

# APPENDIX FOR ONLINE PUBLICATION

## And Yet It Moves: Intergenerational Mobility in Italy

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Variable	N	Mean	SD	p99.9	p99	p95	p90	p75	p50	p25	p10	p5	p1
<b>Parental income 1998</b>	1,719,483	29,957	35,926	354,495	140,329	75,336	55,533	36,825	23,173	14,309	7,028	3,703	197
<b>Top-earner's income 1998</b>	1,719,483	23,740	30,804	305,540	114,317	59,290	42,026	26,433	18,952	12,924	6,349	3,397	224
<b>Father's income 1998</b>													
Total	1,600,529	23,381	31,227	307,194	114,858	59,544	42,142	26,347	18,628	12,306	5,418	1,970	0
Wage	1,600,529	14,017	17,509	140,380	72,062	42,177	31,270	21,866	13,214	0	0	0	0
Entrepreneurship	1,600,529	4,024	14,515	151,783	52,847	21,615	13,633	0	0	0	0	0	0
Other self-employment	1,600,529	2,690	17,673	203,211	64,557	13,009	0	0	0	0	0	0	0
Capital	1,600,529	1,134	28,245	74,692	15,510	3,871	1,824	540	137	0	0	0	0
<b>Mother's income 1998</b>													
Total	1,196,230	11,777	14,577	138,382	56,956	29,475	22,829	17,669	10,188	1,696	208	81	0
Wage	1,196,230	7,681	10,237	62,159	36,937	22,560	19,835	15,452	1,907	0	0	0	0
Entrepreneurship	1,196,230	1,923	8,497	97,746	33,231	12,561	5,974	0	0	0	0	0	0
Other self-employment	1,196,230	558	5,709	68,689	18,035	0	0	0	0	0	0	0	0
Capital	1,196,230	929	6,459	51,023	12,523	3,581	1,769	558	167	0	0	0	0
<b>Child's income 2017</b>													
Total	1,635,680	21,034	23,948	204,561	84,078	48,944	37,800	27,427	19,641	10,257	3,050	638	-2,503
Wage	1,635,680	17,124	19,318	138,741	67,245	41,877	33,520	25,037	16,848	2,654	0	0	0
Entrepreneurship	1,635,680	1,335	11,897	111,788	38,550	11,140	0	0	0	0	0	0	-4,405
Other self-employment	1,635,680	1,731	10,329	110,386	38,083	10,680	525	0	0	0	0	0	0
Capital	1,635,680	1,206	9,375	64,527	18,667	5,766	1,819	531	99	0	0	0	0

Table A1: Summary statistics on the income distribution and its components for parents and children. Income is nominal and expressed in Euros. "Top-earner" is the parent - father or mother - who earns more income.

	Index 1	Index 2	Index 6	Index 9	Index "Moretti"
Index 1	1.000				
Index 2	0.681	1.000			
Index 6	0.823	0.899	1.000		
Index 9	0.809	0.905	0.999	1.000	
Index "Moretti"	0.538	0.837	0.692	0.695	1.000

Table A2: Cross-region correlation of cost of living indexes from [Cannari and Iuzzolino \(2009\)](#) and [Boeri et al. \(2018\)](#).

Child's Outcome	Parent's Income Definition	Core	Core	Core	Male	Male	Male
Income rank	Parental income rank	0.220 (0.0007)			0.222 (0.0010)		
Income rank	Top-earner income rank		0.211 (0.0007)			0.220 (0.0010)	
Income rank	Father income rank			0.202 (0.0008)			0.218 (0.0011)
Constant		0.390 (0.0004)	0.394 (0.0004)	0.400 (0.0004)	0.449 (0.0006)	0.450 (0.0006)	0.452 (0.0006)
AUM		0.445	0.447	0.451	0.504	0.505	0.507
Q1Q5		0.112	0.113	0.122	0.156	0.158	0.167
N		1,719,483	1,719,483	1,644,653	887,401	887,401	849,921
Child's Outcome	Parent's Income Definition	Female	Female	Female	Married Father	Married Father	Married Father
Income rank	Parental income rank	0.227 (0.0010)			0.225 (0.0008)		
Income rank	Top-earner income rank		0.209 (0.0010)			0.215 (0.0008)	
Income rank	Father income rank			0.192 (0.0010)			0.206 (0.0008)
Constant		0.323 (0.0006)	0.332 (0.0006)	0.342 (0.0006)	0.388 (0.0005)	0.394 (0.0005)	0.399 (0.0005)
AUM		0.379	0.384	0.390	0.445	0.448	0.451
Q1Q5		0.061	0.063	0.072	0.110	0.113	0.123
N		832,082	832,082	794,732	1,464,143	1,464,143	1,464,143
Child's Outcome	Parent's Income Definition	Div/Sep Father	Div/Sep Father	Div/Sep Father	2 Earners	2 Earners	2 Earners
Income rank	Parental income rank	0.177 (0.0040)			0.219 (0.0010)		
Income rank	Top-earner income rank		0.168 (0.0040)			0.209 (0.0009)	
Income rank	Father income rank			0.153 (0.0040)			0.195 (0.0009)
Constant		0.394 (0.0024)	0.395 (0.0025)	0.404 (0.0025)	0.392 (0.0006)	0.405 (0.0006)	0.415 (0.0006)
AUM		0.438	0.437	0.443	0.446	0.457	0.464
Q1Q5		0.118	0.121	0.129	0.117	0.122	0.135
N		58,048	58,048	58,048	1,184,767	1,184,767	1,184,767

Table A3: Additional national indicators of intergenerational mobility for the core sample and various subgroups (part 1/3). Standard errors in parentheses. Results reported for three definition of parental income: family income, top-earner income, and father income. See Table 3 for details on the subgroups.

