Employment Effects of Offshoring on Belgian Manufacturing Firms

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Plan

- Offshoring and employment
- Our contribution
- Empirical framework
- Measure
- Results
- Conclusion

PREVIEW

- increased offshoring in downstream industries is a robust channel of negative employment effects for domestic Belgian manufacturing firms

OFFSHORING AND EMPLOYMENT

Introduction

- offshoring = cross-border fragmentation of the value chain
- firms start to source intermediates from abroad

- impact of offshoring on wages and/or employment is an important issue in the (empirical) literature

Offshoring and Employment - Theory

- focus = distributional aspects in terms of relative wages or employment by skill/occupational category (cf. Grossman and Rossi-Hansberg, 2008; Autor, 2011)

- theoretical contributions
  - e.g. Grossman and Rossi-Hansberg (2008), Baldwin and Robert-Nicoud (2010)
  - standard labour market clearing assumption (relative wages of high and low skilled adjust to generate full employment), i.e. assumes away the impact of offshoring on employment levels (Bhagwati et al., 2004)

Offshoring and Employment - Empirics

- Empirical work largely confirms strong distributional effect : **low- or medium-skilled workers suffer** from offshoring in terms of wages and/or employment levels
  - industry-levels papers: Feenstra and Hanson (1996, 1999), Hijzen et al. (2005), Strauss-Kahn (2003)
  - firm-level evidence for Belgium in Mion and Zhu (2012)

Offshoring and Employment - Empirics

- Most empirical work seems to confirm that offshoring has **no robust impact on total employment** levels
  - e.g. Amiti and Wei (2005), Hijzen and Swaim (2007); Michel and Rycx (2012) at industry-level, Mion and Zhu (2012) at firm-level

  - ↔ Hijzen and Swaim (2010) provide some evidence of industry-level effects of materials offshoring and Amiti and Wei (2006) do find a negative impact of service offshoring on US manufacturing employment; firm-level evidence in Görg and Hanley (2005)

Offshoring and Employment - Empirics

- arguments to explain limited impact on within industry employment levels:

    i. "... productivity gains from offshoring are sufficiently large that the jobs created by higher sales completely offset the jobs lost by relocating certain production stages to foreign production sites" (Hijzen and Swaim, 2007)

    ii. Job losses due to offshoring small compared to total job market turnover (Bhagwati et al., 2004)

    iii. measures of offshoring underestimate real extent of offshoring (OECD, 2007)

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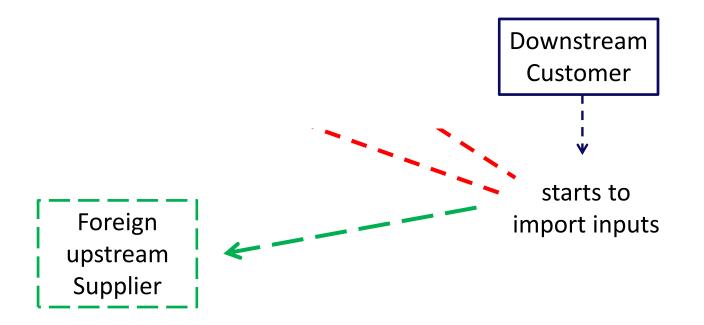
OUR CONTRIBUTION

Our contribution

- in literature: focus on **<u>within-firm</u>** arguments

$\rightarrow$ firms start to source intermediates from abroad that
  - they used to produce in-house

  … but they also might have sourced them from domestic suppliers beyond the boundaries of the firm!

Supply Chain

raw materials   final goods

Downstream Customer

starts to import inputs

Foreign upstream Supplier

Downstream employment effects (1)

- **focus on within-industry impact of offshoring on employment in literature**

$\leftrightarrow$ growing interdependence of firms within value chains

$\Rightarrow$ scope for **indirect employment effect of offshoring:** offshoring decision by firm in industry i likely to affect firms in **supplier industries**

- literature has failed to recognise this channel

Downstream employment effects (2)

- How do we proceed?

