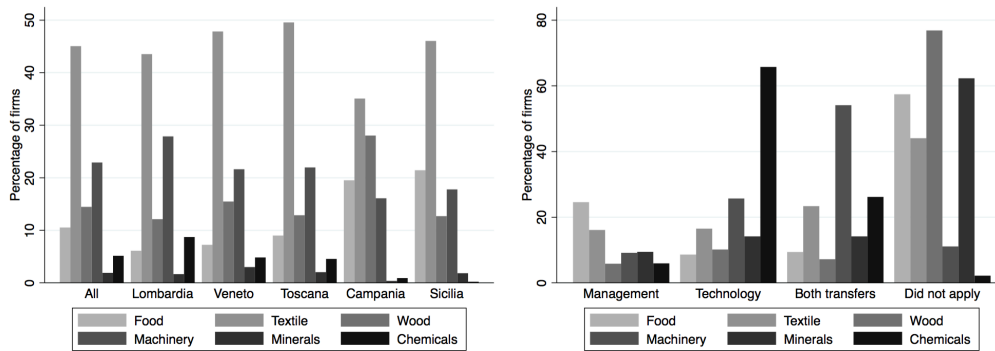


# The Long-Term Effects of Management and Technology Transfers

By MICHELA GIORCELLI

## Online Appendix - Not For Publication

### A. Additional Figures and Tables



Panel A: By Region

Panel B: By U.S. Transfer Chosen

*Notes.* Distribution of 6,065 firms eligible to apply for the Productivity Program by manufacturing industry in 1951. Panel A presents the distribution separately for the five pilot regions; Panel B presents the distribution separately for the U.S. transfer chosen by firms. Industries are defined according to the 1951 National Institute for Statistics (ISTAT) classification. *Food* includes food, beverage, and tobacco industries; *Textile* includes textile, wearing apparel, and leather industries; *Wood* includes wood and wood products (including furniture); *Machinery* includes fabricated metal products, machinery, and equipment; *Minerals* includes nonmetallic mineral products, except products of petroleum, and coal; *Chemicals* includes manufacture of chemicals and chemical, petroleum, coal, rubber, and plastic products.

Figure A.1. : Distribution of Eligible Firms by Industries, 1951

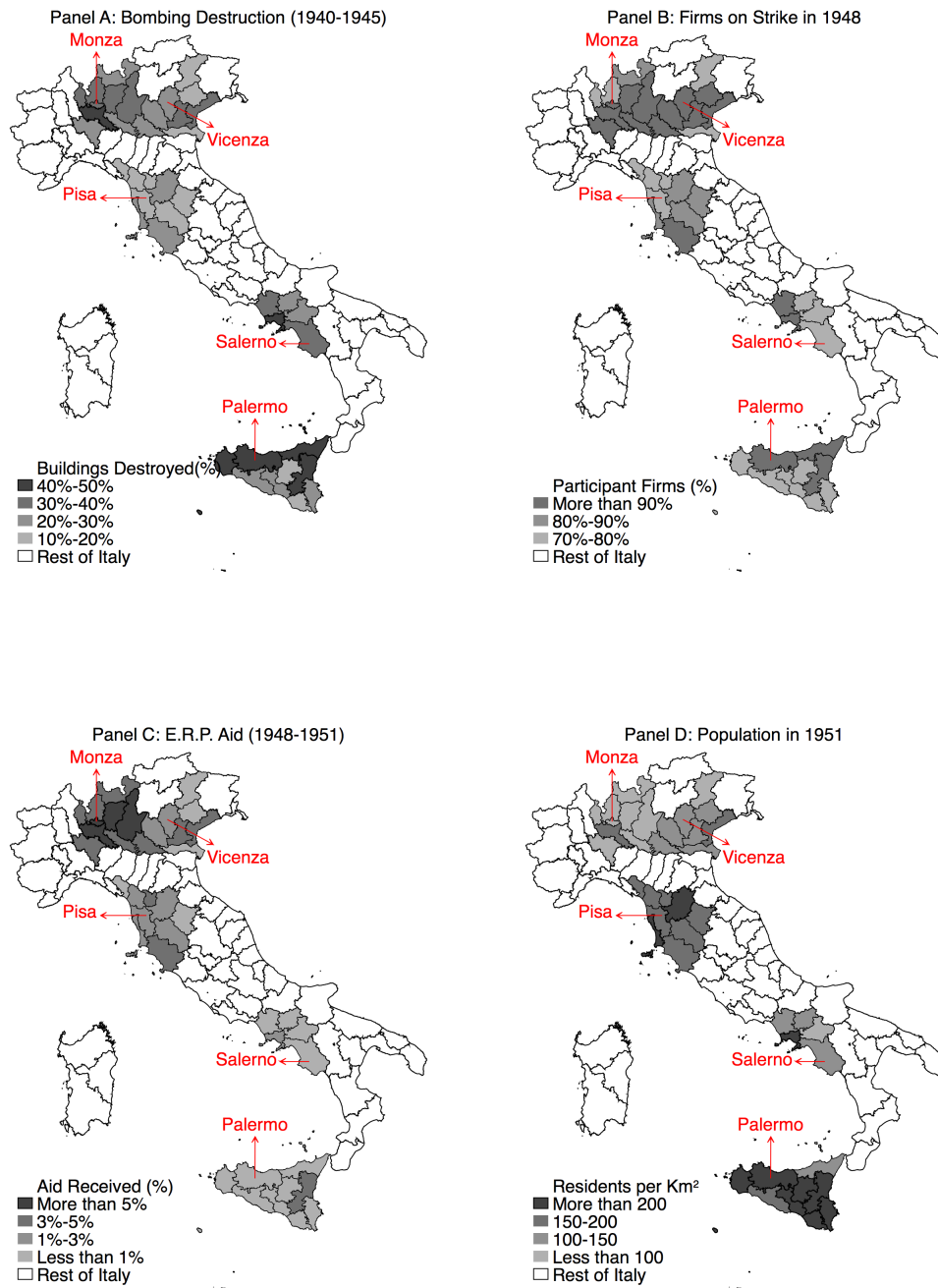


Figure A.2. : Treated and Comparison Provinces

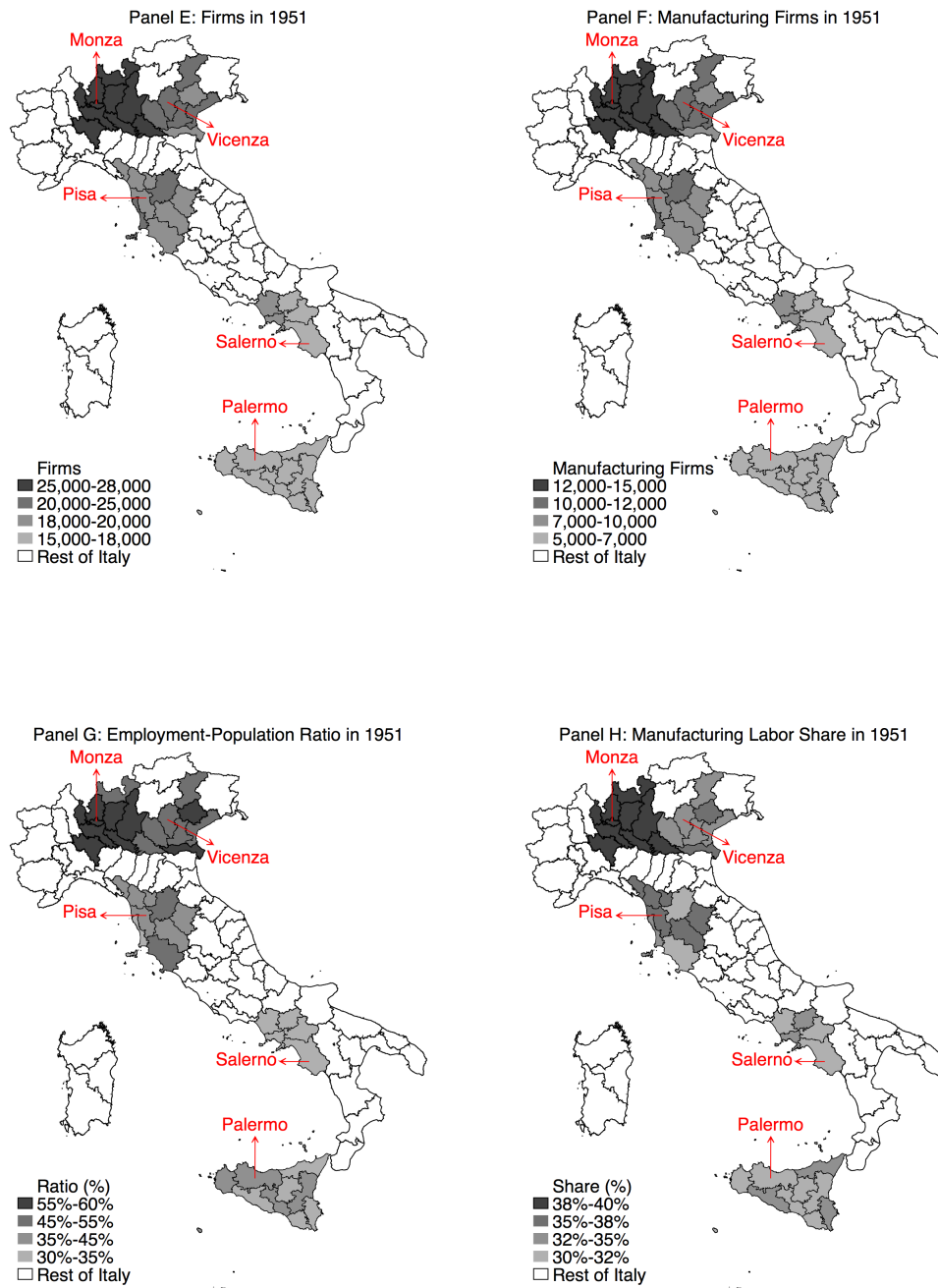


Figure A.2. : Treated and Comparison Provinces (cont.)

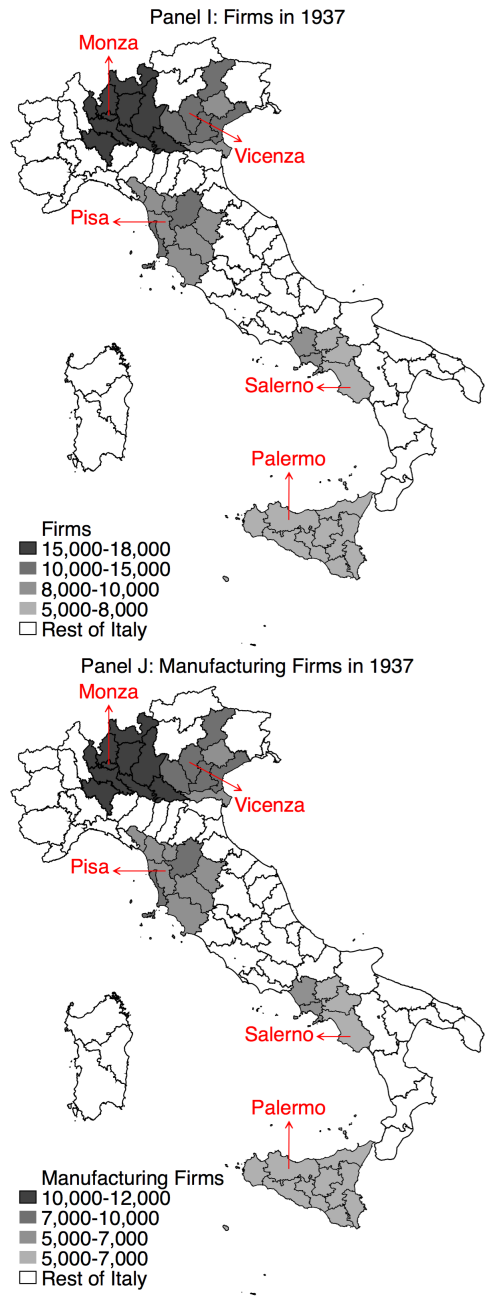
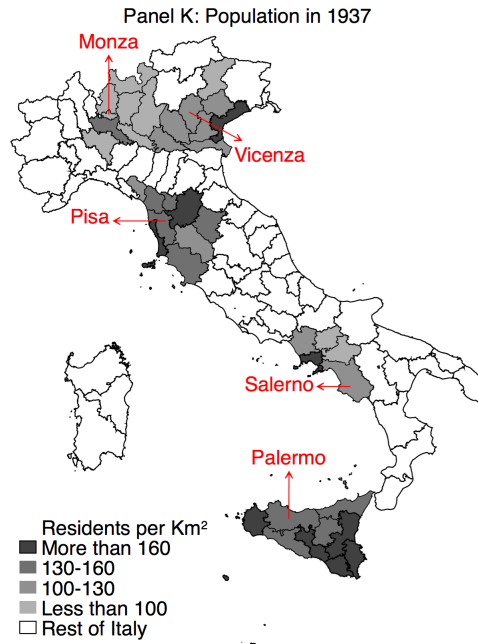
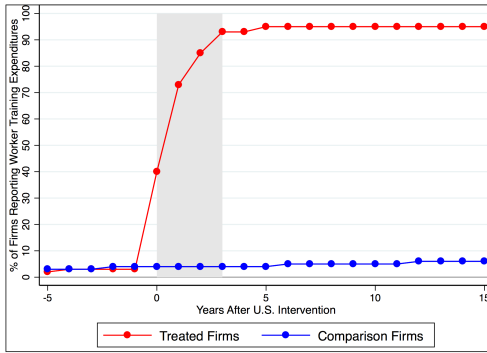


Figure A.2. : Treated and Comparison Provinces (cont.)

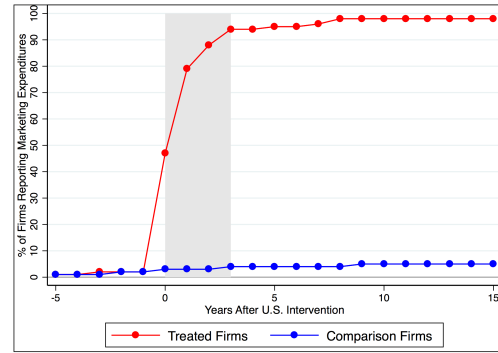


*Notes.* Maps showing percentage of buildings in a province destroyed by bombing between 1940 and 1945 (Panel A), percentage of firms involved in 1948 communist strikes (Panel B), E.R.P. aid received between 1948 and 1951 as fraction of total aid received by Italy (Panel C), population in 1951 and in 1937 (Panels D and K), total number of firms (Panels E and I), manufacturing firms (Panels F and J), employment-population ratio (Panel F), and labor share (Panel G). Data are provided at the province level. Data for Panels A, B and C were collected from the Archivio Storico dello Stato (Rome-Italy), fondo CIR, busta 39, accessed on January 12, 2013. Data for population are from the Italian Population Censuses of 1951 and 1936. The remaining data are from the Italian Industrial Censuses of 1951 and 1937.

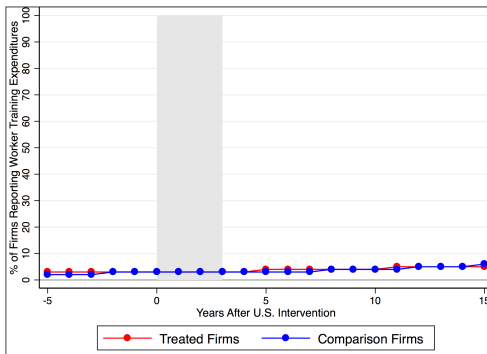
Figure A.2. : Treated and Comparison Provinces (cont.)



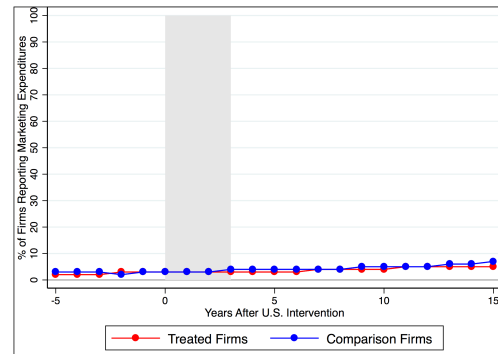
Panel A: Management Worker Training



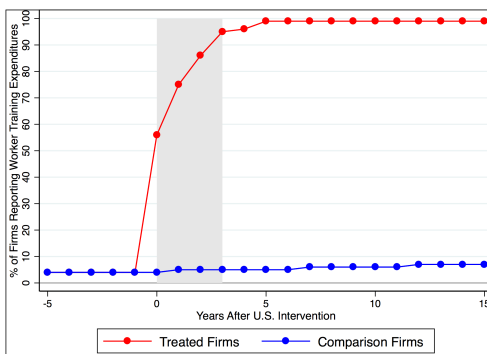
Panel B: Management Marketing



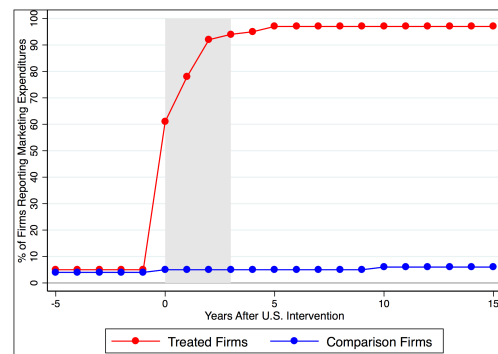
Panel C: Technology Worker Training



Panel D: Technology Marketing



Panel E: Combined Worker Training



Panel F: Combined Marketing

*Notes.* Percentage of firms that were reporting expenditures for worker training (Panels A, C, and E) and marketing in their balance sheets (Panels B, D, and F) for 538 firms that applied for management transfer (Panels A–B), 748 firms that applied for technology transfer (Panels C–D), and 1,082 firms that applied for the combined management and technology transfers (Panels E–F). Data are provided at the firm level. The U.S. intervention year is normalized to zero, and the gray shaded area corresponds to the three-year follow-up period.

Figure A.3. : Effects of the Productivity Program on Managerial Practices Adoption

Table A.1—: Summary Statistics by Pilot Regions, 1951

	All Eligible firms (N = 6,065)				
	Lombardia (1)	Veneto (2)	Toscana (3)	Campania (4)	Sicilia (5)
Plants per firm	1.54	1.23	1.24	1.13	1.17
Employees per firm	55.65	46.87	43.47	37.89	39.78
Current assets (k USD)	1,873.49	1,546.73	1,567.89	1,289.28	1,432.55
Annual sales (k USD)	1,278.90	1,345.98	978.90	357.21	392.26
Value added (k USD)	567.88	489.76	398.58	409.32	459.10
Age	12.58	13.57	11.69	10.38	12.50
Productivity (log TFPR)	2.71	2.44	2.39	2.25	2.21
Export	0.15	0.13	0.12	0.09	0.12
Family-managed	0.36	0.41	0.48	0.48	0.54
Submit application	0.63	0.61	0.65	0.47	0.47
Management	0.13	0.16	0.16	0.11	0.07
Technology	0.19	0.19	0.26	0.16	0.19
Combined management and technology transfers	0.31	0.27	0.28	0.20	0.12
Observations	2,301	1,207	1,038	556	963

*Notes.* Summary statistics for the 6,065 firms eligible to apply for the Productivity Program in 1951, separately by pilot regions. Data are provided at the firm level. Column 1 reports the mean for 2,301 eligible firms in Lombardia, column 2 for 1,207 firms in Veneto, column 3 for 1,038 firms in Toscana, column 4 for 556 firms in Campania, and column 5 for 963 firms in Sicilia. *Plants per firm* reports the number of plants per firm; *Employees per firm* reports the number of employees per firm; *Current assets*, *Annual sales*, and *Value added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro=USD 1; *Productivity (log TFPR)* is the logarithm of firm productivity, estimated using the Akerberg, Caves and Frazer (2006) method; *Export*, *Family-managed*, *Submit application*, *Management*, *Technology*, *Combined management and technology transfers* are indicator variables that equal one if, respectively, a firm exports, is family-managed, had submitted an application for the Productivity Program, and chose the management transfer, the technology transfer, or the combined management and technology transfers.

