

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, type, 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 (2011)
 - ▶ 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 impact 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 in Caliendo and Rossi-Hansberg (2011)
- 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)

The Model: Caliendo and Rossi-Hansberg (2011)

- General demand structure
- \tilde{N} identical agents with demand of a variety α denoted by

$$x(\alpha) = x(p(\alpha), \alpha; R, P)$$

- ▶ $p(\alpha)$ is the price of variety α , R revenue and P the price index
- ▶ Agents like varieties with higher α better

$$x(\alpha') > x(\alpha), \text{ for all } \alpha' > \alpha$$

- Agents are endowed with one unit of time that they supply inelastically
 - ▶ Obtain an equilibrium wage w for their unit of time
 - ▶ If an agent learns an interval of knowledge of length z she has to pay wcz , which she receives back as part of her compensation

Technology

- An entrepreneur pays f^E and obtains a demand draw α from $G(\alpha)$
- If she decides to produce needs to pay a fixed cost f
 - ▶ Builds an organization
 - ▶ Production requires labor and knowledge
- 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

- Managers

- ▶ Specialize in solving problems
- ▶ Spend h units of time with each problem that gets to her
 - ★ 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 $Z_L^\ell = \sum_{i=0}^{\ell} z_L^i$

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,

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

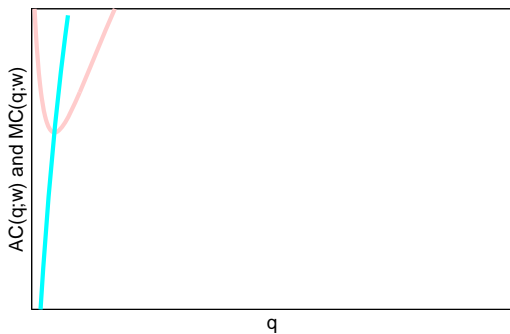
subject to

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

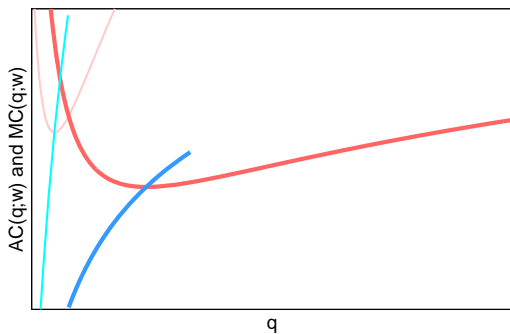
- The **variable** cost function is given by

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

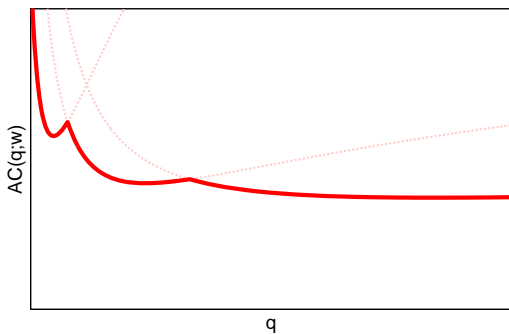
Marginal and Average Costs



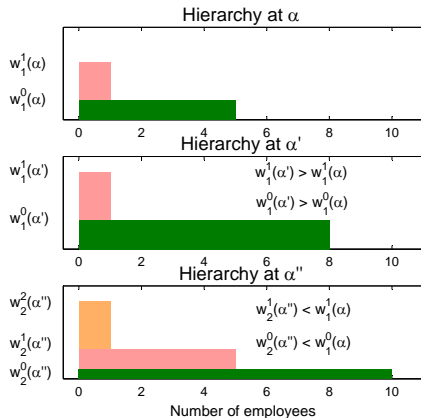
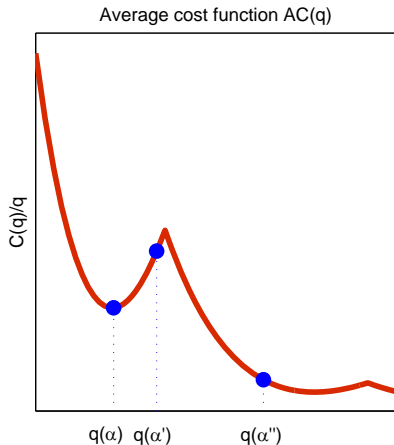
Marginal and Average Costs



Average Costs: The Lower Envelope



The average cost function as a function of q



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](#)

Data description

By year

Year	Firms	Average			
		VA	Hours	Wage	# of layers
2002	79,260	2,909	83,749	22.07	1.59
2003	77,768	2,900	82,704	22.51	1.58
2004	76,448	2,934	81,445	23.33	1.58
2005	75,426	2,786	78,090	24.07	1.55
2006	74,818	2,823	77,697	23.29	1.53
2007	72,918	2,685	73,515	23.98	1.50

Value added in 000s of 2005 euros. Wage = average hourly wage in 2005 euros.