  $\rightarrow$ develop **downstream offshoring indicator**

  $\rightarrow$ largely follow existing empirical work and augment standard firm-level labour demand equation with it

EMPIRICAL FRAMEWORK

Labour demand –
estimation framework (1)

- Hamermesh (1993) (*cf.* Amiti and Wei (2005); Hijzen and Swaim (2010))

  - standard conditional labour demand equation derived from cost minimisation problem with linear homogenous production function including labour as variable factor and offshoring measures as exogenous demand shifters

  - partial derivative of cost function with respect to wage rate yields labour demand:

  $$L = C_w\left(W, Y, Z\right)$$

    where *L* is labour, *C* the cost function, *W* the wage rate, *Y* output, and Z demand shifters

Labour demand – estimation framework (2)

- capital = other input factor
  - As common in the literature, capital = quasi-fixed factor (Berman et al., 1994)

- log-linearize for firm *i* and augment with offshoring indicators as well as other firm-level controls (exit, age):

$$\ln L_{ijt} = \alpha_i + \beta_1 \ln w_{it} + \beta_2 \ln K_{it} + \beta_3 \ln Y_{it} + \Gamma' OFF_{ijt} + \Omega' X_{i(j)t}$$

- expect immediate impact of offshoring
  - focus on '*short-run*' employment effects of offshoring
  - Labour = freely variable input
    (cf. literature on TFP-estimation, OP1996/LP2003)

MEASURING OFFSHORING

Standard services and manufacturing offshoring indicators

- traditional industry-level measures

  (Feenstra and Hanson, 1996/99; Amiti and Wei, 2005)

- Manufacturing offshoring
  - share of imported manufacturing intermediates in total non-energy intermediates for industry j

  $$off_{jt}^m = \frac{X_{jt}^{f,m}}{X_{jt}^{ne}}$$

- Services offshoring
  - share of imported services intermediates in total non-energy intermediates for industry j

  $$off_{jt}^s = \frac{X_{jt}^{f,s}}{X_{jt}^{ne}}$$

Downstream offshoring indicator (1)

- Based on SUT/IOT
- Let *G* be the set of all products *g* indexed by *n = 1, ...,N*

$$G = \left(g^1, g^2, ..., g^N\right)$$

- from the supply table, we retrieve the output product mix of (firms in) industry *j*

$$G_j^S \subset G$$

- from the use table, we retrieve the product mix of intermediate input purchases by the downstream or customer industry *k*

$$G_k^U \subset G$$

Downstream offshoring indicator (2)

- intersection between these two sets contains all products G^n produced by industry j and purchased as intermediates by industry k

$$G_{jk} = G_j^S \cap G_k^U$$

- for any product required in their production process, firms in industry k have the choice between domestic and foreign sourcing

- since SUT contain both domestic and imported use tables, we have for each product $g^n \in G_{jk}$ the share s_{kn} that is imported by firms in industry k

Downstream offshoring indicator (3)

- calculate Φ_{jk} that reflects to what extent imports of intermediates by downstream industry *k* affect upstream industry *j*

$$\Phi_{jk} = \sum_{g^n \in G_{kj}} \delta_{jn} s_{kn}$$

- constructed as a weighted average of s_{kn} over all products $g^n \in G_{jk}$ weighted by the share of product g^n in industry j's output mix G_j^S

$$\delta_{jn} = Y_{jn} / \sum_{g^n \in G_j^S} Y_{jn}$$

Downstream offshoring indicator (4)

- Φ_{jk} is only defined for a specific downstream industry k

- for our final measure we calculate a weighted average of Φ_{jk} s with weights reflecting the relative importance of different downstream industries k as customers of j

$$off f_{jt}^{down} = \sum_{k \neq j} \theta_{jk}^{95} \Phi_{jkt}$$

- weights = technical coefficients for domestic uses (derived from industry-by-industry IO-tables, share of j's output supplied to respective downstream industries k)
- refer to domestic supply only
  $\Rightarrow$ over time affected by offshoring in downstream industries
  $\Rightarrow$ avoid distortion of relative magnitudes over time and across industries of our measure by using fixed weights of 1995 for the entire sample period

