

The Anatomy of French Production Hierarchies

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Introduction

- Firms are heterogeneous in a variety of dimensions
 - ▶ But little is known about where this heterogeneity comes from
- Some of the observed heterogeneity is the result of organizational differences
 - ▶ The number and knowledge of employees
- Our aim is to understand empirically how firms are organized
 - ▶ Does this matter?
 - ★ Yes, because firms change organization as a result of changes in the economic environment
 - ★ Yes, because the organization of firms has aggregate consequences
- Empirical analysis is guided by Caliendo and Rossi-Hansberg (2012)
 - ▶ We divide firms into layers of employees
 - ▶ Study levels and changes in wages, spans of control, and number of employees: overall and for each layer
 - ▶ Study the effect of exporting on within-firm organization

Literature review

- Model of organization based on Garicano (2000)
 - ▶ Applied to GE in Garicano and Rossi-Hansberg (2004, 2006, 2011)
 - ▶ With heterogeneous firms in a product market:
 - ★ Caliendo and Rossi-Hansberg (2012)
- Few empirical studies on organizational change
 - ▶ Garicano and Hubbard (2007) find that as market size increases the span of control of upper-level individuals increases
 - ▶ Rajan and Wulf (2006) find that hierarchies have “flattened” over time and decentralized their decision making
 - ▶ Guadalupe and Wulf (2010) show delayering as a result of trade competition
- Our results relate to the evidence on firm size-wage premium and exporters wage premium
 - ▶ Brown and Medoff (1989), Oi and Idson (1999)
 - ▶ Bernard and Jensen (1997, 1999), Frias, Kaplan and Verhoogen (2009)

Sketch of Theory in CRH (2012)

- Agents employed in a firm act as production workers or managers
- Production workers:
 - ▶ Generate a production possibility that can yield 1 unit of output
 - ▶ For output to be realized the worker needs to solve a problem
 - ★ Problems are drawn from $F(z)$ with $F''(z) < 0$
 - ▶ Workers learn how to solve problems in an interval of knowledge $[0, z_L^0]$
 - ★ If the problem they face is in this interval production is realized
 - ★ Otherwise they could ask a manager one layer above

Sketch of Theory in CRH (2012)

- Managers

- ▶ Specialize in solving problems
- ▶ Spend h units of time with each problem that gets to them
 - ★ So each manager can deal with $1/h$ problems
- ▶ A manager of layer 1 tries to solve the problems workers could not solve
 - ★ So problems that require knowledge larger than z_L^0
 - ★ Learns how to solve problems in the interval $[z_L^0, z_L^0 + z_L^1]$
 - ★ So the firm needs $n_L^1 = hn_L^0 (1 - F(z_L^0))$ of these managers
 - ★ Unsolved problems can be sent to a manager one layer above
- ▶ In general, managers in layer ℓ learn $[Z_L^{\ell-1}, Z_L^\ell]$ and there are $n_L^\ell = hn_L^0 (1 - F(Z_L^{\ell-1}))$ of them, where $Z_L^\ell = \sum_{i=0}^{\ell} z_L^i$

Sketch of Theory in CRH (2012): Cost Minimization

- Consider a firm that produces a quantity q . $C_L(q; w)$ is the minimum cost of producing q with an organization with L layers, namely,

$$C_L(q; w) = \min_{\{n_L^\ell, z_L^\ell\}_{\ell=0}^L \geq 0} \sum_{\ell=0}^L n_L^\ell w_L^\ell$$

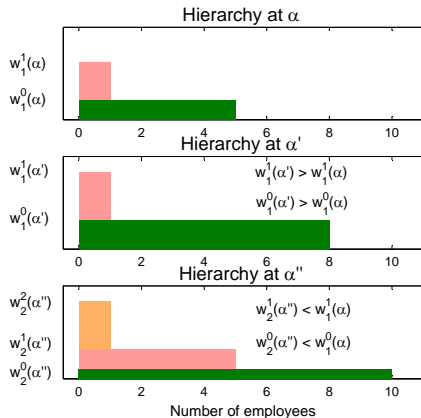
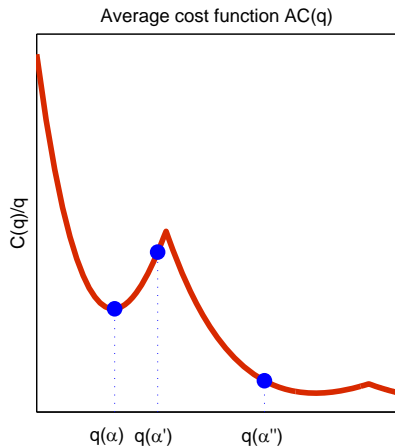
subject to

$$\begin{aligned} q &\leq F(Z_L^L) n_L^0, \\ w_L^\ell &= w [c z_L^\ell + 1] \text{ for all } \ell, \\ n_L^\ell &= h n_L^0 [1 - F(Z_L^{\ell-1})] \text{ for } L \geq \ell > 0, \\ n_L^L &= 1 \end{aligned}$$

- The **variable** cost function is given by

$$C(q; w) = \min_{L \geq 0} \{C_L(q; w)\}$$

Sketch of Theory in CRH (2012)



Implications of the Model

- 1) Firms are hierarchical, $n_L^0 \geq \dots n_L^\ell \dots \geq n_L^L$ for all L
- 2) Layers L , sales pq , and total labor demand $\sum n_L^\ell$, increase with α
- 3) Given L , w_L^ℓ and n_L^ℓ increase with α at all ℓ
- 4) Given α , w_L^ℓ decreases and n_L^ℓ increases with an increase in L at all ℓ
- 5) Exporters have more L than non-exporters
- 6) Predictions for firms that start exporting
 - 6.1 L increases weakly
 - 6.2 Exporters that do not change L increase w_L^ℓ and n_L^ℓ at all ℓ
 - 6.3 Exporters that do change L decrease w_L^ℓ and increase n_L^ℓ at all ℓ

Data description

- Dataset collected by the French National Statistical Institute (INSEE)
 - ▶ We use the period from 2002 to 2007
 - ★ Before 2002 different occupational categories
- We match two sources from mandatory reports:
 - ▶ BRN: private firms balance sheet data
 - ★ 553,125 firm-year observations in manufacturing
 - ▶ DADS: occupation, hours and earning reports of salaried employees
- We lose 11% of the observations from cleaning, and 5.9% from matching
- The sample covers on average 90.7% of total value added in manufacturing
 - ▶ Small firms can choose not to report in BRN, but insignificant in terms of value added

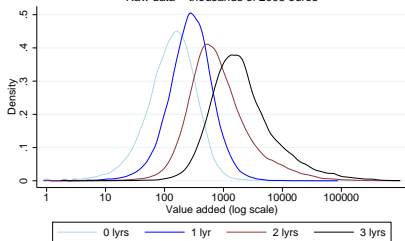
Layers: occupational categories

- PCS-ESE classification codes that belong to manufacturing:
 - 2 Firm owners receiving a wage
 - ★ CEO or firm directors
 - 3 Senior staff or top management positions
 - ★ chief financial officers, head of HR, logistics, purchasing managers
 - 4 Employees at the supervisor level
 - ★ quality control technicians, technical, accounting, and sales supervisors
 - 5 Qualified and non-qualified clerical employees (administrative tasks)
 - ★ secretaries, HR or accounting, telephone operators, sales employees
 - 6 Blue collar qualified and non-qualified workers (manual tasks)
 - ★ welders, assemblers, machine operators and maintenance
- Classification code 1 (farmers) does not belong to manufacturing
- We group 5 and 6 since the distribution of wages coincide [▶ data](#)

Firms with different number of layers are different

Value added distribution by number of layers

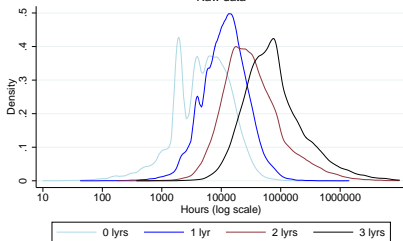
Raw data – thousands of 2005 euros



Kernel density estimate

Hours distribution by number of layers

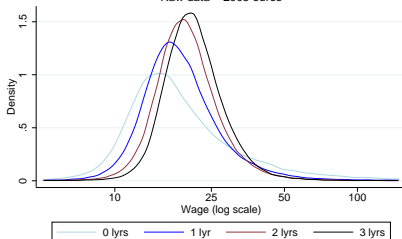
Raw data



Kernel density estimate

Firm hourly wage distribution by number of layers

Raw data – 2005 euros



Kernel density estimate

Year	Firms	Average # of layers
2002	79,260	1.59
2003	77,768	1.58
2004	76,448	1.58
2005	75,426	1.55
2006	74,818	1.53
2007	72,918	1.50

# of layers	Firm-years
0	81,909
1	126,069
2	161,449
3	87,211

Firms with adjacent occupational categories

- We select the sub-sample of firms that satisfy the following criteria:
 - ▶ Layer 0 firms are firms with occupation codes 6 and 5
 - ▶ Layer 1 firms are firms with occupation codes 6, 5 and 4
 - ▶ Layer 2 firms are firms with occupation codes 6, 5, 4 and 3
 - ▶ Layer 3 firms are firms with occupation codes 6, 5, 4, 3 and 2

	Percentage of firms that have adjacent layers				All firms
	0 layers	1 layer	2 layers	3 layers	
Unweighted	87.17	67.22	79.98	100	81.57
Weighted by VA	85.84	68.01	94.54	100	96.65
Weighted by hours	95.86	72.38	93.15	100	95.74

▶ Fraction of firms that transition to an adjacent layer

Hours and wages are hierarchical

Percentage of firms that satisfy a hierarchy

N_L^ℓ = hours at layer ℓ of a firm with L layers

# of layers	$N_L^\ell \geq N_L^{\ell+1}$ all ℓ	Unweighted		
		$N_L^0 \geq N_L^1$	$N_L^1 \geq N_L^2$	$N_L^2 \geq N_L^3$
1	85.3	85.3	-	-
2	62.0	85.2	74.0	-
3	54.3	85.8	76.4	86.6

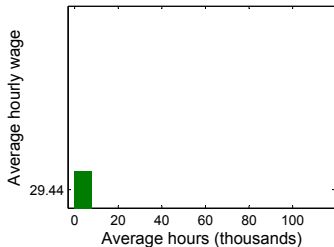
# of layers	$w_L^{\ell+1} \geq w_L^\ell$ all ℓ	Unweighted		
		$w_L^1 \geq w_L^0$	$w_L^2 \geq w_L^1$	$w_L^3 \geq w_L^2$
1	92.1	92.1	-	-
2	86.2	93.6	92.5	-
3	79.7	96.5	94.4	87.8

Variation in log wages

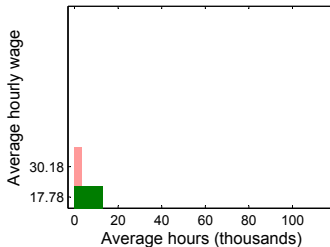
Mean share variation of wages explained by cross-layer variation				
	Firm-years	Unweighted	Weighted by	
			Hours	VA
All firms	440,443	0.50	0.51	0.50
Firms with more than 0 layers	374,568	0.59	0.52	0.50
Firms with 0 layers	65,875	0.00	0.00	0.00
Firms with 1 layer	125,911	0.50	0.41	0.43
Firms with 2 layers	161,447	0.62	0.52	0.50
Firms with 3 layers	87,210	0.66	0.63	0.50

Representative hierarchies

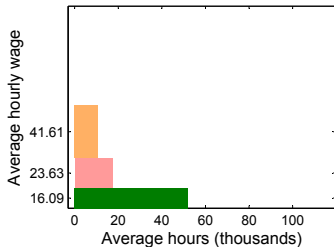
Hierarchy of a 0 layer firm



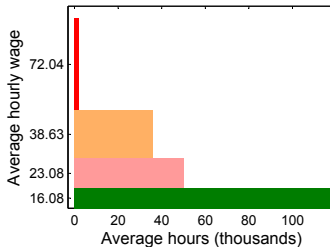
Hierarchy of a 1 layer firm



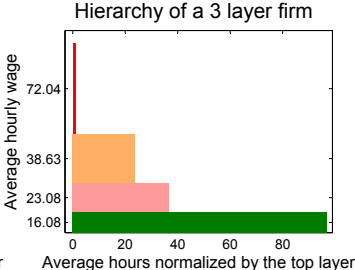
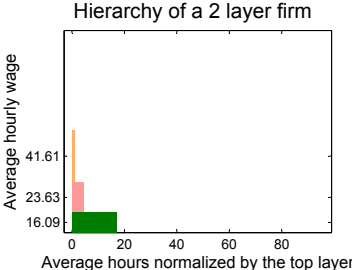
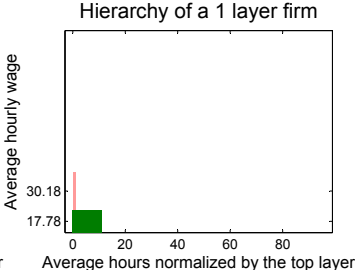
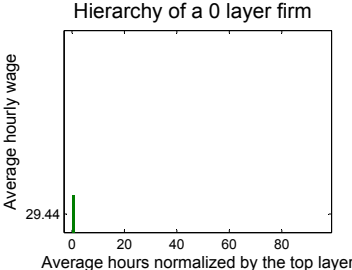
Hierarchy of a 2 layer firm



Hierarchy of a 3 layer firm



Representative hierarchies: normalized hours



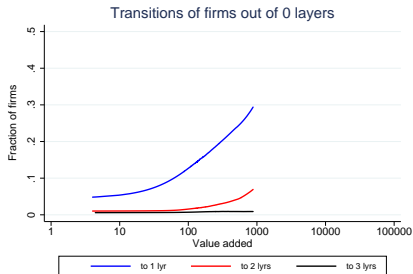
Layer transitions

Distribution of # of layers at time $t+1$ given the # of layers at time t

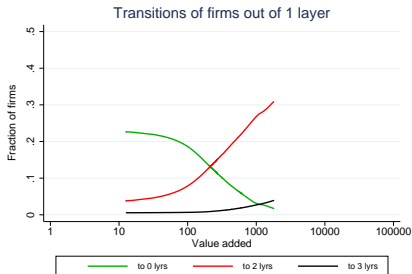
		# of layers at $t + 1$					Total
		Exit	0	1	2	3	
# of layers at t	0	15.4	67.1	15.3	2.0	0.2	100
	1	9.9	10.8	62.0	16.2	1.1	100
	2	7.6	1.2	13.2	67.5	10.5	100
	3	6.1	0.2	2.0	20.5	71.2	100

▶ Weighted by VA

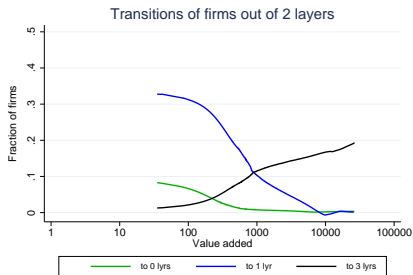
Transitions across layers depend on value added



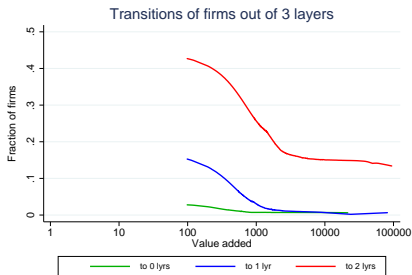
Lowess smoothing – trimming top 1% of value added



Lowess smoothing – trimming top 1% of value added

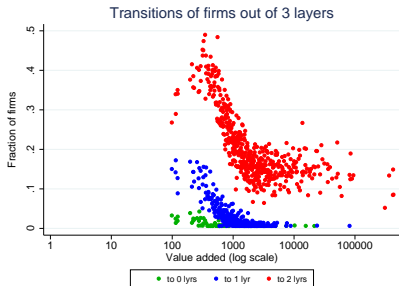
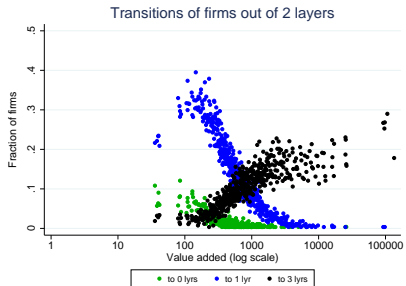
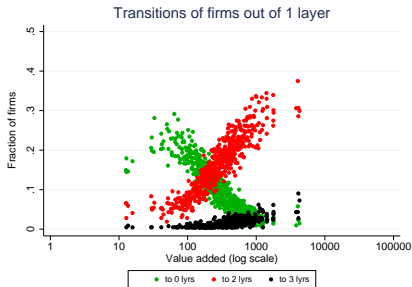
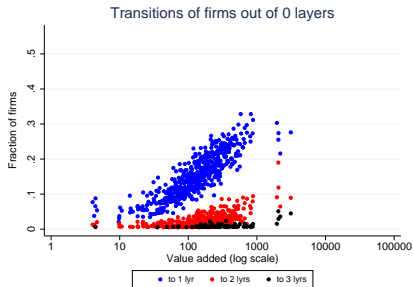


Lowess smoothing – trimming top 1% of value added



Lowess smoothing – trimming top 1% of value added

Transitions across layers depend on value added



Change in firm level outcomes during transition

Average behavior of firms by change in the number of layers

	All	Increase L	No change in L	Decrease L
dlnhours	-0.014***	0.056***	-0.011***	-0.093***
- detrended	-	0.070***	0.003***	-0.079***
$d\ln \sum_{\ell=0}^L n_L^{\ell}$	-0.011***	1.366***	0.012***	-1.408***
- detrended	-	1.377***	0.023***	-1.400***
dln VA	-0.008***	0.032***	-0.007***	-0.049***
- detrended	-	0.039***	0.001	-0.040***
dln avg wage	0.018***	0.001	0.018***	0.038***
- detrended	-	-0.020***	-0.000	0.020***
- common layers	0.020***	-0.117***	0.018***	0.156***
- - detrended	-	-0.137***	-0.002***	0.136***
% firms	100	12.75	73.48	13.78
% VA change	100	39.21	65.65	-4.87

