**The Age-Productivity Profile:**

**Long-Run Evidence from Italian Regions[[1]](#footnote-1)**

Federico Barbiellini Amidei\*, Matteo Gomellini\*, Lorenzo Incoronato† and Paolo Piselli\*

**APPENDIX**

**Table A.1:** Age Effects on Labor Productivity, IV Using Lagged Births

|  |  |  |
| --- | --- | --- |
|   | (1) | (2) |
| Share of 15-24 | 1.158\* | 0.964\*\* |
| (0.624) | (0.489) |
| Share of 25-34 | 2.780\*\*\* | 2.193\*\*\* |
| (1.029) | (0.621) |
| Share of 35-44 | 2.096\*\*\* | 1.955\*\*\* |
| (0.425) | (0.271) |
| Share of 45-54 | 0.853\*\*\* | 0.808\*\*\* |
| (0.280) | (0.133) |
| Share of 55-64 | 0.922\* | 0.884\*\* |
| (0.543) | (0.451) |
| Value Added, Agric. Share  |  | 0.980 |
| (0.697) |
| Value Added, Industry Share |  | 0.188 |
| (0.327) |
| Share of Young with Higher Education  |  | 0.294\* |
| (0.168) |
| Kleibergen-Paap F statistic  | 2.252 | 5.685 |
| Region effects | Yes | Yes |
| Year effects | Yes | Yes |
| Observations | 620 | 620 |
| R-squared | 0.893 | 0.929 |
| *Notes*: Replication of Table 1 Column (4)-(5). Age shares are instrumented using lagged births (Shimer 2001). Standard clustered at the regional level are in parentheses. See Table 1 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. |

**Table A.2:** Age Effects on Labor Productivity, Wild Bootstrap SEs

|  |  |  |  |
| --- | --- | --- | --- |
|   | *Pooled OLS* | *Fixed effects* | *2SLS* |
|   | (1) | (2) | (3) | (4) | (5) |
| Share of 15-24 | 0.311 | 0.444 | 0.581 | 0.398 | 0.548 |
| [-0.52, 1.07] | [-0.34, 1.11] | [-0.24, 1.17] | [-0.69, 1.23] | [-0.33, 1.37] |
| Share of 25-34 | 1.485\*\* | 0.812\* | 0.913\* | 0.877 | 1.199\*\* |
| [0.63, 2.44] | [-0.03, 1.66] | [-0.03, 1.82] | [-0.46, 2.02] | [0.07, 2.23] |
| Share of 35-44 | 1.399\*\* | 0.827 | 0.912 | 1.048 | 1.246\* |
| [0.20, 2.41] | [-0.38, 1.91] | [-0.43, 2.05] | [-0.60, 2.73] | [-0.02, 2.54] |
| Share of 45-54 | 0.852\*\* | 0.432\* | 0.341 | 0.555\* | 0.518\*\* |
| [0.08, 1.67] | [-0.11, 1.03] | [-0.19, 0.84] | [-0.13, 1.22] | [0.05, 0.94] |
| Share of 55-64 | 0.659 | 0.281 | 0.341 | 0.272 | 0.338 |
| [-0.39, 1.38] | [-0.21, 0.72] | [-0.25, 0.84] | [-0.32, .83] | [-0.32, .89] |
| Value Added, Agric. Share  |  |  | 0.894 |  | 0.891 |
|  |  | [-0.79, 3.01] |  | [-1.19, 2.62] |
| Value Added, Industry Share |  |  | 0.304 |  | 0.188 |
|  |  | [-0.70, 1.10] |  | [-0.82, 1.08] |
| Share of Young with Higher Education  |  |  | 0.215 |  | 0.239\* |
|  |  | [-0.11, 0.53] |  | [-0.05, 0.58] |
| Kleibergen-Paap rk Wald F statistic (H0: Weak IV) | - | - | - | 13.647 | 30.545 |
| Region effects | No | Yes | Yes | Yes | Yes |
| Year effects | No | Yes | Yes | Yes | Yes |
| Observations | 620 | 620 | 620 | 620 | 620 |
| R-squared | 0.681 | 0.941 | 0.949 | 0.940 | 0.947 |
| *Notes*: Replication of Table 1, wild cluster bootstrapping procedure using the *boottest* Stata command (Roodman et al. 2019). We report 95% confidence intervals below the coefficients. See Table 1 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. |

**Table A.3:** Age Effects on Labor Productivity, Controlling for Unemployment Rate

|  |  |  |
| --- | --- | --- |
|   | (1) | (2) |
| Share of 15-24 | 0.583\*\* | 0.555\*\* |
| (0.260) | (0.277) |
| Share of 25-34 | 0.915\*\* | 1.203\*\*\* |
| (0.333) | (0.364) |
| Share of 35-44 | 0.916\*\* | 1.252\*\*\* |
| (0.383) | (0.343) |
| Share of 45-54 | 0.343\* | 0.520\*\*\* |
| (0.194) | (0.165) |
| Share of 55-64 | 0.343 | 0.342\* |
| (0.200) | (0.207) |
| Value Added, Agric. Share  | 0.889(0.785) | 0.880 |
| (0.782) |
| Value Added, Industry Share | 0.298(0.356) | 0.176 |
| (0.352) |
| Share of Young with Higher Education | 0.215(0.127) | 0.239\*\* |
| (0.105) |
| Unemployment Rate  | -0.002 | -0.004 |
|  | (0.010) | (0.010) |
| Kleibergen-Paap F statistic  |  | 29.18 |
| Region effects | Yes | Yes |
| Year effects | Yes | Yes |
| Observations | 620 | 620 |
| R-squared | 0.949 | 0.947 |
| *Notes*: Replication of Table 1 Column (3) and (5), including regional unemployment rate as control. Standard clustered at the regional level are in parentheses. See Table 1 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. |