Child's Outcome	Parent's Income Definition	Father Top	Father Top	Father Top	Mother Top	Mother Top	Mother Top
Income rank	Parental income rank	0.226 (0.0008)			0.193 (0.0017)		
Income rank	Top-earner income rank		0.215 (0.0008)			0.202 (0.0018)	
Income rank	Father income rank			0.224 (0.0009)			0.229 (0.0023)
Constant		0.387 (0.0005)	0.391 (0.0005)	0.381 (0.0005)	0.400 (0.0009)	0.405 (0.0009)	0.431 (0.0008)
AUM		0.444	0.444	0.437	0.448	0.455	0.489
Q1Q5		0.108	0.110	0.106	0.122	0.124	0.147
N		1,383,653	1,383,653	1,383,653	335,830	335,830	261,000
Child's Outcome	Parent's Income Definition	> 2/3 Wage	> 2/3 Wage	> 2/3 Wage	> 2/3 Entr.	> 2/3 Entr.	> 2/3 Entr.
Income rank	Parental income rank	0.231 (0.0011)			0.228 (0.0017)		
Income rank	Top-earner income rank		0.225 (0.0011)			0.217 (0.0017)	
Income rank	Father income rank			0.207 (0.0011)			0.217 (0.0018)
Constant		0.379 (0.0007)	0.380 (0.0007)	0.392 (0.0007)	0.386 (0.0008)	0.390 (0.0008)	0.389 (0.0008)
AUM		0.437	0.437	0.443	0.443	0.444	0.444
Q1Q5		0.093	0.092	0.114	0.111	0.114	0.115
N		991,014	991,014	950,815	299,909	299,909	291,230
Child's Outcome	Parent's Income Definition	> 2/3 Prof.	> 2/3 Prof.	> 2/3 Prof.	> 2/3 Cap.	> 2/3 Cap.	> 2/3 Cap.
Income rank	Parental income rank	0.216 (0.0038)			0.211 (0.0047)		
Income rank	Top-earner income rank		0.209 (0.0038)			0.203 (0.0046)	
Income rank	Father income rank			0.201 (0.0040)			0.207 (0.0050)
Constant		0.404 (0.0029)	0.403 (0.0030)	0.410 (0.0031)	0.396 (0.0013)	0.398 (0.0013)	0.395 (0.0014)
AUM		0.458	0.455	0.461	0.449	0.448	0.446
Q1Q5		0.141	0.140	0.152	0.127	0.127	0.127
N		57,047	57,047	55,019	64,637	64,637	59,549

Table A4: Additional national indicators of intergenerational mobility for the core sample and various subgroups (part 2/3). Standard errors in parentheses. Results reported for three definition of parental income: family income, top-earner income, and father income. See Tables 4 and 5 for details on the subgroups.

Child's Outcome	Parent's Income Definition	Lawyers & co.	Lawyers & co.	Lawyers & co.	Mover	Mover	Mover
Income rank	Parental income rank	0.216 (0.0048)			0.155 (0.0018)		
Income rank	Top-earner income rank		0.206 (0.0048)			0.150 (0.0018)	
Income rank	Father income rank			0.180 (0.0045)			0.141 (0.0018)
Constant		0.379 (0.0037)	0.386 (0.0036)	0.411 (0.0033)	0.507 (0.0011)	0.510 (0.0011)	0.516 (0.0011)
AUM		0.433	0.437	0.456	0.546	0.547	0.551
Q1Q5		0.136	0.136	0.157	0.205	0.208	0.219
N		49,366	49,366	48,438	277,462	277,462	277,462

Table A5: Additional national indicators of intergenerational mobility for the core sample and various subgroups (part 3/3). Standard errors in parentheses. Results reported for three definition of parental income: family income, top-earner income, and father income. "Lawyers & co." restricts to children for which the occupation of at least one parent in 1998 involved professional services (ATECO code 74 - including lawyers, accountants, consultants, architects, ...). "Mover" refers to the restriction to children whose province of residence in 2017 is different from the province of residence of their fathers in 1998.

	Sons	Married	Div/Sep	Mover Reg., Father	Mover Reg.	Father Born Abroad
Dependent Variable: Son's Income Rank						
Father's income rank	0.226 (0.0011)	0.230 (0.0011)	0.165 (0.0056)	0.182 (0.0028)	0.125 (0.0030)	0.214 (0.0078)
Constant	0.389 (0.0006)	0.388 (0.0007)	0.394 (0.0036)	0.430 (0.0017)	0.565 (0.0017)	0.403 (0.0046)
AUM	0.445	0.445	0.435	0.476	0.596	0.456
Q1Q5	0.112	0.112	0.130	0.149	0.217	0.144
TMR	4.835	4.818	7.973	4.371	3.827	3.382
N	849,921	756,878	29,449	138,157	92,340	16,049

Table A6: National indicators of intergenerational mobility for fathers and sons (part 1/2). Standard errors in parentheses. See Tables 3 and 5 for details on the subgroups.

	Only Wage	> 2/3 Wage	> 2/3 Entr.	> 2/3 Prof.	> 2/3 Cap.
Dependent Variable: Son's Income Rank					
Father's income rank	0.232 (0.0015)	0.231 (0.0015)	0.227 (0.0022)	0.216 (0.0031)	0.197 (0.0046)
Constant	0.381 (0.0009)	0.382 (0.0009)	0.387 (0.0010)	0.401 (0.0019)	0.395 (0.0014)
AUM	0.439	0.439	0.444	0.455	0.444
Q1Q5	0.090	0.092	0.114	0.121	0.123
TMR	3.237	3.523	5.559	7.093	5.672
N	476,384	505,498	194,191	62,121	65,661

Table A7: National indicators of intergenerational mobility for fathers and sons (part 2/2). Standard errors in parentheses. See Table 4 for details on the subgroups.

<b>Father's Quintile</b>	<b>Son's Quintile</b>				
	1st	2nd	3rd	4th	5th
1st	29.35	25.03	18.51	15.94	11.18
2nd	21.00	23.00	22.46	19.37	14.17
3rd	16.99	19.55	23.11	22.71	17.63
4th	16.20	17.31	20.40	23.73	22.36
5th	15.69	14.82	15.57	18.62	35.31

Table A8: National quintile transition matrix - fathers and sons (%)

<b>Father's Decile</b>	<b>Son's Decile</b>									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1st	16.84	14.57	13.28	11.30	9.46	8.27	8.01	7.40	6.09	4.79
2nd	13.68	13.62	13.48	12.00	10.36	8.92	8.56	7.91	6.52	4.95
3rd	10.64	11.69	11.87	12.02	11.36	10.36	9.51	9.00	7.63	5.93
4th	9.30	10.38	10.71	11.40	11.79	11.42	10.61	9.62	8.55	6.23
5th	8.35	8.98	9.71	10.66	11.66	11.78	11.60	10.78	9.33	7.15
6th	8.10	8.55	8.98	9.75	10.89	11.90	11.87	11.18	10.57	8.21
7th	8.05	8.39	8.58	9.04	10.11	11.03	11.74	12.08	11.66	9.31
8th	7.94	8.02	8.31	8.68	9.33	10.32	11.22	12.43	12.81	10.94
9th	7.76	7.78	7.66	8.26	8.49	9.24	9.84	11.38	13.85	15.74
10th	8.37	7.47	6.98	6.73	6.49	6.91	7.27	8.75	13.55	27.48

Table A9: National decile transition matrix - fathers and sons (%)

# Identification and Estimation of the Income Process

Recall the income process specified in Section 5.1. For each individual in the sample, we have three consecutive observations at dates  $t, t - 1, t - 2$ . The cross-sectional moments we use for estimation are:

$$\text{var}(y_t) = \text{var}(\kappa_t) + \sigma_\varepsilon$$

and

$$\begin{aligned} \text{cov}(y_t, y_{t-1}) &= \rho \text{var}(\kappa_{t-1}) \\ \text{cov}(y_{t-1}, y_{t-2}) &= \rho \text{var}(\kappa_{t-2}) \\ \text{cov}(y_t, y_{t-2}) &= \rho^2 \text{var}(\kappa_{t-2}), \end{aligned}$$

where

$$\text{var}(\kappa_t) = \rho^2 \text{var}(\kappa_{t-1}) + \sigma_n = \rho^{2t} \sigma_{\kappa_0} + \sigma_n \sum_{j=1}^t \rho^{2(j-1)},$$