Data description

By number of layers in the firm

# of layers	Firm-years	Average			Median wage
		VA	Hours	Wage*	
0	81,909	205	7,946	29.44	17.08
1	126,069	403	16,450	20.96	17.99
2	161,449	2,821	85,674	20.99	19.45
3	87,211	8,879	227,070	22.23	20.78

Value added in 000s of 2005 euros. Wage* = average hourly wage in 2005 euros from trimmed sample (0.05% top and bottom in each cell).

► DADS data

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

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

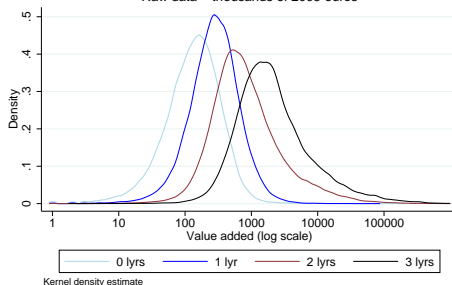
	Percentage of firms that have adjacent layers				All firms
	0 layers	1 layer	2 layers	3 layers	
Unweighted	87.17	67.22	79.98	100	81.57
Weighted by VA	85.84	68.01	94.54	100	96.65
Weighted by hours	95.86	72.38	93.15	100	95.74

▶ Fraction of firms that transition to an adjacent layer

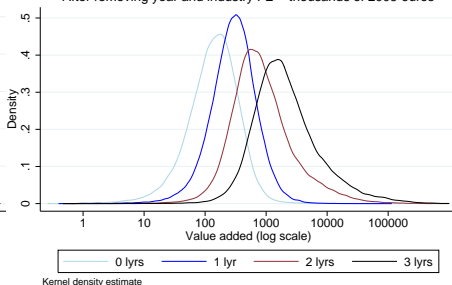
Firms with different number of layers are different

In terms of value added

Value added distribution by number of layers
Raw data – thousands of 2005 euros



Value added distribution by number of layers
After removing year and industry FE – thousands of 2005 euros

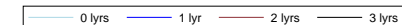
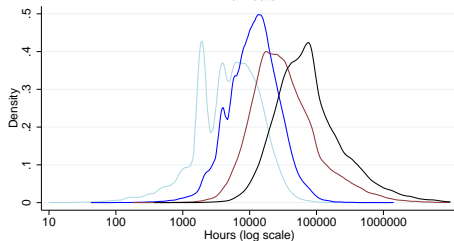


Firms with different number of layers are different

In terms of hours

Hours distribution by number of layers

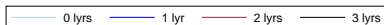
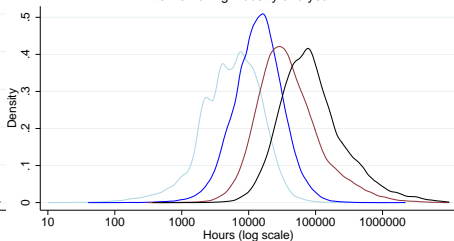
Raw data



Kernel density estimate

Hours distribution by number of layers

After removing industry and year FE



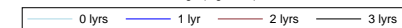
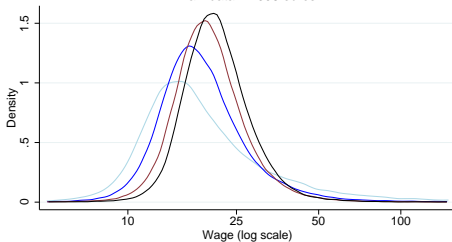
Kernel density estimate

Firms with different number of layers are different

In terms of average wage

Firm hourly wage distribution by number of layers

Raw data – 2005 euros

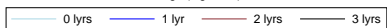
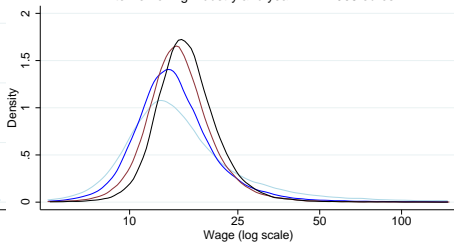


Kernel density estimate

► DADS data

Firm hourly wage distribution by number of layers

After removing industry and year FE – 2005 euros



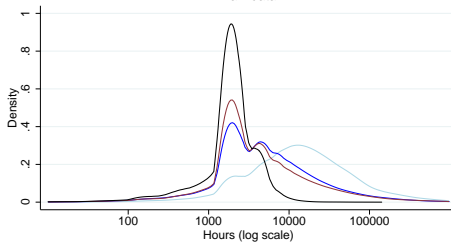
Kernel density estimate

Layers in the firm are different

In terms total hours worked at each layer

Distribution of hours worked in each layer

Raw data

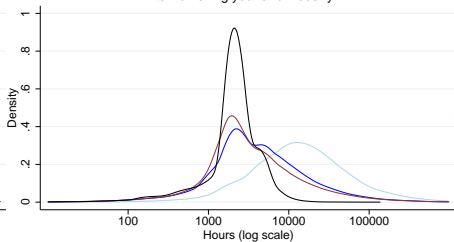


Kernel density estimate

► Percentiles

Distribution of hours worked in each layer

After removing year and industry FE



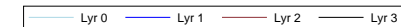
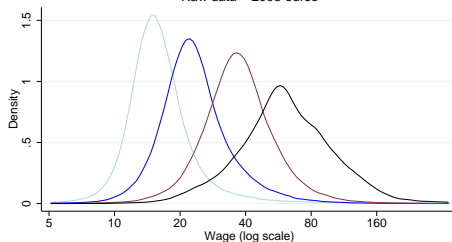
Kernel density estimate

