Firms continue producing many goods domestically
  - ▶ Firms charge higher prices for domestic and produced export varieties
- New offshoring opportunities lead to firm reorganization
  - ▶ Increased shares and levels of tech workers
  - ▶ Increase in R&D expenditures, disproportionate increase in new products
- Studies on import competition may also capture offshoring

# Back-Up



## Reduced form and IV estimates

$$\Delta FirmAttribute_f = \alpha + \beta_{PG} \Delta \frac{PG Imports_f^{NMS}}{Imports_f} + \Sigma Ind_{ft} + \varepsilon_f$$

A: Reduced Form	log	log	Share of Workers in		
	Emp	Production	Tech	Support	Production
$\Delta ExportSh_f^{NMS}$	-0.730** (0.371)	-0.046 (0.976)	0.078** (0.033)	0.088 (0.059)	-0.213** (0.089)
B: IV Estimates					
$\Delta PG ImpSh_f^{NMS}$	-2.031* (1.161)	-0.129 (2.678)	0.216** (0.099)	0.244* (0.140)	-0.592** (0.257)
KP-Fstat	9.303	9.303	9.303	9.303	9.303
AR Chi-sq  P-val	0.05	0.96	0.02	0.13	0.02
Observations	5,160	5,160	5,160	5,160	5,160

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . SEs clustered by HS2 sector.

Regressions weighted by employment and include 2-digit NACE and year fixed effects.

# Reduced form and IV estimates

$$\Delta FirmAttribute_f = \alpha + \beta_{PG} \Delta \frac{PG Imports_f^{NMS}}{Imports_f} + \Sigma Ind_{ft} + \varepsilon_i$$

<b>A: Reduced Form</b>	Growth Rate of Workers in			Share Tech
	Tech	Support	Production	Switchers
$\Delta ExportSh_f^{NMS}$	0.893** (0.400)	0.028 (0.476)	-1.034*** (0.385)	0.031** (0.015)
<b>B: IV Estimates</b>				
$\Delta PG ImpSh_f^{NMS}$	2.484* (1.431)	0.078 (1.301)	-2.876** (1.286)	0.087* (0.051)
KP-Fstat	9.303	9.303	9.303	9.303
AR Chi-sq P-val	0.02	0.95	0.01	0.04
Observations	5,160	5,160	5,160	5,160

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01. SEs clustered by HS2 sector.

Regressions weighted by employment and include 2-digit NACE and year fixed effects.

Growth rate is  $\frac{(Occup_{f,t+5} - Occup_{f,t})}{0.5(Occup_{f,t+5} + Occup_{f,t})}$

Share Tech Switchers is share of tech workers that change occupation w/in firm.