*** significant at 1%.

Normalized hours change according to the theory

- Average log change in normalized hours for firms that transition

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.520	0.017	0.00	10432
0	2	0	1.745	0.053	0.00	1350
0	3	0	2.312	0.193	0.00	111
1	0	0	-1.585	0.017	0.00	11356
1	2	0	0.710	0.012	0.00	17052
1	2	1	0.533	0.012	0.00	17052
1	3	0	1.218	0.048	0.00	1168
1	3	1	1.018	0.047	0.00	1168
2	0	0	-1.801	0.046	0.00	1698
2	1	0	-0.696	0.012	0.00	17927
2	1	1	-0.537	0.012	0.00	17927
2	3	0	1.338	0.014	0.00	14228
2	3	1	1.277	0.016	0.00	14228
2	3	2	1.167	0.016	0.00	14228
3	0	0	-2.203	0.157	0.00	142
3	1	0	-1.112	0.041	0.00	1493
3	1	1	-0.948	0.039	0.00	1493
3	2	0	-1.427	0.014	0.00	15303
3	2	1	-1.359	0.015	0.00	15303
3	2	2	-1.274	0.015	0.00	15303

▶ Layers

▶ VA

▶ H

▶ NH

▶ VA + H

▶ VA + NH

▶ 2 years ahead

▶ 3 years ahead

Normalized hours change according to the theory

- Elasticity of n_L^ℓ with VA for firms that do not change L
- Reporting β_L^ℓ from $d \ln n_{Lit}^\ell = \alpha_L^\ell + \beta_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	0.044	0.012	0.00	65,114
2	0	0.046	0.009	0.00	91,833
2	1	0.019	0.010	0.07	91,833
3	0	0.109	0.014	0.00	53,053
3	1	0.048	0.013	0.00	53,053
3	2	0.037	0.013	0.01	53,053

► Layers

► 2 years ahead

► 3 years ahead

Wages change according to the theory

- Average log change in wages for firms that transition

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.131	0.005	0.00	10432
0	2	0	-0.432	0.024	0.00	1350
0	3	0	-0.943	0.131	0.00	111
1	0	0	0.201	0.005	0.00	11356
1	2	0	-0.041	0.003	0.00	17052
1	2	1	-0.245	0.004	0.00	17052
1	3	0	-0.165	0.018	0.00	1168
1	3	1	-0.416	0.020	0.00	1168
2	0	0	0.489	0.022	0.00	1698
2	1	0	0.085	0.003	0.00	17927
2	1	1	0.275	0.004	0.00	17927
2	3	0	-0.008	0.002	0.00	14228
2	3	1	-0.054	0.003	0.00	14228
2	3	2	-0.185	0.004	0.00	14228
3	0	0	1.102	0.120	0.00	142
3	1	0	0.188	0.014	0.00	1493
3	1	1	0.417	0.017	0.00	1493
3	2	0	0.029	0.002	0.00	15303
3	2	1	0.060	0.003	0.00	15303
3	2	2	0.153	0.004	0.00	15303

► Layers

► VA

► H

► NH

► VA + H

► VA + NH

► All-DADS

► 2 years ahead

► 3 years ahead

Wages change according to the theory

- Elasticity of w_L^ℓ with VA for firms that do not change L
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.077	0.007	0.00	45,606
1	0	0.098	0.006	0.00	65,114
1	1	0.116	0.006	0.00	65,114
2	0	0.145	0.006	0.00	91,833
2	1	0.156	0.006	0.00	91,833
2	2	0.172	0.006	0.00	91,833
3	0	0.173	0.009	0.00	53,053
3	1	0.187	0.009	0.00	53,053
3	2	0.189	0.010	0.00	53,053
3	3	0.218	0.011	0.00	53,053

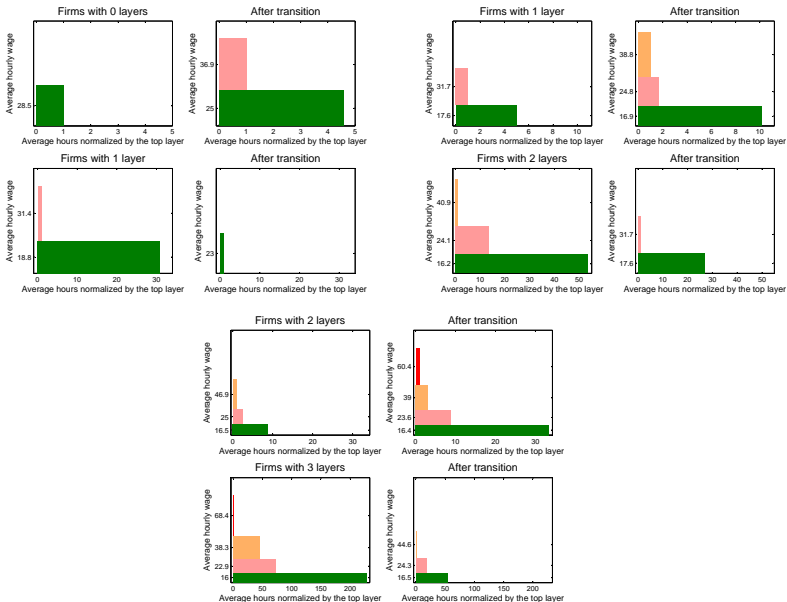
▸ Layers

▸ DADS

▸ 2 years ahead

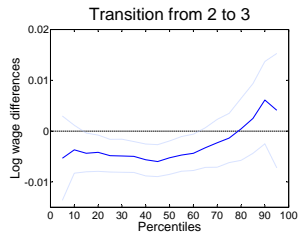
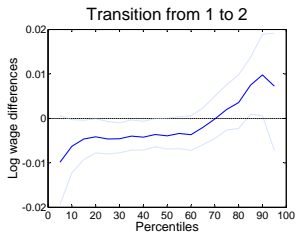
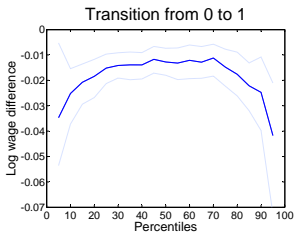
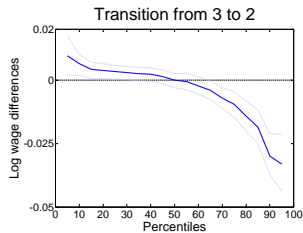
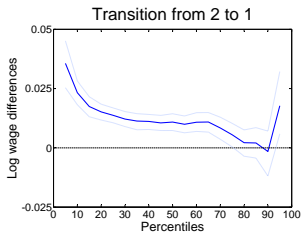
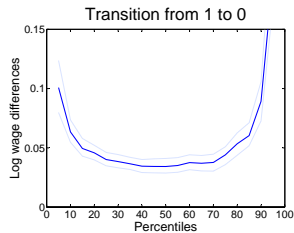
▸ 3 years ahead

Representative hierarchies for one layer transitions



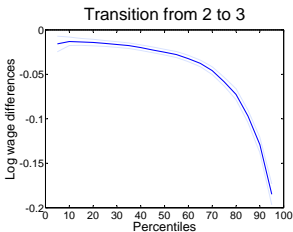
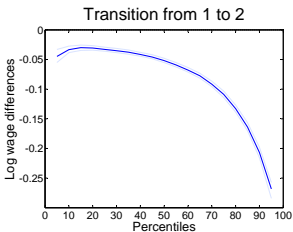
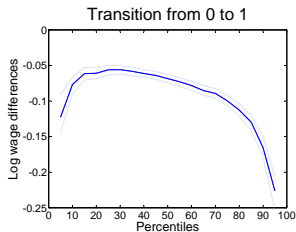
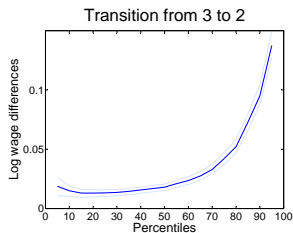
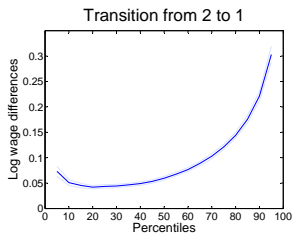
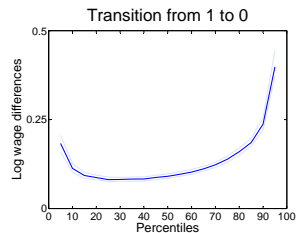
▶ Figure with hours

Distribution of wages after minus before transition



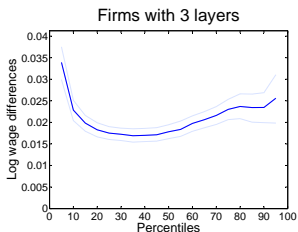
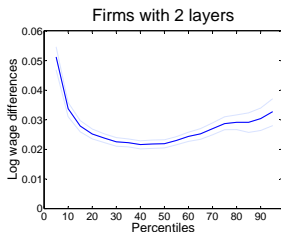
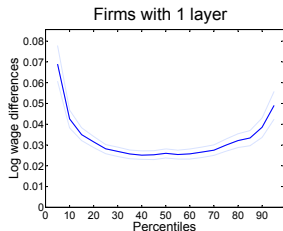
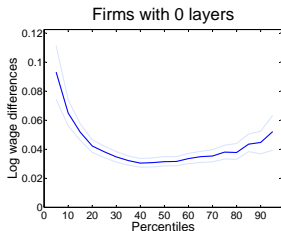
Distribution of wages after minus before transition

Common layers



Distribution of wages after minus before

Conditioning on increase in VA > 0 and no transition



▶ dlogVA5

▶ dlogVA10

▶ Conditioning on decrease in VA

Exporters - data description

	Average			
	VA	Hours	Wage	# of layers
Non-exporters	800	29,026	23.03	1.23
Exporters	5,343	141,615	23.39	1.96

Value added in 000s of 2005 euros. Wage = average hourly wage in 2005 euros. Wages different at 99%

- 45% of firms export, 84% weighted by value added ▶ Share of firms that export by year

Exporters - data description

Composition of firms by number of layers (percentage)

# of layers	Non-exporters	Exporters
0	26.4	7.5
1	34.3	19.5
2	29.4	42.6
3	9.9	30.4
Total	100	100

▶ By number of layers

Layer transitions for exporters

Difference in the distribution of # of layers at time $t+1$ given the # of layers at time t

		New exporters relative to non-exporters			
		# of layers at $t + 1$			
		0	1	2	3
# of layers at t	0	-9.43	6.61	2.31	0.51
	1	-2.57	-3.49	5.29	0.77
	2	-0.87	-4.83	2.84	2.87
	3	-0.18	-2.20	-2.45	4.83

All significant at 1%.

▶ Exit the export market

Average behavior of firms that enter into the export market

	All	Increase L	No change in L
dlnhours	0.021***	0.126***	0.015***
- detrended	0.035***	0.141***	0.029***
$d\ln \sum_{\ell=0}^L n_L^{\ell}$	0.008	1.237***	0.024***
- detrended	0.019***	1.248***	0.035***
dln VA	0.038***	0.116***	0.033***
- detrended	0.046***	0.125***	0.041***
dln avg wage	0.018***	0.000	0.021***
- detrended	-0.000	-0.018**	0.003
- common layers	0.018***	-0.119***	0.021***
- - detrended	-0.002	-0.139***	0.001
% firms	100	14.62	70.61
% VA change	100	18.62	73.66

** significant at 5%, *** significant at 1%.

▶ Exit the export market

▶ Sources of changes during transition

Normalized hours change according to the theory

- Average log change in normalized hours for firms that transition and change export status

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.482	0.074	0.00	528
0	2	0	1.536	0.195	0.00	95
0	3	0	2.990	0.289	0.00	15
1	0	0	-1.482	0.084	0.00	520
1	2	0	0.670	0.046	0.00	1132
1	2	1	0.584	0.045	0.00	1132
1	3	0	0.936	0.175	0.00	91
1	3	1	0.907	0.149	0.00	91
2	0	0	-1.561	0.213	0.00	100
2	1	0	-0.600	0.046	0.00	1119
2	1	1	-0.438	0.048	0.00	1119
2	3	0	1.070	0.049	0.00	861
2	3	1	1.006	0.057	0.00	861
2	3	2	0.877	0.056	0.00	861
3	0	0	-2.900	0.304	0.00	16
3	1	0	-1.162	0.161	0.00	105
3	1	1	-0.880	0.156	0.00	105
3	2	0	-1.228	0.056	0.00	872
3	2	1	-1.159	0.061	0.00	872
3	2	2	-1.045	0.059	0.00	872

Normalized hours change according to the theory

- Firms that change export status and do not change L
- Reporting β_L^ℓ from $d \ln n_{Lit}^\ell = \alpha_L^\ell + \beta_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	-0.011	0.035	0.76	6,968
2	0	0.017	0.024	0.47	10,507
2	1	-0.015	0.027	0.58	10,507
3	0	0.200	0.053	0.00	4,896
3	1	0.073	0.038	0.06	4,896
3	2	0.084	0.042	0.05	4,896

► Layers

Wages change according to the theory

- Average log change in wages for firms that transition and change export status

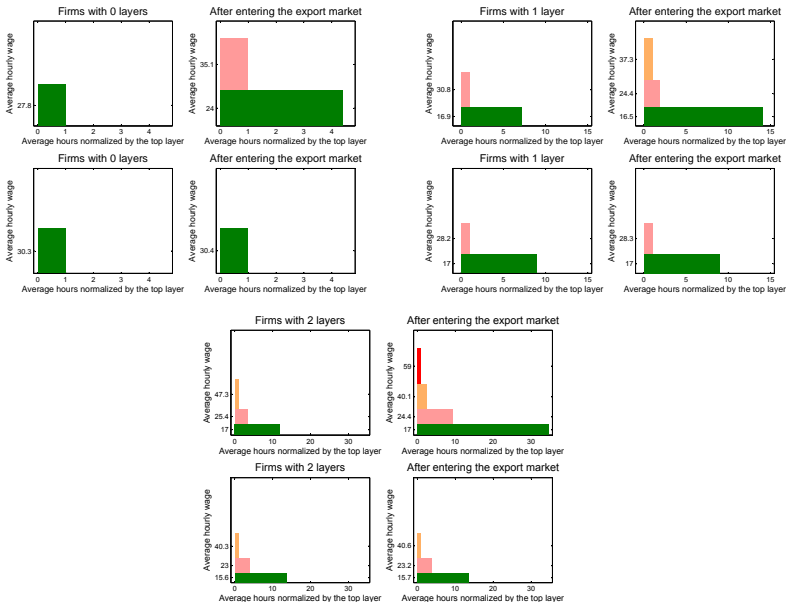
# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.144	0.022	0.00	528
0	2	0	-0.593	0.108	0.00	95
0	3	0	-1.031	0.353	0.01	15
1	0	0	0.219	0.026	0.00	520
1	2	0	-0.025	0.010	0.01	1132
1	2	1	-0.232	0.015	0.00	1132
1	3	0	-0.158	0.043	0.00	91
1	3	1	-0.334	0.056	0.00	91
2	0	0	0.524	0.088	0.00	100
2	1	0	0.074	0.010	0.00	1119
2	1	1	0.247	0.015	0.00	1119
2	3	0	0.004	0.011	0.67	861
2	3	1	-0.043	0.013	0.00	861
2	3	2	-0.165	0.017	0.00	861
3	0	0	0.769	0.346	0.04	16
3	1	0	0.126	0.049	0.01	105
3	1	1	0.465	0.073	0.00	105
3	2	0	0.023	0.009	0.01	872
3	2	1	0.051	0.012	0.00	872
3	2	2	0.169	0.016	0.00	872

Wages change according to the theory

- Firms that change export status and do not change L
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.108	0.022	0.00	3,263
1	0	0.110	0.016	0.00	6,968
1	1	0.119	0.018	0.00	6,968
2	0	0.169	0.017	0.00	10,507
2	1	0.186	0.018	0.00	10,507
2	2	0.193	0.019	0.00	10,507
3	0	0.199	0.033	0.00	4,896
3	1	0.219	0.034	0.00	4,896
3	2	0.218	0.034	0.00	4,896
3	3	0.219	0.035	0.00	4,896

Representative exporters for one layer transitions



► Firms that exit

How do firms change the average wage in a layer?