Identification can be achieved in different ways. For example:

$$\begin{aligned} \rho &= \frac{\text{cov}(y_t, y_{t-2})}{\text{cov}(y_{t-1}, y_{t-2})} \\ \sigma_\varepsilon &= \text{var}(y_{t-1}) - \rho^{-1} \text{cov}(y_t, y_{t-1}) \\ \sigma_\eta &= \text{var}(y_{t-1}) - \text{cov}(y_t, y_{t-2}) - \sigma_\varepsilon \\ \sigma_{\kappa_0} &= \left[ \text{var}(y_t) - \sigma_\varepsilon - \sigma_n \sum_{j=1}^t \rho^{2(j-1)} \right] \cdot \rho^{-2t}. \end{aligned}$$

To avoid contamination by outliers, we trim the top and bottom 5% of the distribution of log-changes. The estimation methodology follows a standard minimum distance approach (Chamberlain, 1984).

## References

CHAMBERLAIN, G. (1984). "Panel Data." *Handbook of Econometrics* 2, 1247-1318.

## Correction for the omission of poor children

We discussed in Section 3 how individuals with very low or no income are not required to file. Our dataset contains records of parents with missing information on children. Under the assumption that these children did not file taxes in because their income fell below this threshold level, we can gauge the effect of omitting poor children from our sample.

We have 876,055 parents with missing information on children in 2017, except for their year of birth. Applying the same age selection criteria for parents and children as in the core sample, we are left with 450,740 records. For each of these records, we set the children's income in 2017 from missing to zero, add them to the core sample and re-estimate the national mobility measures, computing average incomes three years of data as we do in the core analysis. The impact of this correction is small: the RRS decreases from 0.22 to 0.215, AUM increases from 0.445 to 0.446 and the Q1Q5 decreases from 0.112 to 0.106.

## Correction for missing capital income

We have also implemented a correction for some forms of capital income that are missing from tax returns. In order to impute missing capital income from tax returns we proceed as follows. We start with Bank of Italy's SHIW data and define two categories of capital income which are missing in our data: interest income earned on government bonds, and other capital income (from deposits, stocks, bonds, and mutual funds). This distinction is necessary because SHIW data are reported after-tax, and the tax withheld on government bonds is lower. We convert data into before-tax income by using a tax rate of 12.5% for government bonds, and 26% for other capital income. For each of these two categories, we regress capital income on dummy variables that capture i) quantile in the distribution of total income, ii) age above/below 45 years old, iii) gender, iv) year. Using the estimated coefficients, we impute capital income for each child, parent and year in our dataset, relying on the assumption that the tax system being monotonic implies that the individual rank in the before-tax and after-tax income distribution is the same. We take into account that dividends are subject to different tax rules if holdings represent a substantial share of the stock of a firm (qualified holdings) or not. We estimate that in 2015 (2000) approximately 36% (33%) of all dividends were earned on non-qualified holdings of stocks, while the remaining 64% (67%) corresponded to qualified holdings. Dividends from qualified holdings are included in tax returns while dividends from non-qualified holdings are not, thus this is the portion of capital income we are missing. We also account for the fact that starting 2004 only approximately 50% of dividends from qualified holdings have to be reported on tax returns. This correction leaves our estimates of relative and absolute mobility virtually identical.



Figure A2: Map of the Italian provinces

Province	Population in 2010	Region	Macro area
Genova	882,718	Liguria	
Imperia	222,648	Liguria	
La Spezia	223,516	Liguria	
Savona	287,906	Liguria	
Bergamo	1,100,000	Lombardia	
Brescia	1,300,000	Lombardia	
Como	594,988	Lombardia	
Cremona	363,606	Lombardia	
Lecco	340,167	Lombardia	
Lodi	227,655	Lombardia	
Mantova	415,442	Lombardia	
Milano	3,200,000	Lombardia	
Monza-Brianza	849,636	Lombardia	North-West
Pavia	548,307	Lombardia	
Sondrio	183,169	Lombardia	
Varese	883,285	Lombardia	
Alessandria	440,613	Piemonte	
Asti	221,687	Piemonte	
Biella	185,768	Piemonte	
Cuneo	592,303	Piemonte	
Novara	371,802	Piemonte	
Torino	2,300,000	Piemonte	
Verbania	163,247	Piemonte	
Vercelli	179,562	Piemonte	
Aosta	128,230	Valle d'Aosta	

Table A10: Administrative divisions of Italy (part 1/3)

Province	Population in 2010	Region	Macro area
Bologna	991,924	Emilia	
Ferrara	359,994	Emilia	
Forli-Cesena	395,489	Emilia	
Modena	700,913	Emilia	
Parma	442,120	Emilia	
Piacenza	289,875	Emilia	
Ravenna	392,458	Emilia	
Reggio-Emilia	530,343	Emilia	
Rimini	329,302	Emilia	
Gorizia	142,407	Friuli Venezia Giulia	North-East
Pordenone	315,323	Friuli Venezia Giulia	
Trieste	236,556	Friuli Venezia Giulia	
Udine	541,522	Friuli Venezia Giulia	
Bolzano	507,657	Trentino	
Trento	529,457	Trentino	
Belluno	213,474	Veneto	
Padova	934,216	Veneto	
Rovigo	247,884	Veneto	
Treviso	888,249	Veneto	
Venezia	863,133	Veneto	
Verona	920,158	Veneto	
Vicenza	870,740	Veneto	
Frosinone	498,167	Lazio	
Latina	555,692	Lazio	
Rieti	160,467	Lazio	
Roma	4,200,000	Lazio	
Viterbo	320,294	Lazio	
Ancona	481,028	Marche	
Ascoli Piceno	214,068	Marche	
Fermo	177,914	Marche	
Macerata	325,362	Marche	
Pesaro-Urbino	366,963	Marche	
Arezzo	349,651	Toscana	Center
Firenze	998,098	Toscana	
Grosseto	228,157	Toscana	
Livorno	342,955	Toscana	
Lucca	393,795	Toscana	
Massa-Carrara	203,901	Toscana	
Pisa	417,782	Toscana	
Pistoia	293,061	Toscana	
Prato	249,775	Toscana	
Siena	272,638	Toscana	
Perugia	671,821	Umbria	
Terni	234,665	Umbria	

Table A11: Administrative divisions of Italy (part 2/3)

