# The Anatomy of French Production Hierarchies*

# ONLINE APPENDIX

# (Not for publication)

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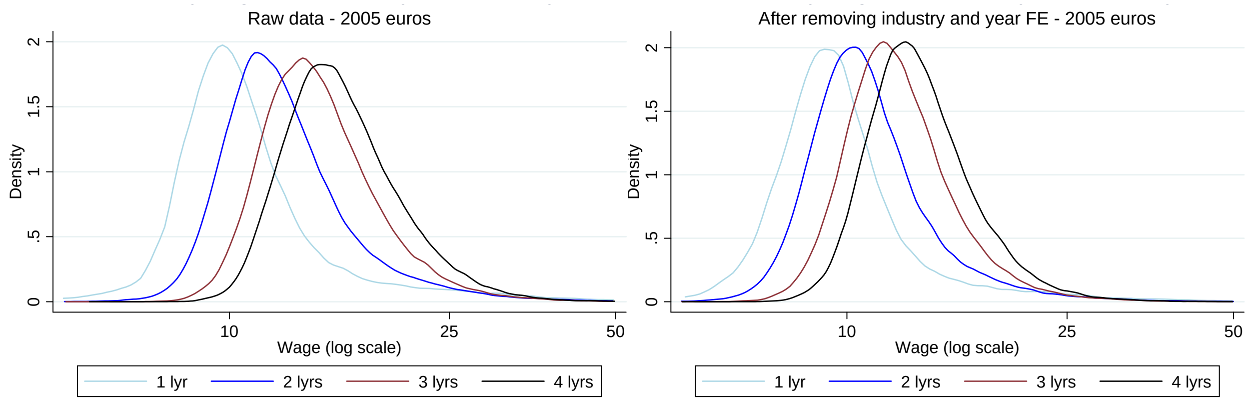
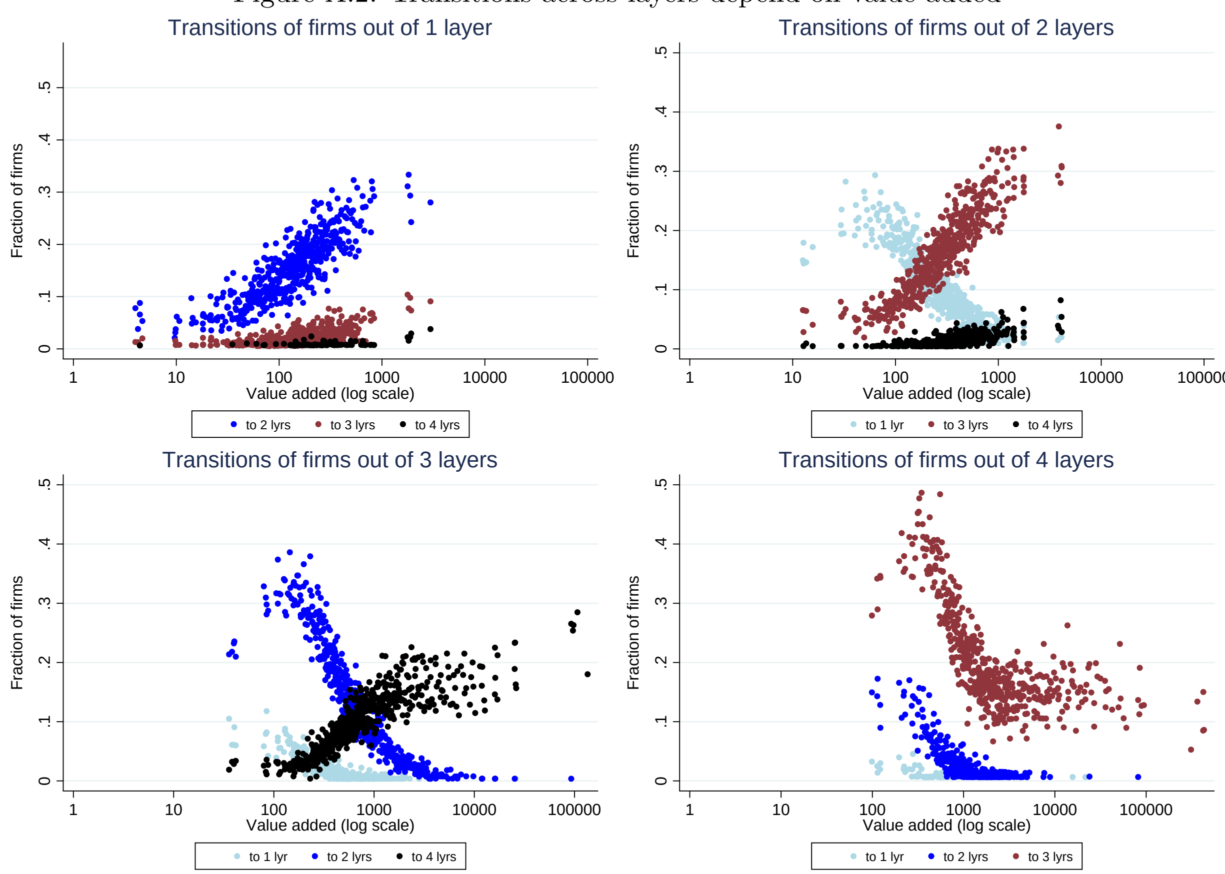
# 1 Online Appendix A

Figure A.1: Firm average hourly wage distribution by number of layers, DADS wages



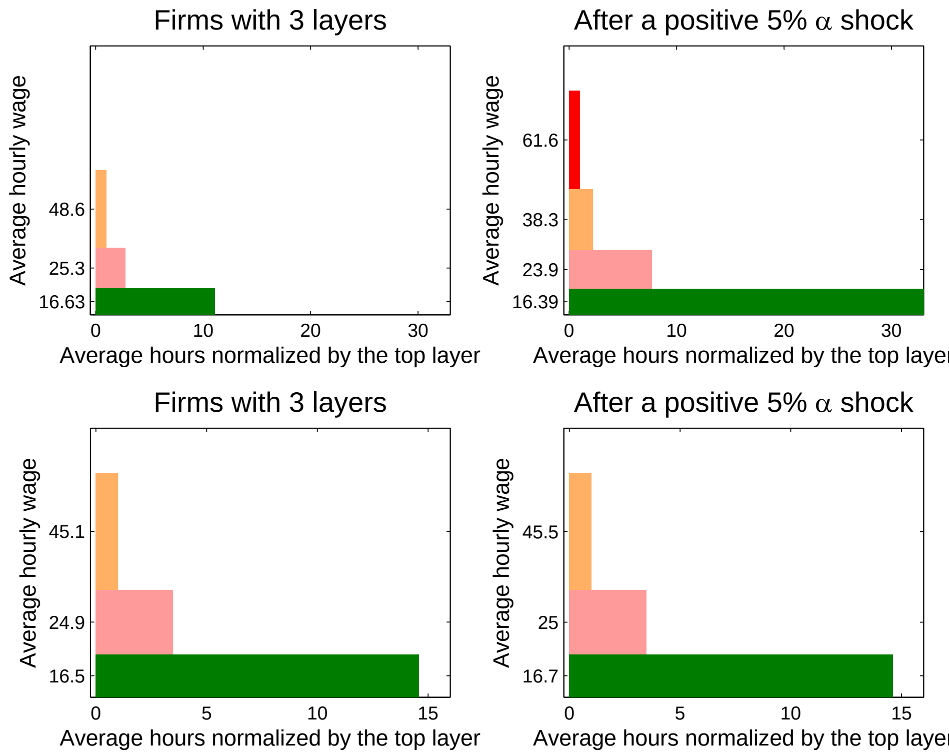

These figures report kernel density estimates of the distribution of log hourly wage by number of layers in the firm using wages from DADS. See note to Figure 2 for a description of how the densities are computed.

Figure A.2: Transitions across layers depend on value added



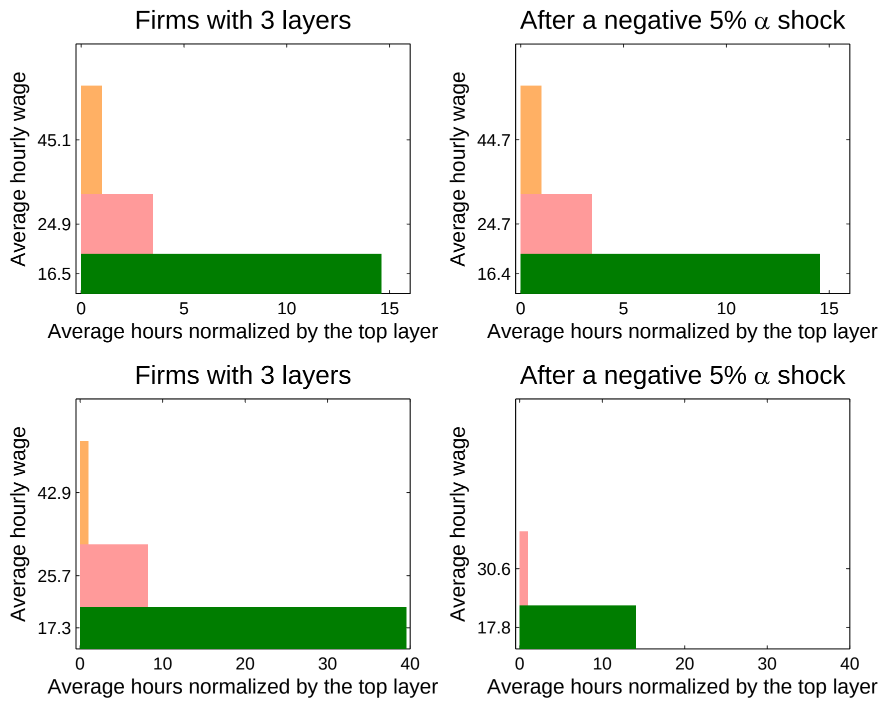

These figures show the probability of transition away from the current layer as a function of the initial value added of the firm. Each panel reports transition probabilities starting from a different initial number of layers. To produce the panel of transitions out of layer L=1,...,4, we take for each year (from 2002 to 2006) all the firms with L layers and group them into 100 bins according to their value added; for each bin, we compute the fraction of firms that will have any number of layers (or exit the dataset) in the following period and plot the average value added in the bin against this fraction.

Figure A.3: Transition after a positive alpha shock



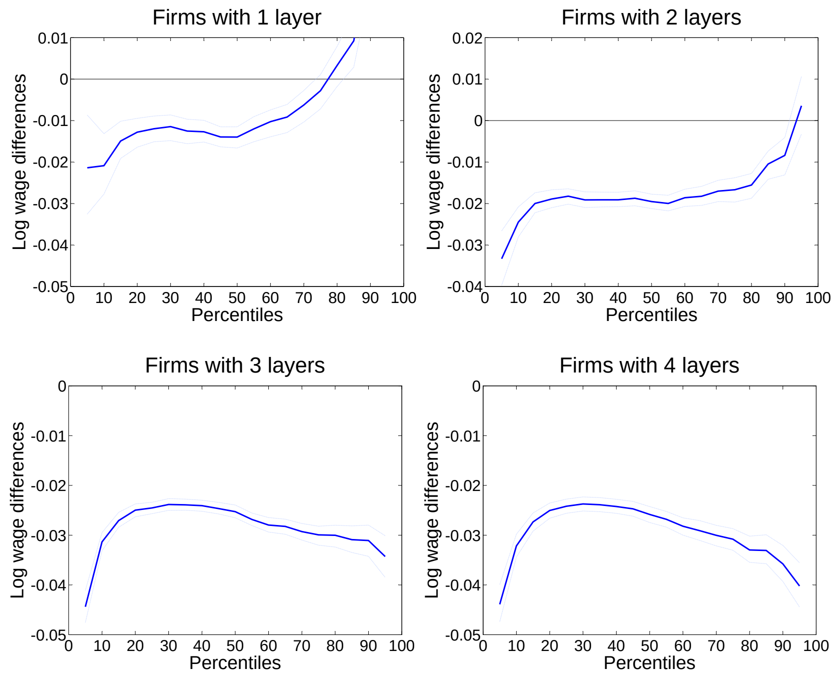

These figures show the change in the hierarchical structure of a firm with 3 layers associated with a 5% increase in value added when the firm adds a fourth layer (first row) or stays at 3 layers (second row). To estimate the hierarchies before and after a transition (first row of graph), we consider only the subset of firms with 3 layers that will become 4 layers the following period, increasing value added and total hours, and build the representative hierarchy of these firms as in Figure 5. To estimate the representative hierarchy after the transition, we regress the detrended log change in layer level outcomes (normalized hours and hourly wage for each layer ℓ=1,2,3) on a set of three dummies (one for each tercile) and log change in value added, using the same subset of firms; again, to mitigate the impact of outliers, each of the six regressions are run on the subsample of firms trimmed of the observations below the $0.05^{th}$ and above the $99.95^{th}$ percentile of each variable. Each layer level quantity after the transition is computed as the layer level quantity before the transition times the exponential of the predicted log change for a firm in the middle tercile following a 5% change in value added. The average hourly wage of the fourth layer after the transition is computed using changes in the top layer (consistent with Figures 11-13), following the same procedure described here. To estimate the change in the hierarchy for firms that do not transition (second row of graph) we proceed as follows. We compute the representative hierarchy before the transition using firms in the middle tercile of value added among those that do not transition. To compute the change in each layer level outcome we regress the change in log outcome on change in log value added (both detrended) with no constant, using the set of all firms staying at 3 layers (trimming as above); each layer level quantity after the transition is computed as the layer level quantity before the transition times the exponential of the predicted log change associated with a 5% increase in value added.

Figure A.4: Transition after a negative alpha shock




These figures show the change in the hierarchical structure of a firm with 3 layers associated with a 5% decrease in value added when the firm drops a layer (first row) or stays at 3 layers (second row). To estimate the hierarchies before and after a transition we follow the same procedure as in Figure A.3.

Figure A.5: Difference in the distribution of wages for firms that do not transition and $dlnVA < 0$




This figure portrays the estimated log change (on the y-axis) in the percentiles (on the x-axis) of the wage distribution within firms, for firms staying at a given number of layers in two consecutive years and negative change in value added. 95% bootstrapped confidence intervals are plotted. To build it we follow the same process described in Figure 8.