Log diff. in hourly wage (after minus before the transition) for hours staying in the layer						
# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	0.001	0.00	0.79	8779
0	2	0	-0.072	0.02	0.00	953
0	3	0	-0.338	0.13	0.01	68
1	0	0	0.114	0.00	0.00	9645
1	2	0	0.022	0.00	0.00	15118
1	2	1	0.022	0.00	0.00	9358
1	3	0	-0.034	0.01	0.02	981
1	3	1	-0.034	0.02	0.10	536
2	0	0	0.243	0.02	0.00	1264
2	1	0	0.059	0.00	0.00	16048
2	1	1	0.086	0.00	0.00	10055
2	3	0	0.020	0.00	0.00	13455
2	3	1	0.028	0.00	0.00	11975
2	3	2	0.037	0.00	0.00	8912
3	0	0	0.557	0.13	0.00	80
3	1	0	0.111	0.01	0.00	1276
3	1	1	0.165	0.02	0.00	723
3	2	0	0.039	0.00	0.00	14508
3	2	1	0.046	0.00	0.00	12948
3	2	2	0.049	0.00	0.00	10348

Log diff. in hourly wage of hours entering the layer (after transition) versus hours leaving the layer (before transition)						
# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.268	0.01	0.00	7564
0	2	0	-0.571	0.03	0.00	1133
0	3	0	-0.954	0.13	0.00	94
1	0	0	0.233	0.01	0.00	7848
1	2	0	-0.130	0.00	0.00	13375
1	2	1	-0.391	0.01	0.00	11406
1	3	0	-0.246	0.02	0.00	982
1	3	1	-0.515	0.02	0.00	929
2	0	0	0.527	0.02	0.00	1321
2	1	0	0.072	0.00	0.00	13707
2	1	1	0.378	0.01	0.00	11530
2	3	0	-0.087	0.00	0.00	12604
2	3	1	-0.154	0.00	0.00	10045
2	3	2	-0.339	0.01	0.00	10329
3	0	0	1.059	0.12	0.00	123
3	1	0	0.199	0.02	0.00	1226
3	1	1	0.497	0.02	0.00	1137
3	2	0	-0.033	0.00	0.00	13584
3	2	1	0.021	0.00	0.00	10771
3	2	2	0.188	0.01	0.00	10450

▶ Hourly wage of entrants and leavers versus hourly wage of stayers

Conclusion

- We use French data to study the organization of production
 - ▶ Organizing the data using layers of employees is meaningful and useful
- We document that:
 - 1 Firms are hierarchical across layers in terms of employees and wages
 - 2 The probability of adding a layer increases with value added
 - 3 Firms that grow by adding layers increase the number of employees and reduce their average wages at all layers
 - 4 Firms that grow but do not add layers increase the number of employees and average wages at all layers
- We study the organizational change in firms that become exporters
 - ▶ We find similar effects than with other sources of growth
 - ▶ New exporters that expand significantly add layers and reduce average wages
- Our findings underscore the importance of organizational change for firm grow and export behavior

Agents working at different layers are different

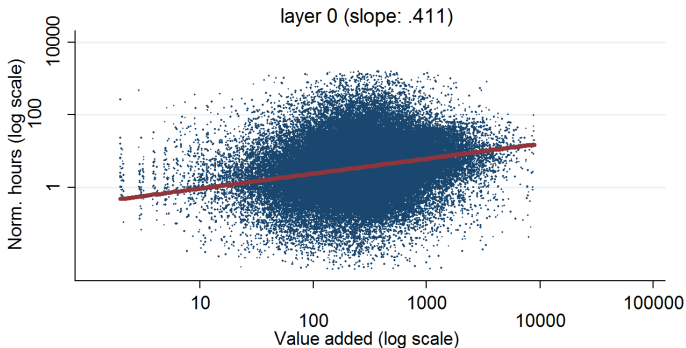
In terms of hours

Layer #	Mean	Percentiles						
		p5	p10	p25	p50	p75	p90	p95
0	48,532	1,443	2,028	5,372	13,189	32,944	81,226	163,721
1	22,309	588	1,280	1,984	4,056	10,953	31,381	66,195
2	22,669	593	1,240	1,820	3,640	8,575	27,493	60,806
3	2,310	338	711	1,773	1,880	2,366	4,056	5,000

▶ Back

Normalized hours within layers

Normalized hours in layers vs. firm value added
Among 1 layer firms



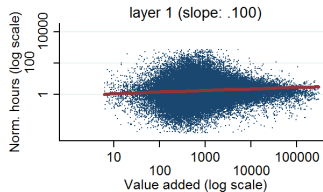
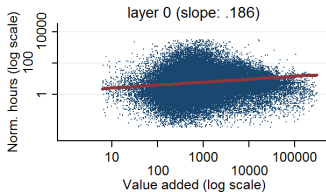
Excluding top and bottom 0.05%

▶ Table

▶ Back

Normalized hours within layers

Normalized hours in layers vs. firm value added
Among 2 layers firms



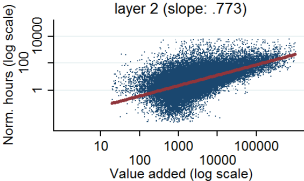
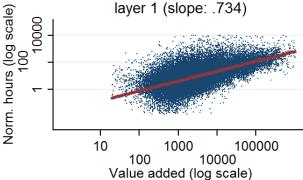
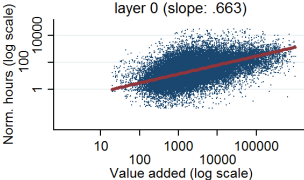
Excluding top and bottom 0.05%

▶ Table

▶ Back

Normalized hours within layers

Normalized hours in layers vs. firm value added Among 3 layers firms



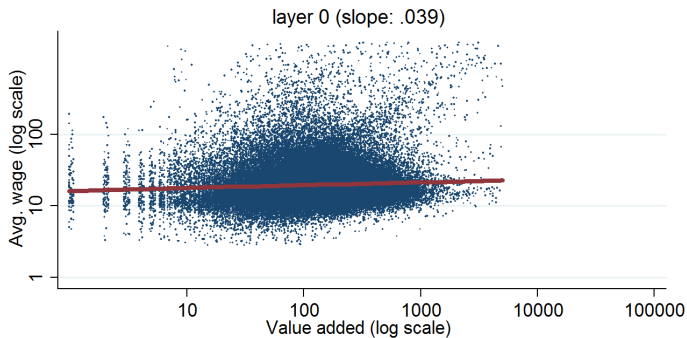
Excluding top and bottom 0.05%

▶ Table

▶ Back

Wages within layers

Average wage in layers vs. firm value added
Among 0 layers firms



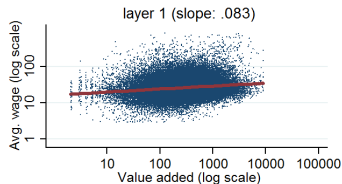
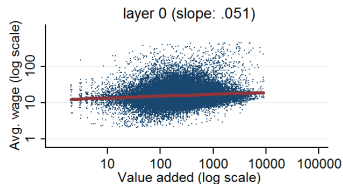
Excluding top and bottom 0.05%

▶ Table

▶ Back

Wages within layers

Average wage in layers vs. firm value added Among 1 layer firms



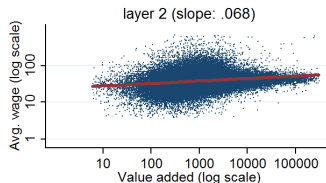
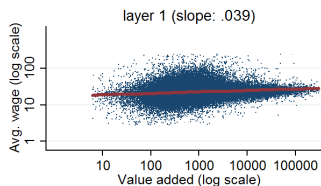
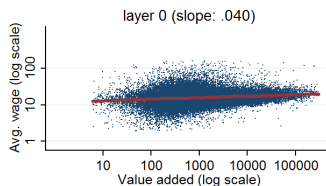
Excluding top and bottom 0.05%

▶ Table

▶ Back

Wages within layers

Average wage in layers vs. firm value added Among 2 layers firms



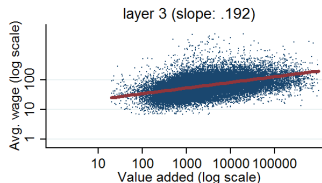
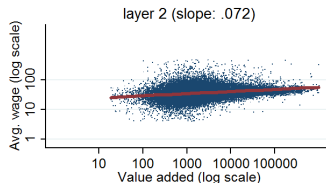
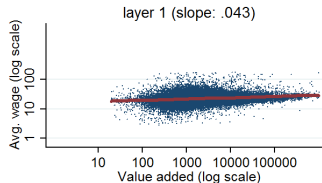
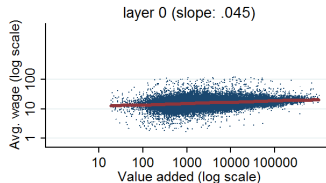
Excluding top and bottom 0.05%

► Table

► Back

Wages within layers

Average wage in layers vs. firm value added Among 3 layers firms



Excluding top and bottom 0.05%

▶ Table

▶ Back

Wages within layers

Regression of log average wage in each layer on log value added of the firm

Wages	Without fe		With fe	
	ln VA	s.e.	ln VA	s.e.
$\ln w_0^0$	.039	.002	.072	.004
$\ln w_1^0$	.051	.002	.059	.002
$\ln w_1^1$	.083	.002	.086	.002
$\ln w_2^0$	.040	.001	.045	.001
$\ln w_2^1$	.039	.001	.043	.001
$\ln w_2^2$	.068	.001	.073	.001
$\ln w_3^0$	.045	.001	.048	.001
$\ln w_3^1$	.043	.001	.046	.001
$\ln w_3^2$	.072	.001	.072	.001
$\ln w_3^3$	.192	.002	.192	.002

All p-values < 0.01. Excluding top and bottom 0.05%

▶ L=0

▶ L=1

▶ L=2

▶ L=3

▶ Back



Normalized hours within layers

Regression of log normalized hours in each layer on log value added of the firm

Normalized hours	Without fe		With fe	
	ln VA	s.e.	ln VA	s.e.
$\ln n_1^0$	.411	.005	.349	.005
$\ln n_2^0$	.186	.003	.158	.003
$\ln n_2^1$	.100	.002	.096	.003
$\ln n_3^0$	.663	.004	.669	.003
$\ln n_3^1$	.734	.003	.719	.003
$\ln n_3^2$	.773	.004	.765	.004

All p-values < 0.01. Excluding top and bottom 0.05%. fe = with 2 industry and year fixed effects

▶ L=1

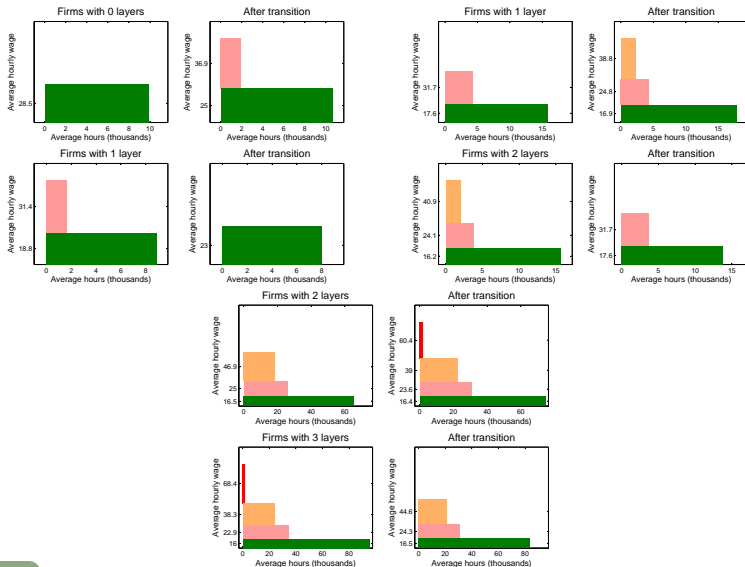
▶ L=2

▶ L=3

▶ Back

Representative hierarchies for one layer transitions

Average before and after with $d \ln VA_{i,t} > 0$, $d \ln N_{i,t} > 0$



▶ Back



Occupational categories

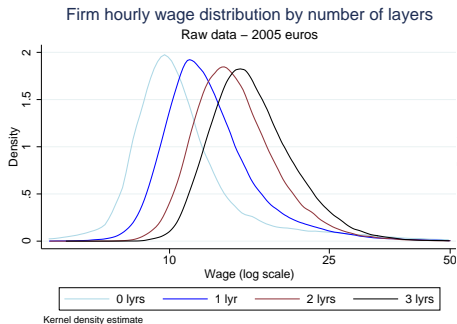
Statistics on wage by occupation

	Average hourly wage by occupation in 2005 Euros				
	CEO, directors	Senior staff	Supervisors	Clerks	Blue collars
Mean	75.60	47.91	26.30	19.06	20.83
p5	22.33	19.56	13.14	9.74	9.67
p10	26.99	23.07	15.01	11.00	10.94
p25	38.86	28.93	18.14	13.03	12.88
p50	54.62	35.96	21.87	15.63	15.24
p75	75.07	44.62	26.44	19.01	18.34
p90	106.04	56.95	32.76	23.73	22.58
p95	132.17	69.01	38.94	28.33	26.94

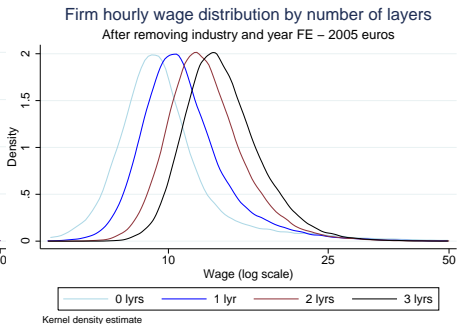
▶ Back

Firms with different number of layers are different

In terms of average wage



▶ Back



Change in normalized hours for firms that change layers

Conditioning on selected sample, positive change in VA and normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.824	0.025	0.00	3636
0	2	0	2.351	0.083	0.00	446
0	3	0	3.000	0.274	0.00	47
1	0	0	-1.822	0.025	0.00	3845
1	2	0	1.518	0.021	0.00	4134
1	2	1	1.261	0.023	0.00	4134
1	3	0	1.845	0.083	0.00	304
1	3	1	1.671	0.085	0.00	304
2	0	0	-2.214	0.072	0.00	567
2	1	0	-1.606	0.023	0.00	3847
2	1	1	-1.352	0.025	0.00	3847
2	3	0	1.999	0.022	0.00	5111
2	3	1	1.993	0.024	0.00	5111
2	3	2	1.781	0.025	0.00	5111
3	0	0	-2.434	0.198	0.00	56
3	1	0	-1.679	0.064	0.00	426
3	1	1	-1.593	0.065	0.00	426
3	2	0	-2.049	0.021	0.00	5699
3	2	1	-2.017	0.022	0.00	5699
3	2	2	-1.851	0.022	0.00	5699

▶ Back

Change in normalized hours for firms that change layers

Conditioning on positive change in VA and normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.514	0.024	0.00	5475
0	2	0	1.724	0.071	0.00	760
0	3	0	2.652	0.251	0.00	71
1	0	0	-1.531	0.023	0.00	6491
1	2	0	1.076	0.016	0.00	7589
1	2	1	0.767	0.018	0.00	7589
1	3	0	1.389	0.064	0.00	595
1	3	1	1.132	0.066	0.00	595
2	0	0	-1.756	0.057	0.00	1054
2	1	0	-1.139	0.016	0.00	7758
2	1	1	-0.805	0.018	0.00	7758
2	3	0	1.634	0.020	0.00	6459
2	3	1	1.588	0.022	0.00	6459
2	3	2	1.406	0.023	0.00	6459
3	0	0	-2.296	0.171	0.00	85
3	1	0	-1.421	0.051	0.00	770
3	1	1	-1.165	0.053	0.00	770
3	2	0	-1.730	0.019	0.00	6948
3	2	1	-1.668	0.021	0.00	6948
3	2	2	-1.511	0.022	0.00	6948

▶ Back

Change in normalized hours for firms that change layers

Conditioning on selected sample and positive change in VA

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.824	0.025	0.00	3636
0	2	0	2.351	0.083	0.00	446
0	3	0	3.000	0.274	0.00	47
1	0	0	-1.822	0.025	0.00	3845
1	2	0	1.248	0.023	0.00	4594
1	2	1	1.100	0.023	0.00	4594
1	3	0	1.709	0.087	0.00	319
1	3	1	1.578	0.086	0.00	319
2	0	0	-2.214	0.072	0.00	567
2	1	0	-1.287	0.025	0.00	4331
2	1	1	-1.157	0.024	0.00	4331
2	3	0	1.840	0.023	0.00	5434
2	3	1	1.824	0.024	0.00	5434
2	3	2	1.657	0.025	0.00	5434
3	0	0	-2.434	0.198	0.00	56
3	1	0	-1.522	0.069	0.00	449
3	1	1	-1.500	0.065	0.00	449
3	2	0	-1.858	0.022	0.00	6123
3	2	1	-1.821	0.023	0.00	6123
3	2	2	-1.711	0.022	0.00	6123

▶ Back

Change in normalized hours for firms that change layers

Conditioning on selected sample and positive change in total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.831	0.024	0.00	3888
0	2	0	2.481	0.076	0.00	476
0	3	0	3.127	0.288	0.00	38
1	0	0	-1.846	0.024	0.00	3966
1	2	0	1.309	0.022	0.00	4506
1	2	1	1.092	0.022	0.00	4506
1	3	0	1.832	0.083	0.00	307
1	3	1	1.520	0.083	0.00	307
2	0	0	-2.269	0.069	0.00	567
2	1	0	-1.325	0.024	0.00	4322
2	1	1	-1.163	0.024	0.00	4322
2	3	0	1.784	0.022	0.00	5292
2	3	1	1.759	0.024	0.00	5292
2	3	2	1.550	0.024	0.00	5292
3	0	0	-2.467	0.191	0.00	57
3	1	0	-1.562	0.067	0.00	456
3	1	1	-1.446	0.064	0.00	456
3	2	0	-1.935	0.021	0.00	6356
3	2	1	-1.887	0.022	0.00	6356
3	2	2	-1.728	0.022	0.00	6356

▶ Back

Change in normalized hours for firms that change layers

Conditioning on selected sample and positive change in normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.787	0.019	0.00	6788
0	2	0	2.364	0.061	0.00	796
0	3	0	2.650	0.200	0.00	75
1	0	0	-1.841	0.019	0.00	7016
1	2	0	1.527	0.016	0.00	7445
1	2	1	1.265	0.018	0.00	7445
1	3	0	1.804	0.059	0.00	563
1	3	1	1.628	0.061	0.00	563
2	0	0	-2.284	0.056	0.00	943
2	1	0	-1.610	0.017	0.00	7245
2	1	1	-1.364	0.018	0.00	7245
2	3	0	2.024	0.016	0.00	9549
2	3	1	2.028	0.017	0.00	9549
2	3	2	1.822	0.018	0.00	9549
3	0	0	-2.476	0.154	0.00	92
3	1	0	-1.674	0.049	0.00	736
3	1	1	-1.539	0.051	0.00	736
3	2	0	-2.080	0.015	0.00	10831
3	2	1	-2.059	0.016	0.00	10831
3	2	2	-1.883	0.016	0.00	10831