Table A.2—: Pre-Productivity Program Differences Treated and Comparison Provinces

	Total Firms	Mfg. Firms	Population	Empl./Pop.	Labor Share	Damage	Strikes	Aid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. 1951 Census								
<i>Pilot region indicators</i>								
Lombardia	27.000	13.667	4,445.889	58.667	46.222	88.889	86.667	4.333
	(0.591)	(0.488)	(1,427.536)	(0.875)	(0.959)	(3.176)	(2.132)	(0.275)
Veneto	21.000	11.000	6,279.333	55.167	35.167	80.000	83.500	2.833
	(0.724)	(0.597)	(1,748.367)	(1.072)	(1.175)	(3.890)	(2.611)	(0.337)
Toscana	19.500	9.500	11,300.625	48.000	35.500	75.625	81.500	3.000
	(0.627)	(0.517)	(1,514.130)	(0.928)	(1.017)	(3.369)	(2.261)	(0.292)
Campania	16.250	6.250	9,571.000	41.000	31.000	87.500	85.000	1.750
	(0.886)	(0.732)	(2,141.304)	(1.313)	(1.439)	(4.764)	(3.198)	(0.413)
Sicilia	14.250	4.250	14,328.500	45.000	30.000	83.750	80.625	1.875
	(0.627)	(0.517)	(1,514.130)	(0.928)	(1.017)	(3.369)	(2.261)	(0.292)
<i>Treatment province indicators</i>								
Monza	2.000	0.333	-445.889	1.333	3.778	1.111	3.333	0.667
	(1.868)	(1.543)	(4,514.264)	(2.768)	(3.033)	(10.043)	(6.742)	(0.870)
Vicenza	2.000	1.000	-1,295.333	-0.167	-0.167	-0.000	3.500	0.167
	(1.914)	(1.581)	(4,625.744)	(2.836)	(3.108)	(10.291)	(6.909)	(0.892)
Pisa	1.500	0.500	-2,089.625	-1.000	1.500	-0.625	-1.500	0.000
	(1.880)	(1.552)	(4,542.391)	(2.785)	(3.052)	(10.106)	(6.784)	(0.876)
Salerno	-0.250	-0.250	-4,241.000	-1.000	-1.000	2.500	-5.000	0.250
	(1.982)	(1.636)	(4,788.100)	(2.936)	(3.217)	(10.652)	(7.151)	(0.923)
Palermo	-0.250	-0.250	-1,059.500	3.000	1.000	11.250	9.375	-0.875
	(1.880)	(1.552)	(4,542.391)	(2.785)	(3.052)	(10.106)	(6.784)	(0.876)
Number of observations	40	40	40	40	40	40	40	40

(continues)



Table A.2—: Continued

	Total Firms	Mfg. Firms	Population
	(1)	(2)	(3)
Panel B. 1937 Census			
<i>Pilot region indicators</i>			
Lombardia	17.000 (0.495)	12.222 (0.382)	4,174.333 (1,272.256)
Veneto	9.333 (0.606)	7.000 (0.468)	6,908.167 (1,558.189)
Toscana	7.500 (0.525)	6.000 (0.405)	10,068.625 (1,349.432)
Campania	6.250 (0.742)	4.000 (0.573)	8,152.250 (1,908.385)
Sicilia	5.000 (0.525)	3.375 (0.405)	13,477.500 (1,349.432)
<i>Treatment province indicators</i>			
Monza	-0.000 (1.564)	1.778 (1.208)	-774.333 (4,023.228)
Vicenza	1.667 (1.603)	1.000 (1.238)	-957.167 (4,122.582)
Pisa	0.500 (1.574)	1.000 (1.216)	-1,083.625 (4,048.295)
Salerno	-0.250 (1.659)	-1.000 (1.282)	-3,660.250 (4,267.278)
Palermo	-1.000 (1.574)	-0.375 (1.216)	-1,909.500 (4,048.295)
Number of observations	40	40	40

*Notes.* OLS regressions predicting province-level outcomes in 1951 (Panel A) and 1937 (Panel B). *Lombardia*, *Veneto*, *Toscana*, *Campania*, and *Sicilia* are indicator variables for pilot regions. *Monza*, *Vicenza*, *Pisa*, *Salerno*, and *Palermo* are indicator variables for treatment provinces. The dependent variables are total number of firms (column 1), manufacturing firms (column 2), population (column 3), employment-population ratio (4), labor share (5), percentage of buildings in a province destroyed by bombing between 1940 and 1945 (column 6), percentage of firms involved in 1948 communist strikes (column 7), and E.R.P. aid received between 1948 and 1951 as a fraction of total aid received by Italy (column 8). Data are provided at the province level. Data for columns 6–8 were collected from the Archivio Storico A4 dello Stato (Rome-Italy), fondo CIR, busta 39, accessed on January 12, 2013. Data for population are from the Italian Population Censuses of 1951 and 1936. The remaining data are from the Italian Industrial Censuses of 1951 and 1937.

Table A.3—: Pre-Productivity Program Differences in Growth Rates between Treated and Comparison Provinces, 1937–1951

	Growth Rate Total Firms (1)	Growth Rate Mfg. Firms (2)	Growth Rate Population (3)
<i>Pilot region indicators</i>			
Lombardia	4.256 (0.819)	0.884 (0.593)	0.794 (0.657)
Veneto	9.411 (1.003)	4.174 (0.726)	0.266 (0.805)
Toscana	11.651 (0.868)	4.498 (0.629)	0.980 (0.697)
Campania	11.650 (1.228)	4.137 (0.889)	1.053 (0.986)
Sicilia	13.363 (0.868)	1.637 (0.629)	0.398 (0.697)
<i>Treatment province indicators</i>			
Monza	0.786 (2.589)	-0.884 (1.875)	0.466 (2.078)
Vicenza	-1.619 (2.653)	-0.602 (1.921)	-1.427 (2.130)
Pisa	-0.044 (2.605)	-1.437 (1.887)	-0.800 (2.091)
Salerno	0.255 (2.746)	3.006 (1.989)	0.280 (2.205)
Palermo	4.494 (2.605)	0.744 (1.887)	0.653 (2.091)
Number of observations	40	40	40

*Notes.* OLS regressions predicting province-level growth rates between 1937 and 1951. *Lombardia*, *Veneto*, *Toscana*, *Campania*, and *Sicilia* are indicator variables for pilot regions. *Monza*, *Vicenza*, *Pisa*, *Salerno*, and *Palermo* are indicator variables for treatment provinces. The dependent variables are the growth rate of total number of firms (column 1), manufacturing firms (column 2), and population (column 3). Data for population are from the Italian Population Censuses of 1951 and 1936. The remaining data are from the Italian Industrial Censuses of 1951 and 1937.

Table A.4—: ANOVA Test for Treated and Comparison Provinces

	Treated = Comparison	Lombardia = Monza	Veneto = Vicenza	Toscana = Pisa	Campania = Salerno	Sicilia = Palermo
	(1)	(2)	(3)	(4)	(5)	(6)
Total firms in 1951	0.04 (0.844)	0.76 (0.409)	2.14 (0.203)	0.78 (0.407)	0.05 (0.830)	0.01 (0.908)
Manufacturing firms in 1951	0.00 (0.975)	0.10 (0.760)	0.54 (0.497)	0.09 (0.777)	0.05 (0.830)	0.01 (0.908)
Population in 1951	0.49 (0.487)	0.03 (0.868)	0.73 (0.433)	0.32 (0.592)	0.16 (0.714)	0.05 (0.829)
Employment/Population in 1951	0.02 (0.884)	0.21 (0.661)	0.00 (0.951)	0.19 (0.673)	0.24 (0.658)	0.76 (0.413)
Labor share in 1951	0.00 (0.959)	1.40 (0.271)	0.00 (0.951)	0.17 (0.692)	0.24 (0.658)	0.12 (0.744)
Damage	0.39 (0.538)	0.05 (0.834)	0.000 (1.000)	0.01 (0.919)	0.05 (0.830)	0.50 (0.504)
Strikes	0.45 (0.507)	0.32 (0.587)	0.18 (0.693)	0.05 (0.822)	0.60 (0.495)	1.70 (0.234)
Aid	0.04 (0.852)	1.60 (0.242)	0.02 (0.881)	0.00 (1.000)	0.05 (0.830)	0.69 (0.433)
Total firms in 1937	0.02 (0.884)	0.00 (1.000)	0.69 (0.445)	0.26 (0.626)	0.05 (0.830)	3.11 (0.121)
Manufacturing firms in 1937	0.00 (0.974)	1.97 (0.198)	2.14 (0.203)	0.62 (0.456)	1.20 (0.353)	0.06 (0.810)
Population in 1937	0.54 (0.468)	0.12 (0.734)	0.05 (0.833)	0.09 (0.767)	0.18 (0.700)	0.34 (0.576)

*Notes.* ANOVA test for mean equality among treated and comparison provinces (column 1), and each pilot region and its treatment province (columns 2–6). For each variable, the first row reports the  $F$ -statistics and the second row the  $p$ -value. The variables are total number of firms, manufacturing firms, population, employment-population ratio, labor share, percentage of buildings in a province destroyed by bombing between 1940 and 1945, percentage of firms involved in 1948 communist strikes, and E.R.P. aid received between 1948 and 1951 as a fraction of total aid received by Italy. Data are provided at the province level.

Table A.5—: Pre-Productivity Program Differences in Time Trends between Treated and Comparison Provinces, 1946–1951

	Log Employment		Log Assets		Log Sales		Log Value Added		Log TFPR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Management										
Time trend	0.031 (0.015)	0.027 (0.013)	0.033 (0.019)	0.038 (0.018)	0.043 (0.011)	0.036 (0.013)	0.029 (0.006)	0.026 (0.005)	0.016 (0.003)	0.014 (0.003)
Time trend · Treatment Province	0.013 (0.013)	0.011 (0.015)	-0.012 (0.013)	-0.014 (0.017)	0.012 (0.017)	0.009 (0.015)	0.019 (0.025)	0.010 (0.018)	0.014 (0.015)	0.010 (0.012)
Treatment Province	0.011 (0.013)	0.014 (0.012)	-0.007 (0.009)	-0.009 (0.014)	-0.009 (0.014)	-0.012 (0.016)	-0.008 (0.011)	-0.006 (0.009)	0.020 (0.026)	0.018 (0.022)
Observations	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141
Panel B. Technology										
Time trend	0.039 (0.017)	0.035 (0.013)	0.029 (0.013)	0.026 (0.011)	0.055 (0.033)	0.054 (0.032)	0.041 (0.013)	0.037 (0.014)	0.015 (0.004)	0.011 (0.003)
Time trend · Treatment Province	-0.006 (0.010)	-0.003 (0.009)	0.010 (0.014)	0.008 (0.012)	0.006 (0.008)	0.005 (0.008)	0.009 (0.010)	0.007 (0.007)	-0.005 (0.008)	-0.005 (0.010)
Treatment Province	0.014 (0.021)	0.016 (0.019)	0.015 (0.023)	0.010 (0.019)	-0.013 (0.019)	-0.012 (0.015)	0.011 (0.010)	0.009 (0.014)	-0.006 (0.009)	-0.003 (0.007)
Observations	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678
Panel C. Combined										
Time trend	0.046 (0.009)	0.041 (0.008)	0.038 (0.012)	0.035 (0.010)	0.045 (0.009)	0.041 (0.008)	0.049 (0.013)	0.048 (0.011)	0.018 (0.005)	0.016 (0.004)
Time trend · Treatment Province	0.008 (0.011)	0.010 (0.013)	-0.021 (0.029)	-0.010 (0.025)	-0.007 (0.011)	-0.008 (0.010)	0.004 (0.007)	0.006 (0.012)	-0.008 (0.015)	-0.008 (0.011)
Treatment Province	-0.017 (0.022)	-0.015 (0.019)	0.005 (0.006)	0.003 (0.008)	0.011 (0.013)	0.014 (0.021)	-0.009 (0.015)	-0.014 (0.015)	0.017 (0.020)	0.014 (0.019)
Observations	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238
Pilot region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot region x time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

*Notes.* OLS regressions predicting outcomes in the pre-Productivity Program period for 804 firms that applied for management transfer (Panel A), 1,178 firms that applied for technology transfer (Panel B), and 1,612 firms that applied for the combined management and technology transfers (Panel C). Thirty firms whose applications were rejected are excluded. Data are provided at the firm level. Outcomes are allowed to vary according to a linear time (year) trend that differs for treatment provinces. Excluded year is 1946. Standard errors are block-bootstrapped at the province level with 200 replications. All the dependent variables are expressed in logs. *Employment* is the number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro=USD 1; *TFPR* is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method.

Table A.6—: Pre-Productivity Program Differences in Region Time Trends, 1946–1951

	Log Empl. (1)	Log Assets (2)	Log Sales (3)	Log Value Added (4)	Log TFPR (5)
Panel A. Management					
<i>Pilot region indicators</i>					
Time Trend · Lombardia	0.043 (0.019)	0.048 (0.025)	0.052 (0.030)	0.034 (0.020)	0.020 (0.006)
Time Trend · Veneto	0.034 (0.015)	0.040 (0.019)	0.046 (0.018)	0.027 (0.012)	0.017 (0.009)
Time Trend · Toscana	0.030 (0.014)	0.035 (0.017)	0.041 (0.022)	0.025 (0.012)	0.015 (0.007)
Time Trend · Campania	0.020 (0.009)	0.012 (0.006)	0.028 (0.014)	0.016 (0.007)	0.010 (0.006)
Time Trend · Sicilia	0.016 (0.008)	0.015 (0.009)	0.024 (0.012)	0.017 (0.006)	0.009 (0.004)
<i>Treatment province indicators</i>					
Time Trend · Monza	0.006 (0.008)	0.003 (0.005)	0.004 (0.012)	-0.003 (0.007)	-0.002 (0.009)
Time Trend · Vicenza	0.002 (0.004)	-0.005 (0.009)	-0.002 (0.004)	0.001 (0.001)	0.003 (0.002)
Time Trend · Pisa	-0.004 (0.007)	-0.006 (0.011)	0.003 (0.005)	0.005 (0.004)	0.002 (0.003)
Time Trend · Salerno	0.004 (0.003)	0.008 (0.009)	-0.003 (0.004)	0.005 (0.011)	0.007 (0.008)
Time Trend · Palermo	-0.001 (0.003)	0.004 (0.006)	0.005 (0.005)	-0.006 (0.008)	-0.007 (0.006)
Observations	3,141	3,141	3,141	3,141	3,141
<i>F</i> -statistic	0.61	0.57	0.65	0.76	0.27
Panel B. Technology					
<i>Pilot region indicators</i>					
Time Trend · Lombardia	0.049 (0.022)	0.042 (0.022)	0.045 (0.023)	0.029 (0.015)	0.024 (0.012)
Time Trend · Veneto	0.038 (0.022)	0.045 (0.023)	0.049 (0.021)	0.033 (0.017)	0.021 (0.012)
Time Trend · Toscana	0.035 (0.016)	0.041 (0.024)	0.048 (0.025)	0.029 (0.014)	0.018 (0.009)
Time Trend · Campania	0.023 (0.012)	0.017 (0.008)	0.031 (0.016)	0.023 (0.010)	0.015 (0.008)
Time Trend · Sicilia	0.022 (0.012)	0.016 (0.008)	0.029 (0.017)	0.021 (0.010)	0.010 (0.006)
<i>Treatment province indicators</i>					
Time Trend · Monza	0.011 (0.010)	-0.012 (0.013)	0.01 (0.013)	0.005 (0.005)	0.004 (0.003)
Time Trend · Vicenza	-0.003 (0.005)	0.007 (0.008)	-0.006 (0.008)	0.003 (0.003)	0.005 (0.007)
Time Trend · Pisa	0.006 (0.005)	-0.012 (0.014)	0.008 (0.009)	-0.004 (0.003)	-0.001 (0.002)

(Continues)

Table A.6—: Continued

	Log Empl.	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Time Trend · Salerno	-0.005 (0.005)	-0.004 (0.006)	0.005 (0.005)	0.007 (0.009)	-0.010 (0.010)
Time Trend · Palermo	0.012 (0.015)	-0.005 (0.010)	-0.007 (0.011)	0.001 (0.002)	-0.005 (0.005)
Observations	4,678	4,678	4,678	4,678	4,678
<i>F</i> -statistic	0.89	0.45	0.74	0.58	0.64
Panel C. Combined					
<i>Pilot region indicators</i>					
Time Trend · Lombardia	0.054 (0.025)	0.047 (0.026)	0.053 (0.021)	0.043 (0.018)	0.029 (0.017)
Time Trend · Veneto	0.041 (0.019)	0.049 (0.021)	0.055 (0.025)	0.037 (0.020)	0.025 (0.014)
Time Trend · Toscana	0.039 (0.014)	0.039 (0.016)	0.044 (0.022)	0.032 (0.018)	0.022 (0.011)
Time Trend · Campania	0.026 (0.014)	0.022 (0.013)	0.034 (0.012)	0.028 (0.011)	0.019 (0.010)
Time Trend · Sicilia	0.024 (0.014)	0.025 (0.013)	0.031 (0.014)	0.026 (0.011)	0.018 (0.010)
<i>Treatment province indicators</i>					
Time Trend · Monza	0.005 (0.004)	0.002 (0.003)	-0.011 (0.011)	0.007 (0.008)	-0.003 (0.002)
Time Trend · Vicenza	0.009 (0.009)	0.002 (0.005)	0.003 (0.005)	-0.002 (0.002)	0.005 (0.006)
Time Trend · Pisa	-0.009 (0.010)	-0.011 (0.012)	0.009 (0.011)	0.005 (0.004)	-0.006 (0.005)
Time Trend · Salerno	-0.002 (0.003)	0.009 (0.011)	-0.008 (0.009)	0.006 (0.007)	-0.004 (0.005)
Time Trend · Palermo	-0.009 (0.011)	0.006 (0.009)	-0.002 (0.005)	-0.007 (0.008)	0.003 (0.003)
Observations	6,238	6,238	6,238	6,238	6,238
<i>F</i> -statistic	0.89	0.77	0.51	0.38	0.45

*Notes.* OLS regressions predicting outcomes in the pre-Productivity Program period for 804 firms that applied for management transfer (Panel A), 1,178 firms that applied for technology transfer (Panel B), and 1,612 firms that applied for the combined management and technology transfers (Panel C). Thirty firms whose applications were rejected are excluded. Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications. *Lombardia*, *Veneto*, *Toscana*, *Campania*, and *Sicilia* are indicator variables for pilot regions. *Monza*, *Vicenza*, *Pisa*, *Salerno*, and *Palermo* are indicator variables for treatment provinces. All the dependent variables are expressed in logs. *Employment* is the number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; TFPR is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method. The *F*-statistics at the bottom of each panel test whether all the interaction terms between treatment provinces and the time trend are jointly zero.