Agents working at different layers are different

In terms of average wages

Distribution of wages in each layer

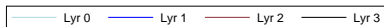
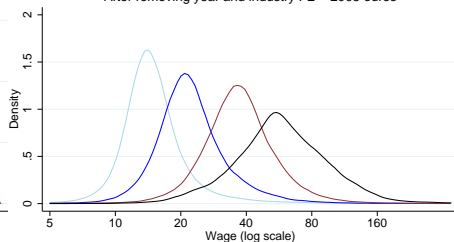
Raw data – 2005 euros



Kernel density estimate

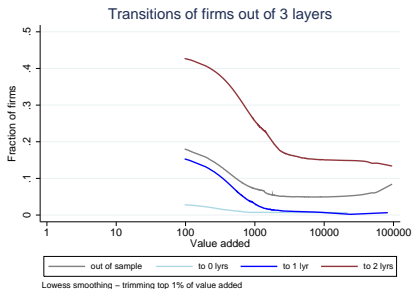
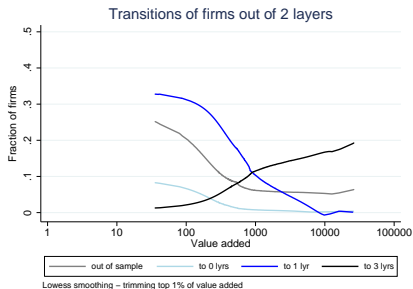
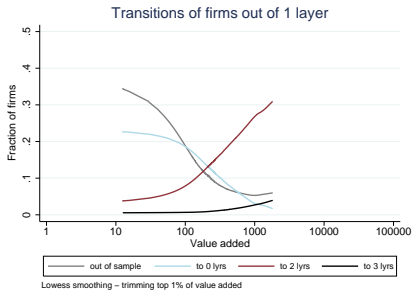
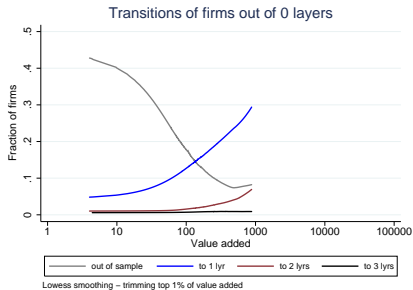
Distribution of wages in each layer

After removing year and industry FE – 2005 euros

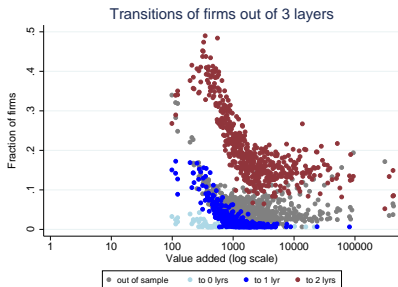
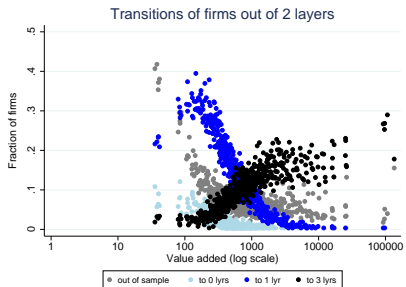
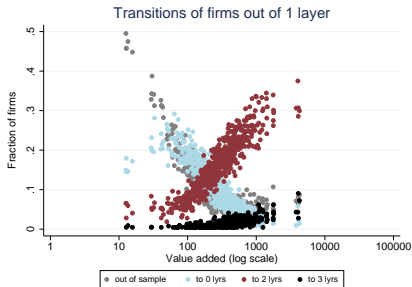
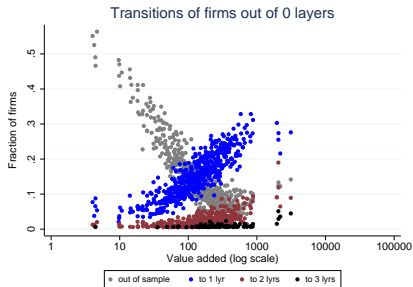


Kernel density estimate

Transitions across layers depend on value added



Transitions across layers depend on value added



Hours 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	$N_L^\ell \geq N_L^{\ell+1}$ all ℓ	Weighted by value added		
		$N_L^0 \geq N_L^1$	$N_L^1 \geq N_L^2$	$N_L^2 \geq N_L^3$
1	88.8	88.8	-	-
2	63.2	79.2	76.3	-
3	57.1	77.7	73.4	98.1