▶ Back

Change in normalized hours for firms that change layers

Conditioning on positive change in VA and total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.499	0.030	0.00	3717
0	2	0	1.745	0.082	0.00	583
0	3	0	2.863	0.291	0.00	50
1	0	0	-1.518	0.027	0.00	4562
1	2	0	0.768	0.019	0.00	6231
1	2	1	0.546	0.020	0.00	6231
1	3	0	1.347	0.079	0.00	423
1	3	1	1.020	0.078	0.00	423
2	0	0	-1.709	0.062	0.00	806
2	1	0	-0.730	0.020	0.00	6642
2	1	1	-0.536	0.020	0.00	6642
2	3	0	1.335	0.024	0.00	4758
2	3	1	1.248	0.026	0.00	4758
2	3	2	1.118	0.026	0.00	4758
3	0	0	-2.210	0.181	0.00	69
3	1	0	-1.242	0.063	0.00	615
3	1	1	-1.052	0.060	0.00	615
3	2	0	-1.426	0.023	0.00	5401
3	2	1	-1.331	0.025	0.00	5401
3	2	2	-1.232	0.025	0.00	5401

▶ Back

Change in normalized hours for firms that change layers

Conditioning on selected sample

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.787	0.019	0.00	6788
0	2	0	2.364	0.061	0.00	796
0	3	0	2.650	0.200	0.00	75
1	0	0	-1.841	0.019	0.00	7016
1	2	0	1.244	0.017	0.00	8339
1	2	1	1.087	0.017	0.00	8339
1	3	0	1.654	0.062	0.00	594
1	3	1	1.529	0.061	0.00	594
2	0	0	-2.284	0.056	0.00	943
2	1	0	-1.286	0.018	0.00	8204
2	1	1	-1.158	0.018	0.00	8204
2	3	0	1.844	0.017	0.00	10233
2	3	1	1.838	0.018	0.00	10233
2	3	2	1.678	0.018	0.00	10233
3	0	0	-2.476	0.154	0.00	92
3	1	0	-1.507	0.053	0.00	780
3	1	1	-1.432	0.052	0.00	780
3	2	0	-1.892	0.016	0.00	11614
3	2	1	-1.866	0.017	0.00	11614
3	2	2	-1.743	0.016	0.00	11614

▶ Back

Change in normalized hours for firms that change layers

Conditioning on positive change in VA

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.514	0.024	0.00	5475
0	2	0	1.724	0.071	0.00	760
0	3	0	2.652	0.251	0.00	71
1	0	0	-1.531	0.023	0.00	6491
1	2	0	0.716	0.016	0.00	9211
1	2	1	0.542	0.016	0.00	9211
1	3	0	1.233	0.064	0.00	638
1	3	1	1.039	0.064	0.00	638
2	0	0	-1.756	0.057	0.00	1054
2	1	0	-0.693	0.016	0.00	9739
2	1	1	-0.529	0.017	0.00	9739
2	3	0	1.346	0.020	0.00	7482
2	3	1	1.279	0.021	0.00	7482
2	3	2	1.166	0.022	0.00	7482
3	0	0	-2.296	0.171	0.00	85
3	1	0	-1.155	0.054	0.00	858
3	1	1	-1.025	0.051	0.00	858
3	2	0	-1.390	0.019	0.00	8186
3	2	1	-1.305	0.021	0.00	8186
3	2	2	-1.239	0.020	0.00	8186

▶ Back

Change in normalized hours for firms that change layers

Conditioning on positive change in total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.463	0.024	0.00	5847
0	2	0	1.690	0.066	0.00	875
0	3	0	2.575	0.230	0.00	72
1	0	0	-1.515	0.022	0.00	6775
1	2	0	0.754	0.015	0.00	9338
1	2	1	0.518	0.016	0.00	9338
1	3	0	1.373	0.066	0.00	650
1	3	1	1.026	0.062	0.00	650
2	0	0	-1.728	0.053	0.00	1146
2	1	0	-0.730	0.016	0.00	9998
2	1	1	-0.517	0.016	0.00	9998
2	3	0	1.311	0.019	0.00	7369
2	3	1	1.218	0.021	0.00	7369
2	3	2	1.099	0.021	0.00	7369
3	0	0	-2.213	0.183	0.00	104
3	1	0	-1.204	0.052	0.00	903
3	1	1	-0.978	0.050	0.00	903
3	2	0	-1.469	0.019	0.00	8416
3	2	1	-1.378	0.021	0.00	8416
3	2	2	-1.263	0.020	0.00	8416

▶ Back

Change in normalized hours for firms that change layers

Conditioning on positive change in normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.520	0.017	0.00	10432
0	2	0	1.745	0.053	0.00	1350
0	3	0	2.312	0.193	0.00	111
1	0	0	-1.585	0.017	0.00	11356
1	2	0	1.105	0.012	0.00	13695
1	2	1	0.803	0.013	0.00	13695
1	3	0	1.436	0.047	0.00	1065
1	3	1	1.157	0.047	0.00	1065
2	0	0	-1.801	0.046	0.00	1698
2	1	0	-1.160	0.012	0.00	14006
2	1	1	-0.846	0.014	0.00	14006
2	3	0	1.677	0.015	0.00	11947
2	3	1	1.641	0.016	0.00	11947
2	3	2	1.463	0.017	0.00	11947
3	0	0	-2.203	0.157	0.00	142
3	1	0	-1.359	0.039	0.00	1342
3	1	1	-1.081	0.041	0.00	1342
3	2	0	-1.794	0.014	0.00	12864
3	2	1	-1.749	0.015	0.00	12864
3	2	2	-1.574	0.016	0.00	12864

▶ Back

Change in normalized hours for firms that change layers

Conditioning on selected sample, positive change in VA and total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.854	0.030	0.00	2528
0	2	0	2.516	0.092	0.00	335
0	3	0	3.378	0.382	0.00	27
1	0	0	-1.855	0.030	0.00	2623
1	2	0	1.321	0.027	0.00	3099
1	2	1	1.121	0.027	0.00	3099
1	3	0	1.880	0.104	0.00	203
1	3	1	1.594	0.105	0.00	203
2	0	0	-2.205	0.080	0.00	407
2	1	0	-1.338	0.031	0.00	2873
2	1	1	-1.190	0.029	0.00	2873
2	3	0	1.806	0.028	0.00	3450
2	3	1	1.783	0.030	0.00	3450
2	3	2	1.574	0.030	0.00	3450
3	0	0	-2.341	0.207	0.00	40
3	1	0	-1.550	0.079	0.00	316
3	1	1	-1.492	0.073	0.00	316
3	2	0	-1.883	0.027	0.00	4064
3	2	1	-1.830	0.028	0.00	4064
3	2	2	-1.683	0.027	0.00	4064

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample, positive change in VA and normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.028	0.006	0.00	3636
0	2	0	-0.161	0.030	0.00	446
0	3	0	-0.297	0.132	0.03	47
1	0	0	0.116	0.007	0.00	3845
1	2	0	0.019	0.005	0.00	4134
1	2	1	-0.029	0.005	0.00	4134
1	3	0	-0.076	0.028	0.01	304
1	3	1	-0.108	0.031	0.00	304
2	0	0	0.277	0.032	0.00	567
2	1	0	0.031	0.006	0.00	3847
2	1	1	0.063	0.006	0.00	3847
2	3	0	0.024	0.004	0.00	5111
2	3	1	0.017	0.004	0.00	5111
2	3	2	-0.048	0.005	0.00	5111
3	0	0	0.458	0.147	0.00	56
3	1	0	0.134	0.026	0.00	426
3	1	1	0.153	0.027	0.00	426
3	2	0	-0.005	0.004	0.24	5699
3	2	1	-0.009	0.004	0.05	5699
3	2	2	0.027	0.005	0.00	5699

▶ Back

Change in average wages for firms that change layers

Conditioning on positive change in VA and normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.113	0.007	0.00	5475
0	2	0	-0.411	0.031	0.00	760
0	3	0	-0.848	0.161	0.00	71
1	0	0	0.199	0.007	0.00	6491
1	2	0	-0.011	0.004	0.01	7589
1	2	1	-0.177	0.005	0.00	7589
1	3	0	-0.139	0.023	0.00	595
1	3	1	-0.375	0.027	0.00	595
2	0	0	0.481	0.028	0.00	1054
2	1	0	0.057	0.004	0.00	7758
2	1	1	0.191	0.006	0.00	7758
2	3	0	0.017	0.003	0.00	6459
2	3	1	-0.015	0.004	0.00	6459
2	3	2	-0.121	0.006	0.00	6459
3	0	0	1.018	0.156	0.00	85
3	1	0	0.181	0.022	0.00	770
3	1	1	0.376	0.024	0.00	770
3	2	0	0.003	0.004	0.42	6948
3	2	1	0.020	0.004	0.00	6948
3	2	2	0.083	0.005	0.00	6948

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in VA

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.028	0.006	0.00	3636
0	2	0	-0.161	0.030	0.00	446
0	3	0	-0.297	0.132	0.03	47
1	0	0	0.116	0.007	0.00	3845
1	2	0	0.016	0.004	0.00	4594
1	2	1	-0.027	0.005	0.00	4594
1	3	0	-0.072	0.027	0.01	319
1	3	1	-0.099	0.030	0.00	319
2	0	0	0.277	0.032	0.00	567
2	1	0	0.039	0.005	0.00	4331
2	1	1	0.073	0.006	0.00	4331
2	3	0	0.025	0.004	0.00	5434
2	3	1	0.015	0.004	0.00	5434
2	3	2	-0.054	0.006	0.00	5434
3	0	0	0.458	0.147	0.00	56
3	1	0	0.132	0.025	0.00	449
3	1	1	0.142	0.026	0.00	449
3	2	0	-0.004	0.004	0.25	6123
3	2	1	-0.007	0.004	0.09	6123
3	2	2	0.031	0.005	0.00	6123

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.158	0.006	0.00	3888
0	2	0	-0.349	0.035	0.00	476
0	3	0	-0.880	0.205	0.00	38
1	0	0	0.234	0.007	0.00	3966
1	2	0	-0.081	0.005	0.00	4506
1	2	1	-0.126	0.006	0.00	4506
1	3	0	-0.260	0.035	0.00	307
1	3	1	-0.328	0.036	0.00	307
2	0	0	0.456	0.036	0.00	567
2	1	0	0.133	0.006	0.00	4322
2	1	1	0.166	0.006	0.00	4322
2	3	0	-0.054	0.004	0.00	5292
2	3	1	-0.066	0.005	0.00	5292
2	3	2	-0.146	0.006	0.00	5292
3	0	0	0.854	0.181	0.00	57
3	1	0	0.281	0.029	0.00	456
3	1	1	0.302	0.030	0.00	456
3	2	0	0.078	0.004	0.00	6356
3	2	1	0.075	0.004	0.00	6356
3	2	2	0.118	0.005	0.00	6356

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.054	0.005	0.00	6788
0	2	0	-0.188	0.024	0.00	796
0	3	0	-0.414	0.120	0.00	75
1	0	0	0.125	0.005	0.00	7016
1	2	0	-0.010	0.004	0.01	7445
1	2	1	-0.059	0.004	0.00	7445
1	3	0	-0.101	0.022	0.00	563
1	3	1	-0.151	0.024	0.00	563
2	0	0	0.282	0.024	0.00	943
2	1	0	0.053	0.004	0.00	7245
2	1	1	0.093	0.004	0.00	7245
2	3	0	-0.003	0.003	0.26	9549
2	3	1	-0.013	0.003	0.00	9549
2	3	2	-0.081	0.004	0.00	9549
3	0	0	0.535	0.121	0.00	92
3	1	0	0.159	0.020	0.00	736
3	1	1	0.187	0.020	0.00	736
3	2	0	0.026	0.003	0.00	10831
3	2	1	0.023	0.003	0.00	10831
3	2	2	0.066	0.004	0.00	10831

▶ Back

Change in average wages for firms that change layers

Conditioning on a positive change in VA and total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.210	0.009	0.00	3717
0	2	0	-0.545	0.037	0.00	583
0	3	0	-1.191	0.205	0.00	50
1	0	0	0.313	0.009	0.00	4562
1	2	0	-0.066	0.004	0.00	6231
1	2	1	-0.263	0.006	0.00	6231
1	3	0	-0.233	0.030	0.00	423
1	3	1	-0.502	0.033	0.00	423
2	0	0	0.639	0.034	0.00	806
2	1	0	0.128	0.005	0.00	6642
2	1	1	0.309	0.007	0.00	6642
2	3	0	-0.019	0.004	0.00	4758
2	3	1	-0.065	0.005	0.00	4758
2	3	2	-0.200	0.007	0.00	4758
3	0	0	1.265	0.179	0.00	69
3	1	0	0.259	0.027	0.00	615
3	1	1	0.478	0.028	0.00	615
3	2	0	0.048	0.004	0.00	5401
3	2	1	0.076	0.005	0.00	5401
3	2	2	0.164	0.006	0.00	5401

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.054	0.005	0.00	6788
0	2	0	-0.188	0.024	0.00	796
0	3	0	-0.414	0.120	0.00	75
1	0	0	0.125	0.005	0.00	7016
1	2	0	-0.013	0.003	0.00	8339
1	2	1	-0.062	0.004	0.00	8339
1	3	0	-0.098	0.021	0.00	594
1	3	1	-0.147	0.023	0.00	594
2	0	0	0.282	0.024	0.00	943
2	1	0	0.061	0.004	0.00	8204
2	1	1	0.103	0.004	0.00	8204
2	3	0	-0.003	0.003	0.34	10233
2	3	1	-0.016	0.003	0.00	10233
2	3	2	-0.088	0.004	0.00	10233
3	0	0	0.535	0.121	0.00	92
3	1	0	0.161	0.019	0.00	780
3	1	1	0.183	0.020	0.00	780
3	2	0	0.026	0.003	0.00	11614
3	2	1	0.026	0.003	0.00	11614
3	2	2	0.072	0.004	0.00	11614

▶ Back

Change in average wages for firms that change layers

Conditioning on a positive change in VA

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.113	0.007	0.00	5475
0	2	0	-0.411	0.031	0.00	760
0	3	0	-0.848	0.161	0.00	71
1	0	0	0.199	0.007	0.00	6491
1	2	0	-0.014	0.003	0.00	9211
1	2	1	-0.211	0.005	0.00	9211
1	3	0	-0.130	0.022	0.00	638
1	3	1	-0.374	0.026	0.00	638
2	0	0	0.481	0.028	0.00	1054
2	1	0	0.061	0.004	0.00	9739
2	1	1	0.246	0.005	0.00	9739
2	3	0	0.019	0.003	0.00	7482
2	3	1	-0.022	0.004	0.00	7482
2	3	2	-0.152	0.006	0.00	7482
3	0	0	1.018	0.156	0.00	85
3	1	0	0.174	0.020	0.00	858
3	1	1	0.397	0.023	0.00	858
3	2	0	0.000	0.003	0.96	8186
3	2	1	0.029	0.004	0.00	8186
3	2	2	0.119	0.005	0.00	8186

▶ Back

Change in average wages for firms that change layers

Conditioning on a positive change in total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.276	0.007	0.00	5847
0	2	0	-0.670	0.033	0.00	875
0	3	0	-1.443	0.170	0.00	72
1	0	0	0.338	0.007	0.00	6775
1	2	0	-0.116	0.004	0.00	9338
1	2	1	-0.320	0.005	0.00	9338
1	3	0	-0.329	0.028	0.00	650
1	3	1	-0.591	0.029	0.00	650
2	0	0	0.708	0.029	0.00	1146
2	1	0	0.158	0.004	0.00	9998
2	1	1	0.342	0.005	0.00	9998
2	3	0	-0.059	0.004	0.00	7369
2	3	1	-0.109	0.004	0.00	7369
2	3	2	-0.244	0.006	0.00	7369
3	0	0	1.454	0.146	0.00	104
3	1	0	0.300	0.022	0.00	903
3	1	1	0.529	0.023	0.00	903
3	2	0	0.079	0.003	0.00	8416
3	2	1	0.108	0.004	0.00	8416
3	2	2	0.197	0.005	0.00	8416

▶ Back

Change in average wages for firms that change layers

Conditioning on a positive change in normalized hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.131	0.005	0.00	10432
0	2	0	-0.432	0.024	0.00	1350
0	3	0	-0.943	0.131	0.00	111
1	0	0	0.201	0.005	0.00	11356
1	2	0	-0.039	0.003	0.00	13695
1	2	1	-0.202	0.004	0.00	13695
1	3	0	-0.179	0.019	0.00	1065
1	3	1	-0.411	0.021	0.00	1065
2	0	0	0.489	0.022	0.00	1698
2	1	0	0.080	0.003	0.00	14006
2	1	1	0.213	0.004	0.00	14006
2	3	0	-0.011	0.003	0.00	11947
2	3	1	-0.046	0.003	0.00	11947
2	3	2	-0.149	0.004	0.00	11947
3	0	0	1.102	0.120	0.00	142
3	1	0	0.192	0.016	0.00	1342
3	1	1	0.395	0.018	0.00	1342
3	2	0	0.032	0.003	0.00	12864
3	2	1	0.048	0.003	0.00	12864
3	2	2	0.112	0.004	0.00	12864

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample, positive change in VA and total hours

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.099	0.007	0.00	2528
0	2	0	-0.244	0.035	0.00	335
0	3	0	-0.566	0.211	0.01	27
1	0	0	0.212	0.009	0.00	2623
1	2	0	-0.031	0.006	0.00	3099
1	2	1	-0.074	0.006	0.00	3099
1	3	0	-0.168	0.038	0.00	203
1	3	1	-0.219	0.040	0.00	203
2	0	0	0.403	0.041	0.00	407
2	1	0	0.104	0.007	0.00	2873
2	1	1	0.133	0.008	0.00	2873
2	3	0	-0.014	0.005	0.01	3450
2	3	1	-0.024	0.006	0.00	3450
2	3	2	-0.101	0.007	0.00	3450
3	0	0	0.661	0.196	0.00	40
3	1	0	0.217	0.033	0.00	316
3	1	1	0.233	0.033	0.00	316
3	2	0	0.045	0.005	0.00	4064
3	2	1	0.042	0.005	0.00	4064
3	2	2	0.082	0.006	0.00	4064