Table A.7—: Pre-Productivity Program Differences in Yearly Trends between Treated and Comparison Provinces, 1946–1951

	Log Employment		Log Assets		Log Sales		Log Value Added		Log TFPR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Management										
Treatment Province· 1947	0.012	0.007	-0.010	-0.014	0.021	0.022	-0.009	-0.005	0.006	0.004
	(0.021)	(0.019)	(0.023)	(0.026)	(0.033)	(0.021)	(0.014)	(0.013)	(0.006)	(0.007)
Treatment Province· 1948	0.006	0.009	-0.014	-0.009	0.017	0.014	0.004	0.003	0.012	0.010
	(0.015)	(0.025)	(0.017)	(0.012)	(0.028)	(0.009)	(0.009)	(0.009)	(0.019)	(0.014)
Treatment Province· 1949	-0.009	-0.015	-0.009	-0.003	-0.010	-0.009	-0.012	-0.011	-0.007	-0.008
	(0.010)	(0.029)	(0.024)	(0.009)	(0.007)	(0.012)	(0.008)	(0.014)	(0.008)	(0.016)
Treatment Province· 1950	0.008	-0.007	0.007	0.011	0.008	0.009	-0.012	-0.014	-0.004	-0.005
	(0.014)	(0.009)	(0.009)	(0.021)	(0.013)	(0.012)	(0.018)	(0.029)	(0.008)	(0.008)
Treatment Province· 1951	0.011	0.008	-0.005	-0.004	-0.005	-0.007	0.011	0.007	-0.012	-0.011
	(0.024)	(0.013)	(0.012)	(0.008)	(0.017)	(0.013)	(0.015)	(0.009)	(0.014)	(0.013)
Observations	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141
<i>F</i> -statistic	0.58	0.72	0.49	0.50	0.33	0.44	0.67	0.41	0.39	0.57
Panel B. Technology										
Treatment Province· 1947	0.013	0.009	0.015	0.006	-0.004	-0.004	0.007	0.006	0.013	0.014
	(0.021)	(0.014)	(0.023)	(0.006)	(0.007)	(0.006)	(0.009)	(0.009)	(0.019)	(0.018)
Treatment Province· 1948	-0.002	-0.004	0.013	0.012	-0.010	-0.014	-0.015	-0.019	0.011	0.009
	(0.009)	(0.009)	(0.009)	(0.019)	(0.014)	(0.017)	(0.021)	(0.023)	(0.026)	(0.019)
Treatment Province· 1949	-0.009	-0.012	-0.011	-0.012	0.008	0.009	0.009	0.014	0.014	0.017
	(0.012)	(0.008)	(0.014)	(0.008)	(0.016)	(0.015)	(0.018)	(0.024)	(0.018)	(0.023)
Treatment Province· 1950	0.018	0.012	0.014	0.014	0.005	0.008	0.024	0.021	0.016	0.019
	(0.022)	(0.018)	(0.029)	(0.028)	(0.008)	(0.014)	(0.028)	(0.029)	(0.019)	(0.021)
Treatment Province· 1951	0.007	0.011	0.007	0.012	0.011	0.012	0.015	0.013	0.003	0.005
	(0.013)	(0.015)	(0.009)	(0.014)	(0.013)	(0.015)	(0.023)	(0.026)	(0.008)	(0.009)
Observations	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678	4,678
<i>F</i> -statistic	0.21	0.59	0.83	0.26	0.69	0.41	0.58	0.44	0.39	0.42
Pilot region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot region x time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

(Continues)

Table A.7—: Continued

	Log Employment		Log Assets		Log Sales		Log Value Added		Log TFPR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel C. Combined										
Treatment Province· 1947	-0.018 (0.021)	-0.015 (0.018)	0.023 (0.026)	0.024 (0.025)	0.014 (0.012)	0.012 (0.011)	0.017 (0.019)	0.015 (0.018)	0.005 (0.006)	0.004 (0.006)
Treatment Province· 1948	0.009 (0.012)	0.009 (0.011)	0.015 (0.019)	0.013 (0.017)	-0.007 (0.008)	0.006 (0.009)	-0.011 (0.012)	-0.009 (0.010)	0.002 (0.003)	0.002 (0.004)
Treatment Province· 1949	0.007 (0.009)	0.008 (0.009)	-0.003 (0.006)	-0.002 (0.004)	0.005 (0.004)	0.006 (0.007)	0.015 (0.016)	0.017 (0.014)	0.004 (0.004)	0.003 (0.004)
Treatment Province· 1950	0.010 (0.015)	0.012 (0.014)	0.009 (0.011)	0.006 (0.009)	-0.011 (0.013)	-0.008 (0.012)	-0.011 (0.012)	-0.011 (0.011)	0.004 (0.005)	0.005 (0.005)
Treatment Province· 1951	-0.017 (0.021)	-0.016 (0.020)	0.011 (0.015)	0.014 (0.013)	0.003 (0.007)	0.003 (0.008)	0.004 (0.005)	0.006 (0.005)	-0.002 (0.004)	-0.002 (0.003)
Observations	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238	6,238
<i>F</i> -statistic	0.59	0.68	0.91	0.65	0.63	0.65	0.49	0.81	0.39	0.42
Pilot region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot region x time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

*Notes.* OLS regressions predicting outcomes in the pre-Productivity Program period for 804 firms that applied for management transfer (Panel A), 1,178 firms that applied for technology transfer (Panel B), and 1,612 firms that applied for the combined management and technology transfers (Panel C). Thirty firms whose applications were rejected are excluded. Data are provided at the firm level. The trend is allowed to vary freely for each year before the Productivity Program was implemented. Year dummies are included, but their coefficients are not reported. Standard errors are block-bootstrapped at the province level with 200 replications. All the dependent variables are expressed in logs. *Employment* is the number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro=USD 1; *TFPR* is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method. The *F*-statistics at the bottom of each panel test whether all the interaction terms between treatment provinces and the year dummy variables are jointly zero.



Table A.8—: Pre-Productivity Program Differences in Yearly Province Time Trends, 1946–1951

	Log Empl.	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Panel A. Management					
Monza · 1947	0.013 (0.015)	0.006 (0.008)	0.010 (0.009)	0.003 (0.004)	-0.007 (0.009)
Monza · 1948	0.007 (0.006)	0.010 (0.008)	-0.009 (0.011)	-0.006 (0.007)	0.004 (0.006)
Monza · 1949	-0.011 (0.012)	0.011 (0.015)	0.005 (0.006)	0.013 (0.011)	-0.011 (0.013)
Monza · 1950	0.013 (0.010)	0.009 (0.011)	-0.011 (0.012)	-0.007 (0.009)	0.008 (0.008)
Monza · 1951	-0.023 (0.028)	0.012 (0.011)	0.005 (0.007)	0.009 (0.010)	0.006 (0.007)
Vicenza · 1947	0.008 (0.009)	-0.007 (0.006)	0.015 (0.011)	0.004 (0.005)	-0.007 (0.005)
Vicenza · 1948	0.010 (0.008)	-0.004 (0.005)	-0.007 (0.009)	-0.014 (0.009)	0.004 (0.009)
Vicenza · 1949	-0.017 (0.024)	0.012 (0.014)	0.003 (0.005)	0.008 (0.009)	-0.005 (0.006)
Vicenza · 1950	0.011 (0.012)	-0.009 (0.009)	-0.012 (0.015)	-0.009 (0.010)	0.009 (0.008)
Vicenza · 1951	0.009 (0.008)	0.006 (0.007)	0.007 (0.006)	0.006 (0.006)	-0.011 (0.012)
Pisa · 1947	0.013 (0.012)	0.012 (0.015)	-0.006 (0.005)	0.008 (0.010)	0.008 (0.009)
Pisa · 1948	-0.015 (0.013)	-0.005 (0.007)	0.012 (0.009)	-0.004 (0.005)	0.007 (0.006)
Pisa · 1949	0.017 (0.015)	0.011 (0.012)	0.009 (0.010)	0.012 (0.008)	-0.004 (0.007)
Pisa · 1950	0.007 (0.009)	0.006 (0.007)	-0.005 (0.004)	-0.009 (0.012)	-0.005 (0.005)
Pisa · 1951	-0.004 (0.005)	-0.010 (0.012)	0.013 (0.015)	0.005 (0.006)	0.003 (0.004)
Salerno · 1947	0.014 (0.011)	-0.005 (0.004)	-0.012 (0.015)	0.006 (0.009)	0.012 (0.008)
Salerno · 1948	-0.016 (0.013)	0.007 (0.008)	0.004 (0.006)	-0.010 (0.011)	-0.008 (0.009)
Salerno · 1949	0.008 (0.006)	0.006 (0.007)	-0.009 (0.013)	-0.014 (0.016)	0.011 (0.014)
Salerno · 1950	-0.010 (0.008)	-0.009 (0.010)	0.011 (0.014)	0.008 (0.009)	0.003 (0.005)
Salerno · 1951	0.009 (0.011)	0.012 (0.008)	0.005 (0.006)	0.005 (0.006)	-0.005 (0.007)

(Continues)

Table A.8—: Continued

	Log Empl.	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Palermo · 1947	0.008 (0.009)	0.014 (0.012)	-0.004 (0.008)	0.011 (0.013)	-0.009 (0.008)
Palermo · 1948	0.014 (0.010)	-0.009 (0.011)	0.006 (0.008)	-0.012 (0.016)	0.004 (0.005)
Palermo · 1949	-0.005 (0.006)	0.006 (0.008)	0.008 (0.009)	0.008 (0.009)	0.006 (0.007)
Palermo · 1950	0.007 (0.009)	-0.005 (0.007)	-0.004 (0.005)	-0.005 (0.007)	-0.008 (0.009)
Palermo · 1951	-0.010 (0.007)	0.003 (0.002)	0.002 (0.005)	0.006 (0.006)	-0.004 (0.005)
Observations	3,141	3,141	3,141	3,141	3,141
<i>F</i> -statistic	0.56	0.73	0.49	0.55	0.72
Panel B. Technology					
Monza · 1947	-0.011 (0.013)	0.006 (0.009)	-0.008 (0.006)	0.004 (0.005)	-0.002 (0.002)
Monza · 1948	0.005 (0.006)	-0.008 (0.010)	0.005 (0.004)	-0.008 (0.009)	-0.003 (0.005)
Monza · 1949	-0.012 (0.010)	0.011 (0.009)	0.006 (0.005)	0.011 (0.009)	0.004 (0.003)
Monza · 1950	-0.009 (0.007)	-0.012 (0.008)	-0.011 (0.012)	0.007 (0.006)	0.005 (0.006)
Monza · 1951	0.004 (0.006)	-0.014 (0.015)	0.009 (0.007)	-0.013 (0.011)	-0.011 (0.012)
Vicenza · 1947	0.007 (0.009)	0.004 (0.007)	-0.004 (0.009)	0.015 (0.016)	0.009 (0.009)
Vicenza · 1948	-0.006 (0.006)	-0.003 (0.005)	0.004 (0.003)	-0.009 (0.009)	0.006 (0.008)
Vicenza · 1949	-0.011 (0.015)	0.002 (0.003)	0.005 (0.007)	0.007 (0.008)	-0.007 (0.005)
Vicenza · 1950	0.008 (0.008)	0.009 (0.008)	-0.006 (0.005)	-0.008 (0.009)	0.011 (0.019)
Vicenza · 1951	0.004 (0.006)	-0.006 (0.008)	0.011 (0.013)	0.014 (0.011)	0.012 (0.013)
Pisa · 1947	-0.009 (0.011)	0.005 (0.004)	-0.015 (0.011)	0.006 (0.004)	-0.014 (0.012)
Pisa · 1948	0.012 (0.014)	0.007 (0.005)	0.007 (0.009)	-0.008 (0.007)	0.005 (0.004)
Pisa · 1949	0.013 (0.012)	-0.008 (0.009)	0.003 (0.002)	0.010 (0.012)	0.008 (0.005)
Pisa · 1950	-0.011 (0.009)	0.004 (0.006)	-0.009 (0.009)	-0.013 (0.019)	-0.005 (0.008)
Pisa · 1951	-0.005 (0.004)	-0.011 (0.014)	0.014 (0.016)	0.004 (0.005)	0.006 (0.005)

(Continues)

Table A.8—: Continued

	Log Empl.	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Salerno · 1947	-0.004 (0.007)	0.005 (0.008)	0.006 (0.008)	-0.009 (0.009)	0.011 (0.008)
Salerno · 1948	0.006 (0.008)	-0.007 (0.009)	-0.004 (0.005)	0.004 (0.006)	0.009 (0.008)
Salerno · 1949	0.005 (0.005)	0.003 (0.002)	-0.009 (0.007)	0.011 (0.014)	0.004 (0.005)
Salerno · 1950	0.007 (0.005)	0.014 (0.016)	0.011 (0.010)	0.012 (0.014)	-0.007 (0.008)
Salerno · 1951	-0.004 (0.007)	-0.002 (0.006)	0.013 (0.016)	-0.007 (0.009)	0.011 (0.014)
Palermo · 1947	0.011 (0.012)	0.008 (0.010)	-0.011 (0.009)	0.006 (0.008)	-0.015 (0.011)
Palermo · 1948	0.002 (0.004)	0.006 (0.005)	0.007 (0.007)	-0.005 (0.004)	0.008 (0.006)
Palermo · 1949	-0.005 (0.006)	-0.013 (0.009)	-0.007 (0.009)	0.008 (0.006)	0.009 (0.011)
Palermo · 1950	0.014 (0.011)	0.005 (0.007)	0.004 (0.008)	-0.009 (0.007)	-0.002 (0.002)
Palermo · 1951	-0.008 (0.005)	0.009 (0.011)	-0.005 (0.006)	0.003 (0.004)	0.003 (0.004)
Observations	4,678	4,678	4,678	4,678	4,678
<i>F</i> -statistic	0.72	0.94	0.54	0.91	0.67
Panel C. Combined					
Monza · 1947	-0.005 (0.007)	0.003 (0.005)	0.007 (0.008)	-0.009 (0.007)	-0.007 (0.009)
Monza · 1948	0.008 (0.009)	0.007 (0.006)	-0.009 (0.011)	0.013 (0.014)	0.006 (0.007)
Monza · 1949	-0.006 (0.005)	-0.009 (0.009)	0.004 (0.006)	-0.004 (0.007)	-0.005 (0.005)
Monza · 1950	0.007 (0.008)	0.013 (0.014)	-0.003 (0.005)	0.005 (0.006)	0.004 (0.007)
Monza · 1951	-0.004 (0.006)	0.005 (0.007)	0.013 (0.012)	0.002 (0.002)	0.010 (0.011)
Vicenza · 1947	-0.003 (0.004)	-0.004 (0.003)	0.007 (0.009)	-0.004 (0.005)	-0.002 (0.004)
Vicenza · 1948	0.002 (0.003)	0.005 (0.005)	-0.003 (0.005)	0.006 (0.007)	0.006 (0.007)
Vicenza · 1949	0.011 (0.015)	0.008 (0.011)	0.009 (0.010)	-0.011 (0.012)	-0.004 (0.008)
Vicenza · 1950	-0.009 (0.008)	-0.014 (0.011)	-0.012 (0.011)	0.002 (0.006)	0.012 (0.020)
Vicenza · 1951	0.004 (0.004)	0.007 (0.008)	0.007 (0.006)	0.004 (0.005)	-0.007 (0.009)

(Continues)

Table A.8—: Continued

	Log Empl.	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Pisa · 1947	-0.005 (0.006)	0.003 (0.005)	-0.008 (0.007)	-0.008 (0.009)	-0.008 (0.005)
Pisa · 1948	0.006 (0.004)	-0.006 (0.007)	0.001 (0.001)	0.006 (0.004)	-0.003 (0.004)
Pisa · 1949	0.002 (0.003)	0.008 (0.006)	-0.005 (0.006)	-0.001 (0.002)	0.002 (0.005)
Pisa · 1950	0.005 (0.004)	-0.003 (0.005)	0.009 (0.010)	0.012 (0.008)	0.006 (0.004)
Pisa · 1951	0.012 (0.013)	0.004 (0.006)	-0.012 (0.015)	0.007 (0.009)	0.008 (0.008)
Salerno · 1947	0.008 (0.008)	0.008 (0.009)	0.004 (0.008)	0.005 (0.006)	-0.001 (0.002)
Salerno · 1948	-0.003 (0.006)	-0.011 (0.013)	-0.008 (0.009)	-0.004 (0.006)	0.003 (0.004)
Salerno · 1949	0.005 (0.004)	-0.005 (0.007)	0.013 (0.016)	0.005 (0.006)	-0.005 (0.008)
Salerno · 1950	0.006 (0.007)	0.006 (0.005)	-0.011 (0.014)	0.006 (0.009)	0.012 (0.011)
Salerno · 1951	-0.009 (0.009)	0.009 (0.012)	0.007 (0.006)	-0.003 (0.004)	0.006 (0.008)
Palermo · 1947	0.011 (0.013)	-0.007 (0.006)	-0.003 (0.004)	0.002 (0.005)	0.004 (0.005)
Palermo · 1948	-0.010 (0.011)	0.012 (0.014)	-0.002 (0.002)	-0.002 (0.003)	-0.003 (0.002)
Palermo · 1949	0.004 (0.005)	-0.014 (0.017)	0.008 (0.011)	0.004 (0.006)	0.002 (0.005)
Palermo · 1950	-0.008 (0.008)	0.007 (0.009)	-0.004 (0.007)	-0.005 (0.007)	-0.001 (0.003)
Palermo · 1951	0.015 (0.016)	-0.004 (0.005)	0.006 (0.008)	0.001 (0.002)	-0.004 (0.006)
Observations	6,238	6,238	6,238	6,238	6,238
<i>F</i> -statistic	0.67	0.87	0.51	0.98	0.46

*Notes.* OLS regressions predicting outcomes in the pre-Productivity Program period for 804 firms that applied for management transfer (Panel A), 1,178 firms that applied for technology transfer (Panel B), and 1,612 firms that applied for the combined management and technology transfers (Panel C). Thirty firms whose applications were rejected are excluded. Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications. Region  $\times$  year dummies are included, but their coefficients are not reported. Monza, Vicenza, Pisa, Salerno, and Palermo are indicator variables for treatment provinces. All the dependent variables are expressed in logs. *Employment* is the number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; TFPR is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method. The *F*-statistics at the bottom of each panel test whether all the interaction terms between treatment provinces and the time trend are jointly zero.