Province	Population in 2010	Region	Macro area
Chieti	397,123	Abruzzo	
L'Aquila	309,820	Abruzzo	
Pescara	323,184	Abruzzo	
Teramo	312,239	Abruzzo	
Matera	203,726	Basilicata	
Potenza	383,791	Basilicata	
Catanzaro	368,597	Calabria	
Cosenza	734,656	Calabria	
Crotone	174,605	Calabria	
Reggio-Calabria	566,977	Calabria	
Vibo Valentia	166,560	Calabria	
Avellino	439,137	Campania	
Benevento	287,874	Campania	
Caserta	916,467	Campania	
Napoli	3,100,000	Campania	
Salerno	1,100,000	Campania	
Campobasso	231,086	Molise	
Isernia	88,694	Molise	
Bari	1,300,000	Puglia	
Barletta-Trani-Andria	392,863	Puglia	
Brindisi	403,229	Puglia	South and Islands
Foggia	640,836	Puglia	
Lecce	815,597	Puglia	
Taranto	580,028	Puglia	
Cagliari	563,180	Sardegna	
Carbonia - Iglesias	129,840	Sardegna	
Medio Campidano	102,409	Sardegna	
Nuoro	160,677	Sardegna	
Ogliastra	57,965	Sardegna	
Olbia - Tempio	157,859	Sardegna	
Oristano	166,244	Sardegna	
Sassari	337,237	Sardegna	
Agrigento	454,002	Sicilia	
Caltanissetta	271,729	Sicilia	
Catania	1,100,000	Sicilia	
Enna	172,485	Sicilia	
Messina	653,737	Sicilia	
Palermo	1,200,000	Sicilia	
Ragusa	318,549	Sicilia	
Siracusa	404,271	Sicilia	
Trapani	436,624	Sicilia	

Table A12: Administrative divisions of Italy (part 3/3)

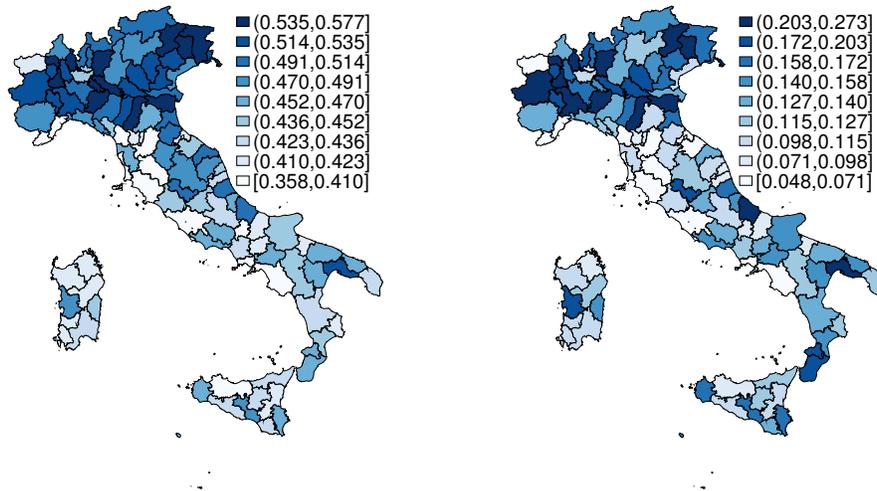


Figure A3: Heat map of Absolute Upward Mobility and Q1Q5 based on PPP-adjusted income (with province-level price indices). Dark areas are more mobile. Left-panel (a): AUM. Right-panel (b): Q1Q5

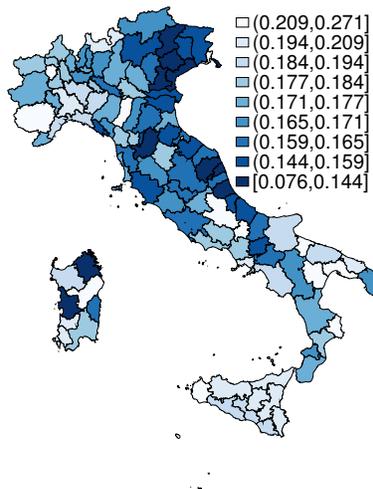


Figure A4: Heat map of the IGE based on nominal income. Dark areas are more mobile.

Upward Mob. Rank	Province Name	Population in 2010	AUM	Q1Q5	RRS	IGE	N
1	Bolzano	507,657	0.574	0.282	0.152	0.169	13,765
2	Lecco	340,167	0.554	0.213	0.141	0.166	10,294
3	Monza-Brianza	849,636	0.545	0.204	0.160	0.175	25,131
4	Bergamo	1,098,740	0.544	0.200	0.142	0.171	30,294
5	Treviso	888,249	0.541	0.183	0.110	0.127	25,283
6	Belluno	213,474	0.541	0.168	0.101	0.076	6,395
7	Milano	3,156,694	0.539	0.224	0.161	0.167	81,305
8	Cremona	363,606	0.536	0.183	0.141	0.161	9,877
9	Lodi	227,655	0.535	0.167	0.164	0.181	5,936
10	Trento	529,457	0.534	0.198	0.127	0.152	15,420
11	Vicenza	870,740	0.533	0.167	0.139	0.161	25,365
12	Venezia	863,133	0.530	0.156	0.116	0.111	23,354
13	Padova	934,216	0.530	0.168	0.137	0.142	27,000
14	Modena	700,913	0.529	0.198	0.164	0.169	17,407
15	Parma	442,120	0.528	0.184	0.153	0.172	10,422
16	Pordenone	315,323	0.526	0.141	0.125	0.144	8,789
17	Piacenza	289,875	0.525	0.213	0.168	0.187	7,031
18	Bologna	991,924	0.524	0.178	0.150	0.160	21,805
19	Verona	920,158	0.519	0.164	0.152	0.176	26,389
20	Brescia	1,256,025	0.519	0.166	0.152	0.174	31,963
21	Reggio-Emilia	530,343	0.518	0.163	0.194	0.219	12,874
22	Mantova	415,442	0.518	0.166	0.144	0.180	9,966
23	Udine	541,522	0.514	0.143	0.127	0.146	15,270
24	Varese	883,285	0.514	0.187	0.166	0.173	22,860
25	Novara	371,802	0.506	0.144	0.165	0.183	10,199
26	Cuneo	592,303	0.505	0.154	0.186	0.223	16,910
27	Ravenna	392,458	0.505	0.164	0.149	0.175	10,053
28	Aosta	128,230	0.503	0.159	0.166	0.182	3,484
29	Pavia	548,307	0.503	0.168	0.171	0.190	12,320
30	Como	594,988	0.503	0.188	0.149	0.166	15,593
31	Trieste	236,556	0.494	0.162	0.145	0.143	4,835
32	Forli-Cesena	395,489	0.493	0.111	0.153	0.148	11,593
33	Asti	221,687	0.493	0.160	0.161	0.177	5,277
34	Genova	882,718	0.491	0.152	0.186	0.186	20,965
35	Firenze	998,098	0.491	0.145	0.135	0.130	25,176
36	Alessandria	440,613	0.489	0.137	0.180	0.209	10,371
37	Rovigo	247,884	0.488	0.122	0.144	0.144	7,789
38	Biella	185,768	0.487	0.150	0.193	0.225	4,835
39	Vercelli	179,562	0.487	0.142	0.164	0.180	4,639
40	Prato	249,775	0.486	0.138	0.164	0.149	7,276