Wages are hierarchical

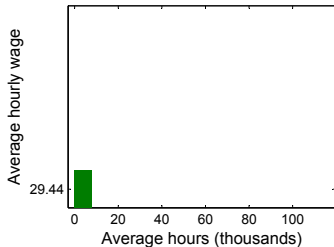
Percentage of firms that satisfy a hierarchy

# 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

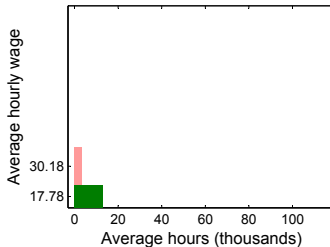
# of layers	$w_L^{\ell+1} \geq w_L^\ell$ all ℓ	Weighted by value added		
		$w_L^1 \geq w_L^0$	$w_L^2 \geq w_L^1$	$w_L^3 \geq w_L^2$
1	94.1	94.1	-	-
2	96.2	98.1	98.1	-
3	87.6	99.2	99.1	89.2

Representative hierarchies

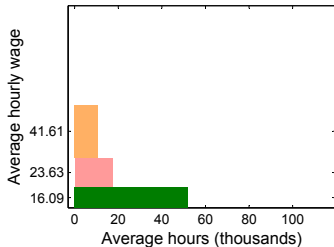
Hierarchy of a 0 layer firm



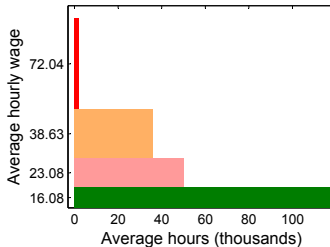
Hierarchy of a 1 layer firm



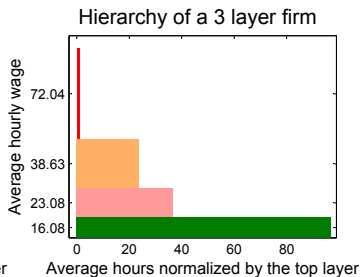
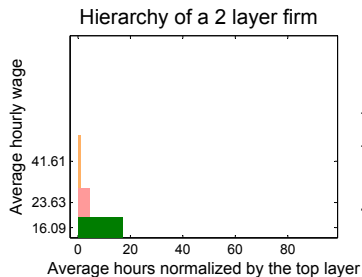
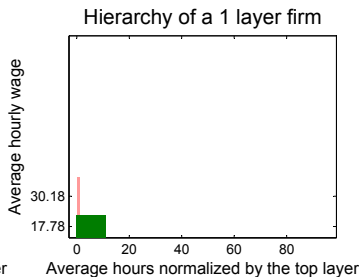
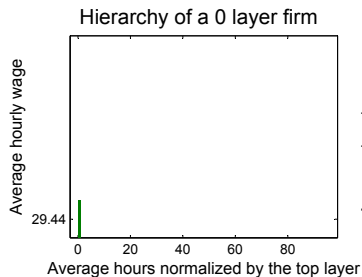
Hierarchy of a 2 layer firm



Hierarchy of a 3 layer firm



Representative hierarchies: normalized



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%.

Sources of changes in average wage during a transition

- Transition from L to L' layers ($L' > L$)

$$\begin{aligned}d \ln \bar{w}_{Lit} &= \ln \bar{w}_{L'it+1} - \ln \bar{w}_{Lit} \\ &= \ln \left(\frac{\bar{w}_{L'it}^{\ell \leq L}}{\bar{w}_{Lit}} s + \frac{w_{L'it}^{L'}}{\bar{w}_{Lit}} (1 - s) \right)\end{aligned}$$

- $\bar{w}_{L'it}^{\ell \leq L}$ = average wage in all pre-existing layers in the reorganized firms with $L' > L$ layers
- $w_{L'it}^{L'}$ = wage of the new top manager
- s = the fraction of hours of work done by employees in pre-existing layers

Sources of changes in average wage during a transition

$\bar{w}_{L'it}^{\ell \leq L} / \bar{w}_{Lit}$				$w_{L'it}^{L'} / \bar{w}_{Lit}$			
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)
s				$d \ln \bar{w}_{Lit}$			
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 parantesis.