Table A.9—: Pre-Productivity Program Differences between Treated and Comparison Provinces, by Firm Application Date

	Log Employment (1)	Log Assets (2)	Log Sales (3)	Log Value Added (4)	Log TFPR (5)
Panel A. Management					
Productivity Program 1953	0.019 (0.021)	0.018 (0.020)	-0.016 (0.019)	0.009 (0.015)	-0.011 (0.014)
Productivity Program 1954	-0.021 (0.025)	0.003 (0.009)	0.007 (0.016)	0.015 (0.019)	0.004 (0.014)
Productivity Program 1955	0.014 (0.013)	0.010 (0.011)	-0.012 (0.015)	0.008 (0.010)	0.019 (0.023)
Productivity Program 1956	0.011 (0.015)	-0.008 (0.010)	0.015 (0.014)	0.011 (0.013)	0.002 (0.009)
Productivity Program 1957	-0.009 (0.011)	0.016 (0.022)	0.003 (0.004)	0.006 (0.012)	-0.009 (0.011)
Productivity Program 1958	0.017 (0.021)	0.006 (0.016)	0.008 (0.009)	0.012 (0.013)	0.021 (0.019)
Productivity Program 1952· Treatment Province	-0.007 (0.010)	0.015 (0.019)	0.009 (0.013)	0.015 (0.019)	-0.003 (0.008)
Productivity Program 1953· Treatment Province	0.008 (0.015)	-0.014 (0.013)	0.003 (0.008)	0.011 (0.015)	0.017 (0.022)
Productivity Program 1954· Treatment Province	0.011 (0.014)	0.005 (0.008)	-0.002 (0.002)	0.012 (0.018)	-0.005 (0.008)
Productivity Program 1955· Treatment Province	-0.014 (0.015)	0.009 (0.011)	0.003 (0.007)	0.014 (0.021)	-0.011 (0.010)
Productivity Program 1956· Treatment Province	0.006 (0.007)	-0.003 (0.004)	0.009 (0.011)	0.007 (0.013)	-0.015 (0.014)
Productivity Program 1957· Treatment Province	0.011 (0.014)	0.005 (0.007)	0.008 (0.009)	0.014 (0.017)	-0.004 (0.005)
Productivity Program 1958· Treatment Province	0.013 (0.016)	-0.022 (0.023)	0.016 (0.018)	0.019 (0.024)	-0.017 (0.021)
Observations	3,141	3,141	3,141	3,141	3,141
<i>F</i> -statistic	0.58	0.67	0.44	0.79	0.61
Panel B. Technology					
Productivity Program 1953	0.014 (0.015)	-0.021 (0.025)	0.009 (0.010)	0.018 (0.017)	-0.007 (0.009)

(Continues)

Table A.9—: Continued

	Log Employment	Log Assets	Log Sales	Log Value Added	Log TFPR
	(1)	(2)	(3)	(4)	(5)
Productivity Program 1954	0.012 (0.015)	0.019 (0.021)	-0.007 (0.011)	0.011 (0.014)	-0.003 (0.006)
Productivity Program 1955	0.015 (0.021)	0.017 (0.022)	-0.021 (0.025)	0.013 (0.016)	0.025 (0.031)
Productivity Program 1956	-0.021 (0.028)	0.023 (0.026)	0.015 (0.019)	0.014 (0.024)	0.011 (0.014)
Productivity Program 1957	0.024 (0.023)	-0.010 (0.015)	-0.011 (0.013)	0.021 (0.025)	0.018 (0.022)
Productivity Program 1958	0.009 (0.010)	0.022 (0.025)	0.016 (0.015)	-0.025 (0.031)	0.008 (0.018)
Productivity Program 1952: Treatment Province	0.013 (0.016)	-0.016 (0.021)	0.012 (0.011)	0.009 (0.009)	-0.017 (0.023)
Productivity Program 1953: Treatment Province	-0.011 (0.021)	0.014 (0.016)	-0.018 (0.023)	0.021 (0.025)	0.013 (0.014)
Productivity Program 1954: Treatment Province	0.008 (0.011)	-0.017 (0.024)	0.014 (0.015)	0.016 (0.023)	0.011 (0.010)
Productivity Program 1955: Treatment Province	0.010 (0.012)	0.024 (0.028)	0.011 (0.013)	0.020 (0.023)	0.015 (0.018)
Productivity Program 1956: Treatment Province	-0.015 (0.023)	0.013 (0.018)	0.021 (0.025)	-0.016 (0.019)	0.019 (0.023)
Productivity Program 1957: Treatment Province	0.021 (0.023)	-0.017 (0.025)	-0.023 (0.026)	0.013 (0.016)	0.024 (0.029)
Productivity Program 1958: Treatment Province	0.016 (0.015)	0.019 (0.022)	0.010 (0.012)	0.014 (0.018)	0.008 (0.007)
Observations	4,678	4,678	4,678	4,678	4,678
<i>F</i> -statistic	0.44	0.78	0.54	0.89	0.31
Panel C. Combined					
Productivity Program 1953	0.015 (0.021)	0.013 (0.016)	-0.020 (0.019)	0.018 (0.022)	0.014 (0.017)
Productivity Program 1954	0.025 (0.029)	-0.017 (0.022)	0.009 (0.011)	0.011 (0.015)	0.015 (0.019)

(Continues)

Table A.9—: Continued

	Log Employment (1)	Log Assets (2)	Log Sales (3)	Log Value Added (4)	Log TFPR (5)
Productivity Program 1955	0.022 (0.025)	-0.020 (0.022)	0.016 (0.019)	0.008 (0.009)	-0.015 (0.019)
Productivity Program 1956	0.011 (0.013)	-0.008 (0.009)	0.018 (0.025)	-0.012 (0.014)	0.023 (0.028)
Productivity Program 1957	0.019 (0.023)	0.014 (0.016)	-0.010 (0.016)	0.021 (0.024)	0.014 (0.013)
Productivity Program 1958	0.014 (0.018)	-0.013 (0.012)	0.022 (0.023)	0.014 (0.016)	0.009 (0.008)
Productivity Program 1952· Treatment Province	-0.017 (0.021)	0.013 (0.017)	0.018 (0.023)	-0.021 (0.25)	-0.024 (0.031)
Productivity Program 1953· Treatment Province	-0.008 (0.009)	0.020 (0.024)	0.025 (0.031)	-0.014 (0.015)	0.017 (0.024)
Productivity Program 1954· Treatment Province	0.023 (0.021)	0.011 (0.015)	0.020 (0.022)	0.008 (0.011)	0.013 (0.016)
Productivity Program 1955· Treatment Province	-0.014 (0.019)	0.009 (0.009)	-0.017 (0.021)	0.012 (0.018)	0.010 (0.009)
Productivity Program 1956· Treatment Province	0.011 (0.013)	0.017 (0.023)	0.020 (0.025)	-0.009 (0.011)	0.021 (0.024)
Productivity Program 1957· Treatment Province	-0.012 (0.015)	0.010 (0.014)	0.016 (0.022)	0.011 (0.024)	0.017 (0.021)
Productivity Program 1958· Treatment Province	0.013 (0.019)	-0.008 (0.010)	0.019 (0.022)	-0.013 (0.015)	-0.007 (0.010)
Observations	6,238	6,238	6,238	6,238	6,238
<i>F</i> -statistic	0.56	0.69	0.36	0.49	0.71
Pilot region	Yes	Yes	Yes	Yes	Yes
Pilot region x time FE	No	No	No	No	No

*Notes.* Coefficients estimated from regressing each dependent variable on a full set of dummies for the year in which firms received/should have received the U.S. transfers and an interaction term between these dummies and an indicator for firms located in treatment provinces for 804 firms that applied for management transfer (Panel A), 1,178 firms that applied for technology transfer (Panel B), and 1,612 firms that applied for the combined management and technology transfers (Panel C). Thirty firms whose applications were rejected are excluded. The excluded year is 1952. Standard errors are block-bootstrapped at province level with 200 replications. *Employment* is the total number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; *TFPR* is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method. The *F*-statistics at the bottom of each panel test whether all the coefficients are jointly zero.

Table A.10—: Pre-Productivity Program Differences in Time Trends between Treated and Comparison Provinces, in the Four Years before the Implementation of the Productivity Program

	Log Employment		Log Assets		Log Sales		Log Value Added		Log TFPR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Management										
Treatment Province· (t-1)	0.009 (0.011)	0.008 (0.010)	0.013 (0.015)	0.011 (0.014)	0.015 (0.019)	0.015 (0.018)	0.008 (0.010)	0.008 (0.009)	0.012 (0.015)	0.010 (0.013)
Treatment Province· (t-2)	0.011 (0.012)	0.009 (0.012)	-0.016 (0.019)	-0.012 (0.013)	0.024 (0.029)	0.022 (0.028)	-0.005 (0.006)	-0.005 (0.004)	0.009 (0.012)	0.007 (0.011)
Treatment Province· (t-3)	-0.010 (0.014)	-0.010 (0.012)	0.022 (0.024)	0.020 (0.021)	-0.013 (0.015)	-0.012 (0.014)	0.006 (0.005)	0.005 (0.005)	0.009 (0.010)	0.08 (0.009)
Treatment Province· (t-4)	0.016 (0.018)	0.013 (0.015)	-0.012 (0.014)	-0.011 (0.013)	0.013 (0.016)	0.011 (0.015)	0.011 (0.010)	0.010 (0.008)	0.021 (0.026)	0.018 (0.024)
Observations	3,655	3,655	3,655	3,655	3,655	3,655	3,655	3,655	3,655	3,655
<i>F</i> -statistic	0.77	0.85	0.59	0.63	0.42	0.49	0.55	0.62	0.59	0.71
Panel B. Technology										
Treatment Province· (t-1)	0.018 (0.022)	0.016 (0.021)	0.008 (0.009)	0.008 (0.008)	0.022 (0.026)	0.021 (0.024)	0.013 (0.018)	0.012 (0.017)	0.021 (0.024)	0.019 (0.022)
Treatment Province· (t-2)	0.012 (0.015)	0.012 (0.013)	-0.019 (0.021)	-0.015 (0.020)	0.011 (0.014)	0.009 (0.012)	0.020 (0.023)	0.018 (0.022)	-0.024 (0.031)	-0.021 (0.027)
Treatment Province· (t-3)	0.025 (0.031)	0.021 (0.029)	0.010 (0.011)	0.009 (0.010)	0.015 (0.019)	0.014 (0.017)	0.011 (0.014)	0.008 (0.011)	0.016 (0.019)	0.012 (0.018)
Treatment Province· (t-4)	0.017 (0.024)	0.016 (0.022)	-0.021 (0.023)	-0.019 (0.020)	0.008 (0.009)	0.006 (0.008)	0.018 (0.021)	0.018 (0.021)	-0.009 (0.010)	-0.006 (0.008)
Observations	5,265	5,265	5,265	5,265	5,265	5,265	5,265	5,265	5,265	5,265
<i>F</i> -statistic	0.89	0.91	0.45	0.61	0.56	0.73	0.42	0.56	0.69	0.78

(Continues)



Table A.10—: Continued

	Log Employment		Log Assets		Log Sales		Log Value Added		Log TFPR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel C. Combined										
Treatment Province· (t-1)	0.016 (0.022)	0.013 (0.020)	0.020 (0.027)	0.018 (0.022)	0.009 (0.010)	0.008 (0.007)	-0.017 (0.025)	-0.015 (0.025)	0.011 (0.014)	0.011 (0.013)
Treatment Province· (t-2)	0.023 (0.026)	0.020 (0.025)	0.015 (0.016)	0.014 (0.016)	-0.008 (0.012)	-0.007 (0.012)	0.009 (0.008)	0.008 (0.008)	0.019 (0.022)	0.018 (0.022)
Treatment Province· (t-3)	-0.017 (0.020)	-0.015 (0.017)	0.019 (0.025)	0.016 (0.021)	0.025 (0.029)	0.022 (0.027)	0.013 (0.018)	0.012 (0.017)	-0.007 (0.009)	-0.007 (0.007)
Treatment Province· (t-4)	0.008 (0.007)	0.007 (0.007)	0.023 (0.028)	0.019 (0.027)	-0.011 (0.015)	-0.010 (0.014)	0.018 (0.022)	0.014 (0.019)	0.023 (0.032)	0.022 (0.029)
Observations	7,340	7,340	7,340	7,340	7,340	7,340	7,340	7,340	7,340	7,340
<i>F</i> -statistic	0.59	0.73	0.67	0.91	0.56	0.69	0.071	0.98	0.43	0.55
Pilot region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pilot region x time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

*Notes.* OLS regressions predicting outcomes in the pre-Productivity Program period for 731 firms that applied for management transfer (Panel A), 1,053 firms that applied for technology transfer (Panel B), and 1,468 firms that applied for the combined management and technology transfers (Panel C). The sample is restricted to firms that survived until the intervention year. Data are provided at the firm level. The trend is allowed to vary freely for each year before the implementation of the Productivity Program. Year dummies are included, but their coefficients are not reported. Standard errors are block-bootstrapped at the province level with 200 replications. *Employment* is the total number of employees per firm; *Assets*, *Sales*, and *Value Added* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; *TFPR* is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method. The *F*-statistics at the bottom of each panel test whether all the interaction terms between treatment provinces and the year dummy variables are jointly zero.

Table A.11—: Firms That Exited the Market before Implementation of the Productivity Program

	A. Management			B. Technology			C. Combined		
	Treatment Provinces		Diff <i>p</i> -value	Treatment Provinces		Diff <i>p</i> -value	Treatment Provinces		Diff <i>p</i> -value
	Yes	No		Yes	No		Yes	No	
	Mean	Mean	Mean	Mean	Mean	Mean			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Plants per firm	1.12	1.15	0.809	1.33	1.29	0.432	1.21	1.28	0.340
Employees per firm	39.85	37.65	0.567	34.51	38.95	0.489	33.45	31.21	0.435
Current assets (k in 2010 USD)	405,671.33	420,983.12	0.482	567,893.36	542,142.59	0.501	606,093.23	587,784.30	0.483
Annual sales (k in 2010 USD)	203,567	234,402.34	0.453	245,682.32	287,671.11	0.444	324,591.34	301,298.35	0.348
Value added (k in 2010 USD)	80.94	85.93	0.521	90.83	94.84	0.536	101.34	106.79	0.210
Age	11.23	12.56	0.322	10.09	11.38	0.439	12.37	10.76	0.398
Productivity (log TFPR)	2.02	2.05	0.492	2.12	2.10	0.321	2.09	2.14	0.394
Export	0.11	0.13	0.671	0.11	0.10	0.702	0.09	0.11	0.475
Family-managed	0.55	0.57	0.459	0.52	0.56	0.540	0.55	0.51	0.555
N	15	58		18	107		44	100	
Ratio (%)	10.27	8.81		7.73	11.32		11.40	8.15	

*Notes.* Balancing tests for firms that closed down before the implementation of the Productivity Program. Data are provided at the firm level. Columns 1, 2, 4, 5, 7, and 8 report the mean, respectively, in treatment and comparison provinces. Columns 3, 6, and 9 report the *p*-value of the mean difference. *Plants per firm* reports the number of plants per firm; *Employees per firm* reports the number of employees per firm; *Current assets (k in 2010 USD)*, *Annual sales (k in 2010 USD)*, and *Value added (k in 2010 USD)* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira=30.884 euros and exchanged at 0.780 euro=USD 1; *Productivity (log TFPR)* is the logarithm of firm productivity, estimated using the Akerberg, Caves and Frazer (2006) method; *Export* and *Family-managed* are indicator variables that equal one if, respectively, a firm exported and was family-managed.

Table A.12—: Cox Survival Model Estimation of Firm Shutdown Hazard

	Shut-Down Hazard Ratio							
	Proportional hazard ratio (1–4)				Different hazard ratio for $t \geq 7$ (5–8)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Management								
Treatment Province	0.294	0.292	0.289	0.276	0.621	0.620	0.618	0.615
	(0.085)	(0.084)	(0.080)	(0.079)	(0.148)	(0.146)	(0.143)	(0.138)
Treatment Province, $t \geq 7$					0.413	0.409	0.404	0.401
					(0.132)	(0.130)	(0.127)	(0.126)
Observations	731	731	731	731	731	731	731	731
Failures	193	193	193	193	193	193	193	193
B. Technology								
Treatment Province	0.407	0.404	0.399	0.388	0.723	0.721	0.717	0.715
	(0.076)	(0.074)	(0.071)	(0.068)	(0.155)	(0.151)	(0.149)	(0.145)
Treatment Province, $t \geq 7$					0.591	0.589	0.585	0.581
					(0.132)	(0.129)	(0.125)	(0.123)
Observations	1,035	1,035	1,035	1,035	1,035	1,035	1,035	1,035
Failures	305	305	305	305	305	305	305	305
C. Combined								
Treatment Province	0.163	0.160	0.157	0.151	0.744	0.739	0.734	0.729
	(0.037)	(0.033)	(0.030)	(0.025)	(0.031)	(0.030)	(0.028)	(0.026)
Treatment Province, $t \geq 7$					0.311	0.308	0.302	0.298
					(0.025)	(0.021)	(0.020)	(0.018)
Observations	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468
Failures	386	386	386	386	386	386	386	386
Pilot region controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar year controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Industry controls	No	No	Yes	Yes	No	No	Yes	Yes
Pre-Productivity Program controls	No	No	No	Yes	No	No	No	Yes

*Notes.* Shutdown hazard ratio estimated from the Cox survival model  $h(t) = h_0(t)\exp(\beta\text{ExpProv}_p + \lambda_r)$ , where  $h(t)$  is the hazard of shutdown  $t$  years after the U.S. intervention,  $\text{Treated Province}_i$  is an indicator variable for firms located in treatment provinces, and  $\lambda_r$  is pilot region fixed effects, for 731 firms that applied for management transfer (Panel A), 1,053 firms that applied for technology transfer (Panel B), and and 1,468 firms that applied for the combined management and technology transfers (Panel C). Data are provided at firm level. Columns 1–4 report estimates of a proportional hazard ratio, constant over time; columns 5–8 report estimates in which the hazard ratio is allowed to change seven years after the Productivity Program.

Table A.13—: Sales, Employment, and TFPR Growth Rates in Italy and in Firms Eligible for the Productivity Program, 1950–1970

	Italy (1)	Management (2)	Technology (3)	Combined (4)	Did Not Apply (5)
<b>Real GDP/Sales</b>					
1950–1955	6.45	4.79	4.23	4.98	4.21
1955–1960	5.23	4.51	4.12	4.73	4.04
1960–1965	6.37	4.23	3.08	4.21	2.99
1965–1970	5.80	3.23	2.96	3.45	2.54
<b>Employment</b>					
1950–1955	3.49	3.55	3.12	4.30	3.07
1955–1960	2.12	3.21	3.07	3.59	2.49
1960–1965	2.00	2.99	2.78	3.01	1.95
1965–1970	1.95	2.08	2.43	2.21	1.97
<b>TFPR</b>					
1950–1955	3.57	3.55	2.41	3.78	2.02
1955–1960	2.94	2.45	2.03	2.98	1.80
1960–1965	2.49	2.33	1.98	2.57	1.55
1965–1970	1.97	2.14	1.82	2.27	1.55

*Notes.* Average annual growth rates (%) of Italian real GDP and firm *Sales*, and *Employment* and *TFPR* of all Italian manufacturing firms; of eligible firms that applied for the management transfer, the technology transfer, and the combined management and technology transfers and did not receive U.S. assistance; and of eligible firms that did not apply between 1950–1955, 1955–1960, 1960–1965, 1965–1970. Italian growth rates are from the Historical Archive of the Bank of Italy (ASBI), accessed in February 2014.

Table A.14—: Lee’s Tightened Bounds

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
Upper Bound Year1	0.065 (0.015)	0.015 (0.010)	0.115 (0.034)	0.009 (0.010)	0.020 (0.014)	0.022 (0.024)	0.099 (0.017)	0.046 (0.015)	0.207 (0.034)
Upper Bound Year5	0.126 (0.029)	0.079 (0.022)	0.207 (0.067)	0.054 (0.020)	0.047 (0.022)	0.092 (0.031)	0.287 (0.067)	0.168 (0.056)	0.367 (0.078)
Upper Bound Year10	0.229 (0.042)	0.255 (0.060)	0.289 (0.084)	0.087 (0.036)	0.099 (0.044)	0.130 (0.061)	0.374 (0.098)	0.371 (0.084)	0.519 (0.089)
Upper Bound Year15	0.382 (0.089)	0.359 (0.101)	0.399 (0.098)	0.084 (0.039)	0.095 (0.048)	0.128 (0.061)	0.511 (0.103)	0.525 (0.116)	0.682 (0.109)
Observations	13,902	13,902	13,902	20,213	20,213	20,213	27,870	27,870	27,870
Number of firms	731	731	731	1,053	1,053	1,053	1,468	1,468	1,468

*Notes.* Lee (2009)’s tightened bounds calculated for coefficients from equation 1 for firms that applied for management transfer (Panel A), firms that applied for technology transfer (Panel B), and firms that applied for the combined management and technology transfers (Panel C). Data are provided at the firm level. The dependent variables are logged deflated *Sales*, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.15—: Comparison of the Effects of the Productivity Program over Time

	Log Sales (1-2)		Log Employment (3-4)		Log TFPR (5-6)	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Management						
Year1 = Year5	2.98	2.77	3.41	2.85	2.91	3.11
Year5 = Year10	3.01	2.93	2.65	2.77	2.74	2.61
Year10 = Year15	2.68	2.82	2.89	2.91	2.67	2.92
B. Technology						
Year1 = Year5	2.65	2.83	2.98	3.01	2.76	2.67
Year5 = Year10	2.42	2.24	2.11	2.45	2.37	2.38
Year10 = Year15	1.13	1.08	1.45	1.22	1.37	1.19
C. Combined						
Year1 = Year5	2.65	2.92	2.97	2.94	2.76	2.95
Year5 = Year10	2.72	2.88	2.61	2.89	2.89	2.80
Year10 = Year15	2.76	2.67	2.67	2.78	2.98	3.04
D. Management = Technology						
Year1 Management = Technology		16.35		13.58		17.46
Year5 Management = Technology		17.60		12.77		16.90
Year10 Management = Technology		15.59		13.89		12.32
Year15 Management = Technology		13.29		16.54		18.55
E. Comparison across Transfers						
Year1 Combined = Mgmt.+Tech.		17.56		15.91		18.29
Year5 Combined = Mgmt.+Tech.		12.77		14.66		17.72
Year10 Combined = Mgmt.+Tech.		16.39		17.62		18.66
Year15 Combined = Mgmt.+Tech.		13.36		16.32		15.32
Sample	Balanced	Matched	Balanced	Matched	Balanced	Matched
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* Panels A–C report the  $t$ -tests of the null hypothesis of equality of the coefficients estimated from equation 1 between one and five, five and ten, and ten and fifteen years after the Productivity Program, respectively, for firms that applied for management transfer (Panel A), firms that applied for technology transfer (Panel B), and firms that applied for the combined management and technology transfers (Panel C). Panels D and E report, respectively, the  $F$ -statistics of the null hypothesis of equality between the coefficients on management and technology transfers, and between the coefficients on the combined management and technology transfers and the sum of coefficients on management and technology transfers one, five, ten, and fifteen years after the Productivity Program, estimated from equation 2. Data are provided at the firm level. The dependent variables are logged deflated *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1–2); logged *Employment*, reporting the number of employees per firm (columns 3–4); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 5–6).