Downstream offshoring indicator (5)

$$off f_{jt}^{down} = \sum_{k \neq j} \theta_{jk}^{95} \Phi_{jkt}$$

- *off*^{down} = relative measure that is interpretable in the same way as the Feenstra—Hanson measure:
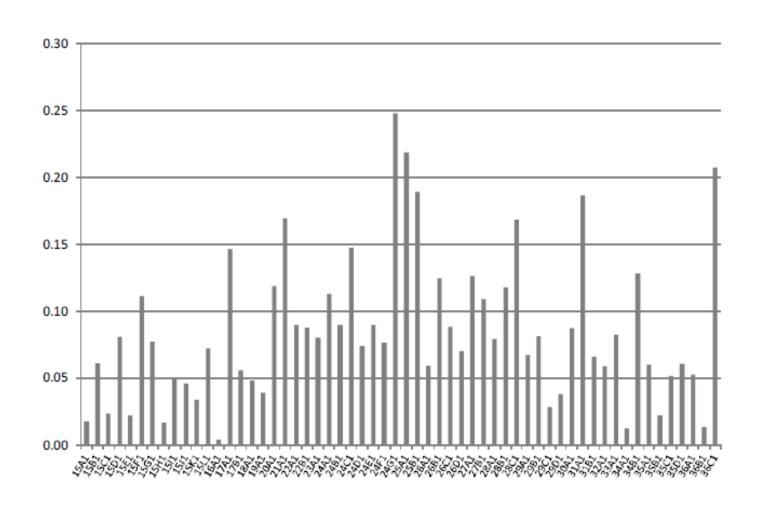 (firms in) industries with a larger value for *off*^{down} are those that are faced with relatively more downstream offshoring
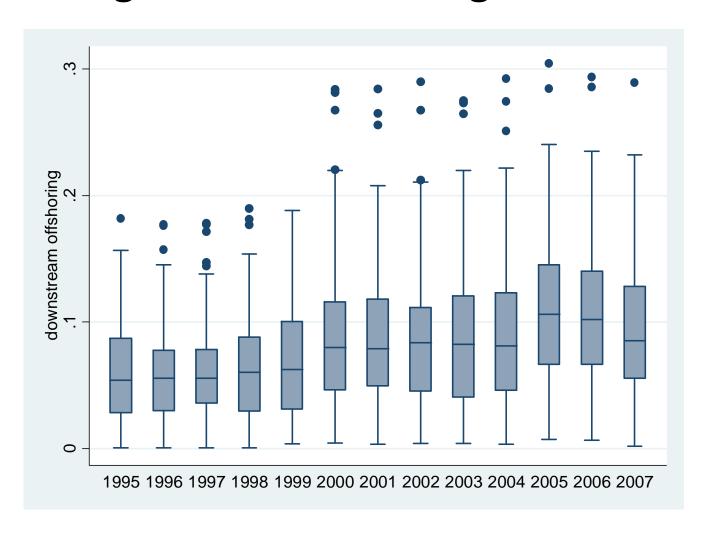
DATA AND RESULTS

Data

- Combinations of two datasets
  - Supply and Use tables, 1995-2007, FPB
    - Used for construction of industry-level offshoring measures
    - Detailed! (59 manufacturing categories)

Downstream offshoring in Belgian manufacturing industries (avg 1995-2007)

Downstream offshoring
in Belgian manufacturing industries

Panel B - Correlation matrix

	within industry manufacturing offshoring	within industry services offshoring	final demand import competition
downstream offshoring	0.147	0.134	-0.096
within industry manufacturing offshoring		-0.080	0.162
within industry services offshoring			0.008

Data

- **Combinations of two datasets**
  - Supply and Use tables, 1995-2007, FPB
    - Used for construction of industry-level offshoring measures
    - Detailed! (59 manufacturing categories)
  - Belgian firm-level data, 1997-2007
    - Source Amadeus database
    - Info on employment, wages, OR, sales, fixed assets, age, exit, foreign, industry, consolidation

Firm (domestic manufacturing firms)