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

- Robustness checks:

▸ Layers

▸ VA

▸ H

▸ NH

▸ VA + H

▸ VA + NH



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

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

- Robustness checks:

▸ Layers

▸ VA

▸ H

▸ NH

▸ VA + H

▸ VA + NH

▸ All-DADS



Wages change according to the theory

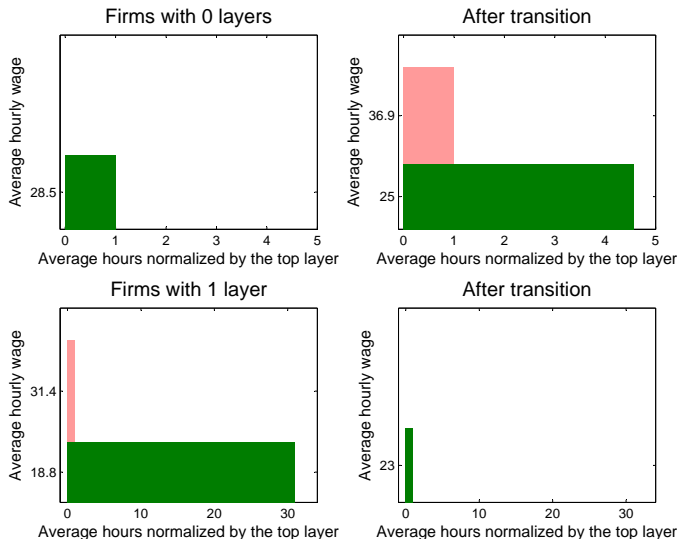
- Elasticity of w_L^ℓ with VA for firms that do not change L
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# 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

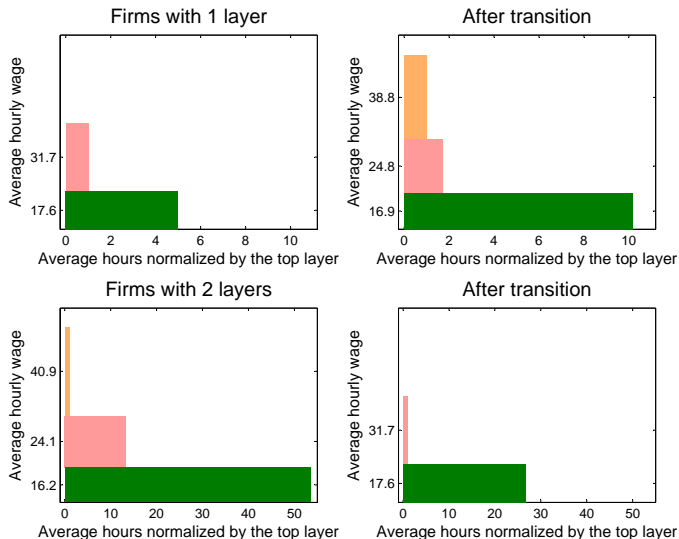
▸ DADS

Representative hierarchies for one layer transitions



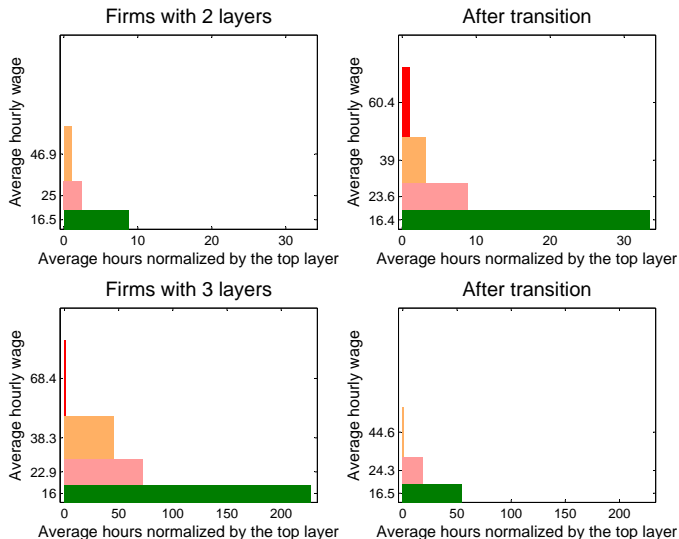
► Figure with hours

Representative hierarchies for one layer transitions



► Figure with hours

Representative hierarchies for one layer transitions



► Figure with hours

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%

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

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

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

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

▶ Trimmed sample

Sources of changes in average wage during a transition

Behavior of firms that enter into the export market

$\bar{w}_{L'it}^{\ell \leq L} / \bar{w}_{Lit}$				$w_{L'it}^{\ell'} / \bar{w}_{Lit}$			
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>				$d \ln \bar{w}_{Lit}$			
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 parenthesis.