Table A.16—: Heterogeneity Effects: by Productivity Levels

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. Below National Industry Mean									
Year1AfterPP	0.065 (0.017)	0.010 (0.008)	0.152 (0.025)	0.005 (0.004)	0.008 (0.009)	0.015 (0.013)	0.105 (0.027)	0.053 (0.012)	0.217 (0.022)
Year15AfterPP	0.367 (0.062)	0.337 (0.071)	0.443 (0.068)	0.051 (0.030)	0.055 (0.030)	0.083 (0.042)	0.483 (0.073)	0.529 (0.081)	0.651 (0.092)
II. Above National Industry Mean									
Year1AfterPP	0.047 (0.015)	0.005 (0.006)	0.135 (0.034)	0.010 (0.006)	0.018 (0.014)	0.027 (0.012)	0.079 (0.021)	0.029 (0.007)	0.186 (0.053)
Year15AfterPP	0.341 (0.067)	0.288 (0.073)	0.386 (0.081)	0.082 (0.025)	0.095 (0.027)	0.121 (0.036)	0.378 (0.068)	0.479 (0.073)	0.574 (0.087)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* OLS estimation of equation 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose technology transfer (columns 4–6), and 1,082 firms that chose the combined management and technology transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by firm productivity level compared to the national industry average. Industries below the national mean are food, wood, and minerals. Industries above the national mean are textile, machinery, and chemicals. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.17—: Heterogeneity Effects: by 1951 Firm Size

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. Fewer than 30 employees									
Year1AfterPP	0.040 (0.019)	0.006 (0.007)	0.103 (0.027)	0.005 (0.007)	0.006 (0.005)	0.012 (0.015)	0.072 (0.019)	0.031 (0.007)	0.189 (0.029)
Year15AfterPP	0.389 (0.073)	0.345 (0.065)	0.441 (0.072)	0.048 (0.025)	0.057 (0.029)	0.094 (0.041)	0.484 (0.081)	0.525 (0.087)	0.678 (0.097)
II. 30–49 employees									
Year1AfterPP	0.041 (0.020)	0.005 (0.006)	0.125 (0.031)	0.004 (0.005)	0.008 (0.009)	0.014 (0.015)	0.075 (0.020)	0.024 (0.006)	0.177 (0.032)
Year15AfterPP	0.361 (0.078)	0.322 (0.062)	0.433 (0.078)	0.057 (0.027)	0.062 (0.032)	0.099 (0.044)	0.431 (0.097)	0.505 (0.086)	0.663 (0.092)
III. 50–99 employees									
Year1AfterPP	0.063 (0.023)	0.010 (0.009)	0.153 (0.035)	0.010 (0.006)	0.016 (0.010)	0.023 (0.013)	0.095 (0.021)	0.043 (0.012)	0.209 (0.035)
Year15AfterPP	0.234 (0.081)	0.281 (0.067)	0.312 (0.080)	0.073 (0.026)	0.083 (0.030)	0.116 (0.033)	0.421 (0.085)	0.469 (0.081)	0.544 (0.083)
IV. 100 employees or more									
Year1AfterPP	0.078 (0.027)	0.013 (0.008)	0.161 (0.037)	0.016 (0.009)	0.019 (0.016)	0.025 (0.015)	0.108 (0.025)	0.051 (0.017)	0.219 (0.038)
Year15AfterPP	0.212 (0.079)	0.249 (0.065)	0.300 (0.073)	0.082 (0.026)	0.091 (0.032)	0.125 (0.035)	0.395 (0.091)	0.442 (0.083)	0.531 (0.089)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* OLS estimation of equation 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose technology transfer (columns 4–6), and 1,082 firms that chose the combined management and technology transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by firm size. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications.



Table A.18—: Heterogeneity Effects: by Region

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. Lombardia									
Year1AfterPP	0.075 (0.019)	0.012 (0.009)	0.162 (0.031)	0.012 (0.010)	0.016 (0.013)	0.025 (0.020)	0.110 (0.024)	0.062 (0.012)	0.211 (0.035)
Year15AfterPP	0.376 (0.086)	0.325 (0.092)	0.431 (0.087)	0.083 (0.040)	0.085 (0.039)	0.125 (0.059)	0.482 (0.101)	0.527 (0.097)	0.647 (0.109)
II. Veneto									
Year1AfterPP	0.064 (0.015)	0.009 (0.006)	0.156 (0.034)	0.010 (0.007)	0.014 (0.013)	0.022 (0.015)	0.102 (0.025)	0.056 (0.007)	0.205 (0.043)
Year15AfterPP	0.333 (0.083)	0.306 (0.088)	0.419 (0.093)	0.078 (0.036)	0.079 (0.033)	0.111 (0.052)	0.475 (0.107)	0.511 (0.092)	0.631 (0.110)
III. Toscana									
Year1AfterPP	0.051 (0.027)	0.007 (0.005)	0.137 (0.027)	0.005 (0.006)	0.011 (0.010)	0.015 (0.010)	0.087 (0.020)	0.042 (0.006)	0.197 (0.032)
Year15AfterPP	0.301 (0.067)	0.292 (0.084)	0.402 (0.081)	0.066 (0.028)	0.070 (0.032)	0.100 (0.059)	0.436 (0.093)	0.501 (0.099)	0.614 (0.102)
IV. Campania									
Year1AfterPP	0.043 (0.027)	0.005 (0.004)	0.129 (0.029)	0.004 (0.005)	0.009 (0.006)	0.011 (0.010)	0.079 (0.015)	0.036 (0.004)	0.176 (0.034)
Year15AfterPP	0.294 (0.059)	0.278 (0.071)	0.391 (0.065)	0.051 (0.029)	0.063 (0.029)	0.094 (0.046)	0.421 (0.089)	0.464 (0.087)	0.601 (0.093)
V. Sicilia									
Year1AfterPP	0.039 (0.015)	0.004 (0.004)	0.122 (0.018)	0.004 (0.009)	0.007 (0.007)	0.009 (0.010)	0.071 (0.016)	0.034 (0.005)	0.157 (0.031)
Year15AfterPP	0.288 (0.062)	0.261 (0.059)	0.375 (0.061)	0.055 (0.033)	0.059 (0.031)	0.081 (0.048)	0.401 (0.085)	0.446 (0.093)	0.599 (0.097)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* OLS estimation of eq. 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose tech transfer (columns 4–6), and 1,082 firms that chose the combined transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by region. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro=USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Std. errors are block-bootstrapped at the province level with 200 replications.

Table A.19—: Heterogeneity Effects: by Industry Growth Rate

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. Above the mean									
Year1AfterPP	0.047 (0.021)	0.005 (0.005)	0.129 (0.029)	0.008 (0.006)	0.017 (0.015)	0.013 (0.012)	0.086 (0.019)	0.036 (0.007)	0.181 (0.029)
Year15AfterPP	0.300 (0.064)	0.307 (0.078)	0.434 (0.085)	0.059 (0.029)	0.085 (0.036)	0.115 (0.048)	0.493 (0.108)	0.519 (0.097)	0.636 (0.088)
II. Below the mean									
Year1AfterPP	0.064 (0.023)	0.010 (0.007)	0.152 (0.028)	0.006 (0.007)	0.011 (0.014)	0.024 (0.020)	0.095 (0.019)	0.047 (0.011)	0.213 (0.049)
Year15AfterPP	0.369 (0.066)	0.295 (0.087)	0.388 (0.093)	0.079 (0.034)	0.065 (0.032)	0.089 (0.044)	0.394 (0.103)	0.477 (0.099)	0.609 (0.110)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* OLS estimation of equation 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose technology transfer (columns 4–6), and 1,082 firms that chose the combined management and technology transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by industry growth rate. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.20—: Heterogeneity Effects: by Year of Participation in the Productivity Program

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. 1952									
Year1AfterPP	0.060 (0.020)	0.008 (0.008)	0.142 (0.030)	0.009 (0.010)	0.016 (0.013)	0.024 (0.015)	0.065 (0.020)	0.038 (0.011)	0.195 (0.034)
Year15AfterPP	0.335 (0.062)	0.306 (0.089)	0.401 (0.091)	0.063 (0.025)	0.077 (0.036)	0.105 (0.046)	0.454 (0.094)	0.495 (0.099)	0.628 (0.103)
II. 1953									
Year1AfterPP	0.061 (0.015)	0.009 (0.008)	0.139 (0.034)	0.005 (0.006)	0.014 (0.017)	0.017 (0.019)	0.067 (0.013)	0.035 (0.008)	0.198 (0.037)
Year15AfterPP	0.333 (0.071)	0.301 (0.065)	0.409 (0.068)	0.071 (0.035)	0.082 (0.040)	0.109 (0.050)	0.456 (0.088)	0.499 (0.091)	0.623 (0.094)
III. 1954									
Year1AfterPP	0.059 (0.022)	0.011 (0.009)	0.141 (0.034)	0.007 (0.009)	0.011 (0.012)	0.021 (0.016)	0.071 (0.017)	0.042 (0.008)	0.199 (0.029)
Year15AfterPP	0.340 (0.087)	0.303 (0.092)	0.402 (0.096)	0.073 (0.036)	0.079 (0.035)	0.108 (0.053)	0.451 (0.102)	0.496 (0.099)	0.618 (0.111)
IV. 1955									
Year1AfterPP	0.058 (0.015)	0.012 (0.008)	0.138 (0.024)	0.008 (0.009)	0.012 (0.014)	0.016 (0.011)	0.072 (0.013)	0.043 (0.010)	0.191 (0.054)
Year15AfterPP	0.335 (0.049)	0.309 (0.056)	0.411 (0.052)	0.066 (0.036)	0.078 (0.039)	0.111 (0.049)	0.456 (0.108)	0.494 (0.089)	0.619 (0.104)
V. 1956									
Year1AfterPP	0.057 (0.016)	0.009 (0.006)	0.140 (0.033)	0.009 (0.009)	0.019 (0.017)	0.020 (0.010)	0.068 (0.017)	0.044 (0.007)	0.197 (0.029)
Year15AfterPP	0.334 (0.081)	0.295 (0.079)	0.395 (0.088)	0.072 (0.039)	0.081 (0.042)	0.112 (0.049)	0.458 (0.092)	0.496 (0.086)	0.617 (0.109)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continues)

Table A.20—: Continued

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
VI. 1957									
Year1AfterPP	0.061 (0.021)	0.008 (0.005)	0.142 (0.034)	0.010 (0.008)	0.018 (0.015)	0.018 (0.014)	0.073 (0.020)	0.038 (0.007)	0.195 (0.039)
Year15AfterPP	0.339 (0.087)	0.299 (0.092)	0.408 (0.099)	0.063 (0.029)	0.082 (0.042)	0.107 (0.045)	0.452 (0.088)	0.498 (0.099)	0.619 (0.112)
VII. 1958									
Year1AfterPP	0.060 (0.023)	0.009 (0.008)	0.141 (0.032)	0.009 (0.006)	0.013 (0.015)	0.019 (0.012)	0.071 (0.019)	0.036 (0.007)	0.193 (0.029)
Year15AfterPP	0.338 (0.066)	0.301 (0.076)	0.399 (0.078)	0.068 (0.033)	0.078 (0.035)	0.105 (0.056)	0.451 (0.112)	0.499 (0.103)	0.620 (0.129)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* OLS estimation of equation 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose technology transfer (columns 4–6), and 1,082 firms that chose the combined management and technology transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by the year of participation in the Productivity Program. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.21—: Effects of the Productivity Program on Exports and Imports

	Exports		Imports	
	Prob(Export) (1)	Exports (2)	Prob(Import) (3)	Log $\frac{\text{Imports}}{\text{Inputs}}$ (4)
A. Management				
Year1AfterPP	0.024 (0.009)	0.015 (0.004)	0.011 (0.004)	0.005 (0.008)
Year5AfterPP	0.155 (0.026)	0.075 (0.014)	0.084 (0.031)	0.022 (0.011)
Year10AfterPP	0.221 (0.039)	0.121 (0.044)	0.096 (0.033)	0.045 (0.017)
Year15AfterPP	0.290 (0.044)	0.155 (0.051)	0.151 (0.049)	0.074 (0.022)
Observations	10,760	1,400	10,760	2,160
Number of firms	538	70	538	108
B. Technology				
Year1AfterPP	0.013 (0.006)	0.004 (0.006)	0.008 (0.006)	0.002 (0.003)
Year5AfterPP	0.026 (0.012)	0.046 (0.053)	0.011 (0.008)	0.015 (0.009)
Year10AfterPP	0.047 (0.008)	0.037 (0.044)	0.017 (0.010)	0.028 (0.014)
Year15AfterPP	0.051 (0.013)	0.041 (0.047)	0.022 (0.013)	0.033 (0.018)
Observations	14,960	1,800	14,960	3,280
Number of firms	748	90	748	164
C. Combined				
Year1AfterPP	0.033 (0.010)	0.045 (0.011)	0.016 (0.006)	0.029 (0.012)
Year5AfterPP	0.172 (0.031)	0.122 (0.031)	0.093 (0.031)	0.044 (0.016)
Year10AfterPP	0.275 (0.041)	0.156 (0.036)	0.105 (0.037)	0.059 (0.020)
Year15AfterPP	0.315 (0.056)	0.191 (0.041)	0.162 (0.045)	0.098 (0.033)
Observations	21,640	3,020	21,640	1,840
Number of firms	1,082	151	1,082	92
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

*Notes.* Coefficients estimated for 538 firms that applied for management transfer (Panel A), 748 firms that applied for technology transfer (Panel B), and 1,082 firms that applied for the combined management and technology transfers (Panel C) and survived in the 15 years after the Productivity Program. Columns 2 and 4 report the coefficients estimated from equation 1 for firms that were, respectively, exporters and importers in 1951. The dependent variables are  $Prob(Export)$ , an indicator variable that equals one if a firm exported; logged deflated  $Exports$  converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro=USD 1;  $Prob(Import)$ , an indicator variable that equals one if a firm imported; and logged  $Imports/Inputs$ , converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.22—: Effects of the Productivity Program on Firms That Did Not Export

	Log Sales (1)	Log Employment (2)	Log TFPR (3)
A. Management			
Year1AfterPP	0.049 (0.013)	0.005 (0.009)	0.095 (0.020)
Year5AfterPP	0.087 (0.020)	0.047 (0.016)	0.165 (0.021)
Year10AfterPP	0.122 (0.028)	0.194 (0.028)	0.232 (0.031)
Year15AfterPP	0.211 (0.035)	0.287 (0.037)	0.302 (0.041)
Number of firms	175	175	175
Observations	3,500	3,500	3,500
B. Technology			
Year1AfterPP	0.005 (0.004)	0.007 (0.010)	0.013 (0.011)
Year5AfterPP	0.034 (0.013)	0.025 (0.011)	0.062 (0.015)
Year10AfterPP	0.062 (0.030)	0.067 (0.027)	0.094 (0.031)
Year15AfterPP	0.059 (0.028)	0.070 (0.033)	0.089 (0.036)
Number of firms	362	362	362
Observations	7,240	7,240	7,240
C. Combined			
Year1AfterPP	0.065 (0.021)	0.024 (0.009)	0.151 (0.022)
Year5AfterPP	0.186 (0.024)	0.137 (0.022)	0.265 (0.029)
Year10AfterPP	0.211 (0.030)	0.212 (0.028)	0.346 (0.036)
Year15AfterPP	0.376 (0.033)	0.326 (0.043)	0.421 (0.051)
Number of firms	368	368	368
Observations	7,360	7,360	7,360
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

*Notes:* Coefficients estimated from equation 1 for 175 firms that applied for management transfer (Panel A), 362 firms that applied for technology transfer (Panel B), and 368 firms that applied for both transfers (Panel C) that did not start exporting after the Productivity Program. Data are provided at the firm level. The dependent variables are logged deflated *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1; logged *Employment*, reporting the number of employees per firm; and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.23—: Rate of Adoption of U.S. Managerial Practices as Reported by U.S. Technical Reports

	Management			Combined		
	Year1 (1)	Year2 (2)	Year3 (3)	Year1 (4)	Year2 (5)	Year3 (6)
Managerial Practices						
1) Human Resource Training						
1a) Training for Leaders	59%	78%	90%	55%	71%	87%
1b) Training for Rest of Workers	73%	85%	95%	75%	90%	97%
1c) Introduction of Bonuses	68%	81%	89%	65%	77%	85%
2) Marketing						
2a) Market Research and Branding	65%	75%	88%	70%	77%	89%
2b) Advertising Campaigns	79%	88%	98%	73%	86%	99%
3) Factory Operations						
3a) Maintenance of Machines	65%	79%	87%	68%	75%	86%
3b) Maintenance of Safety	71%	82%	92%	70%	87%	95%
4) Production Planning						
Sales and Orders Management	75%	87%	95%	74%	90%	97%
Number of firms	118	118	118	321	321	321

*Notes.* Percentage of firms that adopted U.S. managerial practices 1, 2, and 3 years after the Productivity Program in treatment provinces for firms that chose management transfer (columns 1–6) and firms that chose the combined management and technology transfers (columns 7–12). Data are from the reports compiled by U.S. experts who visited participating plants in the three years after the program. The U.S. managerial practices are based on the Training Within Industry (TWI) method, described in Section 1.

Table A.24—: Effects of the Productivity Program on Real Wages

	Log Real Wages (1–3)		
	Management (1)	Technology (2)	Combined (3)
Year1AfterPP	0.065 (0.020)	0.008 (0.010)	0.141 (0.035)
Year5AfterPP	0.117 (0.030)	0.065 (0.015)	0.205 (0.045)
Year10AfterPP	0.198 (0.045)	0.089 (0.064)	0.253 (0.055)
Year15AfterPP	0.278 (0.059)	0.085 (0.061)	0.291 (0.068)
Observations	10,760	14,960	21,640
Number of firms	538	748	1,082
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Sample	Balanced	Balanced	Balanced

*Notes.* Coefficients estimated from equation 1 on 538 firms that chose management transfer (column 1), 748 firms that chose technology transfer (column 2), and 1,082 firms that chose the combined management and technology transfers (column 3) and survived in the 15 years after the Productivity Program. Data are provided at the firm level. The dependent variables are real *Wages*, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1–3). Standard errors are block-bootstrapped at the province level with 200 replications.