Table A.1: Data description by number of layers in the firm, DADS data (2005 Euros)

| Number of layers | Firm-years | Average VA | Average Hours | Average Wage | Median wage |
|---|---|---|---|---|---|
| 1 | 80,326 | 201 | 7,656 | 11.72 | 10.16 |
| 2 | 124,448 | 401 | 15,706 | 13.21 | 12.07 |
| 3 | 160,030 | 2,834 | 80,488 | 15.07 | 14.14 |
| 4 | 86,671 | 8,916 | 211,098 | 16.53 | 15.55 |

This table reports summary statistics on firm-level outcomes, grouping firm-year observations according to the number of layers reported. Firm-years is the number of firm-years observations in the data with the given number of layers. VA is the average value added from the firm's balance sheet. Hours is the average number of total hours from the DADS source. Wage is the average hourly wage from DADS in 2005 euros. Median Wage is the median across all firms in the cell of the average hourly wage from DADS source in 2005 euros. VA is Value added is in thousands of 2005 euros.

Table A.2: % of firms that transition to a consecutive layer

| # of layers = | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Transition up | 75.52 | 82.33 | 100 | - |
| Transition down | - | 91.51 | 60.57 | 75.88 |

This table reports the fraction of firms that have consecutively ordered at time t+1, conditional on having consecutively ordered layers at time t. Transition Up reports, among all firms with L consecutively ordered layers in any year (from 2002 to 2006) that stay in the sample the year after, the fraction of those moving to L+1 consecutively ordered layers, with L=1,2,3. Transition Down reports, among all firms with L consecutively ordered layers in any year (from 2002 to 2006) that stay in the sample the year after, the fraction of those moving to L-1 consecutively ordered layers, with L=2,3,4.

Table A.3: Distribution of layers at t+1 conditional on layers at t (Weighted by VA)

| | | Number of layers at t+1: Exit | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|---|---|
| Number of layers at t | 1 | 11.30 | 65.26 | 19.51 | 3.31 | 0.62 | 100 |
| | 2 | 7.10 | 6.55 | 62.70 | 21.52 | 2.13 | 100 |
| | 3 | 5.79 | 0.15 | 2.38 | 72.62 | 19.06 | 100 |
| | 4 | 7.66 | 0.02 | 0.18 | 13.36 | 78.78 | 100 |

This table reports the distribution of the number of layers at time t+1, grouping firms according to the number of layers at time t. Among all firms with L layers (L=1,...,4) in any year from 2002 to 2006, the columns report the fraction of firms that have layers 1,...,4 the following year (from 2003 to 2007), or are not present in the dataset, Exit. The elements in the table sum to 100% by row. Each firm is weighted according to the share of its value added.

## Change in normalized hours for firms that change layers (Robustness checks)

Table A.4:

Conditioning on $d\ln VA > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.525 | 0.025 | 0.00 | 5331 |
| 1 | 3 | 1 | 1.745 | 0.075 | 0.00 | 709 |
| 1 | 4 | 1 | 2.654 | 0.263 | 0.00 | 65 |
| 2 | 1 | 1 | -1.528 | 0.023 | 0.00 | 6376 |
| 2 | 3 | 1 | 0.720 | 0.016 | 0.00 | 9077 |
| 2 | 3 | 2 | 0.543 | 0.016 | 0.00 | 9077 |
| 2 | 4 | 1 | 1.236 | 0.065 | 0.00 | 623 |
| 2 | 4 | 2 | 1.036 | 0.065 | 0.00 | 623 |
| 3 | 1 | 1 | -1.759 | 0.060 | 0.00 | 991 |
| 3 | 2 | 1 | -0.676 | 0.016 | 0.00 | 9609 |
| 3 | 2 | 2 | -0.506 | 0.017 | 0.00 | 9609 |
| 3 | 4 | 1 | 1.358 | 0.020 | 0.00 | 7417 |
| 3 | 4 | 2 | 1.288 | 0.021 | 0.00 | 7417 |
| 3 | 4 | 3 | 1.173 | 0.022 | 0.00 | 7417 |
| 4 | 1 | 1 | -2.347 | 0.182 | 0.00 | 74 |
| 4 | 2 | 1 | -1.115 | 0.054 | 0.00 | 838 |
| 4 | 2 | 2 | -1.003 | 0.053 | 0.00 | 838 |
| 4 | 3 | 1 | -1.375 | 0.019 | 0.00 | 8127 |
| 4 | 3 | 2 | -1.290 | 0.021 | 0.00 | 8127 |
| 4 | 3 | 3 | -1.226 | 0.021 | 0.00 | 8127 |

We build this table following the same process described in Table 12. This table conditions on positive changes in value added.

Table A.5:

Conditioning on $d\ln VA > 0$ & $d\ln\sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.510 | 0.030 | 0.00 | 3628 |
| 1 | 3 | 1 | 1.789 | 0.088 | 0.00 | 535 |
| 1 | 4 | 1 | 2.952 | 0.312 | 0.00 | 43 |
| 2 | 1 | 1 | -1.512 | 0.027 | 0.00 | 4498 |
| 2 | 3 | 1 | 0.765 | 0.019 | 0.00 | 6135 |
| 2 | 3 | 2 | 0.541 | 0.020 | 0.00 | 6135 |
| 2 | 4 | 1 | 1.319 | 0.080 | 0.00 | 415 |
| 2 | 4 | 2 | 0.991 | 0.078 | 0.00 | 415 |
| 3 | 1 | 1 | -1.725 | 0.065 | 0.00 | 761 |
| 3 | 2 | 1 | -0.711 | 0.020 | 0.00 | 6577 |
| 3 | 2 | 2 | -0.516 | 0.020 | 0.00 | 6577 |
| 3 | 4 | 1 | 1.339 | 0.024 | 0.00 | 4675 |
| 3 | 4 | 2 | 1.249 | 0.026 | 0.00 | 4675 |
| 3 | 4 | 3 | 1.122 | 0.026 | 0.00 | 4675 |
| 4 | 1 | 1 | -2.237 | 0.195 | 0.00 | 59 |
| 4 | 2 | 1 | -1.188 | 0.063 | 0.00 | 607 |
| 4 | 2 | 2 | -1.039 | 0.061 | 0.00 | 607 |
| 4 | 3 | 1 | -1.413 | 0.023 | 0.00 | 5442 |
| 4 | 3 | 2 | -1.315 | 0.025 | 0.00 | 5442 |
| 4 | 3 | 3 | -1.223 | 0.025 | 0.00 | 5442 |

We build this table following the same process described in Table 12. This table conditions on positive changes in value added and total hours.

Table A.6:

Conditioning on $d\ln\sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.478 | 0.024 | 0.00 | 5672 |
| 1 | 3 | 1 | 1.716 | 0.071 | 0.00 | 803 |
| 1 | 4 | 1 | 2.674 | 0.264 | 0.00 | 57 |
| 2 | 1 | 1 | -1.513 | 0.022 | 0.00 | 6604 |
| 2 | 3 | 1 | 0.754 | 0.015 | 0.00 | 9140 |
| 2 | 3 | 2 | 0.521 | 0.016 | 0.00 | 9140 |
| 2 | 4 | 1 | 1.324 | 0.067 | 0.00 | 624 |
| 2 | 4 | 2 | 0.975 | 0.063 | 0.00 | 624 |
| 3 | 1 | 1 | -1.731 | 0.057 | 0.00 | 1051 |
| 3 | 2 | 1 | -0.708 | 0.016 | 0.00 | 9885 |
| 3 | 2 | 2 | -0.495 | 0.016 | 0.00 | 9885 |
| 3 | 4 | 1 | 1.315 | 0.019 | 0.00 | 7187 |
| 3 | 4 | 2 | 1.213 | 0.021 | 0.00 | 7187 |
| 3 | 4 | 3 | 1.094 | 0.021 | 0.00 | 7187 |
| 4 | 1 | 1 | -2.096 | 0.205 | 0.00 | 87 |
| 4 | 2 | 1 | -1.135 | 0.052 | 0.00 | 883 |
| 4 | 2 | 2 | -0.960 | 0.051 | 0.00 | 883 |
| 4 | 3 | 1 | -1.468 | 0.019 | 0.00 | 8387 |
| 4 | 3 | 2 | -1.375 | 0.021 | 0.00 | 8387 |
| 4 | 3 | 3 | -1.265 | 0.021 | 0.00 | 8387 |

We build this table following the same process described in Table 12. This table conditions on positive changes in total hours.

Table A.7:

Conditioning on $d\ln\sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.537 | 0.018 | 0.00 | 10177 |
| 1 | 3 | 1 | 1.762 | 0.056 | 0.00 | 1263 |
| 1 | 4 | 1 | 2.266 | 0.212 | 0.00 | 97 |
| 2 | 1 | 1 | -1.582 | 0.017 | 0.00 | 11106 |
| 2 | 3 | 1 | 1.106 | 0.012 | 0.00 | 13500 |
| 2 | 3 | 2 | 0.808 | 0.013 | 0.00 | 13500 |
| 2 | 4 | 1 | 1.408 | 0.048 | 0.00 | 1033 |
| 2 | 4 | 2 | 1.132 | 0.048 | 0.00 | 1033 |
| 3 | 1 | 1 | -1.795 | 0.048 | 0.00 | 1584 |
| 3 | 2 | 1 | -1.137 | 0.012 | 0.00 | 13852 |
| 3 | 2 | 2 | -0.825 | 0.014 | 0.00 | 13852 |
| 3 | 4 | 1 | 1.684 | 0.015 | 0.00 | 11876 |
| 3 | 4 | 2 | 1.648 | 0.016 | 0.00 | 11876 |
| 3 | 4 | 3 | 1.467 | 0.017 | 0.00 | 11876 |
| 4 | 1 | 1 | -2.119 | 0.173 | 0.00 | 123 |
| 4 | 2 | 1 | -1.306 | 0.039 | 0.00 | 1303 |
| 4 | 2 | 2 | -1.056 | 0.042 | 0.00 | 1303 |
| 4 | 3 | 1 | -1.773 | 0.014 | 0.00 | 12760 |
| 4 | 3 | 2 | -1.730 | 0.015 | 0.00 | 12760 |
| 4 | 3 | 3 | -1.560 | 0.016 | 0.00 | 12760 |

We build this table following the same process described in Table 12. This table conditions on positive changes in total normalized hours.

**Change in normalized hours for firms that change layers (Robustness checks)**

Table A.8:

Conditioning on $d \ln VA > 0$ & $d \ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.111 | 0.006 | 0.00 | 5331 |
| 1 | 3 | 1 | -0.314 | 0.026 | 0.00 | 709 |
| 1 | 4 | 1 | -0.594 | 0.127 | 0.00 | 65 |
| 2 | 1 | 1 | 0.168 | 0.007 | 0.00 | 6376 |
| 2 | 3 | 1 | -0.017 | 0.003 | 0.00 | 7492 |
| 2 | 3 | 2 | -0.184 | 0.005 | 0.00 | 7492 |
| 2 | 4 | 1 | -0.133 | 0.021 | 0.00 | 587 |
| 2 | 4 | 2 | -0.378 | 0.026 | 0.00 | 587 |
| 3 | 1 | 1 | 0.358 | 0.024 | 0.00 | 991 |
| 3 | 2 | 1 | 0.030 | 0.004 | 0.00 | 7672 |
| 3 | 2 | 2 | 0.165 | 0.005 | 0.00 | 7672 |
| 3 | 4 | 1 | 0.005 | 0.003 | 0.10 | 6417 |
| 3 | 4 | 2 | -0.026 | 0.004 | 0.00 | 6417 |
| 3 | 4 | 3 | -0.134 | 0.006 | 0.00 | 6417 |
| 4 | 1 | 1 | 0.756 | 0.141 | 0.00 | 74 |
| 4 | 2 | 1 | 0.126 | 0.020 | 0.00 | 751 |
| 4 | 2 | 2 | 0.332 | 0.023 | 0.00 | 751 |
| 4 | 3 | 1 | -0.018 | 0.003 | 0.00 | 6926 |
| 4 | 3 | 2 | -0.001 | 0.004 | 0.77 | 6926 |
| 4 | 3 | 3 | 0.063 | 0.005 | 0.00 | 6926 |

We build this table following the same process described in Table 12. This table conditions on positive changes in value added and total normalized hours.

Selected sample with consecutively ordered layers

Table A.9:

Consecutively ordered layers

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.807 | 0.019 | 0.00 | 6675 |
| 1 | 3 | 1 | 2.398 | 0.061 | 0.00 | 780 |
| 1 | 4 | 1 | 2.650 | 0.206 | 0.00 | 72 |
| 2 | 1 | 1 | -1.843 | 0.019 | 0.00 | 6886 |
| 2 | 3 | 1 | 1.251 | 0.017 | 0.00 | 8260 |
| 2 | 3 | 2 | 1.092 | 0.017 | 0.00 | 8260 |
| 2 | 4 | 1 | 1.665 | 0.062 | 0.00 | 580 |
| 2 | 4 | 2 | 1.521 | 0.062 | 0.00 | 580 |
| 3 | 1 | 1 | -2.288 | 0.058 | 0.00 | 908 |
| 3 | 2 | 1 | -1.272 | 0.018 | 0.00 | 8125 |
| 3 | 2 | 2 | -1.142 | 0.018 | 0.00 | 8125 |
| 3 | 4 | 1 | 1.859 | 0.017 | 0.00 | 10155 |
| 3 | 4 | 2 | 1.852 | 0.018 | 0.00 | 10155 |
| 3 | 4 | 3 | 1.692 | 0.018 | 0.00 | 10155 |
| 4 | 1 | 1 | -2.468 | 0.156 | 0.00 | 89 |
| 4 | 2 | 1 | -1.478 | 0.053 | 0.00 | 766 |
| 4 | 2 | 2 | -1.400 | 0.053 | 0.00 | 766 |
| 4 | 3 | 1 | -1.879 | 0.016 | 0.00 | 11503 |
| 4 | 3 | 2 | -1.855 | 0.017 | 0.00 | 11503 |
| 4 | 3 | 3 | -1.735 | 0.016 | 0.00 | 11503 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers.