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

- Robustness checks: ▶ Layers

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

- Robustness checks: ▶ Layers ▶ DADS

Wages change according to the theory

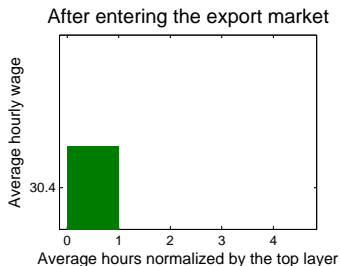
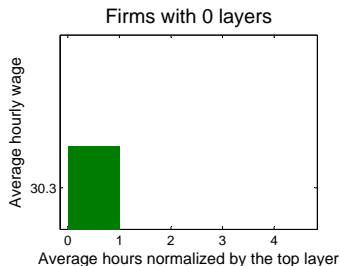
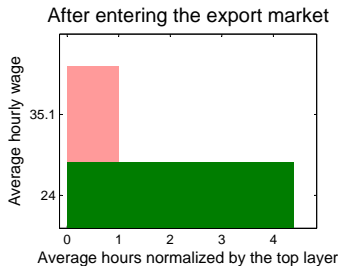
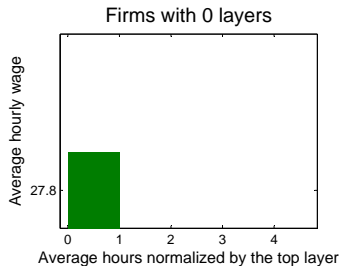
- Firms that change export status and do not change L
- Reporting γ_L^ℓ from $d \ln w_{Lit}^\ell = \delta_L^\ell + \gamma_L^\ell d \ln VA_{it} + \varepsilon_{it}$

# 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

► Layers

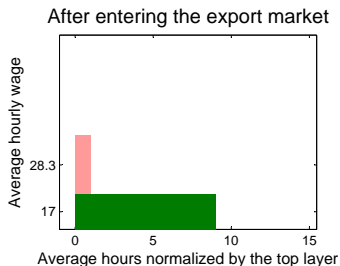
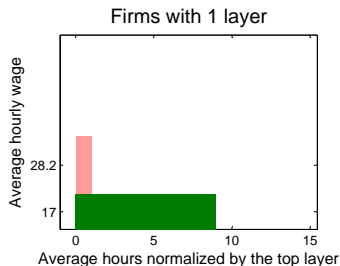
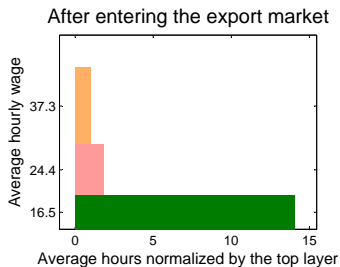
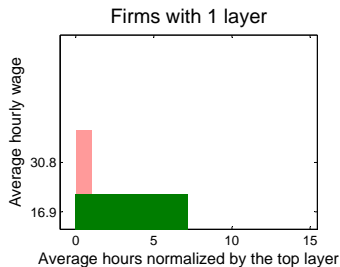
► DADS

Representative exporters for one layer transitions



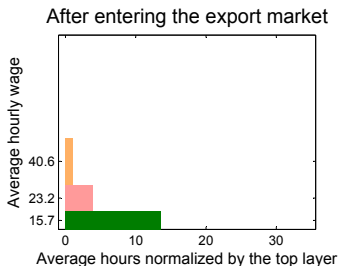
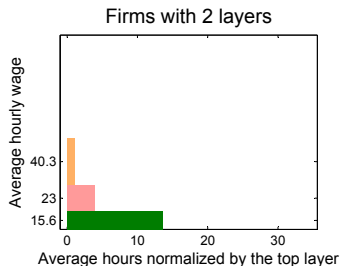
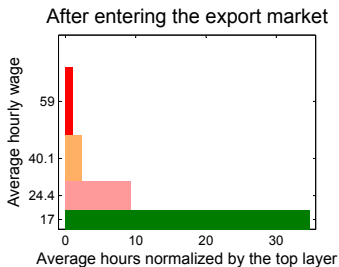
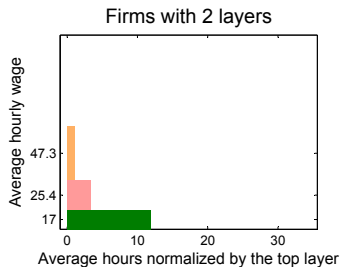
► Firms that exit

Representative exporters for one layer transitions



► Firms that exit

Representative exporters for one layer transitions



► Firms that exit

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 wages at all layers
 - 4 Firms that grow but do not add layers increase the number of employees and 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 expand mostly by adding layers and so reduce wages
 - ★ Many new exporters pay higher wages but do not add layers or expand much
- All findings are consistent with Caliendo and Rossi-Hansberg (2011)

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

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%

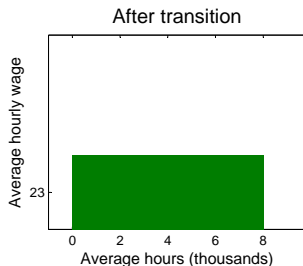
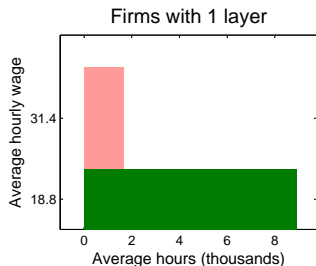
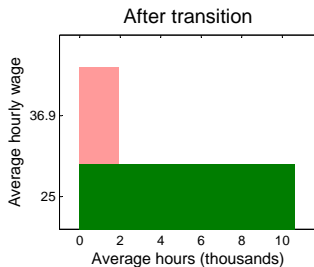
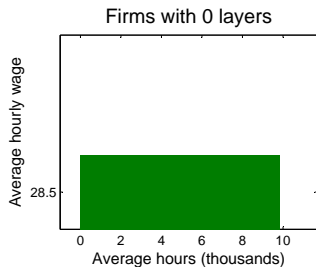
Normalized hours within layers