**Table A.4:** Age Dispersion Effects on Labor Productivity, IV Using Lagged Births

|  |  |
| --- | --- |
|  |  |
|   | (1) | (2) |
| Coeff. Var. of Age | 2.863\*\*\* | 2.676\*\*\* |
| (0.964) | (1.015) |
| (Coeff. Var. of Age)^2 | -0.346\*\*\* | -0.344\*\*\* |
| (0.112) | (0.116) |
| Value Added, Agric. Share  |  | 0.109 |
| (1.041) |
| Value Added, Industry share |  | 0.271 |
| (0.384) |
| Share of Young with Higher Education |  | 0.120 |
| (0.136) |
| Kleibergen-Paap F statistic | 4.205 | 8.977 |
| Region effects | Yes | Yes |
| Year effects | Yes | Yes |
| Observations | 620 | 620 |
| R-squared | 0.930 | 0.931 |

*Notes*: Replication of Table 3 Columns (3)-(4). As instruments, we use the mean and the standard deviation of the age distribution based on lagged births in the region (Shimer 2001). Standard errors clustered at the regional level are in parentheses. See Table 3 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01.

**Table A.5:** Age Dispersion Effects on Labor Productivity, Wild Bootstrap SEs

|  |  |  |
| --- | --- | --- |
|  | *Fixed effects* | *2SLS* |
|   | (1) | (2) | (3) | (4) |
| Coeff. Var. of Age | 1.689 | 1.738\* | 1.508 | 1.577 |
| [-0.65, 3.97] | [-0.17, 3.97] | [-0.69, 3.83] | [-0.62, 3.49] |
| (Coeff. Var. of Age)^2 | -0.195 | -0.192\* | -0.172 | -0.173 |
| [-0.45, 0.05] | [-0.43, 0.03] | [-0.43, 0.10] | [-0.43, 0.07] |
| Value Added, Agric. Share  |  | 0.575 |  | 0.631 |
| [-1.6, 2.97] | [-1.69, 3.38] |
| Value Added, Industry share |  | 0.404 |  | 0.410 |
| [-0.44, 1.11] | [-0.47, 1.19] |
| Share of Young with Higher Education |  | 0.122 |  | 0.118 |
|  | [-0.15, 0.52] |  | [-0.23, 0.49] |
| Kleibergen-Paap F statistic | - | - | 155.317 | 226.530 |
| Region effects | Yes | Yes | Yes | Yes |
| Year effects | Yes | Yes | Yes | Yes |
| Observations | 620 | 620 | 620 | 620 |
| R-squared | 0.935 | 0.940 | 0.935 | 0.940 |
| *Notes*: Replication of Table 3, wild cluster bootstrapping procedure using the *boottest* Stata command (Roodman et al. 2019). We report 95% confidence intervals below the coefficients. See Table 3 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. |

**Table A.6:** Age Dispersion Effects on Labor Productivity: Center-North vs South

|  |  |  |
| --- | --- | --- |
|   | *Fixed effects* | *2SLS* |
|   | North | South | North | South |
| Coeff. Var. of Age | -1.405 | 4.045\*\*\* | -2.008 | 3.344\*\*\* |
| (2.168) | (1.043) | (2.168) | (1.097) |
| (Coeff. Var. of Age)^2 | 0.181 | -0.453\*\*\* | 0.254 | -0.355\*\*\* |
| (0.243) | (0.124) | (0.243) | (0.133) |
| Value Added, Agric. Share  | -1.913 | 1.036 | -1.719 | 1.143 |
|  | (1.799) | (0.791) | (1.614) | (0.714) |
| Value Added, Industry Share | 0.684\* | 0.840\*\*\* | 0.756\*\* | 0.642\*\*\* |
|  | (0.354) | (0.236) | (0.335) | (0.228) |
| Share of Young with Higher Education | 0.096(0.182) | 0.432\*\*(0.166) | 0.106(0.163) | 0.445\*\*\*(0.152) |
|  |  |  |  |  |
| Kleibergen-Paap F statistic | - | - | 282.913 | 167.394 |
| Region effects | Yes | Yes | Yes | Yes |
| Year effects | Yes | Yes | Yes | Yes |
| Observations | 372 | 248 | 372 | 248 |
| R-squared | 0.935 | 0.940 | 0.935 | 0.940 |
| *Notes*: Estimates from Equation (3) separately for Center-North and South. Standard errors clustered at the regional level are in parentheses. See Table 3 and text for details. \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. |

**Figure A.1:** Age Dispersion – Productivity Profiles for Italy, 1981-2011



*Note*: Quadratic function of the coefficient of variation resulting from the coefficients in Table 3 Column (4). The vertical line is the average coefficient of variation in the data. See text for details.

**Figure A.2:** Age-Productivity Profiles for Italy, Regional Differences, 1981-2011



*Notes*: Replication of Figure 4, right panel, separately for Center-North and South of Italy. Standard errors are clustered at the regional level. See Figure 4 and text for details.

**Figure A.3:** Age-Productivity Profiles for Italy, Cubic Specification, 1981-2011



*Notes*: Estimates of structural age coefficients (the $δ\_{j}$) from Equation (4). These result from the estimation of Equation (8) with 2SLS. We impose that the age coefficients lie on a third-order polynomial, rather than second-order as in the baseline analysis. Standard errors are clustered at the regional level. See Figure 4 and text for details.

1. \*Bank of Italy, Directorate General for Economics, Statistics and Research, Structural Economic Analysis Directorate – Division of Economic History and Historical Archives.

†CSEF-University of Naples Federico II, Department of Economics and Statistics, CESifo, CReAM, RFBerlin. [↑](#footnote-ref-1)