Table A.10:

Conditioning on $d \ln VA > 0$ & $d \ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.838 | 0.025 | 0.00 | 3568 |
| 1 | 3 | 1 | 2.394 | 0.083 | 0.00 | 437 |
| 1 | 4 | 1 | 3.023 | 0.272 | 0.00 | 47 |
| 2 | 1 | 1 | -1.827 | 0.025 | 0.00 | 3787 |
| 2 | 3 | 1 | 1.516 | 0.021 | 0.00 | 4104 |
| 2 | 3 | 2 | 1.256 | 0.023 | 0.00 | 4104 |
| 2 | 4 | 1 | 1.813 | 0.083 | 0.00 | 300 |
| 2 | 4 | 2 | 1.636 | 0.085 | 0.00 | 300 |
| 3 | 1 | 1 | -2.223 | 0.074 | 0.00 | 546 |
| 3 | 2 | 1 | -1.579 | 0.023 | 0.00 | 3822 |
| 3 | 2 | 2 | -1.333 | 0.025 | 0.00 | 3822 |
| 3 | 4 | 1 | 2.002 | 0.022 | 0.00 | 5087 |
| 3 | 4 | 2 | 1.992 | 0.023 | 0.00 | 5087 |
| 3 | 4 | 3 | 1.786 | 0.025 | 0.00 | 5087 |
| 4 | 1 | 1 | -2.428 | 0.199 | 0.00 | 54 |
| 4 | 2 | 1 | -1.680 | 0.064 | 0.00 | 420 |
| 4 | 2 | 2 | -1.571 | 0.067 | 0.00 | 420 |
| 4 | 3 | 1 | -2.028 | 0.021 | 0.00 | 5673 |
| 4 | 3 | 2 | -1.998 | 0.022 | 0.00 | 5673 |
| 4 | 3 | 3 | -1.838 | 0.022 | 0.00 | 5673 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers, positive change in value added and total normalized hours.

## Change in normalized hours for firms that change layers (Robustness checks)

Selected sample with consecutively ordered layers

Table A.11:

Conditioning on $d\ln VA > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.838 | 0.025 | 0.00 | 3568 |
| 1 | 3 | 1 | 2.394 | 0.083 | 0.00 | 437 |
| 1 | 4 | 1 | 3.023 | 0.272 | 0.00 | 47 |
| 2 | 1 | 1 | -1.827 | 0.025 | 0.00 | 3787 |
| 2 | 3 | 1 | 1.252 | 0.023 | 0.00 | 4550 |
| 2 | 3 | 2 | 1.102 | 0.023 | 0.00 | 4550 |
| 2 | 4 | 1 | 1.707 | 0.087 | 0.00 | 311 |
| 2 | 4 | 2 | 1.553 | 0.087 | 0.00 | 311 |
| 3 | 1 | 1 | -2.223 | 0.074 | 0.00 | 546 |
| 3 | 2 | 1 | -1.267 | 0.025 | 0.00 | 4293 |
| 3 | 2 | 2 | -1.137 | 0.024 | 0.00 | 4293 |
| 3 | 4 | 1 | 1.852 | 0.023 | 0.00 | 5387 |
| 3 | 4 | 2 | 1.833 | 0.024 | 0.00 | 5387 |
| 3 | 4 | 3 | 1.670 | 0.024 | 0.00 | 5387 |
| 4 | 1 | 1 | -2.428 | 0.199 | 0.00 | 54 |
| 4 | 2 | 1 | -1.515 | 0.070 | 0.00 | 444 |
| 4 | 2 | 2 | -1.477 | 0.067 | 0.00 | 444 |
| 4 | 3 | 1 | -1.845 | 0.022 | 0.00 | 6077 |
| 4 | 3 | 2 | -1.810 | 0.023 | 0.00 | 6077 |
| 4 | 3 | 3 | -1.703 | 0.022 | 0.00 | 6077 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers and positive change in value added.

Table A.12:

Conditioning on $d\ln VA > 0$ & $d\ln \sum_{\ell=1}^{L} N_L^\ell > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.868 | 0.030 | 0.00 | 2494 |
| 1 | 3 | 1 | 2.595 | 0.093 | 0.00 | 328 |
| 1 | 4 | 1 | 3.534 | 0.373 | 0.00 | 26 |
| 2 | 1 | 1 | -1.862 | 0.030 | 0.00 | 2600 |
| 2 | 3 | 1 | 1.315 | 0.027 | 0.00 | 3062 |
| 2 | 3 | 2 | 1.110 | 0.027 | 0.00 | 3062 |
| 2 | 4 | 1 | 1.840 | 0.103 | 0.00 | 200 |
| 2 | 4 | 2 | 1.528 | 0.104 | 0.00 | 200 |
| 3 | 1 | 1 | -2.240 | 0.082 | 0.00 | 398 |
| 3 | 2 | 1 | -1.320 | 0.030 | 0.00 | 2855 |
| 3 | 2 | 2 | -1.170 | 0.029 | 0.00 | 2855 |
| 3 | 4 | 1 | 1.814 | 0.028 | 0.00 | 3388 |
| 3 | 4 | 2 | 1.785 | 0.030 | 0.00 | 3388 |
| 3 | 4 | 3 | 1.582 | 0.030 | 0.00 | 3388 |
| 4 | 1 | 1 | -2.291 | 0.207 | 0.00 | 39 |
| 4 | 2 | 1 | -1.551 | 0.080 | 0.00 | 315 |
| 4 | 2 | 2 | -1.484 | 0.076 | 0.00 | 315 |
| 4 | 3 | 1 | -1.878 | 0.027 | 0.00 | 4086 |
| 4 | 3 | 2 | -1.824 | 0.028 | 0.00 | 4086 |
| 4 | 3 | 3 | -1.686 | 0.027 | 0.00 | 4086 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers, positive change in value added and total hours.

Table A.13:

Conditioning on $d\ln \sum_{\ell=1}^{L} N_L^\ell > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.850 | 0.024 | 0.00 | 3819 |
| 1 | 3 | 1 | 2.545 | 0.076 | 0.00 | 467 |
| 1 | 4 | 1 | 3.242 | 0.300 | 0.00 | 35 |
| 2 | 1 | 1 | -1.861 | 0.025 | 0.00 | 3888 |
| 2 | 3 | 1 | 1.314 | 0.022 | 0.00 | 4431 |
| 2 | 3 | 2 | 1.093 | 0.022 | 0.00 | 4431 |
| 2 | 4 | 1 | 1.806 | 0.083 | 0.00 | 302 |
| 2 | 4 | 2 | 1.477 | 0.083 | 0.00 | 302 |
| 3 | 1 | 1 | -2.289 | 0.072 | 0.00 | 543 |
| 3 | 2 | 1 | -1.308 | 0.024 | 0.00 | 4309 |
| 3 | 2 | 2 | -1.141 | 0.024 | 0.00 | 4309 |
| 3 | 4 | 1 | 1.791 | 0.022 | 0.00 | 5164 |
| 3 | 4 | 2 | 1.751 | 0.024 | 0.00 | 5164 |
| 3 | 4 | 3 | 1.550 | 0.024 | 0.00 | 5164 |
| 4 | 1 | 1 | -2.431 | 0.192 | 0.00 | 56 |
| 4 | 2 | 1 | -1.532 | 0.067 | 0.00 | 446 |
| 4 | 2 | 2 | -1.425 | 0.066 | 0.00 | 446 |
| 4 | 3 | 1 | -1.940 | 0.021 | 0.00 | 6338 |
| 4 | 3 | 2 | -1.893 | 0.022 | 0.00 | 6338 |
| 4 | 3 | 3 | -1.741 | 0.022 | 0.00 | 6338 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers and positive change in total hours.

Table A.14:

Conditioning on $d\ln \sum_{\ell=1}^{L} n_L^\ell > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1.807 | 0.019 | 0.00 | 6675 |
| 1 | 3 | 1 | 2.398 | 0.061 | 0.00 | 780 |
| 1 | 4 | 1 | 2.650 | 0.206 | 0.00 | 72 |
| 2 | 1 | 1 | -1.843 | 0.019 | 0.00 | 6886 |
| 2 | 3 | 1 | 1.529 | 0.016 | 0.00 | 7384 |
| 2 | 3 | 2 | 1.266 | 0.018 | 0.00 | 7384 |
| 2 | 4 | 1 | 1.794 | 0.059 | 0.00 | 554 |
| 2 | 4 | 2 | 1.615 | 0.061 | 0.00 | 554 |
| 3 | 1 | 1 | -2.288 | 0.058 | 0.00 | 908 |
| 3 | 2 | 1 | -1.585 | 0.016 | 0.00 | 7204 |
| 3 | 2 | 2 | -1.342 | 0.018 | 0.00 | 7204 |
| 3 | 4 | 1 | 2.028 | 0.016 | 0.00 | 9517 |
| 3 | 4 | 2 | 2.030 | 0.017 | 0.00 | 9517 |
| 3 | 4 | 3 | 1.825 | 0.018 | 0.00 | 9517 |
| 4 | 1 | 1 | -2.468 | 0.156 | 0.00 | 89 |
| 4 | 2 | 1 | -1.656 | 0.049 | 0.00 | 719 |
| 4 | 2 | 2 | -1.510 | 0.052 | 0.00 | 719 |
| 4 | 3 | 1 | -2.059 | 0.015 | 0.00 | 10754 |
| 4 | 3 | 2 | -2.040 | 0.016 | 0.00 | 10754 |
| 4 | 3 | 3 | -1.869 | 0.016 | 0.00 | 10754 |

We build this table following the same process described in Table 12. This table conditions on firms with consecutively ordered layers and positive change in normalized hours.

**Change in average wages for firms that change layers (Robustness checks)**

Table A.15:
Conditioning on $d\ln VA > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.111 | 0.006 | 0.00 | 5331 |
| 1 | 3 | 1 | -0.314 | 0.026 | 0.00 | 709 |
| 1 | 4 | 1 | -0.594 | 0.127 | 0.00 | 65 |
| 2 | 1 | 1 | 0.168 | 0.007 | 0.00 | 6376 |
| 2 | 3 | 1 | -0.021 | 0.003 | 0.00 | 9077 |
| 2 | 3 | 2 | -0.219 | 0.005 | 0.00 | 9077 |
| 2 | 4 | 1 | -0.127 | 0.020 | 0.00 | 623 |
| 2 | 4 | 2 | -0.379 | 0.025 | 0.00 | 623 |
| 3 | 1 | 1 | 0.358 | 0.024 | 0.00 | 991 |
| 3 | 2 | 1 | 0.035 | 0.004 | 0.00 | 9609 |
| 3 | 2 | 2 | 0.219 | 0.005 | 0.00 | 9609 |
| 3 | 4 | 1 | 0.006 | 0.003 | 0.03 | 7417 |
| 3 | 4 | 2 | -0.034 | 0.004 | 0.00 | 7417 |
| 3 | 4 | 3 | -0.166 | 0.006 | 0.00 | 7417 |
| 4 | 1 | 1 | 0.756 | 0.141 | 0.00 | 74 |
| 4 | 2 | 1 | 0.123 | 0.018 | 0.00 | 838 |
| 4 | 2 | 2 | 0.351 | 0.022 | 0.00 | 838 |
| 4 | 3 | 1 | -0.020 | 0.003 | 0.00 | 8127 |
| 4 | 3 | 2 | 0.008 | 0.004 | 0.04 | 8127 |
| 4 | 3 | 3 | 0.099 | 0.005 | 0.00 | 8127 |

We build this table following the same process described in Table 13. This table conditions on positive changes in value added.

Table A.16:
Conditioning on $d\ln VA > 0$ & $d\ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.194 | 0.008 | 0.00 | 3628 |
| 1 | 3 | 1 | -0.417 | 0.032 | 0.00 | 535 |
| 1 | 4 | 1 | -0.872 | 0.170 | 0.00 | 43 |
| 2 | 1 | 1 | 0.270 | 0.008 | 0.00 | 4498 |
| 2 | 3 | 1 | -0.064 | 0.004 | 0.00 | 6135 |
| 2 | 3 | 2 | -0.263 | 0.006 | 0.00 | 6135 |
| 2 | 4 | 1 | -0.216 | 0.027 | 0.00 | 415 |
| 2 | 4 | 2 | -0.496 | 0.031 | 0.00 | 415 |
| 3 | 1 | 1 | 0.486 | 0.029 | 0.00 | 761 |
| 3 | 2 | 1 | 0.093 | 0.005 | 0.00 | 6577 |
| 3 | 2 | 2 | 0.274 | 0.006 | 0.00 | 6577 |
| 3 | 4 | 1 | -0.027 | 0.004 | 0.00 | 4675 |
| 3 | 4 | 2 | -0.073 | 0.005 | 0.00 | 4675 |
| 3 | 4 | 3 | -0.211 | 0.007 | 0.00 | 4675 |
| 4 | 1 | 1 | 0.963 | 0.166 | 0.00 | 59 |
| 4 | 2 | 1 | 0.191 | 0.023 | 0.00 | 607 |
| 4 | 2 | 2 | 0.423 | 0.026 | 0.00 | 607 |
| 4 | 3 | 1 | 0.020 | 0.004 | 0.00 | 5442 |
| 4 | 3 | 2 | 0.048 | 0.005 | 0.00 | 5442 |
| 4 | 3 | 3 | 0.138 | 0.006 | 0.00 | 5442 |

We build this table following the same process described in Table 13. This table conditions on positive changes in value added and total hours.

Table A.17:
Conditioning on $d\ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.254 | 0.006 | 0.00 | 5672 |
| 1 | 3 | 1 | -0.517 | 0.028 | 0.00 | 803 |
| 1 | 4 | 1 | -1.120 | 0.169 | 0.00 | 57 |
| 2 | 1 | 1 | 0.287 | 0.007 | 0.00 | 6604 |
| 2 | 3 | 1 | -0.113 | 0.004 | 0.00 | 9140 |
| 2 | 3 | 2 | -0.320 | 0.005 | 0.00 | 9140 |
| 2 | 4 | 1 | -0.281 | 0.024 | 0.00 | 624 |
| 2 | 4 | 2 | -0.552 | 0.026 | 0.00 | 624 |
| 3 | 1 | 1 | 0.526 | 0.025 | 0.00 | 1051 |
| 3 | 2 | 1 | 0.121 | 0.004 | 0.00 | 9885 |
| 3 | 2 | 2 | 0.306 | 0.005 | 0.00 | 9885 |
| 3 | 4 | 1 | -0.065 | 0.004 | 0.00 | 7187 |
| 3 | 4 | 2 | -0.115 | 0.004 | 0.00 | 7187 |
| 3 | 4 | 3 | -0.254 | 0.006 | 0.00 | 7187 |
| 4 | 1 | 1 | 1.086 | 0.138 | 0.00 | 87 |
| 4 | 2 | 1 | 0.222 | 0.018 | 0.00 | 883 |
| 4 | 2 | 2 | 0.464 | 0.022 | 0.00 | 883 |
| 4 | 3 | 1 | 0.050 | 0.003 | 0.00 | 8387 |
| 4 | 3 | 2 | 0.079 | 0.004 | 0.00 | 8387 |
| 4 | 3 | 3 | 0.170 | 0.005 | 0.00 | 8387 |

We build this table following the same process described in Table 13. This table conditions on positive changes in total hours.