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.
$\ln n_1^0 / n_1^1$	.411	.005	.349	.005
$\ln n_2^0 / n_2^2$	.186	.003	.158	.003
$\ln n_2^1 / n_2^2$	.100	.002	.096	.003
$\ln n_3^0 / n_3^3$	.663	.004	.669	.003
$\ln n_3^1 / n_3^3$	.734	.003	.719	.003
$\ln n_3^2 / n_3^3$	.773	.004	.765	.004

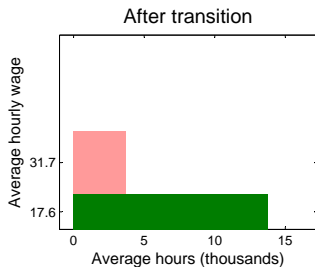
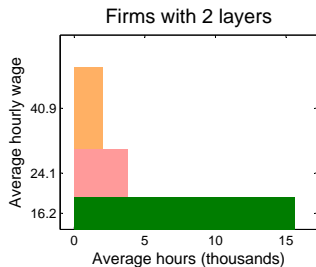
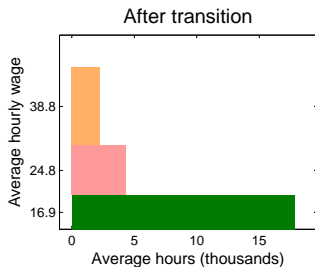
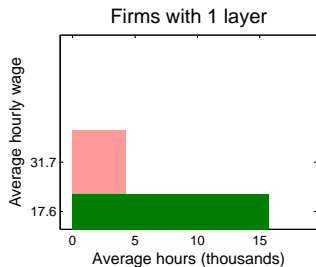
All p-values < 0.01. Excluding top and bottom 0.05%. fe = with 2 industry and year fixed effects

Representative hierarchies for one layer transitions



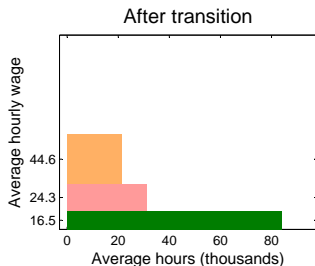
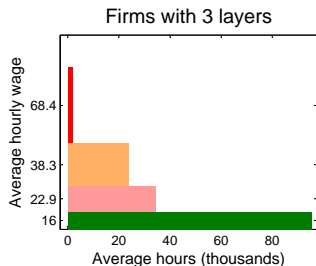
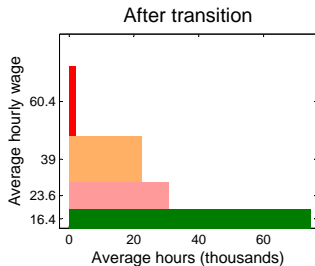
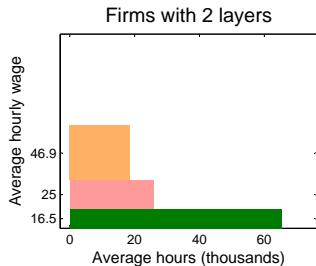
▶ Back

Representative hierarchies for one layer transitions



▶ Back

Representative hierarchies for one layer transitions



▶ Back

Data description

By number of layers in the firm, DADS data

# of layers	Firm-years	Average			Median wage
		VA	Hours	Wage*	
0	81,909	205	7,946	11.69	10.18
1	126,069	403	16,450	13.19	12.08
2	161,449	2,821	85,674	15.12	14.22
3	87,211	8,879	227,070	16.67	15.71

Value added in 000s of 2005 euros. Wage* = average hourly wage in 2005 euros from trimmed sample (0.05% top and bottom in each cell).

▶ 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

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

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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	0 layers	1 layer	2 layers	3 layers	
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▶ 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					Total
		# of layers at $t + 1$					
		Exit	0	1	2	3	
# 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%.