▶ Back

Change in average wages for firms that do not transition

Conditioning on selected sample

- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
0	0	0.067	0.009	0.00	39,914
1	0	0.106	0.009	0.00	42,071
1	1	0.118	0.009	0.00	42,071
2	0	0.145	0.007	0.00	71,424
2	1	0.155	0.007	0.00	71,424
2	2	0.170	0.007	0.00	71,424
3	0	0.173	0.010	0.00	53,053
3	1	0.187	0.010	0.00	53,053
3	2	0.189	0.011	0.00	53,053
3	3	0.218	0.011	0.00	53,053

▶ Back

Change in normalized hours for firms that do not transition

Conditioning on selected sample

- Reporting β_L^ℓ from $d \ln n_{Lit}^\ell = \alpha_L^\ell + \beta_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	0.027	0.014	0.06	42,071
2	0	0.036	0.009	0.00	71,424
2	1	0.013	0.011	0.26	71,424
3	0	0.109	0.014	0.00	53,053
3	1	0.048	0.013	0.00	53,053
3	2	0.037	0.013	0.01	53,053

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample, positive change in VA and normalized hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.012	0.003	0.00	3636
0	2	0	-0.024	0.009	0.01	446
0	3	0	-0.099	0.079	0.22	47
1	0	0	0.048	0.003	0.00	3845
1	2	0	0.013	0.002	0.00	4134
1	2	1	-0.034	0.004	0.00	4134
1	3	0	0.013	0.010	0.17	304
1	3	1	-0.018	0.017	0.28	304
2	0	0	0.063	0.009	0.00	567
2	1	0	0.014	0.002	0.00	3847
2	1	1	0.046	0.004	0.00	3847
2	3	0	0.013	0.002	0.00	5111
2	3	1	0.006	0.003	0.04	5111
2	3	2	-0.059	0.004	0.00	5111
3	0	0	-0.008	0.035	0.83	56
3	1	0	0.000	0.009	0.97	426
3	1	1	0.019	0.014	0.17	426
3	2	0	0.012	0.002	0.00	5699
3	2	1	0.008	0.003	0.00	5699
3	2	2	0.044	0.004	0.00	5699

▶ Back

Change in average wages for firms that change layers

Conditioning on a positive change in VA and normalized hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.076	0.004	0.00	5475
0	2	0	-0.178	0.015	0.00	760
0	3	0	-0.370	0.081	0.00	71
1	0	0	0.101	0.003	0.00	6491
1	2	0	-0.013	0.002	0.00	7589
1	2	1	-0.179	0.004	0.00	7589
1	3	0	-0.039	0.010	0.00	595
1	3	1	-0.275	0.019	0.00	595
2	0	0	0.183	0.012	0.00	1054
2	1	0	0.037	0.002	0.00	7758
2	1	1	0.172	0.004	0.00	7758
2	3	0	0.009	0.002	0.00	6459
2	3	1	-0.022	0.003	0.00	6459
2	3	2	-0.129	0.005	0.00	6459
3	0	0	0.227	0.052	0.00	85
3	1	0	0.060	0.010	0.00	770
3	1	1	0.256	0.017	0.00	770
3	2	0	0.015	0.002	0.00	6948
3	2	1	0.033	0.003	0.00	6948
3	2	2	0.096	0.004	0.00	6948

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in VA - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.012	0.003	0.00	3636
0	2	0	-0.024	0.009	0.01	446
0	3	0	-0.099	0.079	0.22	47
1	0	0	0.048	0.003	0.00	3845
1	2	0	0.011	0.002	0.00	4594
1	2	1	-0.032	0.004	0.00	4594
1	3	0	0.012	0.009	0.21	319
1	3	1	-0.015	0.016	0.34	319
2	0	0	0.063	0.009	0.00	567
2	1	0	0.018	0.002	0.00	4331
2	1	1	0.052	0.004	0.00	4331
2	3	0	0.012	0.002	0.00	5434
2	3	1	0.002	0.003	0.36	5434
2	3	2	-0.066	0.005	0.00	5434
3	0	0	-0.008	0.035	0.83	56
3	1	0	0.003	0.009	0.74	449
3	1	1	0.013	0.014	0.33	449
3	2	0	0.012	0.002	0.00	6123
3	2	1	0.009	0.003	0.00	6123
3	2	2	0.047	0.004	0.00	6123

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in total hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.035	0.003	0.00	3888
0	2	0	-0.042	0.008	0.00	476
0	3	0	-0.160	0.094	0.10	38
1	0	0	0.068	0.003	0.00	3966
1	2	0	-0.004	0.002	0.06	4506
1	2	1	-0.049	0.004	0.00	4506
1	3	0	0.000	0.010	0.99	307
1	3	1	-0.068	0.015	0.00	307
2	0	0	0.067	0.008	0.00	567
2	1	0	0.034	0.002	0.00	4322
2	1	1	0.067	0.004	0.00	4322
2	3	0	0.001	0.002	0.78	5292
2	3	1	-0.011	0.003	0.00	5292
2	3	2	-0.091	0.004	0.00	5292
3	0	0	0.032	0.032	0.33	57
3	1	0	0.026	0.008	0.00	456
3	1	1	0.047	0.013	0.00	456
3	2	0	0.024	0.002	0.00	6356
3	2	1	0.022	0.003	0.00	6356
3	2	2	0.065	0.004	0.00	6356

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample and positive change in normalized hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.017	0.002	0.00	6788
0	2	0	-0.019	0.007	0.01	796
0	3	0	-0.039	0.052	0.46	75
1	0	0	0.053	0.002	0.00	7016
1	2	0	0.013	0.002	0.00	7445
1	2	1	-0.037	0.003	0.00	7445
1	3	0	0.015	0.007	0.03	563
1	3	1	-0.035	0.012	0.00	563
2	0	0	0.053	0.007	0.00	943
2	1	0	0.016	0.002	0.00	7245
2	1	1	0.055	0.003	0.00	7245
2	3	0	0.013	0.001	0.00	9549
2	3	1	0.003	0.002	0.08	9549
2	3	2	-0.065	0.003	0.00	9549
3	0	0	0.005	0.028	0.87	92
3	1	0	0.008	0.006	0.20	736
3	1	1	0.037	0.010	0.00	736
3	2	0	0.011	0.001	0.00	10831
3	2	1	0.009	0.002	0.00	10831
3	2	2	0.051	0.003	0.00	10831

▶ Back

Change in average wages for firms that change layers

Conditioning on positive change in VA and total hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.105	0.005	0.00	3717
0	2	0	-0.225	0.017	0.00	583
0	3	0	-0.509	0.101	0.00	50
1	0	0	0.127	0.004	0.00	4562
1	2	0	-0.034	0.003	0.00	6231
1	2	1	-0.232	0.005	0.00	6231
1	3	0	-0.058	0.012	0.00	423
1	3	1	-0.328	0.022	0.00	423
2	0	0	0.218	0.014	0.00	806
2	1	0	0.058	0.002	0.00	6642
2	1	1	0.239	0.005	0.00	6642
2	3	0	0.001	0.002	0.50	4758
2	3	1	-0.045	0.004	0.00	4758
2	3	2	-0.180	0.007	0.00	4758
3	0	0	0.293	0.060	0.00	69
3	1	0	0.084	0.011	0.00	615
3	1	1	0.303	0.019	0.00	615
3	2	0	0.026	0.002	0.00	5401
3	2	1	0.054	0.003	0.00	5401
3	2	2	0.142	0.006	0.00	5401

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.017	0.002	0.00	6788
0	2	0	-0.019	0.007	0.01	796
0	3	0	-0.039	0.052	0.46	75
1	0	0	0.053	0.002	0.00	7016
1	2	0	0.011	0.002	0.00	8339
1	2	1	-0.038	0.003	0.00	8339
1	3	0	0.014	0.007	0.04	594
1	3	1	-0.035	0.012	0.00	594
2	0	0	0.053	0.007	0.00	943
2	1	0	0.019	0.002	0.00	8204
2	1	1	0.061	0.003	0.00	8204
2	3	0	0.013	0.001	0.00	10233
2	3	1	0.000	0.002	0.93	10233
2	3	2	-0.072	0.003	0.00	10233
3	0	0	0.005	0.028	0.87	92
3	1	0	0.012	0.006	0.04	780
3	1	1	0.035	0.010	0.00	780
3	2	0	0.011	0.001	0.00	11614
3	2	1	0.011	0.002	0.00	11614
3	2	2	0.057	0.003	0.00	11614

▶ Back

Change in average wages for firms that change layers

Conditioning on positive change in VA - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.076	0.004	0.00	5475
0	2	0	-0.178	0.015	0.00	760
0	3	0	-0.370	0.081	0.00	71
1	0	0	0.101	0.003	0.00	6491
1	2	0	-0.017	0.002	0.00	9211
1	2	1	-0.214	0.004	0.00	9211
1	3	0	-0.037	0.010	0.00	638
1	3	1	-0.281	0.019	0.00	638
2	0	0	0.183	0.012	0.00	1054
2	1	0	0.041	0.002	0.00	9739
2	1	1	0.226	0.004	0.00	9739
2	3	0	0.009	0.002	0.00	7482
2	3	1	-0.032	0.003	0.00	7482
2	3	2	-0.162	0.005	0.00	7482
3	0	0	0.227	0.052	0.00	85
3	1	0	0.064	0.009	0.00	858
3	1	1	0.287	0.017	0.00	858
3	2	0	0.014	0.002	0.00	8186
3	2	1	0.043	0.003	0.00	8186
3	2	2	0.133	0.005	0.00	8186

▶ Back

Change in average wages for firms that change layers

Conditioning on positive change in total hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.116	0.004	0.00	5847
0	2	0	-0.248	0.014	0.00	875
0	3	0	-0.493	0.079	0.00	72
1	0	0	0.135	0.004	0.00	6775
1	2	0	-0.040	0.002	0.00	9338
1	2	1	-0.244	0.004	0.00	9338
1	3	0	-0.080	0.011	0.00	650
1	3	1	-0.342	0.018	0.00	650
2	0	0	0.237	0.012	0.00	1146
2	1	0	0.064	0.002	0.00	9998
2	1	1	0.248	0.004	0.00	9998
2	3	0	-0.005	0.002	0.00	7369
2	3	1	-0.055	0.003	0.00	7369
2	3	2	-0.191	0.005	0.00	7369
3	0	0	0.341	0.050	0.00	104
3	1	0	0.088	0.009	0.00	903
3	1	1	0.317	0.016	0.00	903
3	2	0	0.028	0.002	0.00	8416
3	2	1	0.058	0.003	0.00	8416
3	2	2	0.147	0.004	0.00	8416

▶ Back

Change in average wages for firms that change layers

Conditioning on positive change in normalized hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.073	0.003	0.00	10432
0	2	0	-0.172	0.011	0.00	1350
0	3	0	-0.320	0.061	0.00	111
1	0	0	0.100	0.003	0.00	11356
1	2	0	-0.013	0.002	0.00	13695
1	2	1	-0.176	0.003	0.00	13695
1	3	0	-0.047	0.008	0.00	1065
1	3	1	-0.279	0.014	0.00	1065
2	0	0	0.181	0.009	0.00	1698
2	1	0	0.039	0.002	0.00	14006
2	1	1	0.172	0.003	0.00	14006
2	3	0	0.009	0.001	0.00	11947
2	3	1	-0.025	0.002	0.00	11947
2	3	2	-0.129	0.004	0.00	11947
3	0	0	0.274	0.044	0.00	142
3	1	0	0.061	0.007	0.00	1342
3	1	1	0.265	0.012	0.00	1342
3	2	0	0.015	0.001	0.00	12864
3	2	1	0.031	0.002	0.00	12864
3	2	2	0.095	0.003	0.00	12864

▶ Back

Change in average wages for firms that change layers

Conditioning on selected sample, positive change in VA and total hours - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.028	0.003	0.00	2528
0	2	0	-0.038	0.009	0.00	335
0	3	0	-0.217	0.130	0.11	27
1	0	0	0.061	0.003	0.00	2623
1	2	0	-0.001	0.003	0.85	3099
1	2	1	-0.044	0.004	0.00	3099
1	3	0	0.003	0.011	0.78	203
1	3	1	-0.048	0.019	0.01	203
2	0	0	0.066	0.009	0.00	407
2	1	0	0.031	0.003	0.00	2873
2	1	1	0.059	0.005	0.00	2873
2	3	0	0.006	0.002	0.01	3450
2	3	1	-0.004	0.003	0.00	3450
2	3	2	-0.081	0.006	0.00	3450
3	0	0	0.013	0.044	0.77	40
3	1	0	0.014	0.010	0.18	316
3	1	1	0.029	0.016	0.07	316
3	2	0	0.023	0.002	0.00	4064
3	2	1	0.020	0.003	0.00	4064
3	2	2	0.059	0.005	0.00	4064

▶ Back

Wages change according to the theory

- Average log change in wages for firms that transition - DADS data

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.073	0.003	0.00	10432
0	2	0	-0.172	0.011	0.00	1350
0	3	0	-0.320	0.061	0.00	111
1	0	0	0.100	0.003	0.00	11356
1	2	0	-0.016	0.002	0.00	17052
1	2	1	-0.220	0.003	0.00	17052
1	3	0	-0.044	0.007	0.00	1168
1	3	1	-0.295	0.014	0.00	1168
2	0	0	0.181	0.009	0.00	1698
2	1	0	0.044	0.001	0.00	17927
2	1	1	0.234	0.003	0.00	17927
2	3	0	0.009	0.001	0.00	14228
2	3	1	-0.037	0.002	0.00	14228
2	3	2	-0.168	0.004	0.00	14228
3	0	0	0.274	0.044	0.00	142
3	1	0	0.064	0.006	0.00	1493
3	1	1	0.293	0.012	0.00	1493
3	2	0	0.014	0.001	0.00	15303
3	2	1	0.045	0.002	0.00	15303
3	2	2	0.138	0.003	0.00	15303

[▶ VA](#)[▶ H](#)[▶ NH](#)[▶ VA + H](#)[▶ VA + NH](#)[▶ Back](#)

Wages change according to the theory

- Firms that do not transition - DADS data
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.000	0.003	0.94	45,606
1	0	0.001	0.002	0.63	65,114
1	1	0.019	0.003	0.00	65,114
2	0	-0.005	0.002	0.01	91,833
2	1	0.006	0.002	0.01	91,833
2	2	0.022	0.003	0.00	91,833
3	0	-0.007	0.002	0.05	53,053
3	1	0.008	0.002	0.00	53,053
3	2	0.009	0.003	0.01	53,053
3	3	0.038	0.006	0.00	53,053

▶ Back

Firms with adjacent occupational categories

- We select the sub-sample of firms that satisfy the following criteria:
 - ▶ Layer 0 firms are firms with occupation codes 6 and 5
 - ▶ Layer 1 firms are firms with occupation codes 6, 5 and 4
 - ▶ Layer 2 firms are firms with occupation codes 6, 5, 4 and 3
 - ▶ Layer 3 firms are firms with occupation codes 6, 5, 4, 3 and 2

	Percentage of firms that satisfy the selection				All firms
	0 layers	Among firms with 1 layer	2 layers	3 layers	
Unweighted	87.17	67.22	79.98	100	81.57
Weighted by VA	85.84	68.01	94.54	100	96.65
Weighted by hours	95.86	72.38	93.15	100	95.74

▶ Layers

▶ Layers + VA

▶ Layers + H

▶ Layers + NH

▶ Layers + VA + H

▶ Layers + VA + NH

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Percentage of firms that satisfy the selection

	Among firms with				All firms
	0 layers	1 layer	2 layers	3 layers	
Unweighted	87.17	67.22	79.98	100	81.57
Weighted by VA	85.84	68.01	94.54	100	96.65
Weighted by hours	95.86	72.38	93.15	100	95.74

▶ Layers

▶ Layers + VA + H

▶ Layers + VA + NH

▶ Layers + VA

▶ Layers + H

▶ Layers + NH

Layer transitions

Distribution of # of layers at time $t+1$ given the # of layers at time t

		Weighted by VA					
		# of layers at $t + 1$					
		Exit	0	1	2	3	Total
# of layers at t	0	11.9	64.1	19.6	3.7	0.7	100
	1	7.2	6.6	62.2	21.7	2.2	100
	2	5.8	0.2	2.5	72.6	19.0	100
	3	7.7	0.0	0.2	13.3	78.8	100

▶ Back

Fraction of firms that transition to an adjacent layer

- What is the fraction of firms that transition up or down to an adjacent layer?
 - ▶ Conditioning of firms with adjacent layers

# of layers	Transition	
	Up	Down
0	75.4	-
1	82.9	91.3
2	100	60.3
3	-	75.9

▶ back

Layer transitions for exporters

Difference in the distribution of # of layers at time $t+1$ given the # of layers at time t

		Firms that stop exporting relative to exporters			
		# of layers at $t + 1$			
		0	1	2	3
# of layers at t	0	2.85***	-1.8*	-0.95**	-0.10
	1	1.29	1.09***	-2.00***	-0.38*
	2	0.66***	6.02***	-4.41***	-2.27***
	3	0.35***	1.87***	6.61***	-8.83***

* significant at 10%, ** significant at 5%, *** significant at 1%.