Table A.18:
Conditioning on $d\ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.129 | 0.005 | 0.00 | 10177 |
| 1 | 3 | 1 | -0.332 | 0.020 | 0.00 | 1263 |
| 1 | 4 | 1 | -0.678 | 0.117 | 0.00 | 97 |
| 2 | 1 | 1 | 0.167 | 0.005 | 0.00 | 11106 |
| 2 | 3 | 1 | -0.046 | 0.003 | 0.00 | 13500 |
| 2 | 3 | 2 | -0.211 | 0.004 | 0.00 | 13500 |
| 2 | 4 | 1 | -0.161 | 0.016 | 0.00 | 1033 |
| 2 | 4 | 2 | -0.399 | 0.020 | 0.00 | 1033 |
| 3 | 1 | 1 | 0.356 | 0.018 | 0.00 | 1584 |
| 3 | 2 | 1 | 0.054 | 0.003 | 0.00 | 13852 |
| 3 | 2 | 2 | 0.186 | 0.004 | 0.00 | 13852 |
| 3 | 4 | 1 | -0.024 | 0.003 | 0.00 | 11876 |
| 3 | 4 | 2 | -0.057 | 0.003 | 0.00 | 11876 |
| 3 | 4 | 3 | -0.162 | 0.004 | 0.00 | 11876 |
| 4 | 1 | 1 | 0.804 | 0.109 | 0.00 | 123 |
| 4 | 2 | 1 | 0.139 | 0.013 | 0.00 | 1303 |
| 4 | 2 | 2 | 0.351 | 0.016 | 0.00 | 1303 |
| 4 | 3 | 1 | 0.011 | 0.002 | 0.00 | 12760 |
| 4 | 3 | 2 | 0.027 | 0.003 | 0.00 | 12760 |
| 4 | 3 | 3 | 0.092 | 0.004 | 0.00 | 12760 |

We build this table following the same process described in Table 13. This table conditions on positive changes in total normalized hours.

## Change in average wages for firms that change layers (Robustness checks)

Table A.19:

Conditioning on $d\ln VA > 0$ & $d\ln\sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | # of layers After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.111 | 0.006 | 0.00 | 5331 |
| 1 | 3 | 1 | -0.314 | 0.026 | 0.00 | 709 |
| 1 | 4 | 1 | -0.594 | 0.127 | 0.00 | 65 |
| 2 | 1 | 1 | 0.168 | 0.007 | 0.00 | 6376 |
| 2 | 3 | 1 | -0.017 | 0.003 | 0.00 | 7492 |
| 2 | 3 | 2 | -0.184 | 0.005 | 0.00 | 7492 |
| 2 | 4 | 1 | -0.133 | 0.021 | 0.00 | 587 |
| 2 | 4 | 2 | -0.378 | 0.026 | 0.00 | 587 |
| 3 | 1 | 1 | 0.358 | 0.024 | 0.00 | 991 |
| 3 | 2 | 1 | 0.030 | 0.004 | 0.00 | 7672 |
| 3 | 2 | 2 | 0.165 | 0.005 | 0.00 | 7672 |
| 3 | 4 | 1 | 0.005 | 0.003 | 0.10 | 6417 |
| 3 | 4 | 2 | -0.026 | 0.004 | 0.00 | 6417 |
| 3 | 4 | 3 | -0.134 | 0.006 | 0.00 | 6417 |
| 4 | 1 | 1 | 0.756 | 0.141 | 0.00 | 74 |
| 4 | 2 | 1 | 0.126 | 0.020 | 0.00 | 751 |
| 4 | 2 | 2 | 0.332 | 0.023 | 0.00 | 751 |
| 4 | 3 | 1 | -0.018 | 0.003 | 0.00 | 6926 |
| 4 | 3 | 2 | -0.001 | 0.004 | 0.77 | 6926 |
| 4 | 3 | 3 | 0.063 | 0.005 | 0.00 | 6926 |

We build this table following the same process described in Table 13. This table conditions on positive changes in value added and total normalized hours.

Selected sample with consecutively ordered layers

Table A.20:

Consecutively ordered layers

| # of layers Before | # of layers After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.066 | 0.005 | 0.00 | 6675 |
| 1 | 3 | 1 | -0.170 | 0.022 | 0.00 | 780 |
| 1 | 4 | 1 | -0.372 | 0.119 | 0.00 | 72 |
| 2 | 1 | 1 | 0.102 | 0.005 | 0.00 | 6886 |
| 2 | 3 | 1 | -0.026 | 0.003 | 0.00 | 8260 |
| 2 | 3 | 2 | -0.075 | 0.004 | 0.00 | 8260 |
| 2 | 4 | 1 | -0.112 | 0.021 | 0.00 | 580 |
| 2 | 4 | 2 | -0.164 | 0.023 | 0.00 | 580 |
| 3 | 1 | 1 | 0.208 | 0.019 | 0.00 | 908 |
| 3 | 2 | 1 | 0.040 | 0.003 | 0.00 | 8125 |
| 3 | 2 | 2 | 0.082 | 0.004 | 0.00 | 8125 |
| 3 | 4 | 1 | -0.015 | 0.003 | 0.00 | 10155 |
| 3 | 4 | 2 | -0.028 | 0.003 | 0.00 | 10155 |
| 3 | 4 | 3 | -0.101 | 0.004 | 0.00 | 10155 |
| 4 | 1 | 1 | 0.478 | 0.113 | 0.00 | 89 |
| 4 | 2 | 1 | 0.122 | 0.016 | 0.00 | 766 |
| 4 | 2 | 2 | 0.147 | 0.018 | 0.00 | 766 |
| 4 | 3 | 1 | 0.007 | 0.003 | 0.01 | 11503 |
| 4 | 3 | 2 | 0.007 | 0.003 | 0.01 | 11503 |
| 4 | 3 | 3 | 0.054 | 0.004 | 0.00 | 11503 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers.

Table A.21:

Conditioning on $d\ln VA > 0$ & $d\ln\sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | # of layers After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.039 | 0.006 | 0.00 | 3568 |
| 1 | 3 | 1 | -0.157 | 0.029 | 0.00 | 437 |
| 1 | 4 | 1 | -0.293 | 0.129 | 0.03 | 47 |
| 2 | 1 | 1 | 0.093 | 0.007 | 0.00 | 3787 |
| 2 | 3 | 1 | 0.007 | 0.004 | 0.09 | 4104 |
| 2 | 3 | 2 | -0.040 | 0.005 | 0.00 | 4104 |
| 2 | 4 | 1 | -0.083 | 0.028 | 0.00 | 300 |
| 2 | 4 | 2 | -0.118 | 0.031 | 0.00 | 300 |
| 3 | 1 | 1 | 0.200 | 0.026 | 0.00 | 546 |
| 3 | 2 | 1 | 0.009 | 0.005 | 0.09 | 3822 |
| 3 | 2 | 2 | 0.039 | 0.006 | 0.00 | 3822 |
| 3 | 4 | 1 | 0.014 | 0.004 | 0.00 | 5087 |
| 3 | 4 | 2 | 0.007 | 0.004 | 0.12 | 5087 |
| 3 | 4 | 3 | -0.058 | 0.005 | 0.00 | 5087 |
| 4 | 1 | 1 | 0.449 | 0.148 | 0.00 | 54 |
| 4 | 2 | 1 | 0.104 | 0.023 | 0.00 | 420 |
| 4 | 2 | 2 | 0.123 | 0.024 | 0.00 | 420 |
| 4 | 3 | 1 | -0.023 | 0.004 | 0.00 | 5673 |
| 4 | 3 | 2 | -0.028 | 0.004 | 0.00 | 5673 |
| 4 | 3 | 3 | 0.007 | 0.005 | 0.13 | 5673 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers, positive change in value added and total normalized hours.

## Change in average wages for firms that change layers (Robustness checks)

Selected sample with consecutively ordered layers

Table A.22:

Conditioning on $d \ln VA > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.039 | 0.006 | 0.00 | 3568 |
| 1 | 3 | 1 | -0.157 | 0.029 | 0.00 | 437 |
| 1 | 4 | 1 | -0.293 | 0.129 | 0.03 | 47 |
| 2 | 1 | 1 | 0.093 | 0.007 | 0.00 | 3787 |
| 2 | 3 | 1 | 0.004 | 0.004 | 0.28 | 4550 |
| 2 | 3 | 2 | -0.039 | 0.005 | 0.00 | 4550 |
| 2 | 4 | 1 | -0.078 | 0.027 | 0.00 | 311 |
| 2 | 4 | 2 | -0.108 | 0.030 | 0.00 | 311 |
| 3 | 1 | 1 | 0.200 | 0.026 | 0.00 | 546 |
| 3 | 2 | 1 | 0.015 | 0.005 | 0.00 | 4293 |
| 3 | 2 | 2 | 0.048 | 0.006 | 0.00 | 4293 |
| 3 | 4 | 1 | 0.014 | 0.004 | 0.00 | 5387 |
| 3 | 4 | 2 | 0.004 | 0.004 | 0.34 | 5387 |
| 3 | 4 | 3 | -0.066 | 0.005 | 0.00 | 5387 |
| 4 | 1 | 1 | 0.449 | 0.148 | 0.00 | 54 |
| 4 | 2 | 1 | 0.102 | 0.022 | 0.00 | 444 |
| 4 | 2 | 2 | 0.114 | 0.024 | 0.00 | 444 |
| 4 | 3 | 1 | -0.023 | 0.004 | 0.00 | 6077 |
| 4 | 3 | 2 | -0.027 | 0.004 | 0.00 | 6077 |
| 4 | 3 | 3 | 0.012 | 0.005 | 0.02 | 6077 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers and positive change in value added.

Table A.23:

Conditioning on $d \ln VA > 0$ & $d \ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.102 | 0.007 | 0.00 | 2494 |
| 1 | 3 | 1 | -0.229 | 0.035 | 0.00 | 328 |
| 1 | 4 | 1 | -0.567 | 0.215 | 0.01 | 26 |
| 2 | 1 | 1 | 0.180 | 0.009 | 0.00 | 2600 |
| 2 | 3 | 1 | -0.036 | 0.005 | 0.00 | 3062 |
| 2 | 3 | 2 | -0.081 | 0.006 | 0.00 | 3062 |
| 2 | 4 | 1 | -0.171 | 0.037 | 0.00 | 200 |
| 2 | 4 | 2 | -0.223 | 0.040 | 0.00 | 200 |
| 3 | 1 | 1 | 0.297 | 0.032 | 0.00 | 398 |
| 3 | 2 | 1 | 0.072 | 0.006 | 0.00 | 2855 |
| 3 | 2 | 2 | 0.103 | 0.007 | 0.00 | 2855 |
| 3 | 4 | 1 | -0.021 | 0.005 | 0.00 | 3388 |
| 3 | 4 | 2 | -0.032 | 0.005 | 0.00 | 3388 |
| 3 | 4 | 3 | -0.109 | 0.007 | 0.00 | 3388 |
| 4 | 1 | 1 | 0.644 | 0.194 | 0.00 | 39 |
| 4 | 2 | 1 | 0.177 | 0.029 | 0.00 | 315 |
| 4 | 2 | 2 | 0.193 | 0.030 | 0.00 | 315 |
| 4 | 3 | 1 | 0.018 | 0.004 | 0.00 | 4086 |
| 4 | 3 | 2 | 0.016 | 0.005 | 0.00 | 4086 |
| 4 | 3 | 3 | 0.056 | 0.006 | 0.00 | 4086 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers, positive change in value added and total hours.

Table A.24:

Conditioning on $d \ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.160 | 0.006 | 0.00 | 3819 |
| 1 | 3 | 1 | -0.305 | 0.031 | 0.00 | 467 |
| 1 | 4 | 1 | -0.829 | 0.215 | 0.00 | 35 |
| 2 | 1 | 1 | 0.200 | 0.007 | 0.00 | 3888 |
| 2 | 3 | 1 | -0.086 | 0.005 | 0.00 | 4431 |
| 2 | 3 | 2 | -0.132 | 0.005 | 0.00 | 4431 |
| 2 | 4 | 1 | -0.260 | 0.034 | 0.00 | 302 |
| 2 | 4 | 2 | -0.333 | 0.036 | 0.00 | 302 |
| 3 | 1 | 1 | 0.339 | 0.028 | 0.00 | 543 |
| 3 | 2 | 1 | 0.101 | 0.005 | 0.00 | 4309 |
| 3 | 2 | 2 | 0.137 | 0.006 | 0.00 | 4309 |
| 3 | 4 | 1 | -0.059 | 0.004 | 0.00 | 5164 |
| 3 | 4 | 2 | -0.072 | 0.005 | 0.00 | 5164 |
| 3 | 4 | 3 | -0.152 | 0.006 | 0.00 | 5164 |
| 4 | 1 | 1 | 0.765 | 0.166 | 0.00 | 56 |
| 4 | 2 | 1 | 0.221 | 0.025 | 0.00 | 446 |
| 4 | 2 | 2 | 0.245 | 0.026 | 0.00 | 446 |
| 4 | 3 | 1 | 0.051 | 0.004 | 0.00 | 6338 |
| 4 | 3 | 2 | 0.048 | 0.004 | 0.00 | 6338 |
| 4 | 3 | 3 | 0.092 | 0.005 | 0.00 | 6338 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers and positive change in total hours.

Table A.25:

Conditioning on $d \ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.066 | 0.005 | 0.00 | 6675 |
| 1 | 3 | 1 | -0.170 | 0.022 | 0.00 | 780 |
| 1 | 4 | 1 | -0.372 | 0.119 | 0.00 | 72 |
| 2 | 1 | 1 | 0.102 | 0.005 | 0.00 | 6886 |
| 2 | 3 | 1 | -0.023 | 0.003 | 0.00 | 7384 |
| 2 | 3 | 2 | -0.072 | 0.004 | 0.00 | 7384 |
| 2 | 4 | 1 | -0.116 | 0.022 | 0.00 | 554 |
| 2 | 4 | 2 | -0.169 | 0.023 | 0.00 | 554 |
| 3 | 1 | 1 | 0.208 | 0.019 | 0.00 | 908 |
| 3 | 2 | 1 | 0.034 | 0.004 | 0.00 | 7204 |
| 3 | 2 | 2 | 0.073 | 0.004 | 0.00 | 7204 |
| 3 | 4 | 1 | -0.015 | 0.003 | 0.00 | 9517 |
| 3 | 4 | 2 | -0.025 | 0.003 | 0.00 | 9517 |
| 3 | 4 | 3 | -0.093 | 0.004 | 0.00 | 9517 |
| 4 | 1 | 1 | 0.478 | 0.113 | 0.00 | 89 |
| 4 | 2 | 1 | 0.119 | 0.017 | 0.00 | 719 |
| 4 | 2 | 2 | 0.149 | 0.018 | 0.00 | 719 |
| 4 | 3 | 1 | 0.007 | 0.003 | 0.01 | 10754 |
| 4 | 3 | 2 | 0.005 | 0.003 | 0.09 | 10754 |
| 4 | 3 | 3 | 0.047 | 0.003 | 0.00 | 10754 |

We build this table following the same process described in Table 13. This table conditions on firms with consecutively ordered layers and positive change in normalized hours.