	Obs	Mean	Median	Std. Dev.	Min	Max
number of employees	36710	54.6	16	168.0	1	4885
log real operating revenu	36710	14.99	15.04	1.82	7.10	23.11
log real sales	18431	16.33	16.26	1.29	5.64	23.10
log real capital	36710	12.87	12.95	2.00	1.36	20.52
log real wage	36710	10.54	10.55	0.41	3.18	17.24
age	36710	23.64	19	16.46	3	118
exit	36710	0.01	0.00	0.10	0	1
Herfindahl	36710	927.8	705.3	843.9	129.7	9425.6

Specification

- '*Upgraded*' first-differenced model

$$
\begin{aligned}
\Delta l_{it} \;=\;\; & \beta_1' \Delta w_{it} + \beta_2' \Delta y_{it} + \beta_3' \Delta k_{it} + \beta_4' \Delta off_{jt}^{down} \\
& + \beta_5' \Delta off_{jt}^{m} + \beta_6' \Delta off_{jt}^{s} + \beta_7' \Delta impcomp_{jt}^{fd} \\
& + \beta_8' age_{it} + \beta_9' exit + \delta_t' + \delta_j' + \varepsilon_{it}'
\end{aligned}
$$

- IV-estimation (wage)

	(1)	(2)	(3)	(4)	(5)
real wage					
real operating revenue					
real capital					
downstream offshoring					
downstream offshoring (t-1)					
final demand import comp					
final demand import comp (t-1)					
materials offshoring					
materials offshoring (t-1)					
services offshoring					
services offshoring (t-1)					
exit					
age					
Herfindahl					
Time dummies	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y
Observations	36,710	36,710	36,710	36,710	36,710
R-squared	0.398	0.398	0.398	0.398	0.398

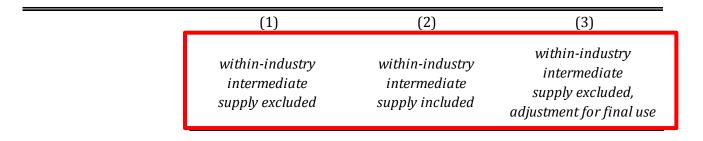|	(1)	(2)	(3)	(4)	(5)
real wage	-0.492***	-0.491***	-0.491***	-0.491***	-0.491***
	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]
real operating revenue	0.396***	0.396***	0.396***	0.396***	0.396***
	[0.023]	[0.023]	[0.023]	[0.023]	[0.023]
real capital	0.058***	0.057***	0.057***	0.058***	0.058***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
downstream offshoring		-0.250***	-0.246***	-0.248***	-0.239***
		[0.070]	[0.071]	[0.071]	[0.073]
downstream offshoring (t-1)					0.047
					[0.083]
final demand import comp			-0.002	-0.001	-0.001
			[0.010]	[0.010]	[0.010]
final demand import comp (t-1)					0.001
					[0.005]
materials offshoring				-0.066**	-0.064**
				[0.029]	[0.030]
materials offshoring (t-1)					0.010
					[0.033]
services offshoring				0.081	0.095
				[0.230]	[0.240]
services offshoring (t-1)					0.084
					[0.266]
exit	-0.255***	-0.255***	-0.255***	-0.255***	-0.255***
	[0.027]	[0.027]	[0.027]	[0.027]	[0.027]
age	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Herfindahl	0.002	0.002	0.002	0.001	0.001
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Time dummies	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y

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Basic specification

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Time dummies	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y

Downstream offshoring measurement?

Downstream offshoring measurement?

	(1)	(2)	(3)
	within-industry intermediate supply excluded	*within-industry intermediate supply included*	*within-industry intermediate supply excluded, adjustment for final use*
1995 weights			
1997 weights			
average weights (95-07)			
time varying weights			
2007 weights			

Downstream offshoring coefficients based on a specification estimated in first differences. Rows refer to different weighting schemes, columns refer to alternative calculations of technical coefficients that are used to construct our measure of downstream offshoring. See the text for full details. Clustered standard errors in brackets; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Downstream offshoring measurement?

	(1)	(2)	(3)
	within-industry intermediate supply excluded	*within-industry intermediate supply included*	*within-industry intermediate supply excluded, adjustment for final use*
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Downstream offshoring measurement?

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1995 weights	-0.248***		
	[0.071]		
1997 weights			
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time varying weights			
2007 weights			

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Downstream offshoring measurement?