▶ Back

Average behavior of firms that exit the export market

	All	Decrease L	No change in L
dln hours	-0.027***	-0.147***	-0.017***
- detrended	-0.013***	-0.133***	-0.003
dln $\sum_{\ell=0}^L n_L^\ell$	-0.009	-1.251***	0.018***
- detrended	0.002	-1.239***	0.029***
dln VA	-0.046***	-0.124***	-0.035***
- detrended	-0.038***	-0.115***	-0.028***
dln avg wage	0.006***	0.027***	0.008***
- detrended	-0.012***	-0.010	-0.010***
- common layers	-0.010***	0.154***	0.008***
- - detrended	-0.010***	0.134***	-0.012***
% firms	100	15.46	70.68
% VA change	100	20.28	76.01

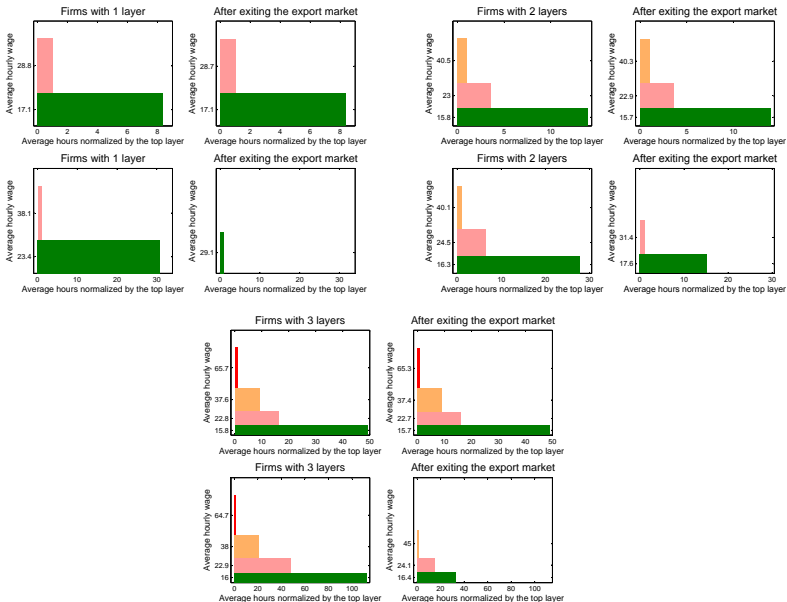
*** significant at 1%.

Average behavior of firms that exit the export market

	All	Decrease L	No change in L
dln hours	-0.025***	-0.129***	-0.016***
- detrended	-0.011***	-0.115***	-0.002
dln $\sum_{\ell=0}^L n_L^\ell$	-0.011	-1.244***	0.018***
- detrended	0.000	-1.231***	0.029***
dln VA	-0.041***	-0.117***	-0.030***
- detrended	-0.033***	-0.109***	-0.023***
dln avg wage	0.007***	0.017**	0.009***
- detrended	-0.012***	-0.001	-0.010***
- common layers	0.010***	0.144***	0.009***
- - detrended	-0.010***	0.124***	-0.011***
% firms	100	15.47	70.67
% VA change	100	33.99	57.16

All results from trimmed sample at 0.05%. ** significant at 5%, *** significant at 1%.

Representative exporters for one layer transitions



▶ Back

Average behavior of firms that enter into the export market

	All	Increase L	No change in L
dlnhours	0.018***	0.103***	0.015***
- detrended	0.032***	0.117***	0.028***
$d\ln \sum_{\ell=0}^L n_L^{\ell}$	0.009	1.233***	0.024***
- detrended	0.021**	1.245***	0.035***
dln VA	0.034***	0.103***	0.030***
- detrended	0.041***	0.112***	0.038***
dln avg wage	0.019***	0.011	0.021***
- detrended	0.001	-0.008	0.003
- common layers	0.020***	-0.105***	0.021***
- - detrended	-0.000	-0.125***	0.002
% firms	100	14.62	70.61
% VA change	100	26.21	65.27

All results from trimmed sample at 0.05%. . ** significant at 5%, *** significant at 1%.

▶ back

Average behavior of firms that enter into the export market

Adjacent layers

	All	Increase L	No change in L
$\ln \text{hours}$	0.023***	0.097***	0.019***
- detrended	0.032***	0.107***	0.028***
$\ln \sum_{\ell=0}^L n_L^\ell$	0.000	1.589***	0.019***
- detrended	0.012	1.600***	0.030***
$\ln VA$	0.043***	0.105***	0.040***
- detrended	0.047***	0.110***	0.043***
$\ln \text{ avg wage}$	0.021***	0.029***	0.021***
- detrended	0.004	0.011	0.004
- common layers	0.021***	-0.051***	0.021***
- - detrended	0.003	-0.069***	0.003
% firms	100	11.81	76.20
% VA change	100	12.21	78.02

*** significant at 1%.

Change in firm level outcomes during transition

Average behavior of firms by change in the number of layers

	All	Increase L	No change in L	Decrease L
dlnhours	-0.014***	0.046***	-0.011***	-0.084***
- detrended	-	0.060***	0.003***	-0.070***
$d\ln \sum_{\ell=0}^L n_L^{\ell}$	-0.011***	1.342***	0.012***	-1.385***
- detrended	-	1.353***	0.023***	-1.373***
dln VA	-0.007***	0.029***	-0.006***	-0.047***
- detrended	-	0.037***	0.001	-0.039***
dln avg wage	0.018***	0.007***	0.018***	0.030***
- detrended	-	-0.011***	-0.000	0.012***
- common layers	0.020***	-0.108***	0.018***	0.147***
- - detrended	-	-0.128***	-0.002***	0.128***
% firms	100	12.75	73.48	13.78
% VA change	100	24.47	79.14	-3.61

All results from trimmed sample at 0.05%, *** significant at 1%.

Change in firm level outcomes during transition

Average behavior of firms with adjacent layers by change in the number of layers

	All	Increase L	No change in L	Decrease L
dlnhours	-0.009***	0.038***	-0.008***	-0.059***
- detrended	-	0.048***	0.001	-0.050***
$d\ln \sum_{\ell=0}^L n_L^{\ell}$	-0.011***	1.788***	0.008***	-1.835***
- detrended	-	1.799***	0.019***	-1.823***
dln VA	-0.003***	0.036***	-0.004***	-0.038***
- detrended	-	0.040***	-0.001	-0.034***
dln avg wage	0.017***	0.019***	0.017***	0.015***
- detrended	-	0.002	0.000	-0.002
- common layers	0.018***	-0.054***	0.017***	0.092***
- - detrended	-	-0.072***	-0.001	0.074***
% firms	100	10.25	78.82	10.94
% VA change	100	34.25	65.86	-0.11

*** significant at 1%.

Normalized hours change according to the theory

- Average log change in normalized hours for firms that transition and change export status, conditioning on selected sample

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.701	0.083	0.00	332
0	2	0	2.159	0.207	0.00	49
0	3	0	2.209	0.421	0.00	6
1	0	0	-1.819	0.091	0.00	291
1	2	0	1.182	0.065	0.00	577
1	2	1	1.084	0.060	0.00	577
1	3	0	1.332	0.192	0.00	53
1	3	1	1.152	0.178	0.00	53
2	0	0	-2.155	0.293	0.00	46
2	1	0	-1.191	0.066	0.00	517
2	1	1	-1.053	0.066	0.00	517
2	3	0	1.508	0.062	0.00	590
2	3	1	1.534	0.066	0.00	590
2	3	2	1.297	0.065	0.00	590
3	0	0	-2.569	0.353	0.00	11
3	1	0	-1.692	0.254	0.00	45
3	1	1	-1.447	0.260	0.00	45
3	2	0	-1.695	0.063	0.00	637
3	2	1	-1.679	0.067	0.00	637
3	2	2	-1.488	0.064	0.00	637

Wages change according to the theory

- Average log change in wages for firms that transition and change export status, selected sample

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.062	0.020	0.00	332
0	2	0	-0.283	0.115	0.02	49
0	3	0	-0.641	0.611	0.34	6
1	0	0	0.096	0.023	0.00	291
1	2	0	0.003	0.012	0.83	577
1	2	1	-0.062	0.015	0.00	577
1	3	0	-0.062	0.049	0.21	53
1	3	1	-0.148	0.053	0.01	53
2	0	0	0.216	0.072	0.00	46
2	1	0	0.040	0.012	0.00	517
2	1	1	0.071	0.016	0.00	517
2	3	0	0.012	0.013	0.37	590
2	3	1	0.008	0.014	0.00	590
2	3	2	-0.074	0.016	0.00	590
3	0	0	0.019	0.127	0.89	11
3	1	0	0.085	0.056	0.14	45
3	1	1	0.119	0.070	0.10	45
3	2	0	0.020	0.011	0.08	637
3	2	1	0.011	0.012	0.40	637
3	2	2	0.079	0.014	0.00	637

Wages change according to the theory

- Average log change in wages for firms that transition and change export status, DADS wages

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.064	0.012	0.00	528
0	2	0	-0.256	0.051	0.00	95
0	3	0	-0.766	0.263	0.01	15
1	0	0	0.127	0.014	0.00	520
1	2	0	-0.012	0.006	0.03	1132
1	2	1	-0.219	0.013	0.00	1132
1	3	0	-0.096	0.030	0.00	91
1	3	1	-0.272	0.048	0.00	91
2	0	0	0.271	0.054	0.00	100
2	1	0	0.052	0.006	0.00	1119
2	1	1	0.226	0.013	0.00	1119
2	3	0	0.009	0.005	0.06	861
2	3	1	-0.038	0.010	0.00	861
2	3	2	-0.160	0.015	0.00	861
3	0	0	0.305	0.154	0.07	16
3	1	0	0.047	0.014	0.00	105
3	1	1	0.386	0.052	0.00	105
3	2	0	0.019	0.005	0.00	872
3	2	1	0.047	0.009	0.00	872
3	2	2	0.165	0.015	0.00	872

Normalized hours change according to the theory

- Firms that change export status and do not change L , selected sample
- Reporting β_L^ℓ from $d \ln n_{Lit}^\ell = \alpha_L^\ell + \beta_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	-0.045	0.044	0.31	4,550
2	0	0.009	0.026	0.73	8,031
2	1	-0.013	0.028	0.64	8,031
3	0	0.200	0.053	0.00	4,896
3	1	0.073	0.038	0.06	4,896
3	2	0.084	0.042	0.05	4,896

▶ back

Wages change according to the theory

- Firms that change export status and do not change L , selected sample
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.105	0.024	0.00	2,720
1	0	0.134	0.023	0.00	4,550
1	1	0.120	0.024	0.00	4,550
2	0	0.165	0.019	0.00	8,031
2	1	0.177	0.019	0.00	8,031
2	2	0.182	0.021	0.00	8,031
3	0	0.199	0.033	0.00	4,896
3	1	0.219	0.034	0.00	4,896
3	2	0.218	0.034	0.00	4,896
3	3	0.219	0.035	0.00	4,896

▶ back

Wages change according to the theory

- Firms that change export status and do not change L , DADS wages
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.030	0.009	0.00	3,263
1	0	0.006	0.005	0.25	6,968
1	1	0.016	0.009	0.08	6,968
2	0	-0.006	0.005	0.19	10,507
2	1	0.010	0.006	0.09	10,507
2	2	0.017	0.008	0.03	10,507
3	0	-0.010	0.005	0.07	4,896
3	1	0.011	0.008	0.17	4,896
3	2	0.010	0.009	0.30	4,896
3	3	0.010	0.016	0.53	4,896

▶ back

Exporters - data description

Percentage of exporters

Year	Unweighted	Weighted by VA
2002	44.6	86.4
2003	44.9	83.4
2004	45.2	83.1
2005	45.1	85.1
2006	45.1	85.0
2007	44.5	83.9

▶ Back

Data description

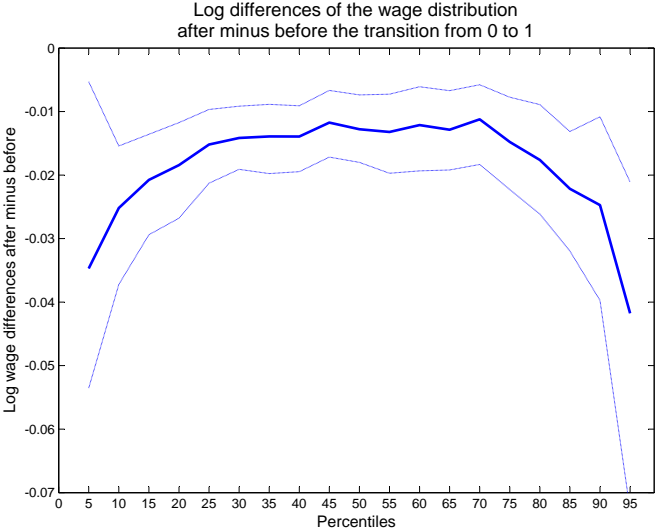
By number of layers in the firm, DADS data

# of layers	Firm-years	Average		Median wage
		VA	Hours	
0	81,909	205	7,946	10.18
1	126,069	403	16,450	12.08
2	161,449	2,821	85,674	14.22
3	87,211	8,879	227,070	15.71

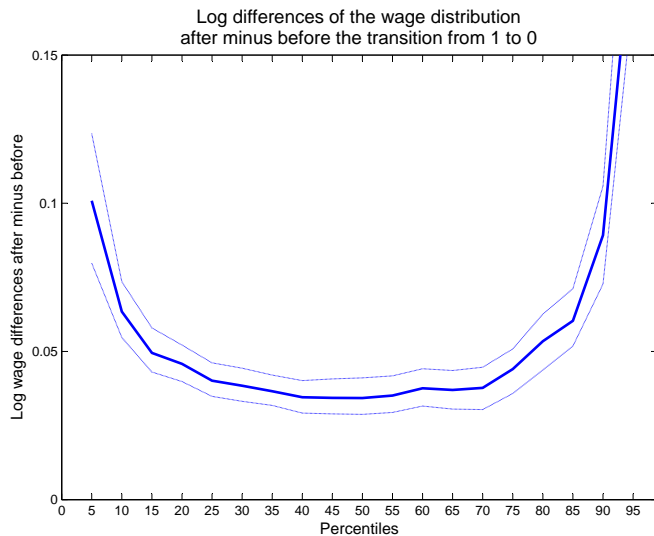
Value added in 000s of 2005 euros.

▶ Back

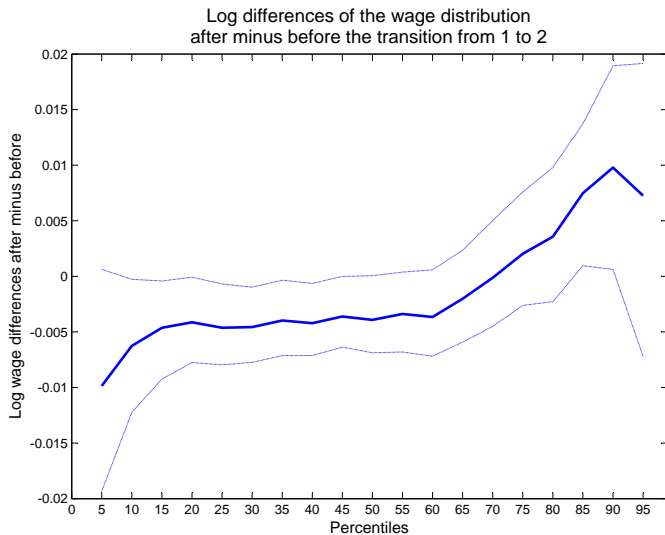
Change in the distribution of wages after a transition up



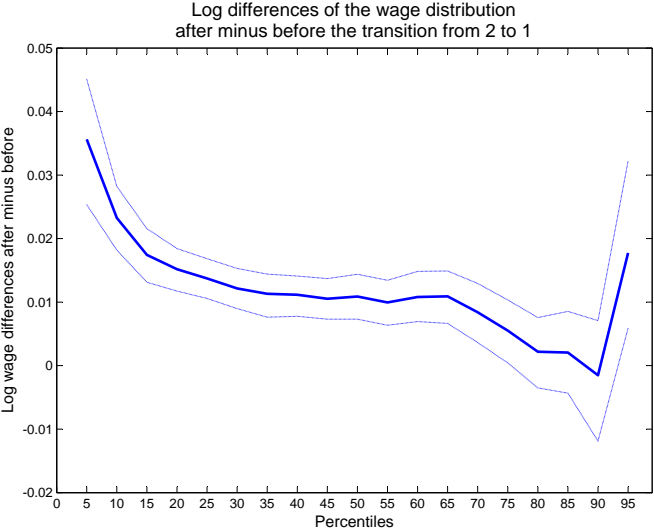
Change in the distribution of wages after a transition up



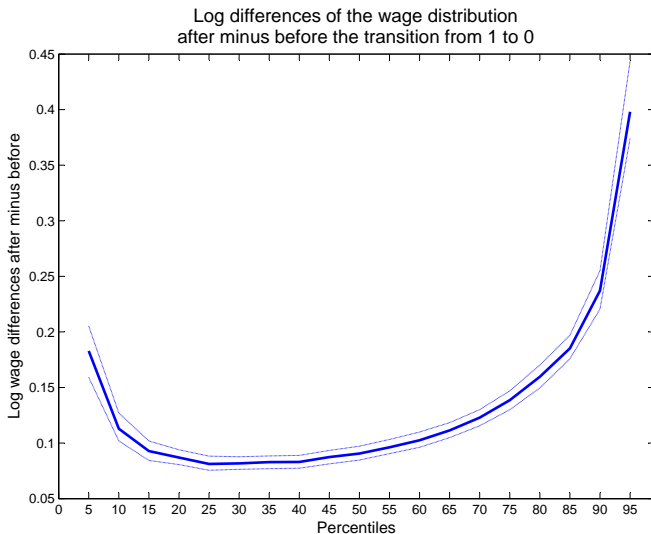
Change in the distribution of wages after a transition up