**Change in average wages for firms that change layers - DADS (Robustness checks)**

Table A.26:

DADS

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.080 | 0.003 | 0.00 | 10177 |
| 1 | 3 | 1 | -0.155 | 0.010 | 0.00 | 1263 |
| 1 | 4 | 1 | -0.302 | 0.068 | 0.00 | 97 |
| 2 | 1 | 1 | 0.086 | 0.003 | 0.00 | 11106 |
| 2 | 3 | 1 | -0.026 | 0.002 | 0.00 | 16800 |
| 2 | 3 | 2 | -0.231 | 0.003 | 0.00 | 16800 |
| 2 | 4 | 1 | -0.047 | 0.007 | 0.00 | 1129 |
| 2 | 4 | 2 | -0.306 | 0.014 | 0.00 | 1129 |
| 3 | 1 | 1 | 0.146 | 0.009 | 0.00 | 1584 |
| 3 | 2 | 1 | 0.032 | 0.001 | 0.00 | 17666 |
| 3 | 2 | 2 | 0.222 | 0.003 | 0.00 | 17666 |
| 3 | 4 | 1 | -0.002 | 0.001 | 0.19 | 14113 |
| 3 | 4 | 2 | -0.048 | 0.002 | 0.00 | 14113 |
| 3 | 4 | 3 | -0.180 | 0.004 | 0.00 | 14113 |
| 4 | 1 | 1 | 0.219 | 0.047 | 0.00 | 123 |
| 4 | 2 | 1 | 0.050 | 0.006 | 0.00 | 1456 |
| 4 | 2 | 2 | 0.283 | 0.012 | 0.00 | 1456 |
| 4 | 3 | 1 | 0.003 | 0.001 | 0.01 | 15160 |
| 4 | 3 | 2 | 0.034 | 0.002 | 0.00 | 15160 |
| 4 | 3 | 3 | 0.128 | 0.003 | 0.00 | 15160 |

We build this table following the same process described in Table 13 using DADS wages.

Table A.27:

Conditioning on $d \ln VA > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.083 | 0.004 | 0.00 | 5331 |
| 1 | 3 | 1 | -0.159 | 0.014 | 0.00 | 709 |
| 1 | 4 | 1 | -0.368 | 0.088 | 0.00 | 65 |
| 2 | 1 | 1 | 0.087 | 0.003 | 0.00 | 6376 |
| 2 | 3 | 1 | -0.027 | 0.002 | 0.00 | 9077 |
| 2 | 3 | 2 | -0.225 | 0.004 | 0.00 | 9077 |
| 2 | 4 | 1 | -0.046 | 0.010 | 0.00 | 623 |
| 2 | 4 | 2 | -0.298 | 0.019 | 0.00 | 623 |
| 3 | 1 | 1 | 0.150 | 0.012 | 0.00 | 991 |
| 3 | 2 | 1 | 0.030 | 0.002 | 0.00 | 9609 |
| 3 | 2 | 2 | 0.213 | 0.004 | 0.00 | 9609 |
| 3 | 4 | 1 | -0.002 | 0.002 | 0.21 | 7417 |
| 3 | 4 | 2 | -0.043 | 0.003 | 0.00 | 7417 |
| 3 | 4 | 3 | -0.174 | 0.005 | 0.00 | 7417 |
| 4 | 1 | 1 | 0.184 | 0.054 | 0.00 | 74 |
| 4 | 2 | 1 | 0.050 | 0.009 | 0.00 | 838 |
| 4 | 2 | 2 | 0.278 | 0.017 | 0.00 | 838 |
| 4 | 3 | 1 | 0.004 | 0.002 | 0.02 | 8127 |
| 4 | 3 | 2 | 0.032 | 0.003 | 0.00 | 8127 |
| 4 | 3 | 3 | 0.123 | 0.005 | 0.00 | 8127 |

We build this table following the same process described in Table 13 using DADS wages. This table conditions on positive changes in value added.

Table A.28:

Conditioning on $d \ln VA > 0$ & $d \ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.110 | 0.005 | 0.00 | 3628 |
| 1 | 3 | 1 | -0.199 | 0.017 | 0.00 | 535 |
| 1 | 4 | 1 | -0.529 | 0.116 | 0.00 | 43 |
| 2 | 1 | 1 | 0.111 | 0.004 | 0.00 | 4498 |
| 2 | 3 | 1 | -0.043 | 0.003 | 0.00 | 6135 |
| 2 | 3 | 2 | -0.242 | 0.005 | 0.00 | 6135 |
| 2 | 4 | 1 | -0.067 | 0.013 | 0.00 | 415 |
| 2 | 4 | 2 | -0.347 | 0.023 | 0.00 | 415 |
| 3 | 1 | 1 | 0.183 | 0.014 | 0.00 | 761 |
| 3 | 2 | 1 | 0.046 | 0.003 | 0.00 | 6577 |
| 3 | 2 | 2 | 0.227 | 0.005 | 0.00 | 6577 |
| 3 | 4 | 1 | -0.011 | 0.002 | 0.00 | 4675 |
| 3 | 4 | 2 | -0.057 | 0.004 | 0.00 | 4675 |
| 3 | 4 | 3 | -0.195 | 0.007 | 0.00 | 4675 |
| 4 | 1 | 1 | 0.246 | 0.064 | 0.00 | 59 |
| 4 | 2 | 1 | 0.067 | 0.011 | 0.00 | 607 |
| 4 | 2 | 2 | 0.299 | 0.019 | 0.00 | 607 |
| 4 | 3 | 1 | 0.015 | 0.002 | 0.00 | 5442 |
| 4 | 3 | 2 | 0.043 | 0.003 | 0.00 | 5442 |
| 4 | 3 | 3 | 0.133 | 0.006 | 0.00 | 5442 |

We build this table following the same process described in Table 13 using DADS wages. This table conditions on positive changes in value added and total hours.

**Change in average wages for firms that change layers - DADS (Robustness checks)**

Table A.29:

Conditioning on $d \ln \sum_{\ell=1}^{L} N_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.121 | 0.004 | 0.00 | 5672 |
| 1 | 3 | 1 | -0.222 | 0.014 | 0.00 | 803 |
| 1 | 4 | 1 | -0.488 | 0.097 | 0.00 | 57 |
| 2 | 1 | 1 | 0.119 | 0.004 | 0.00 | 6604 |
| 2 | 3 | 1 | -0.048 | 0.002 | 0.00 | 9140 |
| 2 | 3 | 2 | -0.255 | 0.004 | 0.00 | 9140 |
| 2 | 4 | 1 | -0.077 | 0.011 | 0.00 | 624 |
| 2 | 4 | 2 | -0.349 | 0.018 | 0.00 | 624 |
| 3 | 1 | 1 | 0.195 | 0.012 | 0.00 | 1051 |
| 3 | 2 | 1 | 0.050 | 0.002 | 0.00 | 9885 |
| 3 | 2 | 2 | 0.235 | 0.004 | 0.00 | 9885 |
| 3 | 4 | 1 | -0.016 | 0.002 | 0.00 | 7187 |
| 3 | 4 | 2 | -0.066 | 0.003 | 0.00 | 7187 |
| 3 | 4 | 3 | -0.205 | 0.005 | 0.00 | 7187 |
| 4 | 1 | 1 | 0.274 | 0.054 | 0.00 | 87 |
| 4 | 2 | 1 | 0.069 | 0.008 | 0.00 | 883 |
| 4 | 2 | 2 | 0.311 | 0.016 | 0.00 | 883 |
| 4 | 3 | 1 | 0.017 | 0.002 | 0.00 | 8387 |
| 4 | 3 | 2 | 0.046 | 0.003 | 0.00 | 8387 |
| 4 | 3 | 3 | 0.136 | 0.004 | 0.00 | 8387 |

We build this table following the same process described in Table 13 using DADS wages. This table conditions on positive changes in total hours.

Table A.30:

Conditioning on $d \ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.080 | 0.003 | 0.00 | 10177 |
| 1 | 3 | 1 | -0.155 | 0.010 | 0.00 | 1263 |
| 1 | 4 | 1 | -0.302 | 0.068 | 0.00 | 97 |
| 2 | 1 | 1 | 0.086 | 0.003 | 0.00 | 11106 |
| 2 | 3 | 1 | -0.022 | 0.002 | 0.00 | 13500 |
| 2 | 3 | 2 | -0.187 | 0.003 | 0.00 | 13500 |
| 2 | 4 | 1 | -0.050 | 0.008 | 0.00 | 1033 |
| 2 | 4 | 2 | -0.288 | 0.014 | 0.00 | 1033 |
| 3 | 1 | 1 | 0.146 | 0.009 | 0.00 | 1584 |
| 3 | 2 | 1 | 0.027 | 0.002 | 0.00 | 13852 |
| 3 | 2 | 2 | 0.159 | 0.003 | 0.00 | 13852 |
| 3 | 4 | 1 | -0.002 | 0.001 | 0.08 | 11876 |
| 3 | 4 | 2 | -0.035 | 0.002 | 0.00 | 11876 |
| 3 | 4 | 3 | -0.140 | 0.004 | 0.00 | 11876 |
| 4 | 1 | 1 | 0.219 | 0.047 | 0.00 | 123 |
| 4 | 2 | 1 | 0.046 | 0.007 | 0.00 | 1303 |
| 4 | 2 | 2 | 0.258 | 0.012 | 0.00 | 1303 |
| 4 | 3 | 1 | 0.004 | 0.001 | 0.01 | 12760 |
| 4 | 3 | 2 | 0.020 | 0.002 | 0.00 | 12760 |
| 4 | 3 | 3 | 0.085 | 0.003 | 0.00 | 12760 |

We build this table following the same process described in Table 13 using DADS wages. This table conditions on positive changes in normalized hours.

Table A.31:

Conditioning on $d \ln VA > 0$ & $d \ln \sum_{\ell=1}^{L} n_L^{\ell} > 0$

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.083 | 0.004 | 0.00 | 5331 |
| 1 | 3 | 1 | -0.159 | 0.014 | 0.00 | 709 |
| 1 | 4 | 1 | -0.368 | 0.088 | 0.00 | 65 |
| 2 | 1 | 1 | 0.087 | 0.003 | 0.00 | 6376 |
| 2 | 3 | 1 | -0.022 | 0.002 | 0.00 | 7492 |
| 2 | 3 | 2 | -0.189 | 0.005 | 0.00 | 7492 |
| 2 | 4 | 1 | -0.047 | 0.010 | 0.00 | 587 |
| 2 | 4 | 2 | -0.293 | 0.019 | 0.00 | 587 |
| 3 | 1 | 1 | 0.150 | 0.012 | 0.00 | 991 |
| 3 | 2 | 1 | 0.025 | 0.002 | 0.00 | 7672 |
| 3 | 2 | 2 | 0.160 | 0.004 | 0.00 | 7672 |
| 3 | 4 | 1 | -0.002 | 0.002 | 0.29 | 6417 |
| 3 | 4 | 2 | -0.033 | 0.003 | 0.00 | 6417 |
| 3 | 4 | 3 | -0.141 | 0.005 | 0.00 | 6417 |
| 4 | 1 | 1 | 0.184 | 0.054 | 0.00 | 74 |
| 4 | 2 | 1 | 0.046 | 0.010 | 0.00 | 751 |
| 4 | 2 | 2 | 0.252 | 0.017 | 0.00 | 751 |
| 4 | 3 | 1 | 0.005 | 0.002 | 0.00 | 6926 |
| 4 | 3 | 2 | 0.022 | 0.003 | 0.00 | 6926 |
| 4 | 3 | 3 | 0.086 | 0.004 | 0.00 | 6926 |

We build this table following the same process described in Table 13 using DADS wages. This table conditions on positive changes in value added and normalized hours.

Table A.32: Elasticity of $w_L^\ell$ with VA for firms that do not change L

Conditioning on selected sample

| Number of layers | Layer | $\gamma_L^\ell$ | s.e. | p-value | obs. |
|---|---|---|---|---|---|
| 1 | 1 | 0.067 | 0.008 | 0.00 | 39,478 |
| 2 | 1 | 0.110 | 0.008 | 0.00 | 41,821 |
| 2 | 2 | 0.122 | 0.008 | 0.00 | 41,821 |
| 3 | 1 | 0.144 | 0.006 | 0.00 | 71,008 |
| 3 | 2 | 0.153 | 0.007 | 0.00 | 71,008 |
| 3 | 3 | 0.168 | 0.007 | 0.00 | 71,008 |
| 4 | 1 | 0.171 | 0.009 | 0.00 | 52,799 |
| 4 | 2 | 0.186 | 0.009 | 0.00 | 52,799 |
| 4 | 3 | 0.187 | 0.010 | 0.00 | 52,799 |
| 4 | 4 | 0.217 | 0.011 | 0.00 | 52,799 |

With DADS wages

| Number of layers | Layer | $\gamma_L^\ell$ | s.e. | p-value | obs. |
|---|---|---|---|---|---|
| 1 | 1 | 0.000 | 0.003 | 0.87 | 45,045 |
| 2 | 1 | 0.001 | 0.002 | 0.74 | 64,536 |
| 2 | 2 | 0.019 | 0.003 | 0.00 | 64,536 |
| 3 | 1 | -0.005 | 0.002 | 0.00 | 91,253 |
| 3 | 2 | 0.005 | 0.002 | 0.02 | 91,253 |
| 3 | 3 | 0.021 | 0.003 | 0.00 | 91,253 |
| 4 | 1 | -0.007 | 0.002 | 0.00 | 52,799 |
| 4 | 2 | 0.007 | 0.002 | 0.00 | 52,799 |
| 4 | 3 | 0.008 | 0.003 | 0.02 | 52,799 |
| 4 | 4 | 0.039 | 0.006 | 0.00 | 52,799 |

Conditioning on selected sample with DADS wages

| Number of layers | Layer | $\gamma_L^\ell$ | s.e. | p-value | obs. |
|---|---|---|---|---|---|
| 1 | 1 | -0.006 | 0.002 | 0.01 | 39,478 |
| 2 | 1 | 0.001 | 0.002 | 0.57 | 41,821 |
| 2 | 2 | 0.013 | 0.003 | 0.00 | 41,821 |
| 3 | 1 | -0.007 | 0.002 | 0.00 | 71,008 |
| 3 | 2 | 0.002 | 0.002 | 0.44 | 71,008 |
| 3 | 3 | 0.016 | 0.003 | 0.00 | 71,008 |
| 4 | 1 | -0.007 | 0.002 | 0.00 | 52,799 |
| 4 | 2 | 0.007 | 0.002 | 0.00 | 52,799 |
| 4 | 3 | 0.008 | 0.003 | 0.01 | 52,799 |
| 4 | 4 | 0.038 | 0.006 | 0.00 | 52,799 |

These tables report the results of regressions of log change in hourly wage by layer on log change in value added for firms that do not change their number of layers L across two consecutive periods, where both variables are detrended as specified in the main text. Specifically, we run a regression of detrended log change in average hourly wage at layer ℓ in a firm with L layers on the detrended log change in value added across all the firms that stay at L layers across two consecutive years, with no constant. $\gamma_L^\ell$ is the coefficient on log change in value added, s.e. and p-value are its robust standard error and p-value, and obs is the number of observations used in the regression. The first panel uses hourly wage at layer ℓ from the BRN and conditions on the selected sample, the second panel uses hourly wage at layer ℓ from DADS, and the third uses hourly wages from DADS in the selected sample.