	(1)	(2)	(3)
	within-industry intermediate supply excluded	*within-industry intermediate supply included*	*within-industry intermediate supply excluded, adjustment for final use*
1995 weights	-0.248***	-0.215***	-0.071***
	[0.071]	[0.062]	[0.022]
1997 weights			
average weights (95-07)			
time varying weights			
2007 weights			

Downstream offshoring coefficients based on a specification estimated in first differences. Rows refer to different weighting schemes, columns refer to alternative calculations of technical coefficients that are used to construct our measure of downstream offshoring. See the text for full details. Clustered standard errors in brackets; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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	within-industry intermediate supply excluded	within-industry intermediate supply included	within-industry intermediate supply excluded, adjustment for final use
1995 weights	-0.248***	-0.215***	-0.071***
	[0.071]	[0.062]	[0.022]
1997 weights	-0.226***	-0.204***	-0.076***
	[0.069]	[0.064]	[0.022]
average weights (95-07)	-0.193**	-0.182**	-0.055**
	[0.093]	[0.083]	[0.025]
time varying weights	-0.059	-0.012	-0.012
	[0.103]	[0.086]	[0.023]
2007 weights	-0.117	-0.119	-0.035
	[0.093]	[0.077]	[0.022]

Downstream offshoring coefficients based on a specification estimated in first differences. Rows refer to different weighting schemes, columns refer to alternative calculations of technical coefficients that are used to construct our measure of downstream offshoring. See the text for full details. Clustered standard errors in brackets; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Alternative specifications?

Alternative specifications?

	(1) level model	(2) level model	(3) level model	(4) input price first dif model	(5) FE first dif model	(6) sales first dif model	(7) sales level model	(8) dynamic level model
real wage								
real operating revenu								
real capital								
material input prices								
real sales								
downstream offshoring								
final demand import competition								
materials offshoring								
services offshoring								
exit								
age								
Herfindahl								
employment (t-1)								

Alternative specifications?

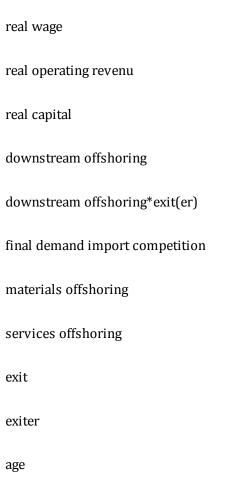|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	level model	*level model*	*level model*	*input price first dif model*	*FE first dif model*	*sales first dif model*	*sales level model*	*dynamic level model*
real wage	-0.591***	-0.590***	-0.590***					
	[0.028]	[0.028]	[0.028]					
real operating revenu	0.524***	0.523***	0.523***					
	[0.024]	[0.024]	[0.024]					
real capital	0.063***	0.063***	0.063***					
	[0.006]	[0.006]	[0.006]					
material input prices								
real sales								
downstream offshoring	-0.249**	-0.250**	-0.252**					
	[0.104]	[0.103]	[0.102]					
final demand import competition		-0.013***	-0.012**					
		[0.005]	[0.005]					
materials offshoring			-0.014					
			[0.046]					
services offshoring			0.163					
			[0.332]					
exit	-0.251***	-0.251***	-0.251***					
	[0.034]	[0.034]	[0.034]					
age	-0.011**	-0.010**	-0.011**					
	[0.004]	[0.004]	[0.004]					
Herfindahl	-0.009	-0.008	-0.007					
	[0.007]	[0.007]	[0.007]					
employment (t-1)								