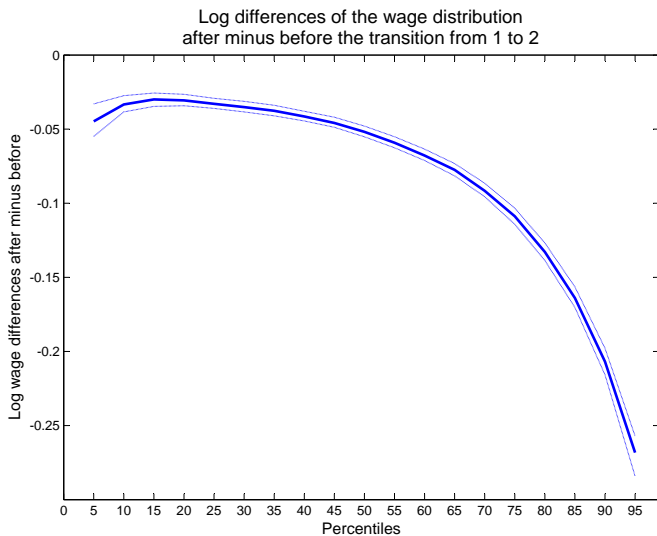
Change in the distribution of wages after a transition up



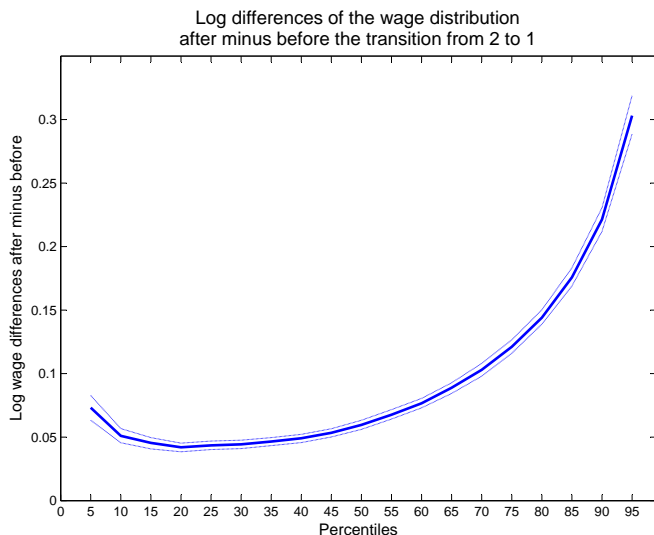
Change in the distribution of wages after a transition up



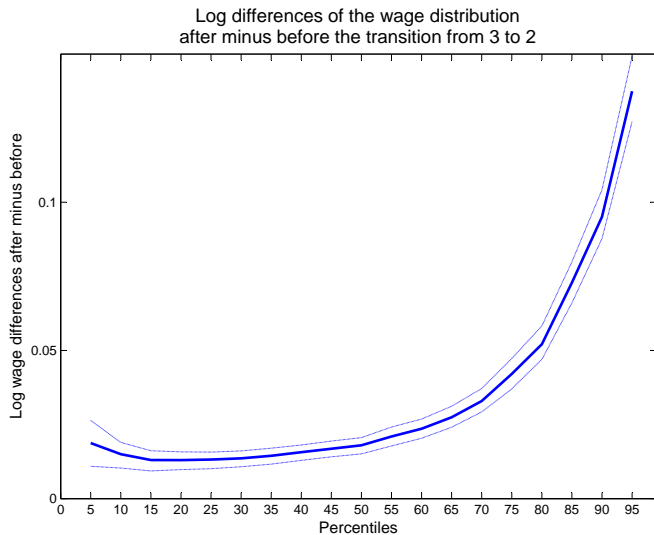
Change in the distribution of wages after a transition up



Change in the distribution of wages after a transition up



Change in the distribution of wages after a transition up



Change in normalized hours for firms that change layers

- Average 2 years ahead log change

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.318	0.023	0.00	4240
0	2	0	1.571	0.084	0.00	382
0	3	0	2.976	0.319	0.00	27
1	0	0	-1.692	0.026	0.00	4970
1	2	0	0.597	0.016	0.00	7171
1	2	1	0.463	0.015	0.00	7171
1	3	0	1.290	0.084	0.00	284
1	3	1	1.094	0.077	0.00	284
2	0	0	-1.924	0.078	0.00	582
2	1	0	-0.743	0.018	0.00	8106
2	1	1	-0.597	0.019	0.00	8106
2	3	0	1.278	0.020	0.00	6074
2	3	1	1.220	0.022	0.00	6074
2	3	2	1.208	0.022	0.00	6074
3	0	0	-2.263	0.233	0.00	50
3	1	0	-1.020	0.064	0.00	576
3	1	1	-0.871	0.063	0.00	576
3	2	0	-1.440	0.019	0.00	8204
3	2	1	-1.368	0.021	0.00	8204
3	2	2	-1.275	0.021	0.00	8204

▶ Back

Change in normalized hours for firms that change layers

- Average 3 years ahead log change

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	1.344	0.033	0.00	1901
0	2	0	1.459	0.144	0.00	133
0	3	0	3.120	0.543	0.00	11
1	0	0	-1.702	0.037	0.00	2395
1	2	0	0.604	0.021	0.00	3456
1	2	1	0.484	0.020	0.00	3456
1	3	0	1.483	0.154	0.00	115
1	3	1	1.224	0.124	0.00	115
2	0	0	-1.959	0.124	0.00	245
2	1	0	-0.722	0.027	0.00	3841
2	1	1	-0.571	0.027	0.00	3841
2	3	0	1.291	0.027	0.00	3182
2	3	1	1.234	0.030	0.00	3182
2	3	2	1.268	0.027	0.00	3182
3	0	0	-2.174	0.316	0.00	28
3	1	0	-0.919	0.089	0.00	298
3	1	1	-0.877	0.088	0.00	298
3	2	0	-1.488	0.026	0.00	4421
3	2	1	-1.444	0.028	0.00	4421
3	2	2	-1.306	0.028	0.00	4421

▶ Back

Change in wages for firms that change layers

- Average 2 years ahead log change

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.152	0.008	0.00	4240
0	2	0	-0.657	0.053	0.00	382
0	3	0	-1.233	0.274	0.00	27
1	0	0	0.174	0.007	0.00	4970
1	2	0	-0.042	0.004	0.00	7171
1	2	1	-0.263	0.006	0.00	7171
1	3	0	-0.293	0.041	0.00	284
1	3	1	-0.586	0.043	0.00	284
2	0	0	0.214	0.022	0.00	582
2	1	0	0.076	0.004	0.00	8106
2	1	1	0.241	0.006	0.00	8106
2	3	0	-0.005	0.004	0.19	6074
2	3	1	-0.060	0.005	0.00	6074
2	3	2	-0.223	0.007	0.00	6074
3	0	0	0.342	0.099	0.00	50
3	1	0	0.119	0.017	0.00	576
3	1	1	0.309	0.024	0.00	576
3	2	0	0.033	0.003	0.00	8204
3	2	1	0.048	0.004	0.00	8204
3	2	2	0.131	0.005	0.00	8204

▶ Back

Change in wages for firms that change layers

- Average 3 years ahead log change

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.111	0.011	0.00	1901
0	2	0	-0.518	0.072	0.00	133
0	3	0	-0.912	0.436	0.06	11
1	0	0	0.167	0.010	0.00	2395
1	2	0	-0.012	0.005	0.02	3456
1	2	1	-0.236	0.008	0.00	3456
1	3	0	-0.310	0.081	0.00	115
1	3	1	-0.646	0.079	0.00	115
2	0	0	0.236	0.036	0.00	245
2	1	0	0.094	0.005	0.00	3841
2	1	1	0.257	0.008	0.00	3841
2	3	0	-0.006	0.006	0.30	3182
2	3	1	-0.065	0.007	0.00	3182
2	3	2	-0.246	0.009	0.00	3182
3	0	0	0.227	0.117	0.06	28
3	1	0	0.089	0.019	0.00	298
3	1	1	0.273	0.031	0.00	298
3	2	0	0.036	0.004	0.00	4421
3	2	1	0.044	0.005	0.00	4421
3	2	2	0.115	0.007	0.00	4421

▶ Back

Change in normalized hours for firms that do not transition

- 2 years ahead
- Reporting β_L^ℓ from $\ln(n_{Lit+2}^\ell/n_{Lit}^\ell) = \alpha_L^\ell + \beta_L^\ell \ln(VA_{it+2}/VA_{it}) + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	0.063	0.016	0.00	34,873
2	0	0.074	0.010	0.00	53,763
2	1	0.031	0.012	0.10	53,763
3	0	0.181	0.015	0.00	34,101
3	1	0.086	0.014	0.00	34,101
3	2	0.104	0.015	0.00	34,101

▶ Back

Change in normalized hours for firms that do not transition

- 3 years ahead
- Reporting β_L^ℓ from $\ln(n_{Lit+3}^\ell/n_{Lit}^\ell) = \alpha_L^\ell + \beta_L^\ell \ln(VA_{it+3}/VA_{it}) + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	β_L^ℓ	s.e.	p-value	obs
1	0	0.113	0.019	0.00	18,138
2	0	0.084	0.013	0.00	30,343
2	1	0.051	0.015	0.10	30,343
3	0	0.229	0.019	0.00	21,097
3	1	0.133	0.017	0.00	21,097
3	2	0.156	0.019	0.00	21,097

▶ Back

Wages change according to the theory

- 2 years ahead
- Reporting γ_L^ℓ from $\ln(w_{Lit+2}^\ell/w_{Lit}^\ell) = \delta_L^\ell + \gamma_L^\ell \ln(VA_{it+2}/VA_{it}) + \varepsilon_{it}$

# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.049	0.009	0.00	26,353
1	0	0.063	0.007	0.00	34,873
1	1	0.098	0.007	0.00	34,873
2	0	0.099	0.006	0.00	53,763
2	1	0.112	0.006	0.00	53,763
2	2	0.138	0.006	0.00	53,763
3	0	0.113	0.006	0.00	34,101
3	1	0.133	0.009	0.00	34,101
3	2	0.139	0.010	0.00	34,101
3	3	0.196	0.011	0.00	34,101

▶ Back

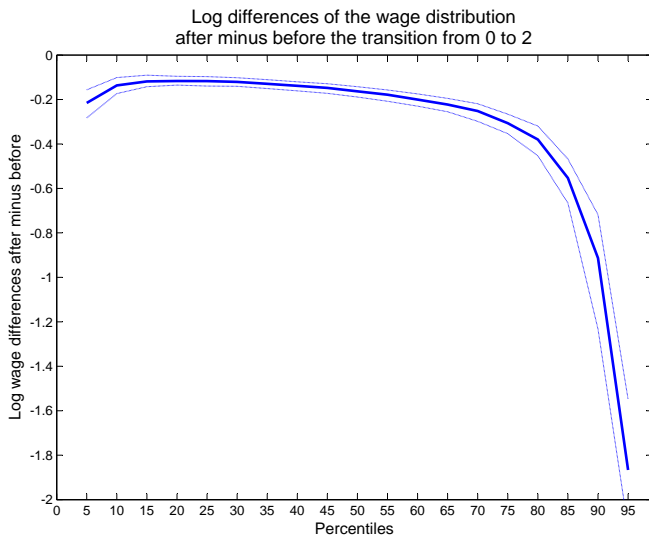
Wages change according to the theory

- 3 years ahead
- Reporting γ_L^ℓ from $\ln(w_{Lit+3}^\ell/w_{Lit}^\ell) = \delta_L^\ell + \gamma_L^\ell \ln(VA_{it+3}/VA_{it}) + \varepsilon_{it}$

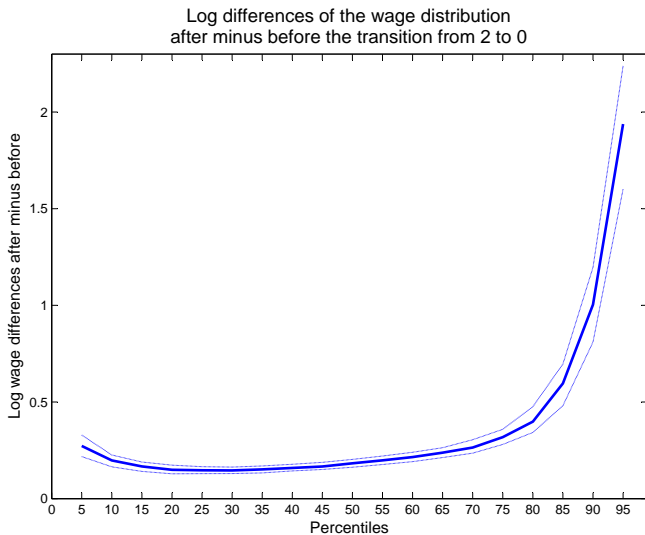
# of layers in the firm (L)	Layer ℓ	γ_L^ℓ	s.e.	p-value	obs
0	0	0.023	0.011	0.03	14,864
1	0	0.056	0.008	0.00	18,138
1	1	0.099	0.009	0.00	18,138
2	0	0.080	0.006	0.00	30,343
2	1	0.097	0.007	0.00	30,343
2	2	0.135	0.008	0.00	30,343
3	0	0.093	0.008	0.00	21,097
3	1	0.113	0.008	0.00	21,097
3	2	0.127	0.009	0.00	21,097
3	3	0.194	0.012	0.00	21,097

▶ Back

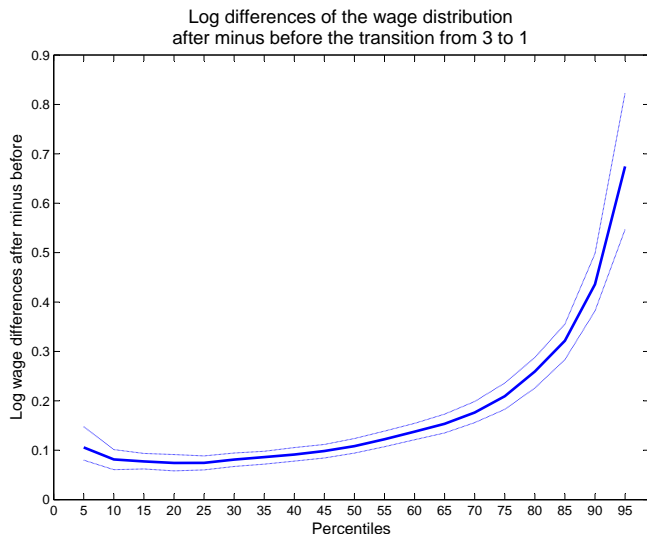
Change in the distribution of wages after a transition up



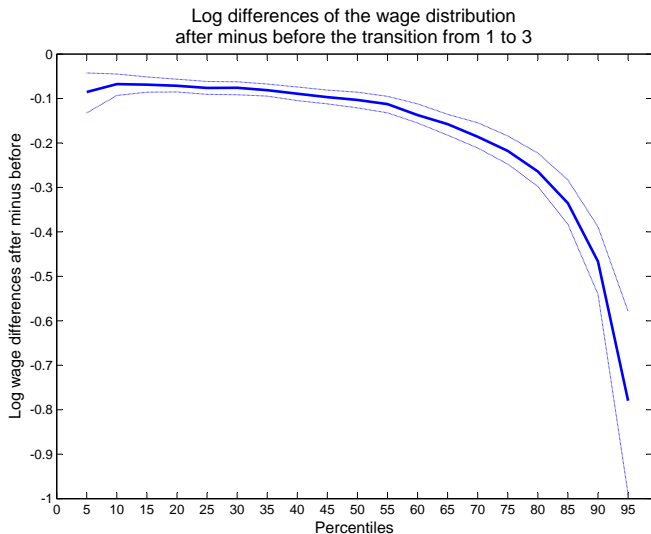
Change in the distribution of wages after a transition up



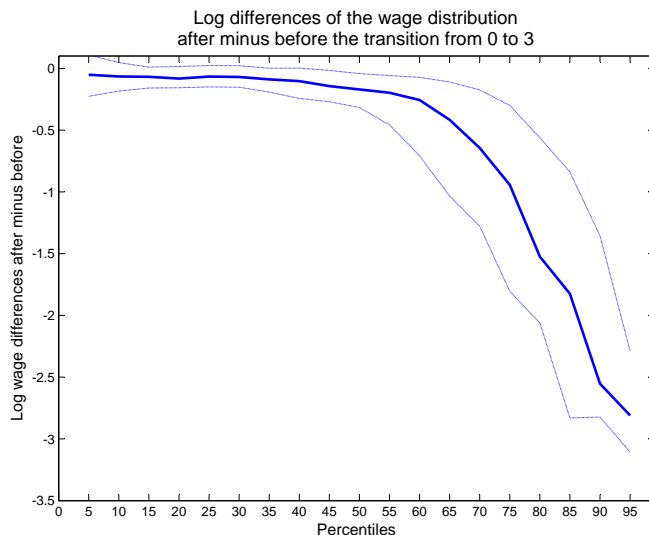
Change in the distribution of wages after a transition up



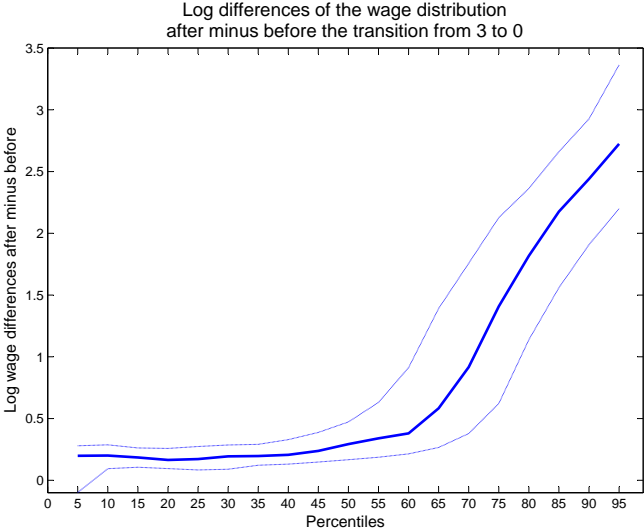
Change in the distribution of wages after a transition up