Table A.33: Firms that satisfy a hierarchy in hours, weighted by VA

| Number of layers | $N_L^\ell \geq N_L^{\ell+1}$ all $\ell$ | $N_L^1 \geq N_L^2$ | $N_L^2 \geq N_L^3$ | $N_L^3 \geq N_L^4$ |
|---|---|---|---|---|
| 2 | 88.8 | 88.8 | - | - |
| 3 | 63.2 | 79.2 | 76.3 | - |
| 4 | 57.1 | 77.7 | 73.4 | 98.1 |

This table reports, among all firms with L=2,3,4 layers, the fraction of firms that satisfy a hierarchy in hours at all layers (first column), and the fraction of those that satisfy a hierarchy in hours between layer ℓ and ℓ+1, with ℓ=1,...,L-1 (second to fourth column). A firm satisfies a hierarchy in hours between layers number ℓ and ℓ+1 in a given year if the number of hours worked in layer ℓ is at least as large as the number of hours worked in layer ℓ+1; moreover, a firm satisfies a hierarchy at all layers if the number of hours worked in layer ℓ is at least as large as the number of hours in layer ℓ+1, for all layers in the firm. $N_L^\ell$ is the number of hours reported in layer ℓ in a firm with L layers from the DADS source. Each firm is weighted according to the share of its value added among all firms with L layers.

Table A.34: Firms that satisfy a hierarchy in wages, weighted by VA

| Number of layers | $w_L^{\ell+1} \geq w_L^\ell$ all $\ell$ | $w_L^2 \geq w_L^1$ | $w_L^3 \geq w_L^2$ | $w_L^4 \geq w_L^3$ |
|---|---|---|---|---|
| 2 | 94.2 | 94.2 | - | - |
| 3 | 96.4 | 98.2 | 98.2 | - |
| 4 | 87.8 | 99.3 | 99.1 | 89.3 |

This table is the same as Table A33 for the case of wages, where $w_L^\ell$ is the average hourly wage in layer ℓ from the BRN in an L layers-firm.

Table A.35: Elasticity of $n_L^\ell$ with VA for firms that do not change L

| Robustness checks, conditioning on selected sample | | | | | |
|---|---|---|---|---|---|
| Number of layers | Layer | $\beta_L^\ell$ | s.e. | p-value | obs. |
| 2 | 1 | 0.026 | 0.014 | 0.00 | 41,821 |
| 3 | 1 | 0.029 | 0.009 | 0.00 | 71,008 |
| 3 | 2 | 0.009 | 0.011 | 0.39 | 71,008 |
| 4 | 1 | 0.105 | 0.014 | 0.00 | 52,799 |
| 4 | 2 | 0.049 | 0.013 | 0.00 | 52,799 |
| 4 | 3 | 0.034 | 0.013 | 0.00 | 52,799 |

This table reports the results of regressions of detrended log change in normalized hours at layer ℓ in a firm with L layers on its detrended log change in value added, and no constant, selecting all the firms that stay at L layers across two consecutive years. $\beta_L^\ell$ is the coefficient on log change in value added, s.e. and p-value are its robust standard error and p-value, and obs is the number of observations in the regression. This tables only uses firms with consecutively ordered layers.

Table A.36: Log diff. in hourly wage (after minus before the transition) for hours staying in the layer

| # of layers Before | # of layers After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.007 | 0.00 | 0.11 | 8625 |
| 1 | 3 | 1 | -0.076 | 0.02 | 0.00 | 939 |
| 1 | 4 | 1 | -0.262 | 0.13 | 0.05 | 64 |
| 2 | 1 | 1 | 0.095 | 0.00 | 0.00 | 9500 |
| 2 | 3 | 1 | 0.011 | 0.00 | 0.00 | 14948 |
| 2 | 3 | 2 | 0.011 | 0.00 | 0.00 | 9275 |
| 2 | 4 | 1 | -0.039 | 0.01 | 0.00 | 956 |
| 2 | 4 | 2 | -0.046 | 0.02 | 0.02 | 523 |
| 3 | 1 | 1 | 0.187 | 0.02 | 0.00 | 1225 |
| 3 | 2 | 1 | 0.040 | 0.00 | 0.00 | 15857 |
| 3 | 2 | 2 | 0.068 | 0.00 | 0.00 | 9954 |
| 3 | 4 | 1 | 0.007 | 0.00 | 0.00 | 13354 |
| 3 | 4 | 2 | 0.015 | 0.00 | 0.00 | 11907 |
| 3 | 4 | 3 | 0.024 | 0.00 | 0.00 | 8858 |
| 4 | 1 | 1 | 0.495 | 0.13 | 0.00 | 77 |
| 4 | 2 | 1 | 0.081 | 0.01 | 0.00 | 1256 |
| 4 | 2 | 2 | 0.134 | 0.02 | 0.00 | 715 |
| 4 | 3 | 1 | 0.022 | 0.00 | 0.00 | 14384 |
| 4 | 3 | 2 | 0.028 | 0.00 | 0.00 | 12853 |
| 4 | 3 | 3 | 0.033 | 0.00 | 0.00 | 10279 |

This table reports the sources of changes in the average wage by layer during a transition. Some introductory notation will aid clarity. For any given firm, denote with i an employee, with $h(i)$, $w(i)$ and $\ell(i)$ the hours worked, the total wage received, and his or her wage before a transition, and let us use primes to denote the same outcomes after a transition, $h'(i)$, $w'(i)$ and $\ell'(i)$. If an employee is not present in the firm before a transition then $\ell(i)=-1$, and $h(i)=w(i)=0$ (and analogously if an employee is not present after a transition). In the employee level dataset for year t, a given employee's row reports his or her outcomes for year t (after a transition) and year t-1 (before a transition), provided the employee stays in the same firm. Given the way the data is reported, an employee may have $\ell(i)=-1$ even if he or she was in the same firm but switched to a different plant, or switched occupation in the middle of the year (rather than at the end of the preceding year): in fact, more rows of data may be present for the same employee. For these reasons, our processing implies an over-estimation of hours leaving the layer and entering the layer, as opposed to hours staying in the layer during a transition. To track the flow of hours across layers we reconstruct transitions observed from year t-1 to year t by using only the employee level dataset for year t (rather than using separately the datasets at time t and time t-1, which would lose such flow). In a number of cases (less than 1/30,000) we are not able to match perfectly the layer structure of the firm with the one recovered by only using information of employees at time t in each year. For a given firm transitioning from L to L′ layers, fix a layer $\ell$ which is common to both before and after the transition. Hours worked in $\ell$ after the transition can be grouped in hours worked by employees coming 1) from the same layer or 2) from outside the layer. For each of these groups, we can compute an average hourly wage: denote these two hourly wages with $w'(\ell)=[\sum_{i:\ell'(i)=\ell(i)=\ell}w'(i)] / [\sum_{i:\ell'(i)=\ell(i)=\ell}h'(i)]$, and $w'(-\ell)=[\sum_{i:\ell'(i)=\ell\neq\ell(i)}w'(i)] / [\sum_{i:\ell'(i)=\ell\neq\ell(i)}h'(i)]$, respectively. Similarly, we can group hours worked in $\ell$ before the transition in hours worked by employees who will 1) stay in the same layer or 2) leave the layer, and compute their average hourly wage: denote these two hourly wages with $w(\ell)=[\sum_{i:\ell'(i)=\ell(i)=\ell}w(i)] / [\sum_{i:\ell'(i)=\ell(i)=\ell}h(i)]$, and $w(-\ell)=[\sum_{i:\ell(i)=\ell\neq\ell'(i)}w(i)] / [\sum_{i:\ell(i)=\ell\neq\ell'(i)}h(i)]$, respectively. Tables A36- A39 report differences between these averages across all firms where both quantities can be computed, for each transition and each layer common to before and after the transition. Table A36 reports the average of $\ln(w'(\ell)/w(\ell))$, i.e., the average change in the hourly wage for hours worked by employees who don't change layer. All log changes are detrended by removing from each observation the average log change in the firms' average hourly wage in the corresponding year.

Table A.37: Log diff. in hourly wage of hours entering the layer (after transition) versus hours leaving the layer (before transition)

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.266 | 0.01 | 0.00 | 7354 |
| 1 | 3 | 1 | -0.454 | 0.02 | 0.00 | 1046 |
| 1 | 4 | 1 | -0.683 | 0.11 | 0.00 | 82 |
| 2 | 1 | 1 | 0.200 | 0.01 | 0.00 | 7638 |
| 2 | 3 | 1 | -0.137 | 0.00 | 0.00 | 13160 |
| 2 | 3 | 2 | -0.397 | 0.01 | 0.00 | 11201 |
| 2 | 4 | 1 | -0.226 | 0.02 | 0.00 | 947 |
| 2 | 4 | 2 | -0.501 | 0.02 | 0.00 | 896 |
| 3 | 1 | 1 | 0.393 | 0.02 | 0.00 | 1224 |
| 3 | 2 | 1 | 0.050 | 0.00 | 0.00 | 13476 |
| 3 | 2 | 2 | 0.354 | 0.01 | 0.00 | 11328 |
| 3 | 4 | 1 | -0.099 | 0.00 | 0.00 | 12506 |
| 3 | 4 | 2 | -0.165 | 0.00 | 0.00 | 9952 |
| 3 | 4 | 3 | -0.354 | 0.01 | 0.00 | 10240 |
| 4 | 1 | 1 | 0.740 | 0.11 | 0.00 | 106 |
| 4 | 2 | 1 | 0.159 | 0.02 | 0.00 | 1198 |
| 4 | 2 | 2 | 0.454 | 0.02 | 0.00 | 1106 |
| 4 | 3 | 1 | -0.052 | 0.00 | 0.00 | 13453 |
| 4 | 3 | 2 | 0.002 | 0.00 | 0.59 | 10656 |
| 4 | 3 | 3 | 0.169 | 0.01 | 0.00 | 10332 |

This table reports the average of $\ln(w'(-\ell)/w(-\ell))$, i.e., the average log difference between the hourly wage after the transition of hours which came from outside the layer and the hourly wage before the transition of hours which are going to leave the layer. We build this table following the same process described in Table A36.

Table A.38: Log diff. in hourly wage of new hours entering the layer versus hours staying in the layer (after transition)

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.157 | 0.00 | 0.00 | 6089 |
| 1 | 3 | 1 | -0.122 | 0.01 | 0.00 | 749 |
| 1 | 4 | 1 | -0.111 | 0.04 | 0.01 | 57 |
| 2 | 1 | 1 | 0.014 | 0.00 | 0.00 | 8170 |
| 2 | 3 | 1 | -0.113 | 0.00 | 0.00 | 12118 |
| 2 | 3 | 2 | -0.171 | 0.01 | 0.00 | 4629 |
| 2 | 4 | 1 | -0.100 | 0.01 | 0.00 | 819 |
| 2 | 4 | 2 | -0.138 | 0.02 | 0.00 | 342 |
| 3 | 1 | 1 | 0.052 | 0.01 | 0.00 | 1102 |
| 3 | 2 | 1 | -0.031 | 0.00 | 0.00 | 13679 |
| 3 | 2 | 2 | 0.021 | 0.00 | 0.00 | 6758 |
| 3 | 4 | 1 | -0.089 | 0.00 | 0.00 | 12266 |
| 3 | 4 | 2 | -0.121 | 0.00 | 0.00 | 8876 |
| 3 | 4 | 3 | -0.184 | 0.01 | 0.00 | 5673 |
| 4 | 1 | 1 | 0.020 | 0.03 | 0.51 | 67 |
| 4 | 2 | 1 | 0.013 | 0.01 | 0.11 | 1145 |
| 4 | 2 | 2 | 0.009 | 0.02 | 0.60 | 547 |
| 4 | 3 | 1 | -0.072 | 0.00 | 0.00 | 13338 |
| 4 | 3 | 2 | -0.074 | 0.00 | 0.00 | 10164 |
| 4 | 3 | 3 | 0.004 | 0.01 | 0.46 | 7922 |

This table reports the average of $\ln(w'(-\ell)/w'(\ell))$, i.e., the average log difference, after the transition, in the hourly wage of hours entering the layer vs. hours who stayed in the layer. We build this table following the same process described in Table A36.