Alternative specifications?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	level model	*level model*	*level model*	*input price first dif model*	*FE first dif model*	*sales first dif model*	*sales level model*	*dynamic level model*
real wage	-0.591***	-0.590***	-0.590***	-0.491***				
	[0.028]	[0.028]	[0.028]	[0.024]				
real operating revenu	0.524***	0.523***	0.523***	0.396***				
	[0.024]	[0.024]	[0.024]	[0.023]				
real capital	0.063***	0.063***	0.063***	0.058***				
	[0.006]	[0.006]	[0.006]	[0.005]				
material input prices				-0.027				
				[0.019]				
real sales								
downstream offshoring	-0.249**	-0.250**	-0.252**	-0.229***				
	[0.104]	[0.103]	[0.102]	[0.072]				
final demand import competition		-0.013***	-0.012**	-0.001				
		[0.005]	[0.005]	[0.010]				
materials offshoring			-0.014	-0.064**				
			[0.046]	[0.029]				
services offshoring			0.163	0.090				
			[0.332]	[0.229]				
exit	-0.251***	-0.251***	-0.251***	-0.255***				
	[0.034]	[0.034]	[0.034]	[0.027]				
age	-0.011**	-0.010**	-0.011**	-0.001***				
	[0.004]	[0.004]	[0.004]	[0.000]				
Herfindahl	-0.009	-0.008	-0.007	0.001				
	[0.007]	[0.007]	[0.007]	[0.003]				
employment (t-1)								

Alternative specifications?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	level model	level model	level model	input price first dif model	FE first dif model	sales first dif model	sales level model	dynamic level model
real wage	-0.591***	-0.590***	-0.590***	-0.491***	-0.444***	·		
	[0.028]	[0.028]	[0.028]	[0.024]	[0.024]			
real operating revenu	0.524***	0.523***	0.523***	0.396***	0.361***			
	[0.024]	[0.024]	[0.024]	[0.023]	[0.023]			
real capital	0.063***	0.063***	0.063***	0.058***	0.047***			
	[0.006]	[0.006]	[0.006]	[0.005]	[0.005]			
material input prices				-0.027				
				[0.019]				
real sales								
downstream offshoring	-0.249**	-0.250**	-0.252**	-0.229***	-0.238***			
	[0.104]	[0.103]	[0.102]	[0.072]	[0.072]			
final demand import competition		-0.013***	-0.012**	-0.001	0.002			
		[0.005]	[0.005]	[0.010]	[0.009]			
materials offshoring				-0.014	-0.064**	-0.076***		
				[0.046]	[0.029]	[0.029]		
services offshoring				0.163	0.090	0.162		
				[0.332]	[0.229]	[0.230]		
exit	-0.251***	-0.251***	-0.251***	-0.255***	-0.218***	·		
	[0.034]	[0.034]	[0.034]	[0.027]	[0.033]			
age	-0.011**	-0.010**	-0.011**	-0.001***	-0.025***	·		
	[0.004]	[0.004]	[0.004]	[0.000]	[0.006]			
Herfindahl	-0.009	-0.008	-0.007	0.001	0.002			
	[0.007]	[0.007]	[0.007]	[0.003]	[0.003]			
employment (t-1)								

Alternative specifications?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	level model	level model	level model	input price first dif model	FE first dif model	sales first dif model	sales level model	dynamic level model
real wage	-0.591***	-0.590***	-0.590***	-0.491***	-0.444***	-0.400***	-0.557***	
	[0.028]	[0.028]	[0.028]	[0.024]	[0.024]	[0.031]	[0.037]	
real operating revenu	0.524***	0.523***	0.523***	0.396***	0.361***			
	[0.024]	[0.024]	[0.024]	[0.023]	[0.023]			
real capital	0.063***	0.063***	0.063***	0.058***	0.047***	0.072***	0.102***	
	[0.006]	[0.006]	[0.006]	[0.005]	[0.005]	[0.009]	[0.009]	
material input prices				-0.027				
				[0.019]				
real sales						0.321***	0.451***	
						[0.027]	[0.030]	
downstream offshoring	-0.249**	-0.250**	-0.252**	-0.229***	-0.238***	-0.284***	-0.390***	
	[0.104]	[0.103]	[0.102]	[0.072]	[0.072]	[0.083]	[0.148]	
final demand import competition		-0.013***	-0.012**	-0.001	0.002	-0.006	-0.015***	
		[0.005]	[0.005]	[0.010]	[0.009]	[0.010]	[0.005]	
materials offshoring			-0.014	-0.064**	-0.076***	-0.044	0.055	
			[0.046]	[0.029]	[0.029]	[0.036]	[0.063]	
services offshoring			0.163	0.090	0.162	0.469*	-0.081	
			[0.332]	[0.229]	[0.230]	[0.276]	[0.407]	
exit	-0.251***	-0.251***	-0.251***	-0.255***	-0.218***	-0.373***	-0.303***	
	[0.034]	[0.034]	[0.034]	[0.027]	[0.033]	[0.054]	[0.067]	
age	-0.011**	-0.010**	-0.011**	-0.001***	-0.025***	-0.001***	-0.012**	
	[0.004]	[0.004]	[0.004]	[0.000]	[0.006]	[0.000]	[0.006]	
Herfindahl	-0.009	-0.008	-0.007	0.001	0.002	0.006	0.001	
	[0.007]	[0.007]	[0.007]	[0.003]	[0.003]	[0.004]	[0.009]	
employment (t-1)								