Table A.25—: Heterogeneity Effects: by Access to Credit

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employees (2)	Log TFPR (3)	Log Sales (4)	Log Employees (5)	Log TFPR (6)	Log Sales (7)	Log Employees (8)	Log TFPR (9)
I. High Access to Credit									
Year1AfterPP	0.055 (0.011)	0.005 (0.004)	0.153 (0.029)	0.007 (0.008)	0.017 (0.013)	0.019 (0.017)	0.087 (0.015)	0.035 (0.006)	0.215 (0.039)
Year15AfterPP	0.369 (0.076)	0.326 (0.051)	0.445 (0.062)	0.067 (0.030)	0.069 (0.029)	0.117 (0.049)	0.404 (0.102)	0.520 (0.088)	0.657 (0.105)
II. Low Access to Credit									
Year1AfterPP	0.062 (0.013)	0.009 (0.006)	0.128 (0.025)	0.006 (0.008)	0.011 (0.010)	0.022 (0.014)	0.093 (0.018)	0.053 (0.007)	0.169 (0.038)
Year15AfterPP	0.307 (0.081)	0.289 (0.049)	0.375 (0.051)	0.073 (0.035)	0.085 (0.039)	0.095 (0.042)	0.479 (0.105)	0.471 (0.099)	0.593 (0.114)
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>F</i> -statistic Year1	47.9	48.9	41.7	47.5	53.6	42.7	33.3	55.8	42.3
<i>F</i> -statistic Year15	35.4	47.6	32.9	30.7	41.2	53.5	45.9	38.0	51.3

*Notes.* OLS estimation of equation 1 for 538 firms that chose management transfer (columns 1–3), 748 firms that chose technology transfer (columns 4–6), and 1,082 firms that chose the combined management and technology transfers (columns 7–9) and survived in the 15 years after the Productivity Program, stratifying the sample by access to credit. The dependent variables are logged (deflated) *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employees*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Data are provided at the firm level. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.26—: Multinomial Logit, U.S. Transfers Choice

	Choice of U.S. Transfer		
	Management (1)	Technology (2)	Combined (3)
Plants per firm	0.012 (0.006)	0.027 (0.009)	0.033 (0.011)
Employees per firm	0.008 (0.003)	0.017 (0.003)	0.028 (0.009)
Annual sales (k USD)	0.015 (0.004)	0.013 (0.005)	0.022 (0.008)
Productivity (TFPR)	0.021 (0.006)	0.016 (0.004)	0.025 (0.008)
Age	-0.009 (0.011)	-0.011 (0.012)	-0.008 (0.013)
Export	0.009 (0.008)	0.018 (0.010)	0.031 (0.017)
Family-managed	-0.151 (0.032)	-0.127 (0.025)	-0.176 (0.034)
Treatment Province	-0.003 (0.009)	-0.002 (0.003)	0.004 (0.007)
Observations	6,035	6,035	6,035
Pilot region FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes

*Notes.* Marginal effects estimated from the multinomial logit model of equation 3, where the choice is either applying for the management transfer, the technology transfer, or the combined management and technology transfers, or not applying, used as baseline. Thirty firms whose applications were rejected are excluded. *Plants per firm* is the total number of plants per firm; *Employees per firm* is the number of employees per firm; *Annual sales* is in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; *Productivity (log TFPR)* is the logarithm of firm productivity, estimated using the Akerberg, Caves and Frazer (2006) method; *Export* and *Family-managed* are indicator variables that equal one if, respectively, a firm exported and was family-managed; *treatment province* is an indicator for firms located in a treatment province. Data are provided at the firm level.  $\ast$  denotes 1%,  $\ast\ast$  denotes 5%, and  $\ast\ast\ast$  denotes 10% significance.

Table A.27—: Spillover Effects on Firms That Did Not Receive U.S. Transfers

	Probability of Shutdown			Log Sales			Log Employment			Log TFPR		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Manag·PostPP·Different	0.002 (0.004)	0.002 (0.003)	0.002 (0.003)	-0.004 (0.006)	-0.003 (0.005)	-0.002 (0.002)	0.006 (0.009)	0.005 (0.008)	0.003 (0.005)	0.009 (0.014)	0.007 (0.013)	0.007 (0.012)
Tech·PostPP·Different	0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	0.005 (0.007)	0.005 (0.007)	0.003 (0.004)	-0.011 (0.015)	-0.010 (0.013)	-0.010 (0.010)	0.002 (0.005)	0.002 (0.004)	0.001 (0.03)
Combined·PostPP·Different	0.004 (0.006)	0.003 (0.005)	0.003 (0.005)	-0.006 (0.008)	-0.006 (0.008)	-0.004 (0.006)	0.014 (0.017)	0.012 (0.015)	0.009 (0.011)	0.008 (0.012)	0.007 (0.010)	0.007 (0.007)
Manag·PostPP·Samet	0.012 (0.007)	0.012 (0.006)	0.002 (0.005)	-0.032 (0.019)	-0.029 (0.017)	0.001 (0.007)	-0.007 (0.012)	-0.007 (0.011)	-0.003 (0.010)	-0.017 (0.008)	-0.015 (0.007)	-0.006 (0.006)
Techn·PostPP·Same	0.015 (0.009)	0.015 (0.009)	0.001 (0.007)	-0.024 (0.014)	-0.021 (0.012)	-0.002 (0.006)	-0.004 (0.009)	-0.004 (0.008)	-0.002 (0.004)	-0.013 (0.006)	-0.012 (0.006)	-0.002 (0.005)
Combined·PostPP·Same	0.014 (0.008)	0.014 (0.008)	0.002 (0.007)	-0.035 (0.020)	-0.028 (0.017)	-0.011 (0.012)	-0.005 (0.008)	-0.005 (0.007)	-0.002 (0.006)	-0.022 (0.010)	-0.019 (0.008)	-0.009 (0.007)
Observations	105,400	105,400	105,400	73,780	73,780	73,780	73,780	73,780	73,780	73,780	73,780	73,780
Radius (km)	5	10	20	5	10	20	5	10	20	5	10	20
Panel	Unbal.	Unbal.	Unbal.	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* Coefficients estimated from equation 4 for 5,270 firms that did not received Productivity Program transfers. In columns 1–3, the samples include all the firms; in columns 4–12, only firms that survived in the 15 years after the Productivity Program. Manag · PostPP · Same, Tech · PostPP · Same, Combined · PostPP · Same are the count of firms that received, respectively, management transfer, technology transfer or the combined management and technology transfers, operating in the same industry and located in the radius of  $x$  km from firm  $i$ , where  $x$  is within 5, 10, or 20 km of a non-participating firm; Manag · PostPP · Different, Tech · PostPP · Different, and Combined · PostPP · Different are the count of firms that received, respectively, management transfer, technology transfer or the combined management and technology transfers, operating in a different industry and located in the radius of  $x$  km from firm  $i$ , where  $x$  is within 5, 10, or 20 km of a non-participating firm. Data are provided at the firm level. The dependent variables are *Probability of Shutdown*, an indicator for firms that shut down in year  $t$ ; *Log Sales*, reported in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira = 30.884 euros and exchanged at 0.780 euro = USD 1; *Log Employment*, reporting the logged number of employees per firm; and *log TFPR*, the logarithm of firm productivity, estimated using the Akerberg, Caves and Frazer (2006) method. Standard errors are block-bootstrapped at the province level with 200 replications.

Table A.28—: Effects of the Productivity Program on Sales, Employment, and TFPR Controlling for Spillover Effects

	A. Management (1–3)			B. Technology (4–6)			C. Combined (7–9)		
	Log Sales	Log Employees	Log TFPR	Log Sales	Log Employees	Log TFPR	Log Sales	Log Employees	Log TFPR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year1AfterPP	0.057 (0.013)	0.005 (0.006)	0.136 (0.025)	0.006 (0.007)	0.009 (0.010)	0.018 (0.012)	0.086 (0.023)	0.034 (0.009)	0.182 (0.0232)
Year5AfterPP	0.101 (0.026)	0.058 (0.020)	0.195 (0.038)	0.036 (0.013)	0.029 (0.014)	0.069 (0.019)	0.241 (0.033)	0.159 (0.032)	0.302 (0.0342)
Year10AfterPP	0.186 (0.035)	0.193 (0.038)	0.265 (0.053)	0.063 (0.029)	0.067 (0.031)	0.096 (0.042)	0.279 (0.047)	0.346 (0.038)	0.455 (0.057)
Year15AfterPP	0.313 (0.051)	0.278 (0.045)	0.468 (0.056)	0.060 (0.030)	0.069 (0.033)	0.095 (0.047)	0.428 (0.061)	0.473 (0.057)	0.597 (0.059)
Observations	10,760	10,760	10,760	14,960	14,960	14,960	21,640	21,640	21,640
Number of firms	538	538	538	748	748	748	1,082	1,082	1,082
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced

*Notes.* Coefficients estimated from equation 1 on firms that survived for 15 years after the program, excluding firms within 5 kilometers of a firm that participated in the Productivity Program. Data are provided at the firm level. The dependent variables are logged deflated *Sales*, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1–4); logged *Employees*, reporting the number of employees per firm (columns 5–8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 9–12). Standard errors are block-bootstrapped at the province level with 200 replications.

## B. Data Collection

The data collection targeted the population of firms eligible to apply for the Productivity Program in 1951. The process comprised three phases.

**Phase 1: Locating the data.** Between September and November 2013, I contacted four Italian historical archives: Confindustria Historical Archive (ASC), the Central Archives of the States (ACS), the Historical Archive of Istituto Mobiliare Italiano (ASI-IMI), and the Bank of Italy Historical Archive (ASBI), all located in Rome, Italy. These archives confirmed that they owned the data I needed and granted me access to it.

**Phase 2: Collecting the data.** Between December 2013 and March 2014, I visited the four archives, proceeding in three steps. First, I used firm registries at ASC to obtain the list of 6,065 firms that were eligible to apply for the Productivity Program in 1951. These firms were manufacturing companies, with 15 to 250 employees, were required to compile a balance sheet, and were located in five Italian regions: Lombardia, Veneto, Toscana, Campania, and Sicilia. Second, for each of them, I photographed the balance sheets and the statement of profits and losses from 1946 to 1973, which are stored at ASC. Finally, I linked these firms with the application records, stored at ACS and ASI-IMI. I was able to take pictures of 60 percent of the application records. For the remaining 40 percent, I was not allowed to take pictures due to archive regulations, so I manually copied them. I also visited the ASBI to obtain institutional data, such as the series of interest rates, GDP, and industries deflators. The ASBI provided this material on a DVD.

**Phase 3: Digitizing the data.** Between April and December 2014, I digitized the photographic copies with the help of freelancers hired on a popular online marketplace. To test the quality of the freelancers, I prepared a guideline document and tested their ability to transcribe the data into Excel spreadsheets. I hired only freelancers who made zero mistakes in this phase. To ensure quality of the data, I had two freelancers digitizing the same data. This tactic sped up the search for potential mistakes. In particular, I checked all the data by comparing the work of the two freelancers. For each difference I found, I manually checked the original document and fixed the mistake. In addition, I randomly checked 10 percent of the digitized data for which there were no differences. Finally, I manually matched the eligible firms with the application records, using firm name, headquarters address, and municipality as identifiers.

### C. Description of Primary Sources

The main source of data for this paper is firm balance sheets. According to 1942 Italian civil code, firms with at least 2010 \$150,000 in annual revenues had to compile a balance sheet. This was one of the eligibility criteria for firms to participate in the Productivity Program. Italian balance sheets are composed of three parts: the *stato patrimoniale*, the *conto economico*, and the *nota integrativa*. The *stato patrimoniale* is the statement of assets and liabilities. The *conto economico* is the statement of profits and losses. The *nota integrativa* is a note attached to the balance sheets that provides additional data that, given their qualitative or extra-accounting nature, are not reported in the other documents. Appendix Table C.1 contains a list and definition of all the variables used in the paper and their sources.

Table C.1—: List and Definition of Variables and Their Sources

Variable	Definition	Source
Sales	Operating Revenues	Conto Economico
Employment	Number of Employees	Nota Integrativa
Productivity (TFPR)	Total Factor Productivity Revenue	Author's Calculation (see Appendix E.1)
Revenues	Gross Income	Conto Economico
Value Added	Difference between firm gross income and intermediate inputs	Author's Calculation (see Appendix E.1)
Profits	Difference between value added and taxes	Author's Calculation
Intermediate Inputs	Sum of costs of raw materials	Conto Economico
Capital	Firm capital stock	Author's Calculation (see Appendix E.1)
Import	Values of imported goods	Conto Economico
Export	Values of exported goods	Conto Economico
Wages	Total wages paid to workers	Conto Economico
Investments	Difference between fixed gross asset at time $t$ and time $t - 1$	Author's Calculation (see Appendix E.1)
Loans	Firm loans with banks	Stato Patrimoniale
Fixed Gross Asset	Value of land, buildings, and machines owned by the firm	Stato Patrimoniale
Managers	Numbers and names of managers	Nota Integrativa
Professionally-managed firm	Firm with no family representative or kin formally involved in its governance	Nota Integrativa
Return-on-Assets (ROA)	Ratio between profits and capital	Author's Calculation

## D. Robustness Checks

### A. Alternative Specifications

To be consistent with the event study presented in Section 4.1 and to exploit the variation at the province level, I also compare the outcomes of firms located in treatment provinces with those of firms located in comparison provinces in the same pilot region and that applied for the same transfer in 1951 via the following equation:

$$(D.1) \text{ outcome}_{isprt} = \alpha + \beta \text{Treat}_p + \sum_{\tau=-5}^{15} \delta_{\tau} (\text{Treat}_p \cdot \text{PostPP}_{\tau}) + \lambda_r + \zeta_s + \nu_t + \epsilon_{isprt}$$

where the dependent variable,  $\text{outcome}_{isprt}$ , is one of the key performance metrics of logged (deflated) sales, number of employees, and TFPR of firm  $i$  operating in industry  $s$ , located in province  $p$  in region  $r$  at time  $t$ .  $\alpha$  is a constant term;  $\text{Treat}_p$  is an indicator that equals one if firm  $i$  is located in a treatment province;  $\text{PostPP}_{\tau}$  is an indicator for each year  $t$ , after firm  $i$  received the Productivity Program assistance, from 5 years before to 15 years after the program. Pilot region fixed effects  $\lambda_r$  control for variation in outcomes across regions that are constant over time; industry fixed effects  $\zeta_s$  control for variation in outcomes across manufacturing industries; time fixed effects  $\nu_t$  control for variation in outcomes over time that is common across all Italian regions.  $\epsilon_{isprt}$  is the error term. Each  $\delta_{\tau}$  coefficient captures the effects of the Productivity Program  $\tau$  years after its implementation.

Since comparison firms never got treated, I need to assign them a “treatment” year. The Productivity Program was implemented between 1952 and 1958. Firms in treatment provinces were ranked based on their application’s submission date, and they received U.S. transfers in the order in which their applications were received. Since I can also observe the application date for firms in comparison provinces, I assume that these firms would have received U.S. assistance in the same year as the firms in treatment provinces that applied at the same time. For instance, if firms in treatment provinces that applied between February 1 and February 20, 1951, received the U.S. assistance in 1953, I assume that firms in comparison provinces that submitted an application between February 1 and February 20, 1951, would have received the U.S. assistance in 1953 as well. I show that the distribution of application dates and the resulting distribution of treatment years for treatment and comparison provinces is balanced (Appendix Figures D.1 and D.2).

The estimates are consistent with the main results presented in Section 4. The management transfer and the combined management and technology transfers were large and continued to grow for the 15 years after the program, while the effects of technology transfer reached a plateau after 10 years (Appendix Table



D.1). In terms of magnitude, they are larger than the main results in the paper because I am not using firm fixed effects. The estimation with firm fixed effects are comparable with the main results.

In all the specifications presented so far, to follow each firm for the same number of years before and after the Productivity Program, I restrict the years of data from 5 years before to 15 years after the U.S. intervention. However, I collected data from 1946 to 1973 for all eligible firms, unless they exit the market. I therefore run two additional specifications: a specification in which I keep years from 5 before to 15 after the Productivity Program for treated firms and all the data I have for comparison firms, and a specification in which I keep all the data I have for both treated and comparison firms.

The results, presented in Appendix Table D.2, are larger than those on the balanced sample I use in the main specification of the paper (Table 3, columns 1, 5, and 9, Panels A-C). This is consistent with the idea that the balanced sample, which conditions on survival, is the most conservative way to estimate the treatment effects. In fact, comparison firms that survived even without participating in the Productivity Program were likely to perform better than comparison firms that failed. The estimates using years from 5 before to 15 after the Productivity Program for treated firms and all the data for comparison firms are substantially equivalent to the estimates on the unbalanced sample (Appendix Table D.2, columns 1, 3, and 5, Panels A-C vs Table 3, columns 3, 7, and 11, Panels A-C). In fact, conceptually, using more data for the comparison firms, but not for the treated firms, should only affect the estimation of year fixed effects, and not of the treatment coefficients, that are estimated for the treated firms only. The estimates using all years of data for both the treated and the comparison firms allows me to estimate additional coefficients up to 21 years after the Productivity Program. The results, comparable to the estimates on the unbalanced sample, confirm that the effects of management and the combined management and technology transfers are persistent over time, and that the effects of the technology transfer flatten out after 10 years (Appendix Table D.2, columns 2, 4, and 6, Panels A-C). I conclude that my results are not driven by restricting the sample from 5 years before to 15 years after the U.S. intervention and are robust to the inclusion of the additional years.

### *B. Selection of Treatment Provinces*

A possible threat to the identification strategy of this paper is that the selection of firms participating in the program was not random. If firms that eventually took part in the Productivity Program had been randomly selected, I simply could have compared treated and comparison firms in the post-Productivity Program period. The estimates I obtained excluding the pre-program period are essentially the same as the difference-in-differences coefficients, confirming that the province selection after the budget cut was plausibly exogenous (Appendix Table D.3).

### C. Robustness to Reporting Effects

Sales, employment, and TFPR come from firm balance sheets. Given the self-reported nature of the balance sheet data, concern arises about both misreporting and changes in reporting behavior caused by the Productivity Program. These effects are unlikely to be a major factor in this research, for a number of reasons. First, from technical reports compiled by the U.S. experts visiting Italian plants, it seems that firm performance improved due to changes in management practices and production technology rather than changes in accounting methods. Second, survivorship and employment that are not subject to reporting errors follow the same dynamics as sales and TFPR. Third, the Productivity Program did not organize specific sessions for reporting and accounting, and I do not observe changes in the balance-sheet structure of receiving firms after the program.

Another concern is the Hawthorne effects. Simply being part of the Productivity Program may have improved firm performance. For instance, study-trip participants or employees could have been more motivated or have worked harder during this time. Although the data do not allow me to rule out this possibility, Hawthorne-type effects should dissipate in the long run and therefore cannot explain why the impact of the Productivity Program persisted over time.

### D. Price Effects

The improved performance of firms receiving U.S. transfers may have enabled them to increase their market power, and therefore charge higher prices.

I derive a firm-level markups estimation by using the method pioneered by De Loecker and Warzynski (2012).<sup>1</sup> This approach computes markup without relying on market-level demand information; but it requires only standard firm-level data. The main assumptions are that at least one input is variable (therefore, not subject to adjustment costs) and that firms minimize costs. The intuition is as follows: Under cost minimization, the output elasticity of a variable factor of production is equal to its expenditure share in total revenue only when price equals marginal cost of production. Under any form of imperfect competition, however, the relevant markup drives a wedge between the input's revenue share and its output elasticity. Therefore, the markup is calculated via

$$\mu_{it} = \underbrace{\left( \frac{\partial Q_{it}(\cdot)}{\partial X_{it}} \cdot \frac{X_{it}}{Q_{it}} \right)}_{\text{output elasticity}} \bigg/ \underbrace{\left( \frac{p_{it}^X X_{it}}{p_{it}^Q Q_{it}} \right)}_{\text{revenue share}}, \text{ where } \mu_{it} \text{ is the markup of firm } i \text{ at time } t,$$

$Q_{it}$  is firm output,  $X_{it}$  is the variable input,  $p_{it}^X X$  is the expenditure on input  $X$ , and  $p_{it}^Q Q$  is total revenue. I estimate the output elasticity from the production function, using the Akerberg, Caves and Frazer (2006) method, where the vari-

<sup>1</sup>To compute markups directly, I would need to observe output, which is not reported in balance sheets.

able input is labor,<sup>2</sup> and the production output is proxied by deflated revenues.<sup>3</sup> I calculate the revenue share of labor from balance sheets.