Table A13: Inter-generational mobility across provinces (part 1/3)

Upward Mob. Rank	Province Name	Population in 2010	AUM	Q1Q5	RRS	IGE	N
41	Torino	2,302,353	0.483	0.145	0.170	0.176	60,748
42	Sondrio	183,169	0.482	0.151	0.169	0.195	5,819
43	Ferrara	359,994	0.481	0.119	0.152	0.158	9,325
44	La Spezia	223,516	0.477	0.135	0.162	0.154	5,403
45	Arezzo	349,651	0.473	0.114	0.175	0.184	10,094
46	Siena	272,638	0.471	0.132	0.160	0.168	7,594
47	Verbania	163,247	0.470	0.134	0.192	0.181	4,117
48	Ancona	481,028	0.467	0.091	0.155	0.165	15,265
49	Pisa	417,782	0.466	0.107	0.155	0.160	11,761
50	Gorizia	142,407	0.464	0.081	0.176	0.237	3,211
51	Pesaro-Urbino	366,963	0.462	0.091	0.152	0.154	11,478
52	Rimini	329,302	0.459	0.109	0.157	0.165	9,423
53	Macerata	325,362	0.457	0.088	0.125	0.123	10,322
54	Savona	287,906	0.455	0.127	0.186	0.185	6,362
55	Pistoia	293,061	0.454	0.112	0.166	0.183	7,628
56	Perugia	671,821	0.452	0.083	0.142	0.161	21,445
57	Lucca	393,795	0.449	0.098	0.162	0.180	10,532
58	Fermo	177,914	0.446	0.093	0.139	0.142	5,635
59	Roma	4,194,068	0.443	0.122	0.177	0.164	106,656
60	Terni	234,665	0.443	0.101	0.147	0.161	7,305
61	Massa-Carrara	203,901	0.442	0.125	0.169	0.169	5,559
62	Livorno	342,955	0.439	0.092	0.164	0.175	9,371
63	Ascoli Piceno	214,068	0.437	0.095	0.149	0.161	7,456
64	Chieti	397,123	0.437	0.106	0.157	0.145	14,193
65	Grosseto	228,157	0.436	0.103	0.157	0.145	6,175
66	Rieti	160,467	0.434	0.093	0.180	0.176	5,096
67	Taranto	580,028	0.430	0.110	0.200	0.218	22,231
68	Frosinone	498,167	0.426	0.103	0.178	0.184	18,724
69	L'Aquila	309,820	0.424	0.096	0.187	0.217	11,452
70	Teramo	312,239	0.422	0.089	0.147	0.142	10,602
71	Imperia	222,648	0.420	0.085	0.197	0.177	4,642
72	Brindisi	403,229	0.419	0.097	0.237	0.205	14,405
73	Latina	555,692	0.417	0.100	0.198	0.184	17,842
74	Caserta	916,467	0.416	0.100	0.200	0.181	24,638
75	Viterbo	320,294	0.415	0.083	0.174	0.167	10,057
76	Potenza	383,791	0.413	0.092	0.181	0.170	14,398
77	Bari	1,258,706	0.412	0.089	0.207	0.194	41,057
78	Lecce	815,597	0.410	0.095	0.196	0.168	27,909
79	Matera	203,726	0.409	0.090	0.206	0.213	8,689
80	Pescara	323,184	0.405	0.090	0.166	0.157	9,966

Table A14: Inter-generational mobility across provinces (part 2/3)

Upward Mob. Rank	Province Name	Population in 2010	AUM	Q1Q5	RRS	IGE	N
81	Napoli	3,080,873	0.405	0.102	0.221	0.195	80,126
82	Campobasso	231,086	0.401	0.076	0.164	0.164	8,422
83	Avellino	439,137	0.401	0.089	0.193	0.159	13,994
84	Foggia	640,836	0.398	0.082	0.212	0.191	23,885
85	Vibo Valentia	166,560	0.396	0.088	0.188	0.167	5,142
86	Benevento	287,874	0.396	0.100	0.186	0.151	9,099
87	Trapani	436,624	0.393	0.085	0.190	0.226	14,269
88	Cagliari	563,180	0.392	0.082	0.160	0.179	16,490
89	Caltanissetta	271,729	0.391	0.082	0.208	0.187	9,860
90	Catanzaro	368,597	0.391	0.090	0.186	0.180	11,640
91	Salerno	1,109,705	0.390	0.086	0.210	0.194	33,592
92	Barletta-Trani-Andria	392,863	0.387	0.069	0.238	0.226	13,680
93	Olbia - Tempio	157,859	0.386	0.071	0.138	0.116	4,114
94	Oristano	166,244	0.385	0.070	0.143	0.135	5,844
95	Isernia	88,694	0.383	0.068	0.232	0.219	3,215
96	Enna	172,485	0.382	0.068	0.190	0.201	5,987
97	Crotone	174,605	0.382	0.073	0.208	0.219	4,923
98	Agrigento	454,002	0.381	0.071	0.206	0.191	13,877
99	Medio Campidano	102,409	0.380	0.065	0.152	0.206	3,784
100	Carbonia - Iglesias	129,840	0.379	0.076	0.167	0.201	4,454
101	Messina	653,737	0.379	0.080	0.212	0.207	20,322
102	Sassari	337,237	0.377	0.077	0.181	0.194	10,457
103	Reggio-Calabria	566,977	0.377	0.086	0.219	0.176	15,336
104	Siracusa	404,271	0.376	0.078	0.204	0.200	12,717
105	Catania	1,090,101	0.376	0.078	0.207	0.203	29,084
106	Palermo	1,249,577	0.373	0.076	0.186	0.205	33,949
107	Ogliastra	57,965	0.372	0.052	0.180	0.161	1,872
108	Nuoro	160,677	0.364	0.064	0.199	0.271	5,201
109	Cosenza	734,656	0.363	0.077	0.206	0.176	23,178
110	Ragusa	318,549	0.353	0.063	0.230	0.192	10,214

Table A15: Inter-generational mobility across provinces (part 3/3)