Alternative specifications?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	level model	*level model*	*level model*	*input price first dif model*	*FE first dif model*	*sales first dif model*	*sales level model*	*dynamic level model*
real wage	-0.591***	-0.590***	-0.590***	-0.491***	-0.444***	-0.400***	-0.557***	-0.522***
	[0.028]	[0.028]	[0.028]	[0.024]	[0.024]	[0.031]	[0.037]	[0.021]
real operating revenu	0.524***	0.523***	0.523***	0.396***	0.361***			0.425***
	[0.024]	[0.024]	[0.024]	[0.023]	[0.023]			[0.023]
real capital	0.063***	0.063***	0.063***	0.058***	0.047***	0.072***	0.102***	0.067***
	[0.006]	[0.006]	[0.006]	[0.005]	[0.005]	[0.009]	[0.009]	[0.005]
material input prices				-0.027				
				[0.019]				
real sales						0.321***	0.451***	
						[0.027]	[0.030]	
downstream offshoring	-0.249**	-0.250**	-0.252**	-0.229***	-0.238***	-0.284***	-0.390***	-0.252**
	[0.104]	[0.103]	[0.102]	[0.072]	[0.072]	[0.083]	[0.148]	[0.099]
final demand import competition		-0.013***	-0.012**	-0.001	0.002	-0.006	-0.015***	0.010
		[0.005]	[0.005]	[0.010]	[0.009]	[0.010]	[0.005]	[0.008]
materials offshoring			-0.014	-0.064**	-0.076***	-0.044	0.055	-0.006
			[0.046]	[0.029]	[0.029]	[0.036]	[0.063]	[0.043]
services offshoring			0.163	0.090	0.162	0.469*	-0.081	0.268
			[0.332]	[0.229]	[0.230]	[0.276]	[0.407]	[0.314]
exit	-0.251***	-0.251***	-0.251***	-0.255***	-0.218***	-0.373***	-0.303***	-0.175***
	[0.034]	[0.034]	[0.034]	[0.027]	[0.033]	[0.054]	[0.067]	[0.027]
age	-0.011**	-0.010**	-0.011**	-0.001***	-0.025***	-0.001***	-0.012**	-0.013***
	[0.004]	[0.004]	[0.004]	[0.000]	[0.006]	[0.000]	[0.006]	[0.002]
Herfindahl	-0.009	-0.008	-0.007	0.001	0.002	0.006	0.001	0.008
	[0.007]	[0.007]	[0.007]	[0.003]	[0.003]	[0.004]	[0.009]	[0.005]
employment (t-1)								0.497***
								[0.025]

Different samples?

Different samples?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	sample				*balanced*	*non-exit*	*exit*	*exiter*
	starts 1999	*starts2001*	*ends 2003*	*ends 2005*	*sample*	*sample*	*interaction*	*interaction*
real wage								
real operating revenu								
real capital								
downstream offshoring								
downstream offshoring*exit(er)								
final demand import competition								
materials offshoring								
services offshoring								
exit								
exiter								
age								
Herfindahl								