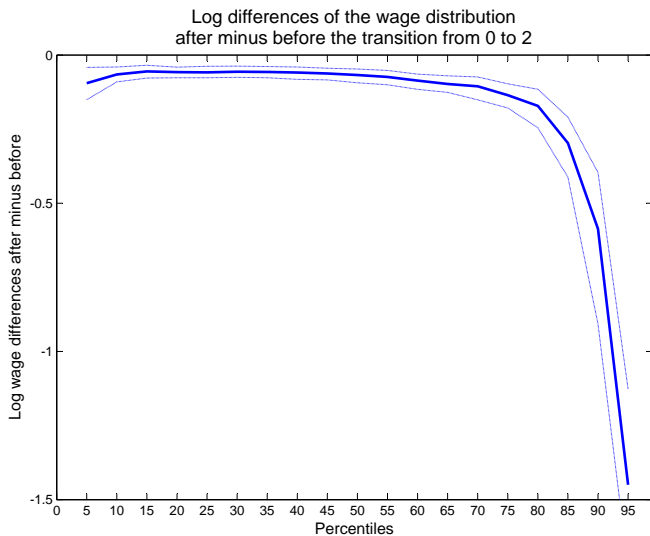
Change in the distribution of wages after a transition up



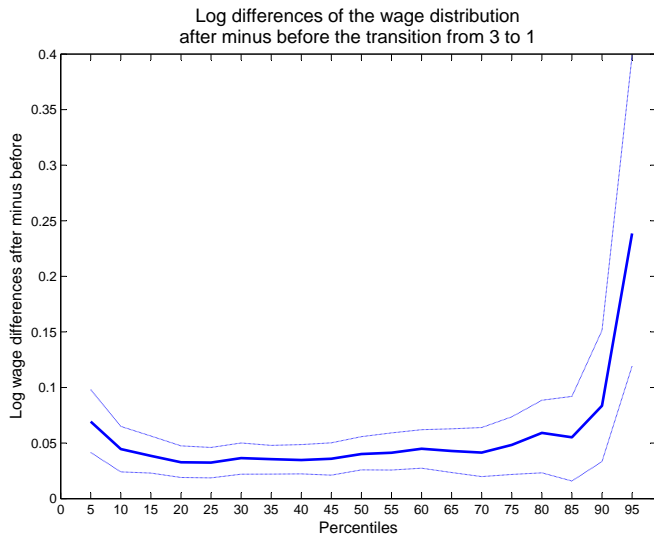
Change in the distribution of wages after a transition up



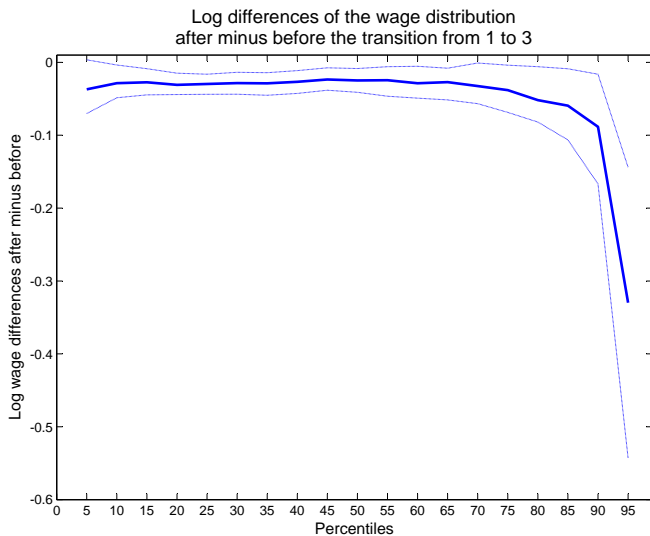
Change in the distribution of wages after a transition up



Change in the distribution of wages after a transition up



Change in the distribution of wages after a transition up



How do firms change the average wage in a layer?

Log diff. in hourly wage of new hours entering the layer versus hours staying in the layer (after transition)

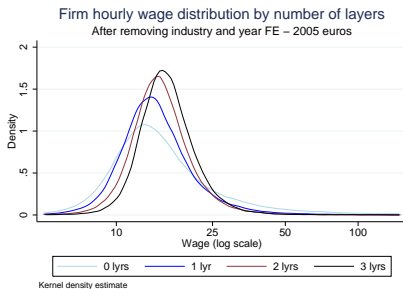
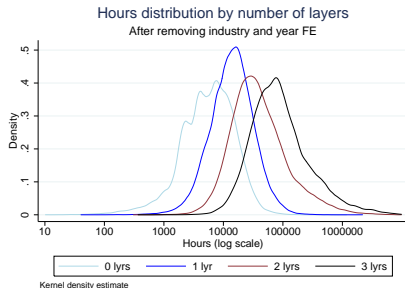
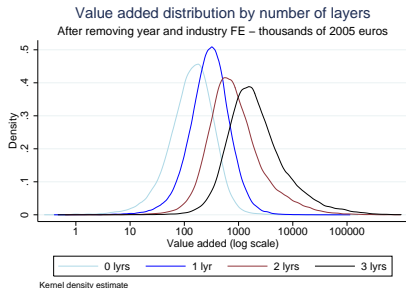
# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	-0.139	0.00	0.00	6216
0	2	0	-0.104	0.01	0.00	763
0	3	0	-0.099	0.04	0.02	61
1	0	0	0.029	0.00	0.00	8294
1	2	0	-0.097	0.00	0.00	12269
1	2	1	-0.156	0.01	0.00	4681
1	3	0	-0.086	0.01	0.00	843
1	3	1	-0.123	0.02	0.00	352
2	0	0	0.069	0.01	0.00	1131
2	1	0	-0.015	0.00	0.00	13854
2	1	1	0.037	0.00	0.00	6821
2	3	0	-0.073	0.00	0.00	12360
2	3	1	-0.106	0.00	0.00	8930
2	3	2	-0.168	0.01	0.00	5710
3	0	0	0.037	0.03	0.21	69
3	1	0	0.030	0.01	0.00	1157
3	1	1	0.026	0.02	0.14	552
3	2	0	-0.056	0.00	0.00	13451
3	2	1	-0.060	0.00	0.00	10241
3	2	2	0.019	0.01	0.00	7980

Log diff. in hourly wage of hours leaving the layer versus hours who stayed in the layer (before the transition)

# of layers		Layer	Change	s.e.	p-value	obs
Before	After					
0	1	0	0.091	0.00	0.00	8148
0	2	0	0.140	0.01	0.00	912
0	3	0	0.185	0.03	0.00	58
1	0	0	-0.052	0.00	0.00	6738
1	2	0	0.049	0.00	0.00	13614
1	2	1	0.114	0.00	0.00	6929
1	3	0	0.091	0.01	0.00	919
1	3	1	0.176	0.02	0.00	448
2	0	0	-0.038	0.01	0.00	981
2	1	0	-0.013	0.00	0.00	13097
2	1	1	-0.070	0.01	0.00	4900
2	3	0	0.033	0.00	0.00	12646
2	3	1	0.055	0.00	0.00	9729
2	3	2	0.174	0.01	0.00	7313
3	0	0	-0.065	0.03	0.03	71
3	1	0	-0.020	0.01	0.03	1090
3	1	1	-0.046	0.02	0.02	468
3	2	0	0.018	0.00	0.00	13547
3	2	1	0.011	0.00	0.00	9805
3	2	2	-0.011	0.01	0.07	6464

▶ Back

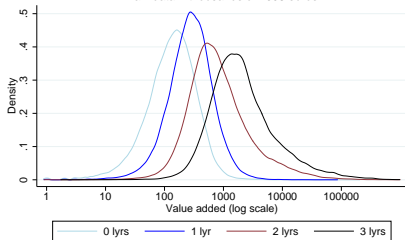
Firms with different number of layers are different



Firms with different number of layers are different

Value added distribution by number of layers

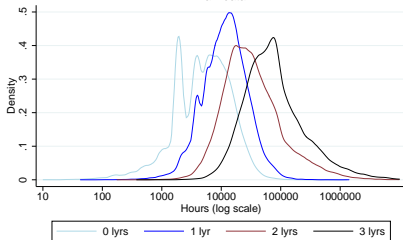
Raw data – thousands of 2005 euros



Kernel density estimate

Hours distribution by number of layers

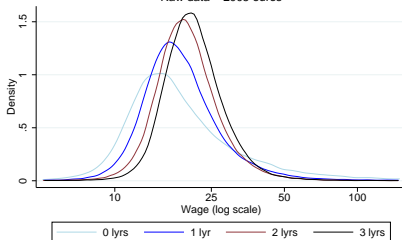
Raw data



Kernel density estimate

Firm hourly wage distribution by number of layers

Raw data – 2005 euros



Kernel density estimate

Year	Firms	Average # of layers
2002	79,260	1.59
2003	77,768	1.58
2004	76,448	1.58
2005	75,426	1.55
2006	74,818	1.53
2007	72,918	1.50

# of layers	Firm-years
0	81,909
1	126,069
2	161,449
3	87,211

Sources of changes in average wage during a transition

$\bar{w}_{L'it+1}^{l \leq L} / \bar{w}_{Lit}$				$w_{L'it+1}^{L'} / \bar{w}_{Lit}$			
from/to	1	2	3	from/to	1	2	3
0	0.975** (10,422)	0.838** (1,348)	0.679** (111)	0	1.531** (10,421)	1.435** (1,349)	1.461** (110)
1		0.940** (17,036)	0.886** (1,167)	1		2.067** (17,035)	2.034** (1,167)
2			0.974 (14,214)	2			4.357** (14,213)
<i>s</i>				$d \ln \bar{w}_{Lit}$			
from/to	1	2	3	from/to	1	2	3
0	0.741** (10,422)	0.621** (1,350)	0.572** (111)	0	-0.008* (10,421)	-0.195** (1,350)	-0.589** (111)
1		0.853** (17,036)	0.775** (1,167)	1		0.014** (17,035)	-0.050** (1,167)
2			0.947** (14,214)	2			0.013** (14,212)

All results from trimmed sample at 0.05%. *significant at 10% ** significant at 1%. Number of observations in paranthesis.

▶ back

Sources of changes in average wage during a transition

Behavior of firms that enter into the export market

$\bar{w}_{L'it+1}^{l \leq L} / \bar{w}_{Lit}$			$w_{L'it+1}^{L'} / \bar{w}_{Lit}$				
from/to	1	2	3	from/to	1	2	3
0	0.956** (527)	0.814** (94)	0.629** (15)	0	1.445** (527)	1.510** (94)	1.309** (15)
1		0.963** (1,132)	0.872** (91)	1		1.975** (1,132)	1.854** (90)
2			0.988** (861)	2			5.244** (861)
<i>s</i>			<i>d ln \bar{w}_{Lit}</i>				
from/to	1	2	3	from/to	1	2	3
0	0.740** (528)	0.586** (95)	0.649** (14)	0	-0.024 (528)	-0.300** (95)	-0.779* (15)
1		0.848** (1,132)	0.749** (90)	1		0.027** (1,132)	0.002 (91)
2			0.941** (861)	2			0.027** (861)

All results from trimmed sample at 0.05%. * significant at 5%, ** significant at 1%. Number of observations in paranthesis.

▶ back

Exporters - data description

Percentage of firms that are exporters by number of layers in the firm

# of layers	Unweighted	Weighted by VA
0	18.9	25.2
1	31.7	38.3
2	54.1	82.1
3	71.6	90.2

▶ Back

Sketch of Theory in CRH (2012): Cost Minimization

- Consider a firm that produces a quantity q . $C_L(q; w)$ is the minimum cost of producing q with an organization with L layers, namely,

$$C_L(q; w) = \min_{\{n_L^\ell, z_L^\ell\}_{\ell=0}^L \geq 0} \sum_{\ell=0}^L n_L^\ell w_L^\ell$$

subject to

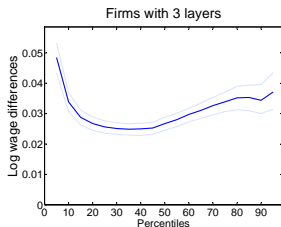
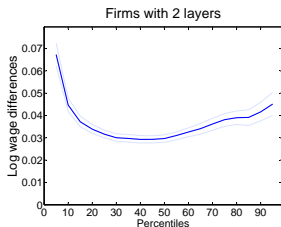
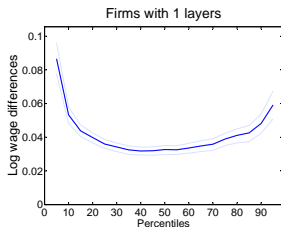
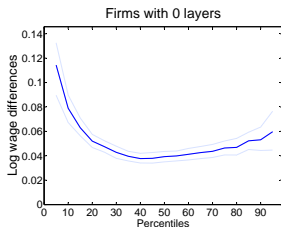
$$\begin{aligned} q &\leq F(Z_L^L) n_L^0, \\ w_L^\ell &= w [c z_L^\ell + 1] \text{ for all } \ell, \\ n_L^\ell &= h n_L^0 [1 - F(Z_L^{\ell-1})] \text{ for } L \geq \ell > 0, \\ n_L^L &= 1 \end{aligned}$$

- The **variable** cost function is given by

$$C(q; w) = \min_{L \geq 0} \{C_L(q; w)\}$$

Distribution of wages after minus before

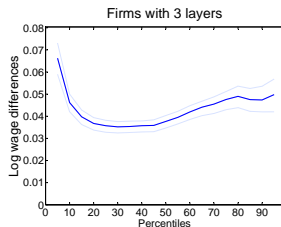
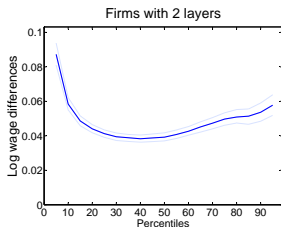
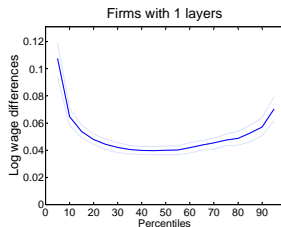
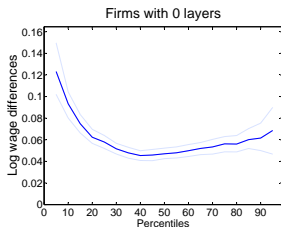
Conditioning on increase in VA > 5% and no transition



▶ back

Distribution of wages after minus before

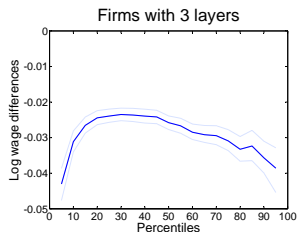
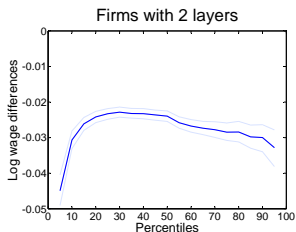
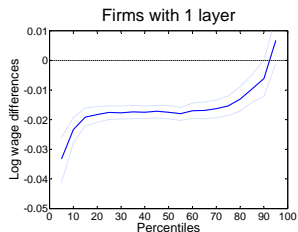
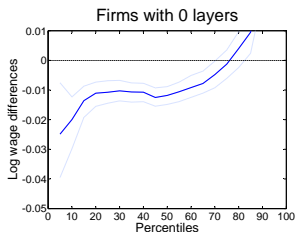
Conditioning on increase in VA > 10% and no transition



▶ back

Distribution of wages after minus before

Conditioning on decrease in VA < 0 and no transition



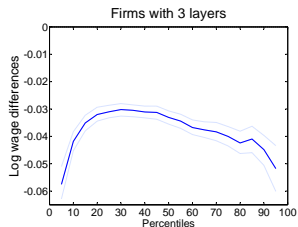
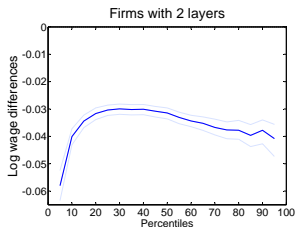
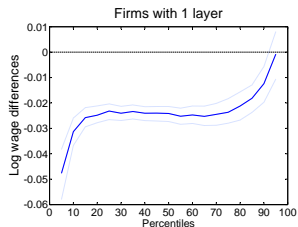
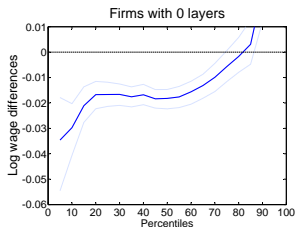
▶ back

▶ dlogVA5

▶ dlogVA10

Distribution of wages after minus before

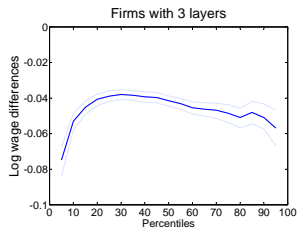
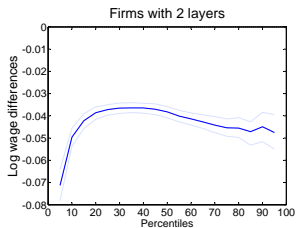
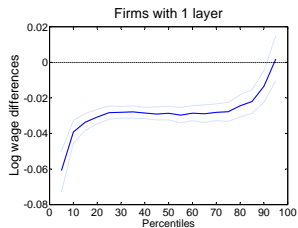
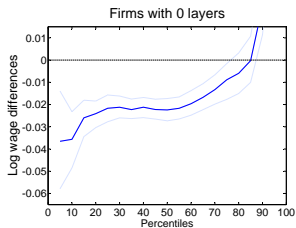
Conditioning on decrease in VA < 5% and no transition



▶ back

Distribution of wages after minus before

Conditioning on decrease in VA < 10% and no transition



▶ back

Normalized hours and span of control

Normalized hours				
Normalized hours at layers	among firms with			
	0	1	2	3
0	1.00	11.07	16.91	96.98
1		1.00	4.34	36.64
2			1.00	23.71
3				1.00

Ratio between adjacent layers				
Span between	among firms with			
	0	1	2	3
layer 0 / layer 1		11.07	3.89	2.65
layer 1 / layer 2			4.34	1.55
layer 2 / layer 3				23.71