Table A.39: Log diff. in hourly wage of hours leaving the layer versus hours who stayed in the layer (before the transition)

| # of layers Before | After | Layer | Change | s.e. | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 0.076 | 0.00 | 0.00 | 8014 |
| 1 | 3 | 1 | 0.124 | 0.01 | 0.00 | 898 |
| 1 | 4 | 1 | 0.158 | 0.02 | 0.00 | 56 |
| 2 | 1 | 1 | -0.068 | 0.00 | 0.00 | 6620 |
| 2 | 3 | 1 | 0.034 | 0.00 | 0.00 | 13465 |
| 2 | 3 | 2 | 0.099 | 0.00 | 0.00 | 6873 |
| 2 | 4 | 1 | 0.075 | 0.01 | 0.00 | 897 |
| 2 | 4 | 2 | 0.163 | 0.02 | 0.00 | 438 |
| 3 | 1 | 1 | -0.056 | 0.01 | 0.00 | 948 |
| 3 | 2 | 1 | -0.028 | 0.00 | 0.00 | 12923 |
| 3 | 2 | 2 | -0.084 | 0.01 | 0.00 | 4844 |
| 3 | 4 | 1 | 0.018 | 0.00 | 0.00 | 12556 |
| 3 | 4 | 2 | 0.040 | 0.00 | 0.00 | 9672 |
| 3 | 4 | 3 | 0.160 | 0.01 | 0.00 | 7273 |
| 4 | 1 | 1 | -0.084 | 0.03 | 0.01 | 69 |
| 4 | 2 | 1 | -0.034 | 0.01 | 0.00 | 1071 |
| 4 | 2 | 2 | -0.061 | 0.02 | 0.00 | 463 |
| 4 | 3 | 1 | 0.003 | 0.00 | 0.15 | 13427 |
| 4 | 3 | 2 | -0.003 | 0.00 | 0.33 | 9731 |
| 4 | 3 | 3 | -0.025 | 0.01 | 0.00 | 6417 |

This table reports the average of $\ln(w(-\ell)/w(\ell))$, i.e., the average log difference, before the transition, in the hourly wage of hours who will leave the layer vs. hours who will stay in the layer. We build this table following the same process described in Table A36.

## Average change in 'knowledge' for firms that change $L$ (Robustness checks)

Table A.40: Specification 1

| # of layers Before | # of layers After | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.1080 | 0.00 | -0.0040 | 0.00 | 10,171 |
| 1 | 3 | 1 | -0.1830 | 0.00 | -0.0030 | 0.23 | 1,261 |
| 1 | 4 | 1 | -0.3300 | 0.00 | 0.0260 | 0.03 | 97 |
| 2 | 1 | 1 | 0.0960 | 0.00 | 0.0060 | 0.00 | 11,088 |
| 2 | 3 | 1 | -0.0430 | 0.00 | 0.0000 | 0.97 | 16,778 |
| 2 | 3 | 2 | -0.1810 | 0.00 | 0.0020 | 0.00 | 16,778 |
| 2 | 4 | 1 | -0.0640 | 0.00 | 0.0020 | 0.33 | 1,124 |
| 2 | 4 | 2 | -0.2290 | 0.00 | 0.0090 | 0.01 | 1,124 |
| 3 | 1 | 1 | 0.1370 | 0.00 | 0.0060 | 0.01 | 1,584 |
| 3 | 2 | 1 | 0.0440 | 0.00 | 0.0020 | 0.00 | 17,626 |
| 3 | 2 | 2 | 0.1530 | 0.00 | -0.0010 | 0.25 | 17,626 |
| 3 | 4 | 1 | -0.0110 | 0.00 | 0.0010 | 0.00 | 14,098 |
| 3 | 4 | 2 | -0.0380 | 0.00 | -0.0010 | 0.09 | 14,098 |
| 3 | 4 | 3 | -0.1770 | 0.00 | 0.0250 | 0.00 | 14,098 |
| 4 | 1 | 1 | 0.1980 | 0.00 | -0.0020 | 0.79 | 123 |
| 4 | 2 | 1 | 0.0720 | 0.00 | 0.0000 | 0.96 | 1,454 |
| 4 | 2 | 2 | 0.1720 | 0.00 | -0.0050 | 0.07 | 1,454 |
| 4 | 3 | 1 | 0.0130 | 0.00 | -0.0010 | 0.00 | 15,150 |
| 4 | 3 | 2 | 0.0250 | 0.00 | -0.0010 | 0.19 | 15,150 |
| 4 | 3 | 3 | 0.1140 | 0.00 | -0.0210 | 0.00 | 15,150 |

This table shows estimates of the average detrended log change in years of potential labor market experience and of education at each layer ℓ among firms that transition from L to L′ layers, with L≠L′: for a transition from L to L′, we can only evaluate changes for layer number ℓ=1,...,min{L,L′}. The detrending is explained in the main text. Each average change is estimated as a regression of the detrended log change in the variable of interest in layer ℓ in two consecutive years on a constant. This table uses specification 1 (for a description of the specifications, refer to the "Data Processing" subsection Appendix B).

Table A.41: Specification 3

| # of layers Before | # of layers After | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.1030 | 0.00 | -0.0100 | 0.00 | 10,171 |
| 1 | 3 | 1 | -0.1590 | 0.00 | -0.0240 | 0.00 | 1,261 |
| 1 | 4 | 1 | -0.2940 | 0.00 | -0.0120 | 0.36 | 97 |
| 2 | 1 | 1 | 0.0890 | 0.00 | 0.0120 | 0.00 | 11,088 |
| 2 | 3 | 1 | -0.0420 | 0.00 | -0.0020 | 0.00 | 16,778 |
| 2 | 3 | 2 | -0.1530 | 0.00 | -0.0270 | 0.00 | 16,778 |
| 2 | 4 | 1 | -0.0570 | 0.00 | -0.0050 | 0.03 | 1,124 |
| 2 | 4 | 2 | -0.1820 | 0.00 | -0.0400 | 0.00 | 1,124 |
| 3 | 1 | 1 | 0.1150 | 0.00 | 0.0270 | 0.00 | 1,584 |
| 3 | 2 | 1 | 0.0430 | 0.00 | 0.0030 | 0.00 | 17,626 |
| 3 | 2 | 2 | 0.1220 | 0.00 | 0.0320 | 0.00 | 17,626 |
| 3 | 4 | 1 | -0.0110 | 0.00 | 0.0010 | 0.01 | 14,098 |
| 3 | 4 | 2 | -0.0310 | 0.00 | -0.0070 | 0.00 | 14,098 |
| 3 | 4 | 3 | -0.2270 | 0.00 | 0.0580 | 0.00 | 14,098 |
| 4 | 1 | 1 | 0.1540 | 0.01 | 0.0410 | 0.00 | 123 |
| 4 | 2 | 1 | 0.0690 | 0.00 | 0.0030 | 0.10 | 1,454 |
| 4 | 2 | 2 | 0.1230 | 0.00 | 0.0450 | 0.00 | 1,454 |
| 4 | 3 | 1 | 0.0120 | 0.00 | -0.0010 | 0.08 | 15,150 |
| 4 | 3 | 2 | 0.0160 | 0.00 | 0.0080 | 0.00 | 15,150 |
| 4 | 3 | 3 | 0.1530 | 0.00 | -0.0460 | 0.00 | 15,150 |

We build this table following the same process described in Table A40. This table uses specification 2 (for a description of the specifications, refer to the "Data Processing" subsection Appendix B).

Table A.42: Specification 4

| # of layers Before | # of layers After | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | -0.1160 | 0.00 | 0.0030 | 0.00 | 10,171 |
| 1 | 3 | 1 | -0.1920 | 0.00 | 0.0100 | 0.00 | 1,261 |
| 1 | 4 | 1 | -0.3340 | 0.00 | 0.0330 | 0.00 | 97 |
| 2 | 1 | 1 | 0.1050 | 0.00 | -0.0040 | 0.00 | 11,088 |
| 2 | 3 | 1 | -0.0430 | 0.00 | 0.0010 | 0.00 | 16,778 |
| 2 | 3 | 2 | -0.2190 | 0.00 | 0.0220 | 0.00 | 16,778 |
| 2 | 4 | 1 | -0.0620 | 0.00 | 0.0040 | 0.03 | 1,124 |
| 2 | 4 | 2 | -0.2770 | 0.00 | 0.0310 | 0.00 | 1,124 |
| 3 | 1 | 1 | 0.1460 | 0.00 | -0.0050 | 0.01 | 1,584 |
| 3 | 2 | 1 | 0.0460 | 0.00 | 0.0000 | 0.18 | 17,626 |
| 3 | 2 | 2 | 0.1900 | 0.00 | -0.0180 | 0.00 | 17,626 |
| 3 | 4 | 1 | -0.0110 | 0.00 | 0.0010 | 0.00 | 14,098 |
| 3 | 4 | 2 | -0.0470 | 0.00 | 0.0050 | 0.00 | 14,098 |
| 3 | 4 | 3 | -0.1470 | 0.00 | -0.0010 | 0.49 | 14,098 |
| 4 | 1 | 1 | 0.2030 | 0.00 | -0.0100 | 0.15 | 123 |
| 4 | 2 | 1 | 0.0730 | 0.00 | -0.0030 | 0.02 | 1,454 |
| 4 | 2 | 2 | 0.2160 | 0.00 | -0.0240 | 0.00 | 1,454 |
| 4 | 3 | 1 | 0.0130 | 0.00 | -0.0010 | 0.00 | 15,150 |
| 4 | 3 | 2 | 0.0320 | 0.00 | -0.0040 | 0.00 | 15,150 |
| 4 | 3 | 3 | 0.0840 | 0.00 | 0.0050 | 0.00 | 15,150 |

We build this table following the same process described in Table A40. This table uses specification 3 (for a description of the specifications, refer to the "Data Processing" subsection Appendix B).

Table A.43: Elasticity of knowledge with VA for firms that do not change L

Specification 1

| # of layers | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 1 | 0.0010 | 0.69 | 0.0010 | 0.05 | 45,009 |
| 2 | 1 | -0.0100 | 0.02 | 0.0040 | 0.00 | 64,469 |
| 2 | 2 | 0.0090 | 0.03 | 0.0030 | 0.00 | 64,469 |
| 3 | 1 | -0.0100 | 0.00 | 0.0040 | 0.00 | 91,161 |
| 3 | 2 | 0.0000 | 0.98 | 0.0030 | 0.00 | 91,161 |
| 3 | 3 | 0.0080 | 0.01 | 0.0010 | 0.19 | 91,161 |
| 4 | 1 | -0.0150 | 0.00 | 0.0030 | 0.00 | 52,730 |
| 4 | 2 | -0.0040 | 0.29 | 0.0030 | 0.00 | 52,730 |
| 4 | 3 | 0.0000 | 0.98 | 0.0000 | 0.92 | 52,730 |
| 4 | 4 | 0.0080 | 0.01 | -0.0030 | 0.05 | 52,730 |

Specification 3

| # of layers | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 1 | 0.0010 | 0.85 | 0.0020 | 0.00 | 45,009 |
| 2 | 1 | -0.0090 | 0.03 | 0.0030 | 0.00 | 64,469 |
| 2 | 2 | 0.0120 | 0.01 | 0.0010 | 0.09 | 64,469 |
| 3 | 1 | -0.0090 | 0.00 | 0.0030 | 0.00 | 91,161 |
| 3 | 2 | 0.0010 | 0.84 | 0.0020 | 0.00 | 91,161 |
| 3 | 3 | 0.0090 | 0.00 | 0.0000 | 0.65 | 91,161 |
| 4 | 1 | -0.0150 | 0.00 | 0.0020 | 0.00 | 52,730 |
| 4 | 2 | -0.0030 | 0.40 | 0.0020 | 0.00 | 52,730 |
| 4 | 3 | -0.0010 | 0.85 | 0.0010 | 0.28 | 52,730 |
| 4 | 4 | 0.0070 | 0.01 | -0.0030 | 0.01 | 52,730 |

Specification 4

| # of layers | Layer | Experience | p-value | Education | p-value | obs. |
|---|---|---|---|---|---|---|
| 1 | 1 | 0.0010 | 0.83 | 0.0020 | 0.00 | 45,009 |
| 2 | 1 | -0.0090 | 0.03 | 0.0030 | 0.00 | 64,469 |
| 2 | 2 | 0.0120 | 0.01 | 0.0010 | 0.07 | 64,469 |
| 3 | 1 | -0.0100 | 0.00 | 0.0040 | 0.00 | 91,161 |
| 3 | 2 | 0.0010 | 0.71 | 0.0010 | 0.01 | 91,161 |
| 3 | 3 | 0.0070 | 0.01 | 0.0020 | 0.01 | 91,161 |
| 4 | 1 | -0.0160 | 0.00 | 0.0030 | 0.00 | 52,730 |
| 4 | 2 | -0.0020 | 0.49 | 0.0020 | 0.01 | 52,730 |
| 4 | 3 | -0.0010 | 0.83 | 0.0010 | 0.23 | 52,730 |
| 4 | 4 | 0.0040 | 0.14 | 0.0000 | 0.01 | 52,730 |

The table reports the results of regressions of log change in years of potential labor market experience (Experience) and of education (Education) by layer on log change in value added for firms that do not change their number of layers L across two consecutive periods, where both variables are detrended as specified in the main text. Specifically, we run a regression of detrended log change in each of the two variables at layer ℓ in a firm with L layers on its detrended log change in value added, and no constant, across all the firms that stay at L layers across two consecutive years, with robust standard error. The columns p-value report the respective p-value for each left-hand side, and obs is the number of observations in the regressions. For a description of the specifications, refer to "Data Processing" in Appendix B.

# 2 Online Appendix B - Data Description

## 2.1 Sources

Our main dataset is built from two data sources, a firm-level source and a worker-level source, both collected from the French National Statistical Institute (INSEE). We cover the manufacturing sector of France for the years 2002-2007. The firm-level source contains balance-sheet information for all the firms reporting their income under the Bénéfice Réel Normal (BRN) fiscal regime. This regime is compulsory for firms above a certain revenue threshold, but it can still be adopted by smaller firms. The ratio between the value added of manufacturing firms in our original, uncleaned BRN dataset and value added in manufacturing as reported by the French National Statistical Institute is 96.4% on average. Each row in this dataset contains, among other things, a firm identifier, total employment, total wages and employer-paid payroll taxes, total value added, and an industry classification. The worker-level data source is the Déclarations Annuel des Données Sociales (DADS). This dataset is built on mandatory employer filing of the earnings of each salaried employee in France subject to the French payroll taxes in a given year. Each row of this dataset is an employment spell and contains, among other things, a worker identifier, his or her occupation, a firm identifier (which will be matched to the BRN dataset), the number of hours worked, and the total gross wage received by the worker from the firm.

In addition to these two sources, we resort to the French Labor Force Survey[1] (LFS), from 2002 to 2007), also run by the INSEE, for the part pertaining to the imputation of education and labor market experience. The Labor Force Survey is a worker-level survey of people 15 years-old and above whose purpose is to provide yearly information on the French labor market. This source provides information, among other things, on wage, hours of work, years of education, age, sector and 1 and 2 digit occupation of workers, allowing us to estimate a relation between labor market experience and education, on one side, and observable worker level characteristics, on the other.