I estimate equation 1 using markup as the dependent variable. In the first five years after the U.S. intervention, the markup remains almost unchanged, then it increases over time, but at a very slow pace (Appendix Table D.4). I then reestimate equation 1 controlling for markup variation over time. One year after the Productivity Program, the estimates are very close in magnitude to those from equation 1 for all the transfers and all the outcomes (Appendix Table D.5). Between five and fifteen years after the U.S. intervention, the estimates that control for markup are smaller than the estimates from equation 1. The pattern over time, however, is fully consistent. Therefore, the change in market power of firms that participated in the Productivity Program is correlated with its long-run effects, but cannot entirely explain its pattern over time, suggesting that there were productivity improvements.

#### *E. Inverse Probability of Treatment Weighting (IPTW)*

Firms that participated in the Productivity Program could decide the transfer they wanted to receive. As a result, it is likely that businesses that chose the management transfer were different from companies that chose the technology or the combined management and technology transfers.

I employ the inverse probability of treatment weighting (IPTW) using the propensity score to create a synthetic sample in which the distribution of firm covariates is independent from the U.S. intervention they chose. Specifically, I first estimate the propensity score  $\hat{p}_{ij}$ , the predicted probability of choosing a given U.S. intervention,<sup>4</sup> as a function of firm covariates (size, assets, sales, productivity, exports, and family ownership in 1951) using a multinomial logit. Second, I weight each observation by the inverse of its propensity score.<sup>5</sup> Third, I estimate equation 2.

The difference in the weighted means using the inverse propensity score weights among the different interventions and the treatment and comparison groups are

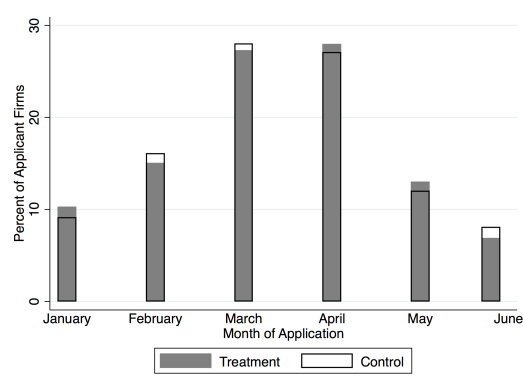
<sup>2</sup>I chose labor as the variable input because during the 1950s and the 1960s in Italy small and medium-size firms had little exposure to the unions and were fairly flexible in their management of employees (Zamagni, 1997).

<sup>3</sup>I use deflated revenues, instead of physical output, in computing the output elasticity, which is potentially subject to the omitted price variable bias discussed in Klette and Griliches (1996). This, if anything, might downward-bias the estimates of the markup. However, under Cobb-Douglas technology, the output elasticity reduces to a constant; therefore, the bias induced by unobserved prices impacts only the level of markup but not how it changes over time, which is the outcome of interest in this context. Additional details can be found in De Loecker and Warzynski (2012).

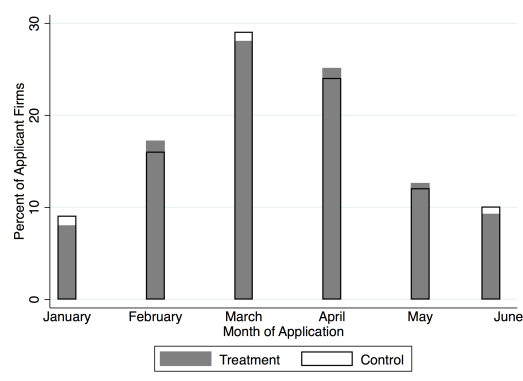
<sup>4</sup>The predicted probability of choosing a given U.S. intervention is  $\hat{p}_{i,j=MAN}$  for firms that chose the management transfer;  $\hat{p}_{i,j=TEC}$  for firms that chose the technology transfer; and  $(1 - \hat{p}_{i,j=MAN} - \hat{p}_{i,j=TEC})$  for firms that chose the combined management and technology transfers.

<sup>5</sup> $\frac{1}{\hat{p}_{i,MAN}}$  for firms that chose the management transfer;  $\frac{1}{\hat{p}_{i,TEC}}$  for firms that chose the technology transfer; and  $\frac{1}{(1 - \hat{p}_{i,MAN} - \hat{p}_{i,TEC})}$  for firms that chose the combined management and technology transfers.

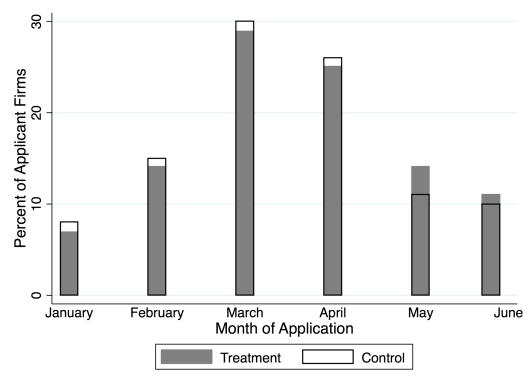
very balanced (Appendix Table D.6). None of the covariates are statistically significantly different at 1 percent.



Panel A: Management



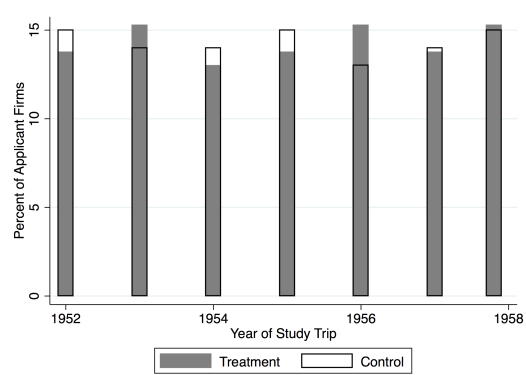
Panel B: Technology



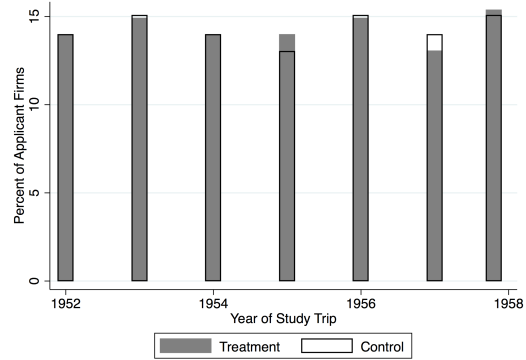
Panel C: Combined

*Notes.* Distribution of application months for 731 firms that applied for management transfer (Panel A), 1,052 firms that applied for technology transfer (Panel B), and 1,468 firms that applied for the combined management and technology transfers (Panel C). In each panel, the gray bar is for the treated firms, the white bar for the comparison firms.

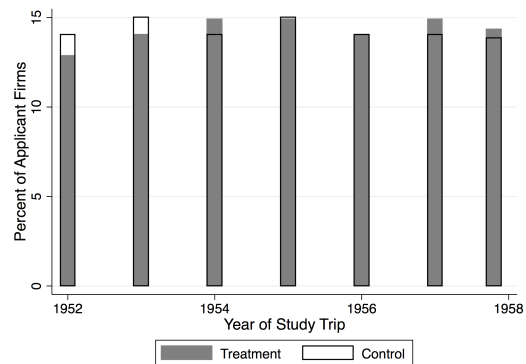
Figure D.1. : Distribution of Application Months between Treated and Comparison Firms



Panel A: Management



Panel B: Technology



Panel C: Combined

*Notes.* Distribution of years in which firms participated in the Productivity Program for 731 firms that applied for management transfer (Panel A), 1,052 firms that applied for technology transfer (Panel B), and 1,468 firms that applied for the combined management and technology transfers (Panel C). In each panel, the gray bar is for the treated firms, the white bar for the comparison firms.

Figure D.2. : Distribution of Treatment Years between Treated and Comparison Firms

Table D.1—: Effects of the Productivity Program on Sales, Employment, and TFPR

	Log Sales (1–3)			Log Employees (4–6)			Log TFPR (7–9)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. Management									
Year1AfterPP	0.070 (0.014)	0.063 (0.011)	0.073 (0.010)	0.011 (0.015)	0.008 (0.011)	0.012 (0.013)	0.153 (0.031)	0.146 (0.027)	0.159 (0.027)
Year5AfterPP	0.125 (0.025)	0.119 (0.022)	0.142 (0.027)	0.069 (0.019)	0.067 (0.016)	0.076 (0.023)	0.221 (0.037)	0.215 (0.032)	0.234 (0.039)
Year10AfterPP	0.208 (0.031)	0.205 (0.029)	0.235 (0.045)	0.219 (0.046)	0.209 (0.038)	0.257 (0.051)	0.312 (0.051)	0.303 (0.049)	0.341 (0.055)
Year15AfterPP	0.354 (0.049)	0.344 (0.043)	0.406 (0.061)	0.326 (0.054)	0.312 (0.047)	0.384 (0.073)	0.421 (0.065)	0.414 (0.044)	0.473 (0.079)
Observations	10,760	10,760	13,902	10,760	10,760	13,902	10,760	10,760	13,902
Number of firms	538	538	731	538	538	731	538	538	731
B. Technology									
Year1AfterPP	0.013 (0.019)	0.009 (0.014)	0.015 (0.016)	0.018 (0.022)	0.013 (0.017)	0.021 (0.025)	0.028 (0.038)	0.023 (0.027)	0.032 (0.033)
Year5AfterPP	0.051 (0.017)	0.047 (0.014)	0.058 (0.015)	0.041 (0.018)	0.037 (0.016)	0.047 (0.023)	0.083 (0.022)	0.079 (0.019)	0.091 (0.025)
Year10AfterPP	0.081 (0.030)	0.075 (0.027)	0.094 (0.034)	0.084 (0.039)	0.082 (0.036)	0.095 (0.042)	0.111 (0.037)	0.115 (0.030)	0.121 (0.047)
Year15AfterPP	0.079 (0.039)	0.076 (0.033)	0.084 (0.042)	0.085 (0.043)	0.080 (0.040)	0.095 (0.044)	0.108 (0.038)	0.102 (0.031)	0.122 (0.045)
Observations	14,960	14,960	20,213	14,960	14,960	20,213	14,960	14,960	20,213
Number of firms	748	748	1,053	748	748	1,053	748	748	1,053
Sample	Balanced	Balanced	Unbalanced	Balanced	Balanced	Unbalanced	Balanced	Balanced	Unbalanced
Pilot region FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Firm FE	No	Yes	No	No	Yes	No	No	Yes	No

(Continues)

Table D.1—: Continued

	Log Sales (1–3)			Log Employees (4–6)			Log TFPR (7–9)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
C. Combined									
Year1AfterPP	0.092 (0.019)	0.087 (0.015)	0.094 (0.017)	0.049 (0.017)	0.044 (0.015)	0.051 (0.014)	0.208 (0.044)	0.199 (0.041)	0.212 (0.053)
Year5AfterPP	0.252 (0.021)	0.244 (0.023)	0.279 (0.025)	0.185 (0.043)	0.181 (0.038)	0.197 (0.059)	0.351 (0.044)	0.347 (0.040)	0.358 (0.049)
Year10AfterPP	0.310 (0.039)	0.290 (0.034)	0.369 (0.034)	0.389 (0.056)	0.374 (0.054)	0.429 (0.068)	0.505 (0.067)	0.500 (0.063)	0.533 (0.071)
Year15AfterPP	0.470 (0.058)	0.459 (0.062)	0.602 (0.059)	0.530 (0.081)	0.513 (0.075)	0.591 (0.085)	0.653 (0.055)	0.645 (0.049)	0.725 (0.085)
Observations	21,640	21,640	27,870	21,640	21,640	27,870	21,640	21,640	27,870
Number of firms	1,082	1,082	1,468	1,082	1,082	1,468	1,082	1,082	1,468
Sample	Balanced	Balanced	Unbalanced	Balanced	Balanced	Unbalanced	Balanced	Balanced	Unbalanced
Pilot region FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Firm FE	No	Yes	No	No	Yes	No	No	Yes	No

*Notes.* Coefficients estimated from equation D.1 for firms that applied for management transfer (Panel A), firms that applied for technology transfer (Panel B) and firms that applied for the combined management and technology transfers (Panel C). In columns 1–2, 4–5, and 7–8, the samples include only firms that survived in the 15 years after the Productivity Program; in columns 3, 7, and 11, equation D.1 is estimated on the unbalanced panel (i.e., including firms that exited the market over time) from 5 years before to 15 years after the Productivity Program. If a firm exits the market in year  $t$ , missing values are imputed for the dependent variables starting on year  $t+1$ . Data are provided at the firm level. The dependent variables are logged deflated *Sales*, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1–3); logged *Employees*, reporting the number of employees per firm (columns 4–6); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 7–9). Standard errors are block-bootstrapped at the province level with 200 replications.



Table D.2—: Effects of the Productivity Program on Sales, Employment, and TFPR

	Log Sales (1-2)		Log Employees (3-4)		Log TFPR (5-6)	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Management						
Year1AfterPP	0.065 (0.024)	0.069 (0.026)	0.015 (0.014)	0.018 (0.019)	0.115 (0.030)	0.121 (0.033)
Year5AfterPP	0.125 (0.036)	0.138 (0.041)	0.083 (0.028)	0.091 (0.031)	0.202 (0.051)	0.212 (0.054)
Year10AfterPP	0.223 (0.053)	0.239 (0.059)	0.258 (0.048)	0.268 (0.055)	0.306 (0.065)	0.318 (0.071)
Year15AfterPP	0.383 (0.070)	0.402 (0.079)	0.354 (0.061)	0.366 (0.074)	0.387 (0.085)	0.398 (0.094)
Year21AfterPP		0.433 (0.088)		0.391 (0.092)		0.443 (0.109)
Observations	15,678	17,530	15,678	17,530	15,678	17,530
Number of firms	731	731	731	731	731	731
B. Technology						
Year1AfterPP	0.010 (0.012)	0.011 (0.015)	0.021 (0.015)	0.024 (0.016)	0.027 (0.020)	0.031 (0.023)
Year5AfterPP	0.052 (0.018)	0.062 (0.024)	0.055 (0.020)	0.061 (0.023)	0.085 (0.028)	0.092 (0.030)
Year10AfterPP	0.091 (0.039)	0.098 (0.045)	0.091 (0.046)	0.102 (0.050)	0.128 (0.055)	0.136 (0.064)
Year15AfterPP	0.089 (0.051)	0.093 (0.055)	0.090 (0.044)	0.099 (0.047)	0.129 (0.058)	0.130 (0.061)
Year21AfterPP		0.090 (0.062)		0.095 (0.054)		0.128 (0.069)
Observations	23,782	26,946	23,782	26,946	23,782	26,946
Number of firms	1,053	1,053	1,053	1,053	1,053	1,053
C. Combined						
Year1AfterPP	0.099 (0.030)	0.105 (0.033)	0.046 (0.015)	0.056 (0.020)	0.205 (0.044)	0.219 (0.047)
Year5AfterPP	0.278 (0.055)	0.286 (0.061)	0.203 (0.055)	0.219 (0.060)	0.358 (0.058)	0.381 (0.065)
Year10AfterPP	0.372 (0.067)	0.391 (0.071)	0.402 (0.066)	0.420 (0.075)	0.512 (0.071)	0.528 (0.080)
Year15AfterPP	0.504 (0.111)	0.529 (0.121)	0.546 (0.071)	0.559 (0.078)	0.674 (0.094)	0.685 (0.101)
Year21AfterPP		0.561 (0.133)		0.589 (0.090)		0.710 (0.109)
Observations	34,588	37,010	34,588	37,010	34,588	37,010
Number of firms	1,468	1,468	1,468	1,468	1,468	1,468

*Notes.* Columns 1, 3, and 5 report the coefficients from equation 1 estimated by including data from 5 years before to 15 years after for treated firms and all the years of data available for comparison firms. Columns 2, 4, and 6 report the coefficients from equation 1 estimated by including all the available years of data for both treated and comparison firms. The dependent variables are logged deflated Sales, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro=USD 1 (columns 1-2); logged Employment, reporting the number of employees per firm (columns 3-4); and logged TFPR, estimated using the Akerberg, Caves and Frazer (2006) method (columns 5-6). Standard errors are block-bootstrapped at the province level with 200 replications.

Table D.3—: Effects of the Productivity Program on Sales, Employment, and TFPR (Using Only Post Productivity Program Data)

	A. Management			B. Technology			C. Combined		
	Log sales (1)	Log employees (2)	Log TFPR (3)	Log sales (4)	Log employees (5)	Log TFPR (6)	Log sales (7)	Log employees (8)	Log TFPR (9)
A. Management									
Year1AfterPP	0.062 (0.011)	0.010 (0.014)	0.135 (0.030)	0.011 (0.017)	0.015 (0.019)	0.025 (0.034)	0.087 (0.021)	0.035 (0.015)	0.203 (0.041)
Year5AfterPP	0.113 (0.020)	0.065 (0.021)	0.200 (0.041)	0.049 (0.015)	0.039 (0.017)	0.079 (0.020)	0.238 (0.024)	0.170 (0.040)	0.328 (0.039)
Year10AfterPP	0.188 (0.033)	0.202 (0.049)	0.278 (0.046)	0.077 (0.027)	0.080 (0.040)	0.117 (0.032)	0.287 (0.043)	0.333 (0.052)	0.449 (0.062)
Year15AfterPP	0.328 (0.051)	0.308 (0.057)	0.385 (0.060)	0.073 (0.037)	0.081 (0.041)	0.109 (0.042)	0.431 (0.062)	0.525 (0.077)	0.607 (0.049)
Observations	8,070	8,070	8,070	11,220	11,220	11,220	16,230	16,230	16,230
Number of firms	538	538	538	748	748	748	1,082	1,082	1,082
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* Coefficients estimated from equation 1 using only post Productivity Program years. Data are provided at the firm level. The dependent variables are logged deflated *Sales*, converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro=USD 1 (columns 1–4); logged *Employment*, reporting the number of employees per firm (columns 5–8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 9–12). Standard errors are block-bootstrapped at the province level with 200 replications.

Table D.4—: Effects of the Productivity Program on Markups

	A. Management	B. Technology	C. Combined
	Log Markups	Log Markups	Log Markups
	(1)	(2)	(3)
Year1AfterPP	0.007 (0.005)	0.002 (0.002)	0.005 (0.004)
Year5AfterPP	0.009 (0.006)	0.007 (0.005)	0.008 (0.007)
Year10AfterPP	0.015 (0.007)	0.010 (0.005)	0.017 (0.008)
Year15AfterPP	0.018 (0.008)	0.014 (0.008)	0.019 (0.009)
Observations	10,760	14,960	21,640
Number of firms	538	748	1,082
Sample	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

*Notes.* Coefficients estimated from equation 1 for 538 firms that applied for management transfer (Panel A), 748 firms that applied for technology transfer (Panel B), and 1,082 firms that applied for the combined management and technology transfers (Panel C) and survived in the 15 years after the Productivity Program. Data are provided at the firm level. The dependent variable is log markup estimated as described in Appendix D. Standard errors are block-bootstrapped at the province level with 200 replications.