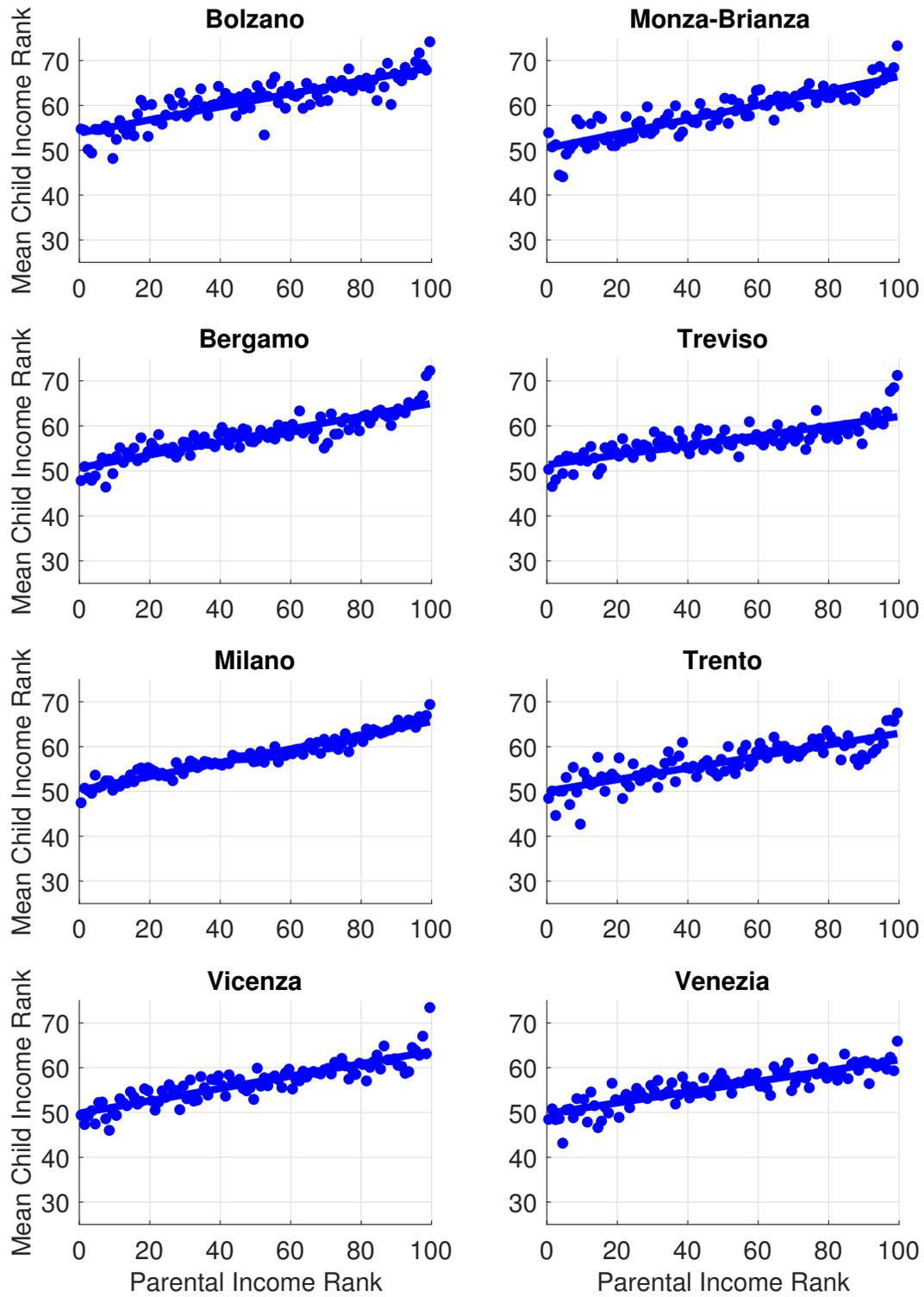


Figure A5: Rank-rank relationship for children who grew up in top provinces for AUM.

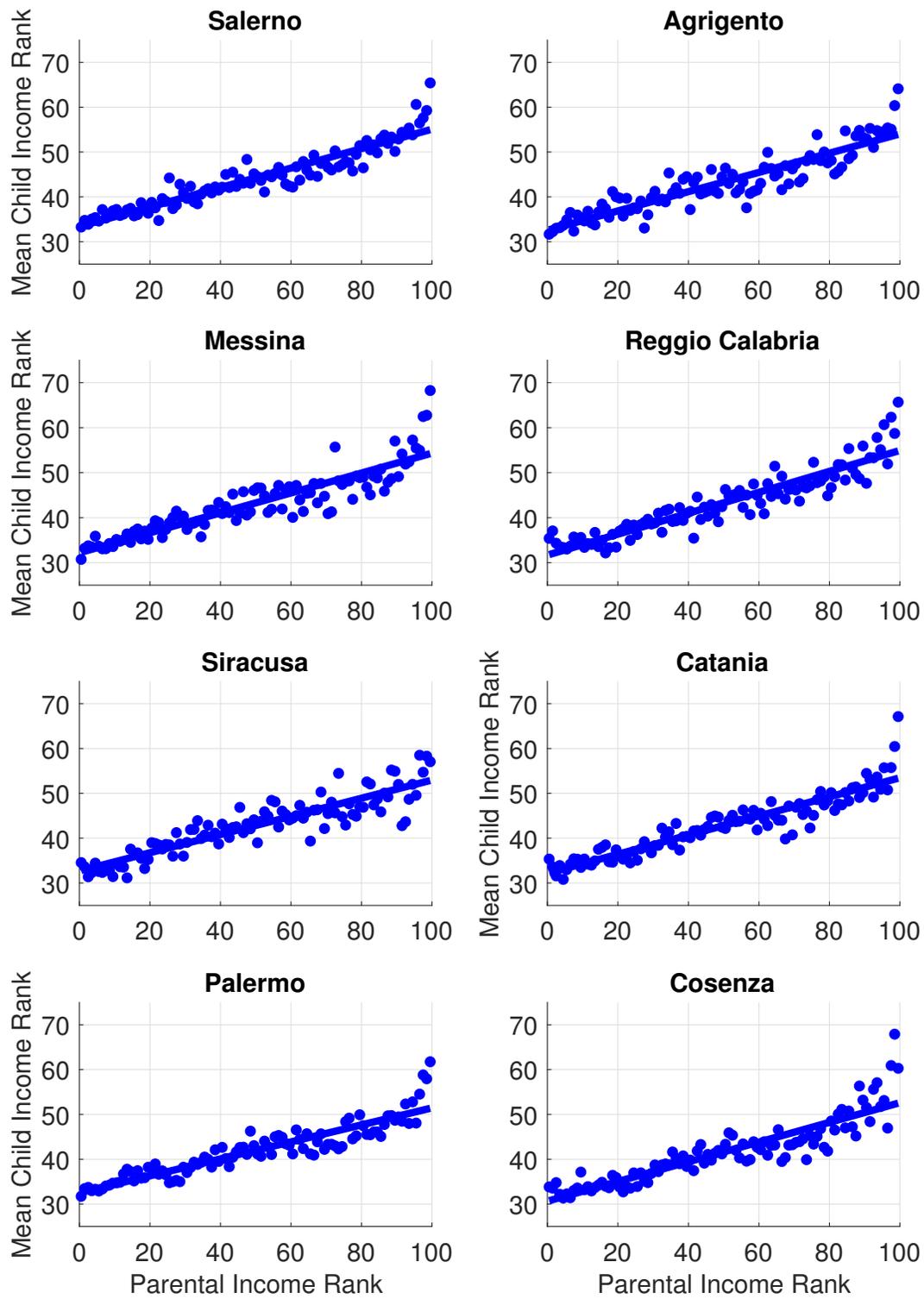


Figure A6: Rank-rank relationship for children who grew up in bottom provinces for AUM.