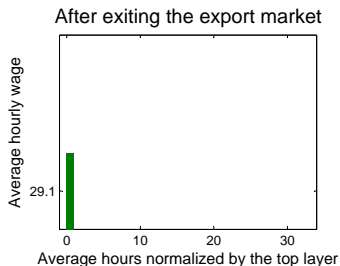
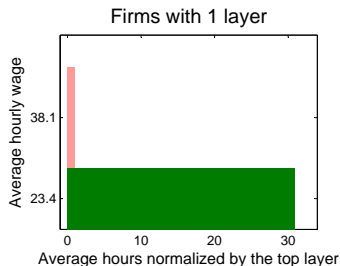
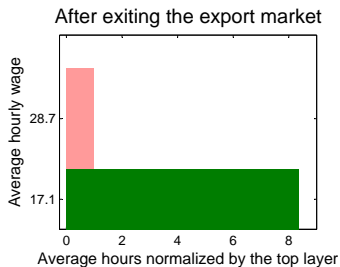
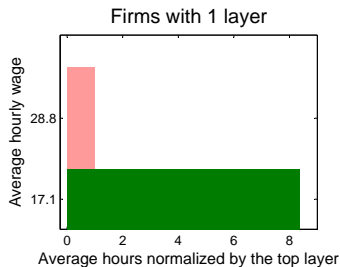
▶ Back

Average behavior of firms that exit the export market

	All	Decrease L	No change in L
dln hours	-0.025***	-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

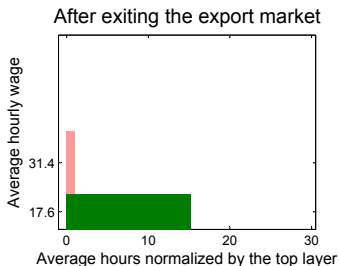
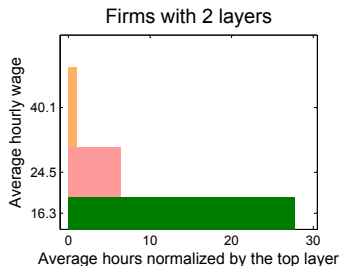
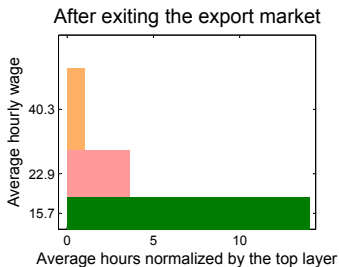
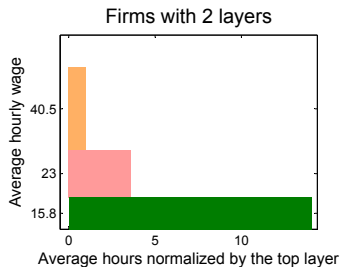
All results from trimmed sample at 0.05%. ** significant at 5%, *** significant at 1%.

Representative exporters for one layer transitions



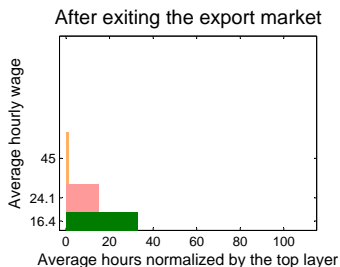
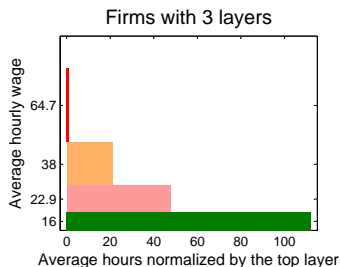
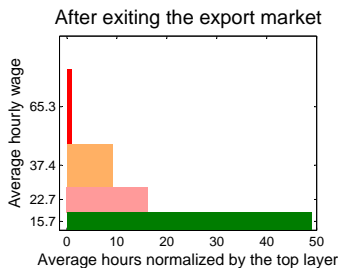
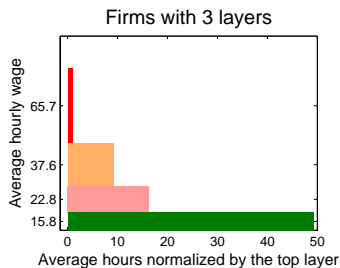
▶ Back

Representative exporters for one layer transitions



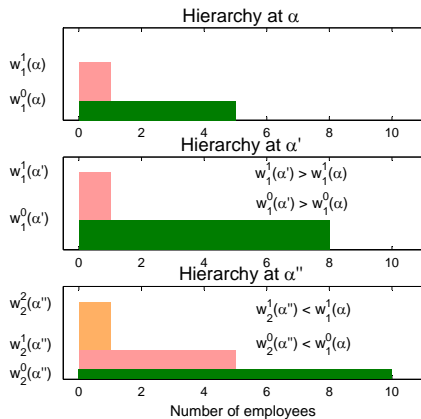
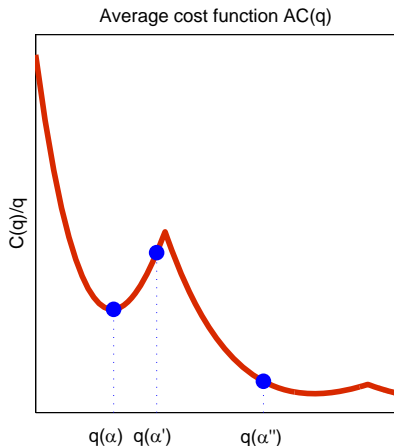
▶ Back

Representative exporters for one layer transitions



▶ Back

The average cost function as a function of q



▶ 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

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%.

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