Different samples?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		sample			*balanced*	*non-exit*	*exit*	*exiter*
	starts 1999	*starts2001*	*ends 2003*	*ends 2005*	*sample*	*sample*	*interaction*	*interaction*
real wage	-0.590***	-0.645***	-0.481***	-0.491***				
	[0.041]	[0.047]	[0.030]	[0.026]				
real operating revenu	0.389***	0.338***	0.392***	0.396***				
	[0.021]	[0.022]	[0.031]	[0.027]				
real capital	0.050***	0.039***	0.064***	0.061***				
	[0.005]	[0.005]	[0.006]	[0.005]				
downstream offshoring	-0.258***	-0.358***	-0.188**	-0.253***				
	[0.072]	[0.101]	[0.095]	[0.078]				
downstream offshoring*exit(er)								
final demand import competition	-0.002	0.001	-0.010	0.005				
	[0.009]	[0.008]	[0.009]	[0.007]				
materials offshoring	-0.074**	-0.098**	-0.074*	-0.053*				
	[0.030]	[0.044]	[0.039]	[0.031]				
services offshoring	0.043	-0.387	0.026	0.147				
	[0.242]	[0.320]	[0.312]	[0.233]				
exit	-0.279***	-0.324***	-0.216***	-0.238***				
	[0.028]	[0.032]	[0.033]	[0.030]				
exiter								
age	-0.001***	-0.001***	-0.001***	-0.001***				
	[0.000]	[0.000]	[0.000]	[0.000]				
Herfindahl	0.003	0.001	0.003	0.002				
	[0.004]	[0.005]	[0.004]	[0.004]				

Different samples?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	sample				*balanced*	*non-exit*	*exit*	*exiter*
	starts 1999	*starts2001*	*ends 2003*	*ends 2005*	*sample*	*sample*	*interaction*	*interaction*
real wage	-0.590***	-0.645***	-0.481***	-0.491***	-0.488***	-0.504***	-0.491***	-0.496***
	[0.041]	[0.047]	[0.030]	[0.026]	[0.028]	[0.026]	[0.024]	[0.024]
real operating revenu	0.389***	0.338***	0.392***	0.396***	0.401***	0.408***	0.396***	0.401***
	[0.021]	[0.022]	[0.031]	[0.027]	[0.029]	[0.027]	[0.023]	[0.023]
real capital	0.050***	0.039***	0.064***	0.061***	0.054***	0.056***	0.058***	0.058***
	[0.005]	[0.005]	[0.006]	[0.005]	[0.005]	[0.004]	[0.005]	[0.005]
downstream offshoring	-0.258***	-0.358***	-0.188**	-0.253***	-0.175***	-0.181***	-0.242***	-0.218***
	[0.072]	[0.101]	[0.095]	[0.078]	[0.063]	[0.062]	[0.070]	[0.065]
downstream offshoring*exit(er)							-0.622	-0.391
							[1.366]	[0.393]
final demand import competition	-0.002	0.001	-0.010	0.005	0.002	-0.004	-0.001	-0.000
	[0.009]	[0.008]	[0.009]	[0.007]	[0.006]	[0.007]	[0.010]	[0.010]
materials offshoring	-0.074**	-0.098**	-0.074*	-0.053*	-0.070**	-0.075***	-0.067**	-0.064**
	[0.030]	[0.044]	[0.039]	[0.031]	[0.030]	[0.028]	[0.029]	[0.029]
services offshoring	0.043	-0.387	0.026	0.147	0.264	0.205	0.079	0.091
	[0.242]	[0.320]	[0.312]	[0.233]	[0.228]	[0.221]	[0.229]	[0.229]
exit	-0.279***	-0.324***	-0.216***	-0.238***			-0.254***	
	[0.028]	[0.032]	[0.033]	[0.030]			[0.027]	
exiter								-0.072***
								[0.007]
age	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Herfindahl	0.003	0.001	0.003	0.002	-0.000	-0.002	0.001	0.001
	[0.004]	[0.005]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]

Size?

numbers:

- coefficient of -0.25

    – one standard deviation increase in off^{down} results in a
      decrease of employment of 1.53%

    – increase of 0.0181 in downstream offshoring
        between 1997 and 2007
        $\Rightarrow$ 10.3% of net in sample job loss over 97-07

Conclusion

- Downstream offshoring seems to be a significant channel of employment effects of offshoring for domestic Belgian manufacturing firms
  - significant throughout all robustness checks

- Industry level offshoring of manufacturing inputs and final demand import comeptition seem to have a negative impact, but not robust to different specifications
- Industry level offshoring of services inputs is insignificant