<b>Variable</b>	<b>p90</b>	<b>p50</b>	<b>p10</b>
<i>Productivity</i>			
Value added per resident (Euros)	22,342	17,121	10,676
Manufacturing share of value added	29%	18%	7.5%
Public works started (1,000 Euros)	267,223	67,500	29,925
Public works completed (1,000 Euros)	166,361	71,023	32,809
<i>Labor market</i>			
Unemployment rate	23%	8.2%	3.7%
Female unemployment rate	36%	12%	5.8%
Male unemployment rate	17%	5.4%	2.1%
Youth unemployment rate (age 15-24)	61%	25%	9.9%
Long-term unemployment rate (12 months or more)	9.2%	2.1%	0.96%
Female employment rate	39%	32%	17%
Male employment rate	63%	57%	48%
Youth employment rate (age 15-24)	43%	30%	12%
Employment rate (high school diploma)	82%	76%	60%
Employment rate (college degree or higher)	87%	81%	73%
Labor force participation	66%	61%	52%
Female labor force participation	57%	48%	32%
Male labor force participation	77%	73%	69%
Youth labor force participation (age 15-24)	49%	38%	28%
<i>Educational attainment</i>			
Share of illiterates	24%	20%	17%
School dropouts (per 100 residents)	32	22	14
<i>Social capital</i>			
Blood bags collected per resident (GSZ 2004)	0.055	0.018	0
Non-profit organizations per resident (GSZ 2016)	7.3	4.5	2.7
Voter turnout, House of Representatives	89%	85%	76%
Voter turnout, European Parliament	81%	75%	63%
Recycling to total waste ratio	31%	14%	1%
<i>Crime</i>			
Burglaries (per 100,000 residents)	804	545	290
Smuggling offenses (per 100,000 residents)	65	1.6	0
GTAAs (per 100,000 residents)	592	187	87
Petty thefts (per 100,000 residents)	463	93	17
Thefts with tear (per 100,000 residents)	80	21	4.5
Murders (per 100,000 residents)	2.4	0.92	0
Distraints (per 1,000 residents aged 18 or more)	12	6.1	3.4
Exploitation-of-prostitution offenses (per 100,000 residents)	9.7	2.9	0.44
Protests of checks (per 1,000 residents)	11	5.3	2.6
Drug dealing offenses (per 100,000 residents)	139	60	30
Scam offenses (per 100,000 residents)	138	66	33

Table A16: Statistics on province-level indicators used in the analyses of mobility and local characteristics (part 1/2)

Variable	p90	p50	p10
<i>Life expectancy</i>			
Female life expectancy at birth (years)	83	82	81
Male life expectancy at birth (years)	77	76	75
Female life expectancy at 65 (years)	21	20	19
Male life expectancy at 65 (years)	17	16	15
Old-age index (ratio of residents above age 65 to below age 15)	2.2	1.4	0.91
Number of suicides (per 100,000 residents)	10	6	1.5
<i>Family instability</i>			
Divorce rate	1	0.56	0.21
Divorces (per 100 marriages)	25	12	3.9
Divorce rate of married women less than 35 years old	57	28	9.1
Divorce rate of married women aged 35-44	72	36	13
Children in custody due to divorce (per 100 residents aged 0-17)	0.31	0.17	0.058
Separation rate	1.7	1.2	0.46
Separations (per 100 marriages)	37	24	9.3
Separation rate of married women less than 35 years old	15	10	3.8
Separation rate of married women aged 35-44	10	6.8	2.8
Children in custody due to separation (per 100 residents aged 0-17)	0.81	0.53	0.2
<i>Openness</i>			
Trade (exports+imports, 1,000 Euros)	9,063,175	1,865,859	128,255
Net inter-province migration (per 1,000 residents)	5.2	1.3	-4.3
Rate of inter-province mobility of resident population	26	18	14
Foreign-born residents (per 1,000 residents)	57	35	9
Inflow of graduates (per 100 graduates who left)	221	111	47
<i>Quality of schools</i>			
Teachers below 40 years old: pre-school	26%	18%	7.4%
Teachers below 40 years old: primary school	27%	22%	13%
Teachers below 40 years old: middle school	13%	7.8%	4.7%
Teachers below 40 years old: high school	12%	7.6%	5.3%
Teachers under temporary contracts: pre-school	15%	9%	1.5%
Teachers under temporary contracts: primary school	14%	9.1%	2.6%
Teachers under temporary contracts: middle school	27%	21%	15%
Teachers under temporary contracts: high school	28%	22%	15%

Table A17: Statistics on province-level indicators used in the analyses of mobility and local characteristics (part 2/2)

Variable	Source
<b>Value added per resident</b>	ISTAT
<b>Crime:</b>	
Burglaries (per 100,000 residents)	ISTAT
Smuggling offenses (per 100,000 residents)	ISTAT
GTAs (per 100,000 residents)	ISTAT
Petty thefts (per 100,000 residents)	ISTAT
Thefts with tear (per 100,000 residents)	ISTAT
Murders (per 100,000 residents)	ISTAT
Distraints (per 1,000 residents aged 18 or more)	ISTAT
Exploitation-of-prostitution offenses (per 100,000 residents)	ISTAT
Protests of checks (per 1,000 residents)	ISTAT
Drug dealing offenses (per 100,000 residents)	ISTAT
Scam offenses (per 100,000 residents)	ISTAT
<b>Educational attainment:</b>	
Students repeating school year	Tuttoscuola
School dropouts	Tuttoscuola
Education level achieved	Tuttoscuola
<b>Family instability:</b>	
Divorces (per 100 marriages)	ISTAT
Separations (per 100 marriages)	ISTAT
Children in custody due to divorce (per 100 residents aged 0-17)	ISTAT
Children in custody due to separation (per 100 residents aged 0-17)	ISTAT
Separation rate of married women less than 35 years old	ISTAT
Separation rate of married women aged 35-44	ISTAT
Divorce rate of married women less than 35 years old	ISTAT
Divorce rate of married women aged 35-44	ISTAT
<b>Strong labor market:</b>	
Youth unemployment rate (age 15-24)	ISTAT
Female unemployment rate	ISTAT
Male unemployment rate	ISTAT
Long-term unemployment rate (12 months or more)	ISTAT
Youth employment rate (age 15-24)	ISTAT
Female employment rate	ISTAT
Male employment rate	ISTAT
Youth labor force participation (age 15-24)	ISTAT
Female labor force participation	ISTAT
Male labor force participation	ISTAT
Employment rate (high school diploma)	ISTAT
Employment rate (college degree or higher)	ISTAT