Table D.5—: Effects of the Productivity Program after Controlling for Variation in Markups

	A. Management			B. Technology			C. Combined		
	Log Sales (1)	Log Employment (2)	Log TFPR (3)	Log Sales (4)	Log Employment (5)	Log TFPR (6)	Log Sales (7)	Log Employment (8)	Log TFPR (9)
Year1AfterPP	0.058 (0.012)	0.009 (0.015)	0.131 (0.031)	0.006 (0.009)	0.012 (0.017)	0.015 (0.023)	0.086 (0.016)	0.038 (0.020)	0.180 (0.043)
Year5AfterPP	0.107 (0.016)	0.054 (0.017)	0.195 (0.032)	0.037 (0.012)	0.035 (0.021)	0.068 (0.025)	0.235 (0.049)	0.157 (0.041)	0.313 (0.042)
Year10AfterPP	0.184 (0.044)	0.189 (0.040)	0.279 (0.051)	0.059 (0.017)	0.064 (0.028)	0.101 (0.046)	0.288 (0.065)	0.331 (0.058)	0.428 (0.061)
Year15AfterPP	0.304 (0.059)	0.281 (0.054)	0.378 (0.055)	0.058 (0.028)	0.068 (0.030)	0.097 (0.039)	0.417 (0.106)	0.457 (0.099)	0.555 (0.054)
Observations	10,760	10,760	10,760	14,960	14,960	14,960	21,640	21,640	21,640
Number of firms	538	538	538	748	748	748	1,082	1,082	1,082
Sample	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced	Balanced
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes.* Coefficients estimated from equation 1 for 538 firms that applied for management transfer (Panel A), 748 firms that applied for technology transfer (Panel B), and 1,082 firms that applied for the combined management and technology transfers (Panel C) and survived in the 15 years after the Productivity Program. Data are provided at the firm level. The dependent variables are logged deflated *Sales* converted from 1951 Italian lira to 2010 euro and exchanged at 0.780 euro = USD 1 (columns 1, 4, and 7); logged *Employment*, reporting the number of employees per firm (columns 2, 5, and 8); and logged *TFPR*, estimated using the Akerberg, Caves and Frazer (2006) method (columns 3, 6, and 9). Standard errors are block-bootstrapped at the province level with 200 replications. denotes 1%, denotes 5%, and denotes 10% significance.

Table D.6—: Verifying Balance in Terms of Firms' Characteristics and Outcomes with IPTW

	Management (1–3)			Technology (4–6)			Combined (7–9)			All Transfers
	Treated		Difference	Treated		Difference	Treated		Difference	<i>F</i> -statistics
	Provinces			Provinces			Provinces			Equality
	Yes	No	Yes	No	Yes	No	Yes	No	All Means	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Employees per firm	40.92 (33.45)	39.89 (34.98)	1.03 (4.37)	40.02 (35.87)	39.22 (37.41)	0.80 (1.44)	39.43 (39.61)	40.67 (37.23)	-1.24 (3.75)	0.567
Current assets (k USD)	1,833.45 (2,738.26)	1,836.41 (2,889.44)	-2.96 (3.46)	1,831.87 (2,809.31)	1,834.89 (2,983.29)	-3.02 (4.39)	1,835.89 (2,578.10)	1,832.38 (2,493.1)	3.51 (15.93)	0.732
Annual sales (k USD)	915.69 (1,342.28)	913.91 (1,904.39)	1.78 (1.90)	911.90 (1,509.29)	914.39 (1,432.91)	-2.49 (3.48)	915.22 (1,783.91)	918.65 (1,678.01)	-3.43 (4.39)	0.804
Productivity (log TFPR)	2.65 (0.49)	2.58 (0.46)	0.07 (0.09)	2.51 (0.42)	2.56 (0.41)	-0.05 (0.08)	2.60 (0.49)	2.66 (0.50)	-0.06 (0.07)	0.421
Export	0.14 (0.37)	0.13 (0.39)	0.02 (0.08)	0.12 (0.33)	0.14 (0.38)	-0.03 (0.05)	0.14 (0.31)	0.13 (0.39)	0.01 (0.05)	0.480
Family-managed	0.25 (0.46)	0.24 (0.48)	0.01 (0.07)	0.24 (0.49)	0.23 (0.41)	0.01 (0.08)	0.25 (0.39)	0.25 (0.49)	-0.02 (0.09)	0.298

*Notes.* Columns 1, 2, 4, 5, 7, and 8 report the means of firm covariates weighting each observation by the inverse of its propensity score. Columns 3, 6, and 9 report the  $\beta_j$  coefficients estimated from  $outcome_i = \sum_{j=1}^3 \alpha_j Transfer_i^j + \sum_{j=1}^3 \beta_j (Transfer_i^j \cdot Treated Province_p) + \lambda_r + \epsilon_i$  in 1951, where  $Transfer_i^j$  is an indicator for firms that applied for management transfer for  $j = 1$ , for technology transfer for  $j = 2$ , and for the combined management and technology transfers for  $j = 3$ , Treated Province is an indicator for firms located in a treated province, and  $\lambda_r$  is pilot region fixed effects, in which each observation is weighted by the inverse of its propensity score. Column 10 reports the *F*-statistics of testing the null hypothesis of equality between the six coefficients. Standard errors are block-bootstrapped using 200 replications. Firm covariates are: *Employees* per firm reports the number of employees per firm; *Current assets* and *Annual sales* are in 2010 USD, reevaluated from 1951 to 2010 values at 1 lira=30.884 euros and exchanged at 0.780 euro=USD 1; *Productivity (log TFPR)* is the logarithm of total factor productivity revenue, estimated using the Akerberg, Caves and Frazer (2006) method; *Export* and *Family-managed* are indicators that equal one if, respectively, a firm exported and was family-managed.

## E. Estimation of the Production Function

I assume a Cobb-Douglas production function

$$(E.1) \quad Y_{it} = A_{it} K_{it}^{\beta_k} L_{it}^{\beta_l}$$

where  $Y_{it}$  is the value added of firm  $i$  in period  $t$ ,  $K_{it}$  and  $L_{it}$  are inputs of capital and labor, and  $A_{it}$  is the Hicksian-neutral efficiency level. Taking natural logs, equation E.1 results in the linear production function

$$(E.2) \quad y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \underbrace{\omega_{it} + \eta_{it}}_{\epsilon_{it}}$$

where lower-case letters refer to natural logarithms,  $\beta_0$  measures the mean efficiency level across firms and over time,  $\epsilon_{it}$  is the time- and producer-specific deviation from that mean, which can then be further decomposed into an observable (or at least predictable)  $\omega_{it}$  and unobservable component  $\eta_{it}$ .  $\omega_{it}$  is a productivity shock (which may include, for instance, machinery breakdown, demand shock, and managerial skills) and  $\eta_{it}$  is an i.i.d. component, representing unexpected deviations from the mean due to measurement error, unexpected delays, or other external circumstances.

The major econometric issue of estimating equation E.2 is that the firm's optimal choice of inputs  $k_{it}$  and  $l_{it}$  is generally correlated with the observed productivity shock  $\omega_{it}$ , which renders OLS estimates of the  $\beta$ 's biased and inconsistent.

Possible solutions for this problem include using instrumental variable estimation techniques or controlling for firm fixed effects. In practice, however, these solutions have not worked well. Natural instruments, such as input prices if firms are operating in competitive input markets, are often not observed or do not vary enough across firms, and fixed effects estimation requires the strong assumption that the unobservables are constant across time, i.e.,  $\omega_{it} = \omega_{it-1} \forall t$  (Akerberg, Caves and Frazer, 2006). The dynamic panel literature extends the fixed effects literature to allow for more sophisticated error structures (Bond and Soderbom, 2005). For instance, it is possible to assume that  $\omega$  follows an AR(1) process, i.e.,  $\omega_{it} = \rho\omega_{it-1} + \xi_{it}$ . Since the innovation in  $\omega_{it}$ ,  $\xi_{it}$ , occurs after time  $t-1$ , it may not be correlated with inputs dated  $t-1$  and earlier (Akerberg, Caves and Frazer, 2006), and this is used to derive the moment conditions.<sup>6</sup>

Other solutions, such as those advocated by Olley and Pakes (1996) and Levinsohn and Petrin (2003), involve a more structural approach and use investment or intermediate inputs proxy for productivity shocks. Specifically, they assume

<sup>6</sup>In this case, the moment condition is  $E \left[ (\xi_{it} - \xi_{it-1} + (\epsilon_{it} - \rho\epsilon_{it-1}) - (\epsilon_{it-1} - \rho\epsilon_{it-2})) \left\{ \begin{matrix} k_{i\tau} \\ l_{i\tau} \end{matrix} \right\}_{\tau=1}^{t-2} \right] = 0$ .

that labor is the nondynamic input, capital is the dynamic input, and that

$$(E.3) \quad m_{it} = f_t(k_{it}, \omega_{it})$$

where  $m_{it}$  is investment in the Olley and Pakes (1996)'s method and intermediate inputs in the Levinsohn and Petrin (2003)'s method and is function of capital  $k_{it}$  and productivity  $\omega_{it}$ .<sup>7</sup>

Assuming that E.3 is invertible, then

$$(E.4) \quad \omega_{it} = f_t^{-1}(k_{it}, m_{it})$$

and substituting in equation E.2,

$$(E.5) \quad y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + f_t^{-1}(k_{it}, m_{it}) + \eta_{it}$$

where  $f_t^{-1}$  is treated as nonparametric. The estimation consists of two steps. First, equation E.5 is estimated by using semiparametric techniques. This allows estimating  $\beta_l$ , but does not identify  $\beta_k$ , since it is collinear with the nonparametric function. Second, assuming that  $\omega$  follows a first-order Markov process implies that

$$(E.6) \quad \omega_{it} = E[\omega_{it}|m_{it-1}] + \xi_{it} = E[\omega_{it}|\omega_{it-1}] + \xi_{it}$$

where  $\xi$  is the ‘‘innovation’’ component of  $\omega$ , such that  $E[\xi_{it}|m_{it-1}] = 0$ . Since capital at time  $t$  is decided at time  $t-1$ ,  $E[\xi_{it}|k_{it}] = 0$ .<sup>8</sup> Variation in  $k_{it}$  conditional on  $\omega_{it-1}$  is the exogenous variation used to identify  $\beta_k$ , which is estimated via GMM using the following moment conditions:

$$(E.7) \quad \frac{1}{T} \frac{1}{N} \sum_t \sum_i \xi_{it}(\beta_k) \cdot k_{it}$$

In this paper, I use the method proposed by Akerberg, Caves and Frazer (2006), which is based on the Olley and Pakes (1996) and Levinsohn and Petrin (2003) methods, but solves the possible collinearity problem between labor and investment or intermediate inputs. This collinearity problem may arise because labor and investment or intermediate inputs have the same data generation process (DGP). Therefore, it is not possible to simultaneously estimate a fully nonparametric (time-varying) function of  $(\omega_{it}, k_{it})$  along with a coefficient on a variable that is only a (time-varying) function of those same variables  $(\omega_{it}, k_{it})$ . The Akerberg, Caves and Frazer (2006) method assumes that  $l_{it}$  is chosen by firms at time

<sup>7</sup>Petrin, Poi and Levinsohn (2004) propose to use intermediate inputs rather than investment as a proxy for productivity shocks, because investment is lumpy due to substantial adjustment costs and, so, it might not smoothly respond to the productivity shock.

<sup>8</sup>Olley and Pakes (1996) also control for selection, by introducing an exit rule for firms.

$t - b$  ( $0 < b < 1$ ), after  $k_{it}$  was chosen at time  $t - 1$ , but before  $m_{it}$  being chosen at time  $t$ . In this setup,

$$m_{it} = f_t(\omega_{it}, k_{it}, l_{it})$$

In the first stage,  $\beta_l$  is not identified, but it is possible to estimate  $\Phi_t(m_{it}, k_{it}, l_{it}) = \beta_k k_{it} + \beta_l l_{it} + f_t^{-1}(m_{it}, k_{it}, l_{it})$ , which represents output net of the untransmitted shock  $\eta_{it}$ . In the second stage, the moment condition on capital is  $E[\xi_{it}|k_{it}] = 0$  (which comes from  $\omega$  following a first order Markov process and implies  $E[\xi_{it} \cdot k_{it}] = 0$ ) and the moment condition on labor is  $E\left[\xi_{it} \begin{matrix} k_{it} \\ l_{it-1} \end{matrix}\right] = 0$  (since  $l_{it-1}$  was chosen at time  $t - b - 1$  and this implies  $E\left[\xi_{it} \cdot \begin{matrix} k_{it} \\ l_{it-1} \end{matrix}\right] = 0$ ).<sup>9</sup>

Appendix Table E.1 reports the coefficients on labor and capital estimated by using the Akerberg, Caves and Frazer (2006) method, separately for each manufacturing industry. To check the extent to which the Akerberg, Caves and Frazer (2006) estimates differ from other estimates, I also report the labor and capital coefficients estimated with the OLS, the factor shares (Solow's residuals), the Levinsohn and Petrin (2003) method, and the dynamic panel method. The OLS and factor shares calculations tend to underestimate the coefficients on capital compared to the Akerberg, Caves and Frazer (2006)'s coefficients, while the Levinsohn and Petrin (2003) method tends to overestimate it. However, the coefficients are roughly comparable across the different estimation methods and in each industry I cannot reject the null hypothesis of constant return to scale.<sup>10</sup>

#### A. Definition of the Variables

To estimate the production function in equation E.2, I use the following variables:

- value added: measured as the difference between firm deflated total income and intermediate inputs. The deflator used is the year-industry deflator, with base-year 1946.
- labor: measured by number of employees.
- capital: measured by firm capital stock. To obtain a measure of firm capital stock from the fixed gross assets (*fga*) reported in the balance sheets, I use

<sup>9</sup>Compared with the dynamic panel approach, the Akerberg, Caves and Frazer (2006) method allows estimating  $\omega$  separately from  $\epsilon$ . This has two major implications: (1) in the Akerberg, Caves and Frazer (2006)'s method  $\omega$  can follow a first-order Markov process not necessarily linear; (2) the variance of a GMM estimator is proportional to the variance of the moment condition being used, so Akerberg, Caves and Frazer (2006) method is more efficient. However, the GMM estimator can allow for a fixed effect  $\alpha_i$  in addition to  $\omega_{it}$ , allows for  $\epsilon_{it}$  to be correlated over time and allows for  $\omega$  following a higher than first order Markov process, as long as this process is linear (Akerberg, Caves and Frazer (2006)).

<sup>10</sup>I measure firm output by using deflated value added, which might not reflect the ranking of firms in their productivity if they charge different markups.



the Perpetual Inventory Method (PIM). First, I compute investment  $I$  as the difference between the deflated current and the lagged  $fga$ . This enables me to use the PIM formula

$$(E.8) \quad P_{t+1}K_{t+1} = P_{t+1}(1 - \delta)P_tK_t + P_{t+1}I_{t+1}$$

where  $K$  is the quantity of capital,  $P$  is its price (set equal to the interest rate on credit for 1946 to 1950 and to the national industry credit rate for 1951 to 1970),  $I$  is investment, and  $\delta$  is the depreciation rate (set equal to 6.5 percent, according to the average estimated life of machine of 15 years (ISTAT, 2012)). However, this procedure is valid only if the base-year capital stock (the first year in the data for a given firm) can be written as  $P_0K_0$ , which is not the case here because in the balance sheets  $fga$  is reported at its historic cost. To estimate its value at replacement cost, I use the  $R^G$  factor suggested by Balakrishnan, Pushpangadan and Suresh Babu (2000):

$$(E.9) \quad R^G = \frac{[(1 + g)^{\tau+1} - 1](1 + \pi)^\tau[(1 + g)(1 + \pi) - 1]}{g\{[(1 + g)(1 + \pi)]^{\tau+1} - 1\}}$$

where  $\tau$  is the average life of machines (assumed to be 15 years, according to ISTAT, 2012),  $\pi$  is the average capital price  $\frac{P_t}{P_{t-1}}$  from 1946 to 1973 (equal to 1.00255), and  $g$  is the (assumed constant) real investment growth rate  $\frac{I_t}{I_{t-1}}$  from 1946 to 1973 (equal to 1.062272). I multiply  $fga$  in the base year 1946 by  $R^G$  to convert capital to replacement costs at current prices, which I then deflate using the price index for machinery and machine tools to express it in real terms. Finally, I apply formula E.8.

Table E.1—: Estimation of Production Function

	I. Food			II. Textile			III. Wood		
	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ACF	0.58 (0.12)	0.44 (0.11)	0.367	0.67 (0.15)	0.35 (0.07)	0.451	0.55 (0.18)	0.47 (0.15)	0.246
OLS	0.61 (0.13)	0.40 (0.14)	0.281	0.70 (0.13)	0.33 (0.10)	0.342	0.56 (0.12)	0.42 (0.11)	0.358
Factor Shares	0.55	0.45		0.64	0.36		0.57	0.43	
LP	0.56 (0.11)	0.47 (0.09)	0.452	0.63 (0.12)	0.39 (0.08)	0.246	0.50 (0.11)	0.51 (0.13)	0.435
DP	0.59 (0.13)	0.44 (0.10)	0.498	0.65 (0.11)	0.36 (0.09)	0.377	0.57 (0.08)	0.46 (0.11)	0.239
	IV. Machinery			V. Minerals			VI. Chemicals		
	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$	$\beta_l$	$\beta_k$	$p$ -value $\beta_l + \beta_k = 1$
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ACF	0.62 (0.13)	0.39 (0.09)	0.539	0.61 (0.08)	0.42 (0.15)	0.371	0.65 (0.21)	0.34 (0.11)	0.654
OLS	0.64 (0.09)	0.35 (0.11)	0.432	0.62 (0.10)	0.40 (0.14)	0.254	0.66 (0.19)	0.32 (0.11)	0.348
Factor Shares	0.65	0.35		0.64	0.36		0.62	0.38	
LP	0.57 (0.11)	0.42 (0.13)	0.394	0.63 (0.14)	0.44 (0.17)	0.365	0.63 (0.13)	0.38 (0.13)	0.493
DP	0.61 (0.12)	0.40 (0.15)	0.453	0.62 (0.15)	0.42 (0.15)	0.410	0.67 (0.21)	0.34 (0.12)	0.352

*Notes.* Coefficients on labor ( $\beta_l$ ) and capital ( $\beta_k$ ) estimated with the Akerberg, Caves and Frazer (2006) method (ACF), OLS, factor shares (Solow's residuals), Petrin, Poi and Levinsohn (2004) (LP), and dynamic-panel method (DP), separately for each manufacturing industry. Columns 3, 6, 9, 12, 15, and 18 report the  $p$ -value of testing constant return to scale (CRS)  $\beta_l + \beta_k = 1$ . The sample include 6,065 Italian firms eligible to apply for the Productivity Program. Data are provided at the firm level. denotes 1%, denotes 5%, and denotes 10% significance.

## REFERENCES

- Akerberg, Daniel A., Kevin Caves, and Garth Frazer.** 2006. "Structural Identification of Production Functions."
- Balakrishnan, Pulapre K., K. Pushpangadan, and M. Suresh Babu.** 2000. "Trade Liberalisation and Productivity Growth in Manufacturing: Evidence from Firm-Level Panel Data." *Economic and Political Weekly*, 35(41): 3679–3682.
- Bond, Stephen, and Mans Soderbom.** 2005. "Adjustment Costs and the Identification of Cobb Douglas Production Functions."
- De Loecker, Jan, and Frederic Warzynski.** 2012. "Markups and firm-level export status." *American Economic Review*, 102(6): 2437–2471.
- ISTAT.** 2012. "Nota Metodologica sulle Misure di Produttività."
- Klette, Tor Jakob, and Zvi Griliches.** 1996. "The Inconsistency of Common Scale Estimators when Output Prices Are Unobserved and Endogenous." *Journal of Applied Econometrics*, 11(4): 343–61.
- Lee, David S.** 2009. "Training, wages, and sample selection: Estimating sharp bounds on treatment effects." *Review of Economic Studies*, 76: 1071–1102.
- Levinsohn, James, and Amil Petrin.** 2003. "Production Functions Estimating to Control for Using Inputs Unobservables." *Review of Economic Studies*, 70(2): 317–341.
- Olley, G. Steven, and Ariel Pakes.** 1996. "The Dynamics of Productivity in the Telecommunications Equipment Industry." *Econometrica*, 64(6): 1263–1297.
- Petrin, Amil, Brian P. Poi, and James Levinsohn.** 2004. "Production Function Estimation in Stata Using Input to Estimate the Unobservables." *Stata Journal*, 4(2): 113–123.
- Zamagni, Vera.** 1997. *Come Perdere la Guerra e Vincere la Pace. L'Economia Italiana tra Guerra e Dopoguerra: 1938-1947*. Bologna:Il Mulino.