### 2.1.1 Definitions

Some concepts are recurring in the explanation of a majority of the tables and figures. We define them here and consider them understood in what follows.

**Average hourly wage from BRN**: the total labor cost resulting from the balance sheet divided by the number of hours in the DADS source.

**Average hourly wage in layer $\ell$ from BRN**: the total labor cost for layer $\ell$ in the BRN divided by the number of hours reported in the DADS; the total labor cost for layer $\ell$ from the BRN is the share of wages paid to layer $\ell$ in the total wages paid by the firm as in the DADS source, multiplied by the total labor cost in the BRN.

**Average hourly wage from DADS**: the total wage payments in the DADS to all occupations divided by the number of hours, always from the DADS source.

**Firm with consecutively ordered layers or firms in the 'selected sample'**: it is a firm that 1) reports occupations in consecutively ordered 1 digit PCS-ESE occupational categories, 2) starting from occupation 5+6 (blue and white collar workers). For example, firms with occupations 2 and 4 or 2 and 3 do not have consecutively ordered layers; a firm with occupational categories 4 and 5 does and has 2 consecutively ordered layers.

[1] The INSEE's name of the LFS is Enquête Emploi.

**Layer number**: is the position of the workers in the hierarchy of the firm, starting from 1 (lowest layer, present in all firms) to 4 (highest layer, only present in firms with 4 layers).

**Normalized hours**: normalized hours in layer $\ell = 1, ..., L$ in a firm with $L$ layers are the number of hours in layer $\ell$ per unit of hour worked in the top layer $L$.

**Number of layers**: the total number of 1 digit occupations in the firm from the DADS source.

## 2.2 Data processing

We start with the firm-level dataset, keeping only firms in the manufacturing sector. There are in total 553,125 firm-year observations. We drop some existing duplicated firm-year identifiers and then all firms with non-positive value added, total employment, total labor cost (i.e. total wages plus payroll taxes) or total sales. This leaves us with 11.5% fewer observations. We then move to the worker-level dataset. Starting from the universe of all observations, we keep the observations referring to all employees in any firm in the French private sector. We drop observations with missing or non-positive hours or total wage or with missing occupations. At this point, we match this dataset with the firm-level dataset based on the firm identifier and year and keep the observations that are matched (workers for which we find the firm and vice versa). This gives us a dataset of about 23.5 million observations for 6 years.[2]

To recover the occupational structure at the firm level, we work with the occupational code reported in the worker-level data. The occupational classification used in the DADS is the PCS-ESE 2003, and its first digit identifies 5 occupational categories relevant for manufacturing firms: firm owners and CEO (code 2), senior staff or top management positions (code 3), supervisors (code 4), white collar workers (code 5), blue collar workers (code 6).[3] We relabel code 6 into code 5, in order to create a unique category of blue and white collar workers, since their hourly wage distribution coincides in the data (see Table 1). We are left with 4 occupational categories: for each firm-year, we sum total hours and total wages of all the observations with the same occupation to recover the occupational structure at the firm level. During the matching we lose about 6.9% of the original dataset. Finally, we trim away firm-year observations with average hourly wages (see below for details) above the $99.95^{th}$ percentile, which would otherwise cause abnormal swings in the average wage by year. Our final dataset is composed of 451,475 firm-year observations. These observations represent on average 90.3% of the value added in the manufacturing sector in France.

To compute the average hourly wage at each occupation, we follow two alternative approaches. The first simply divides the total wage resulting from the DADS by the total number of hours in the same source. This approach doesn't include payroll taxes and some other worker-related expenditures paid by the firm. To approximate more closely the effective labor cost of each occupation type for the firm, we compute the share of wages paid to a given occupation in the total wages paid by the firm in the DADS source; we then apply this share to the total labor cost as in the BRN dataset to compute the labor cost of the occupation considered. We finally divide this total cost by the number of hours reported in the DADS to obtain the hourly wage from the BRN source. This latter estimate is our preferred measure of hourly wages; we will use the former measure for purposes of comparison and robustness checks.

To estimate the average potential labor market experience and average years of educations at each occupation, we start by estimating a statistical relationship between each of these outcomes and worker characteristics and controls in the LFS among all the workers active in the manufacturing

[2] Note that the number of observations in any given year does not correspond to total employment. A worker can have more than one row, for example, because of a job change during the year.

[3] There are 558 observations of workers categorized as farmers (code 1). Since the firms in our sample are only in the manufacturing sectors, we exclude from the analysis the 125 firm-year observations associated to these workers.

sector between 2002 and 2007. Years of formal education are directly reported in LFS, while we compute potential labor market experience as age minus years of education minus 6. For each of these measures on the left-hand side, we use 4 different sets of regressors on the right-hand side: 1) log hourly wage (and its square), log age (and its squre) and a gender dummy; 2) regressors in 1) plus 1-digit within-manufacturing and year fixed effects; 3) regressors in 2) plus 1 digit PCS-ESE occupations; 4) regressors in 2) plus 2-digit PCS-ESE occupations. The log hourly wage is the net monthly wage of the worker divided by the number of hours worked in a month, deflated with the same CPI deflator used for other monetary variables (see the end of the subsection for more). The regression coefficients from these regressions are below in table B1 and B2. We then apply these estimated coefficients to the corresponding variables in the DADS dataset[4], at individual level, to obtain 4 different predicted measures of education and experience: the set of regressors we can use in the LFS analysis is therefore limited by the availability of corresponding variables in the DADS database. For each of these 8 measures, we compute the within-firm, occupation-level average as its average across all the workers in the occupation, weighted by total hours of work.

We finally recode the name of the occupations into layers. A firm reporting $L$ occupational categories will be said to have $L$ layers: hence, in our data we will have firms that have from 1 to 4 layers. We drop the name of the occupation and assume that firms always grow from the lowest (occupations 5+6) to the highest skill (occupation 2), irrespective of the name of the occupation itself. Hence a firm with occupational categories 3 and 5 will have 2 layers, and its organization will consist of a layer 1 corresponding to blue and white collar workers, and a layer 2 corresponding to senior staff. After this recoding, we can compute normalized hours.

We define normalized hours, $n_L^\ell$, in layer $\ell = 1, ..., 4$ in a firm with $L$ layers as the number of hours in layer $l$ per unit of hour worked in the top layer.

All monetary values are deflated to 2005 euros using a CPI deflator for France. Value added is always expressed in thousands of euros; all hourly wages are in euros. Potential labor market experience and education are in years.

[4] In particular, we use in this imputation the *net* hourly wage of the worker in the DADS to have the correspondent quantity used in the regression.

Table B.1: Dependent variable: log potential labor market experience

| | (Spec. 1) | | (Spec. 2) | | (Spec. 3) | | (Spec. 4) | |
|---|---|---|---|---|---|---|---|---|
| | coef. | s.e. | coef. | s.e. | coef. | s.e. | coef. | s.e. |
| log hourly wage | -0.663*** | 0.028 | -0.624*** | 0.028 | -0.129*** | 0.028 | -0.091*** | 0.028 |
| log hourly wage, squared | 0.103*** | 0.005 | 0.096*** | 0.005 | 0.025*** | 0.005 | 0.019*** | 0.005 |
| log age | 15.625*** | 0.140 | 15.638*** | 0.140 | 15.577*** | 0.131 | 15.605*** | 0.130 |
| log age, squared | -1.795*** | 0.019 | -1.796*** | 0.019 | -1.792*** | 0.018 | -1.796*** | 0.018 |
| female dummy | -0.054*** | 0.003 | -0.050*** | 0.003 | -0.023*** | 0.003 | -0.020*** | 0.004 |
| sector = C | | | -0.063*** | 0.005 | -0.044*** | 0.005 | -0.035*** | 0.005 |
| sector = D | | | -0.021*** | 0.006 | -0.029*** | 0.006 | -0.025*** | 0.006 |
| sector = E | | | -0.048*** | 0.005 | -0.023*** | 0.005 | -0.018*** | 0.005 |
| sector = F | | | -0.012*** | 0.005 | -0.011** | 0.004 | -0.008* | 0.004 |
| year = 2003 | | | -0.019*** | 0.005 | -0.011** | 0.005 | -0.011** | 0.005 |
| year = 2004 | | | -0.027*** | 0.005 | -0.016*** | 0.005 | -0.016*** | 0.005 |
| year = 2005 | | | -0.042*** | 0.005 | -0.025*** | 0.005 | -0.025*** | 0.005 |
| year = 2006 | | | -0.051*** | 0.005 | -0.024*** | 0.005 | -0.024*** | 0.005 |
| year = 2007 | | | -0.038*** | 0.005 | -0.024*** | 0.005 | -0.024*** | 0.005 |
| occupation = 3 | | | | | -0.152*** | 0.019 | | |
| occupation = 4 | | | | | 0.020 | 0.019 | | |
| occupation = 5 | | | | | 0.069*** | 0.019 | | |
| occupation = 6 | | | | | 0.160*** | 0.019 | | |
| occupation = 22 | | | | | | | -0.044 | 0.154 |
| occupation = 23 | | | | | | | -0.148*** | 0.037 |
| occupation = 31 | | | | | | | -0.342** | 0.157 |
| occupation = 32 | | | | | | | -0.301*** | 0.031 |
| occupation = 36 | | | | | | | -0.230*** | 0.028 |
| occupation = 41 | | | | | | | -0.040 | 0.032 |
| occupation = 46 | | | | | | | -0.104*** | 0.029 |
| occupation = 47 | | | | | | | -0.068** | 0.028 |
| occupation = 48 | | | | | | | -0.006 | 0.029 |
| occupation = 51 | | | | | | | 0.068* | 0.037 |
| occupation = 54 | | | | | | | -0.028 | 0.029 |
| occupation = 55 | | | | | | | 0.008 | 0.029 |
| occupation = 56 | | | | | | | 0.048 | 0.043 |
| occupation = 61 | | | | | | | 0.071** | 0.028 |
| occupation = 66 | | | | | | | 0.101*** | 0.028 |
| occupation = 69 | | | | | | | 0.075* | 0.040 |
| Constant | -29.163*** | 0.250 | -29.186*** | 0.248 | -29.885*** | 0.233 | -29.905*** | 0.234 |
| R2 | 0.89 | | 0.90 | | 0.91 | | 0.91 | |
| *N* | 28,227 | | 28,227 | | 28,226 | | 28,226 | |

r¦§¦³ŁµºŁµ©¦Ł®¢ª¯Łµ¦¹µŁª¯Ł¢±±¦¯¥ª¹ŁbℕŁ* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table B.2: Dependent variable: log years of education

| | (Spec. 1) | | (Spec. 2) | | (Spec. 3) | | (Spec. 4) | |
|---|---|---|---|---|---|---|---|---|
| | coef. | s.e. | coef. | s.e. | coef. | s.e. | coef. | s.e. |
| log hourly wage | 0.741*** | 0.024 | 0.705*** | 0.024 | 0.226*** | 0.023 | 0.191*** | 0.024 |
| log hourly wage, squared | -0.111*** | 0.005 | -0.104*** | 0.005 | -0.035*** | 0.004 | -0.029*** | 0.004 |
| log age | 2.196*** | 0.121 | 2.203*** | 0.120 | 2.284*** | 0.110 | 2.253*** | 0.109 |
| log age, squared | -0.362*** | 0.017 | -0.363*** | 0.017 | -0.370*** | 0.015 | -0.366*** | 0.015 |
| female dummy | 0.036*** | 0.003 | 0.033*** | 0.003 | 0.003 | 0.003 | -0.001 | 0.003 |
| sector = C | | | 0.041*** | 0.005 | 0.023*** | 0.004 | 0.015*** | 0.004 |
| sector = D | | | 0.003 | 0.006 | 0.012** | 0.005 | 0.009* | 0.005 |
| sector = E | | | 0.049*** | 0.004 | 0.023*** | 0.004 | 0.018*** | 0.004 |
| sector = F | | | -0.000 | 0.004 | -0.000 | 0.004 | -0.003 | 0.004 |
| year = 2003 | | | 0.014*** | 0.005 | 0.006 | 0.004 | 0.007 | 0.004 |
| year = 2004 | | | 0.025*** | 0.005 | 0.014*** | 0.004 | 0.014*** | 0.004 |
| year = 2005 | | | 0.045*** | 0.005 | 0.030*** | 0.004 | 0.030*** | 0.004 |
| year = 2006 | | | 0.074*** | 0.005 | 0.048*** | 0.004 | 0.048*** | 0.004 |
| year = 2007 | | | 0.065*** | 0.005 | 0.051*** | 0.004 | 0.051*** | 0.004 |
| occupation = 3 | | | | | 0.095*** | 0.016 | | |
| occupation = 4 | | | | | -0.066*** | 0.016 | | |
| occupation = 5 | | | | | -0.096*** | 0.017 | | |
| occupation = 6 | | | | | -0.207*** | 0.016 | | |
| occupation = 22 | | | | | | | 0.004 | 0.132 |
| occupation = 23 | | | | | | | 0.128*** | 0.032 |
| occupation = 31 | | | | | | | 0.421*** | 0.134 |
| occupation = 32 | | | | | | | 0.221*** | 0.027 |
| occupation = 36 | | | | | | | 0.163*** | 0.024 |
| occupation = 41 | | | | | | | -0.011 | 0.028 |
| occupation = 46 | | | | | | | 0.047* | 0.024 |
| occupation = 47 | | | | | | | 0.010 | 0.024 |
| occupation = 48 | | | | | | | -0.049** | 0.025 |
| occupation = 51 | | | | | | | -0.117*** | 0.032 |
| occupation = 54 | | | | | | | -0.007 | 0.025 |
| occupation = 55 | | | | | | | -0.047* | 0.025 |
| occupation = 56 | | | | | | | -0.121*** | 0.037 |
| occupation = 61 | | | | | | | -0.131*** | 0.024 |
| occupation = 66 | | | | | | | -0.157*** | 0.024 |
| occupation = 69 | | | | | | | -0.103*** | 0.034 |
| Constant | -1.769*** | 0.215 | -1.784*** | 0.212 | -1.098*** | 0.196 | -1.066*** | 0.196 |
| R2 | 0.24 | | 0.25 | | 0.37 | | 0.38 | |
| *N* | 28,326 | | 28,326 | | 28,325 | | 28,325 | |

r ¦§¦³Ŀµ°Ŀµ©¦Ŀ®¢ª¯Ŀµ¦¹µĿª¯Ŀ¢±±¦¯¥ª¹ĿbℕĿ*Á$p < 0.1$; ** $p < 0.05$; *** $p < 0.01$