Table A18: Indicators used in the principal component analysis of Section 7 (part 1/5)

Variable	Source
<b>Life expectancy:</b>	
Female life expectancy at birth	ISTAT
Male life expectancy at birth	ISTAT
Female life expectancy at 65	ISTAT
Male life expectancy at 65	ISTAT
<b>Economic openness:</b>	
Trade (exports+imports)	ISTAT
Rate of inter-province mobility of resident population	ISTAT
Net inter-province migration (per 1,000 residents)	ISTAT
<b>Social capital:</b>	
Blood bags collected per resident (average within province)	GSZ (2004)
Measure of self-efficacy (average within province)	GSZ (2016)
Non-profit organizations per resident (average within province)	GSZ (2016)
Voter turnout, House of Representatives	ISTAT
<b>School quality:</b>	
School assets	Tuttoscuola
Local government spending in education	Tuttoscuola
Availability of teaching materials and technologies	Tuttoscuola
Quality of school buildings	Tuttoscuola
Students per class	Tuttoscuola
Students using canteen, school bus and other services	Tuttoscuola
Extended teaching-time availability	Tuttoscuola
Processing time of substitute teachers' rankings	Tuttoscuola
Teaching hours per class	Tuttoscuola
Share of male and young teachers	Tuttoscuola
Teachers employed under temporary contracts	Tuttoscuola
Tenure and stability of teachers' position	Tuttoscuola
INVALSI scores for primary and middle schools	Tuttoscuola
INVALSI scores for high school	Tuttoscuola
End-of-year grades at middle and high school	Tuttoscuola
High-school graduation exam	Tuttoscuola

Table A19: Indicators used in the principal component analysis of Section 7 (part 2/5)

Variable	Source
<b>Pre-school quality:</b>	
Local government spending in pre-school education	Tuttoscuola
Students per class	Tuttoscuola
Students per class at private pre-school	Tuttoscuola
Share of students using canteen	Tuttoscuola
Share of students using canteen at private pre-school	Tuttoscuola
Share of students using school bus	Tuttoscuola
Share of students using school bus at private pre-school	Tuttoscuola
Share of students participating in earlier school start time	Tuttoscuola
Share of classes with school time on Saturdays	Tuttoscuola
Share of students attending more than 40h/week at private pre-school	Tuttoscuola
Processing time of substitute teachers' rankings (band I)	Tuttoscuola
Processing time of substitute teachers' rankings (band III)	Tuttoscuola
Teaching hours per class	Tuttoscuola
Average number of pupils per special-needs teacher	Tuttoscuola
Share of male teachers	Tuttoscuola
Share of teachers below 40 years old	Tuttoscuola
Share of teachers employed under temporary contracts	Tuttoscuola
Share of teachers retiring/resigning	Tuttoscuola
Share of teachers transferred to other school/position	Tuttoscuola
<b>Primary school quality:</b>	
Local government spending in primary school education	Tuttoscuola
Students per class	Tuttoscuola
Share of classes with students of different age	Tuttoscuola
Share of primary schools with canteen	Tuttoscuola
Share of students using canteen	Tuttoscuola
Share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of students using extended teaching time	Tuttoscuola
Processing time of substitute teachers' rankings (band I)	Tuttoscuola
Processing time of substitute teachers' rankings (band III)	Tuttoscuola
Teaching hours per class	Tuttoscuola
Average number of pupils per special-needs teacher	Tuttoscuola
Share of male teachers	Tuttoscuola
Share of teachers below 40 years old	Tuttoscuola
Share of teachers employed under temporary contracts	Tuttoscuola
Share of teachers retiring/resigning	Tuttoscuola
Share of teachers transferred to other school/position	Tuttoscuola
Share of students repeating school year	Tuttoscuola

Table A20: Indicators used in the principal component analysis of Section 7 (part 3/5)

Variable	Source
<b>Middle school quality:</b>	
Local government spending in middle school education	Tuttoscuola
Students per class	Tuttoscuola
Share of students using canteen	Tuttoscuola
Share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of students using extended teaching time	Tuttoscuola
Processing time of substitute teachers' rankings (band I)	Tuttoscuola
Processing time of substitute teachers' rankings (band III)	Tuttoscuola
Teaching hours per class	Tuttoscuola
Average number of pupils per special-needs teacher	Tuttoscuola
Share of male teachers	Tuttoscuola
Share of teachers below 40 years old	Tuttoscuola
Share of teachers employed under temporary contracts	Tuttoscuola
Share of teachers retiring/resigning	Tuttoscuola
Share of teachers transferred to other school/position	Tuttoscuola
Share of students repeating school year	Tuttoscuola
<b>High school quality:</b>	
Value of books, teaching/office materials, and equipment available to high schools	Tuttoscuola
Students per class	Tuttoscuola
Share of students using canteen	Tuttoscuola
Share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of classes with extended teaching time	Tuttoscuola
Year-over-year change in share of students using extended teaching time	Tuttoscuola
Processing time of substitute teachers' rankings (band I)	Tuttoscuola
Processing time of substitute teachers' rankings (band III)	Tuttoscuola
Teaching hours per class	Tuttoscuola
Average number of pupils per special-needs teacher	Tuttoscuola
Share of male teachers	Tuttoscuola
Share of teachers below 40 years old	Tuttoscuola
Share of teachers employed under temporary contracts	Tuttoscuola
Share of teachers retiring/resigning	Tuttoscuola
Share of teachers transferred to other school/position	Tuttoscuola
Share of students repeating school year	Tuttoscuola
Share of students dropping out	Tuttoscuola
Share of students continuing to college	Tuttoscuola

Table A21: Indicators used in the principal component analysis of Section 7 (part 4/5)

Variable	Source
<b>School structures and resources:</b>	
School assets	Tuttoscuola
Local government spending in education	Tuttoscuola
Availability of teaching materials and technologies	Tuttoscuola
Quality of school buildings	Tuttoscuola
<b>School organization and services:</b>	
Students per class	Tuttoscuola
Students using canteen, school bus and other services	Tuttoscuola
Extended teaching-time availability	Tuttoscuola
Processing time of substitute teachers' rankings	Tuttoscuola
<b>Teachers' composition:</b>	
Teaching hours per class	Tuttoscuola
Share of male and young teachers	Tuttoscuola
Teachers employed under temporary contracts	Tuttoscuola
Tenure and stability of teachers' position	Tuttoscuola
<b>Students' grades and test scores:</b>	
INVALSI scores for primary and middle schools	Tuttoscuola
INVALSI scores for high school	Tuttoscuola
End-of-year grades at middle and high school	Tuttoscuola
High-school graduation exam	Tuttoscuola

Table A22: Indicators used in the principal component analysis of Section 7 (part 5/5)