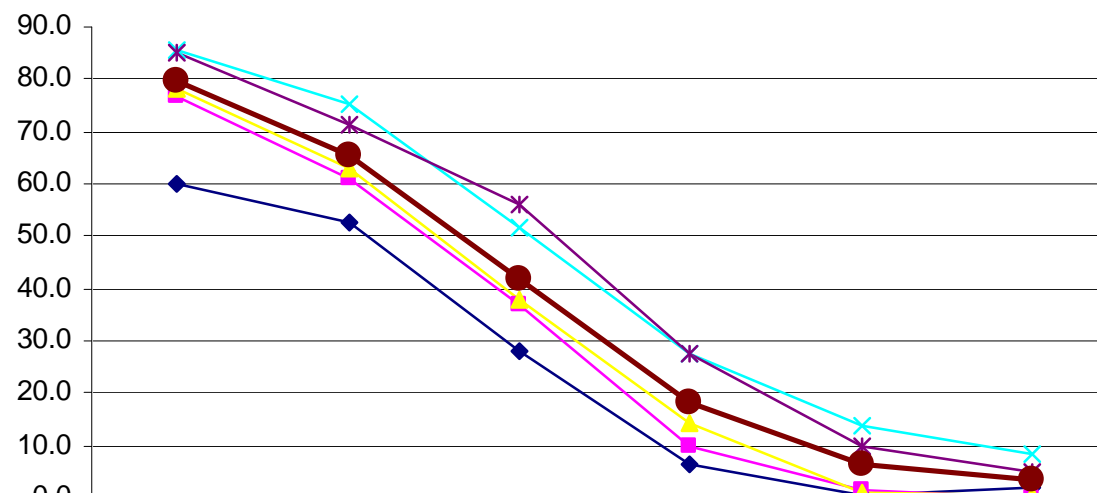


The reform of university curricula under the Bologna process: just a bubble ?

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Italy late comer in mass schooling

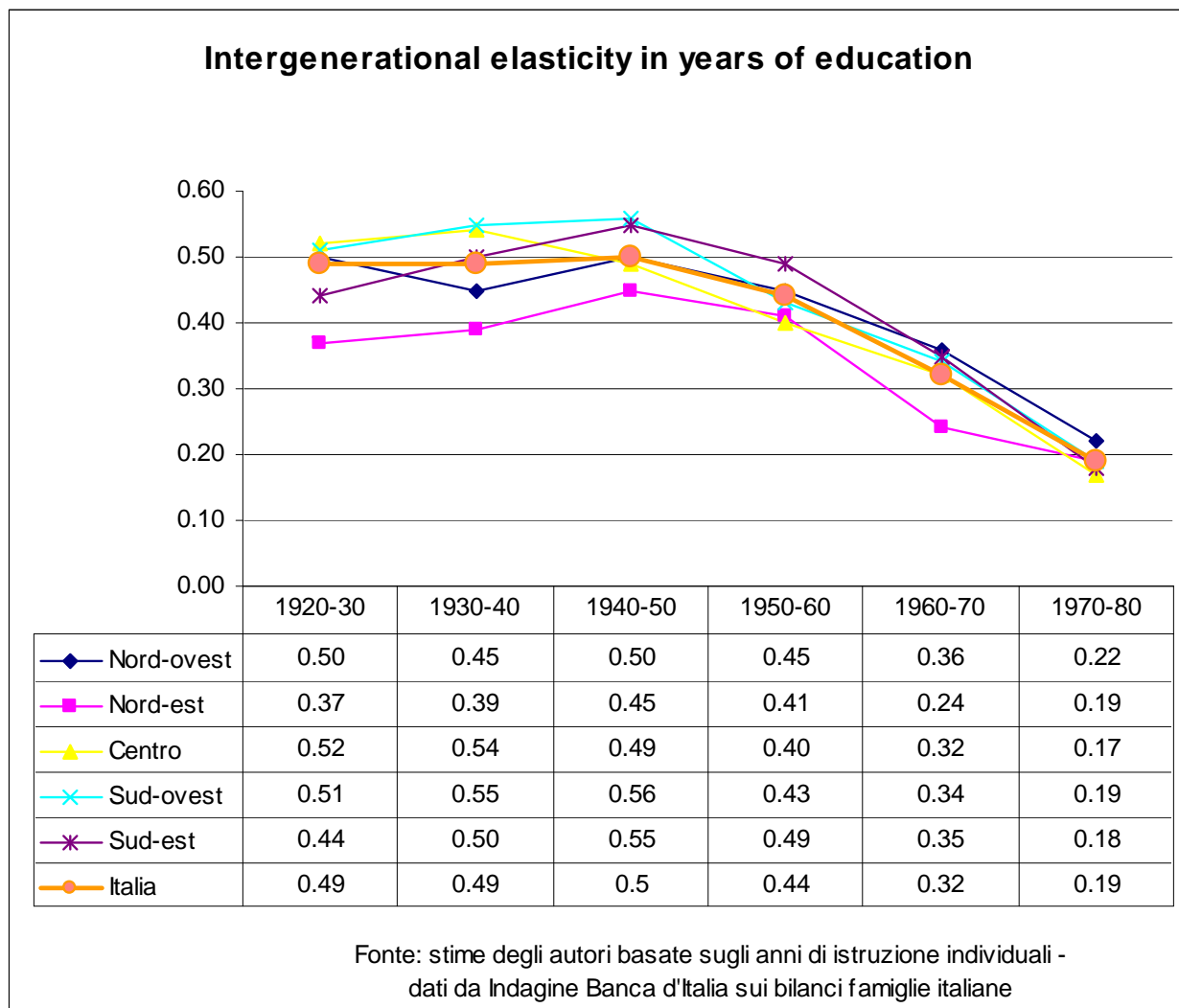
share of population with just primary education by birth cohort



	<1929	1930-39	1940-49	1950-59	1960-69	1970-79
◆ Nord-ovest	60.1	52.4	28.1	6.3	0.5	1.8
■ Nord-est	76.6	61.2	36.9	9.6	1.3	0.1
▲ Centro	78.2	62.9	37.7	14.4	1.1	0.7
× Sud-ovest	85.4	75.4	51.8	27.6	13.9	8.4
* Sud-est	85.2	71.2	55.9	27.5	10.0	4.9
● Italia	79.8	65.5	41.7	18.4	6.5	3.4

Fonte: elaborazione sui dati dell'Indagine Banca d'Italia sui Bilanci delle Famiglie italiane (2008)

As a consequence of increased schooling, intergenerational mobility expanded



Still drop-out rates and tracking allow for social selection.

1968-1977 nasce la coorte che ha meno di 30 anni nel 2008			cosa fanno nel 2008			
1974-1983	entrano 100 bambini alla scuola elementare			→ 1 esce senza alcun titolo di studio: vive di pensione non da lavoro (invalidità/reversibilità/ sociale) o fa la casalinga		
1979-1988	escono 99 bambini con licenza elementare entrano 99 bambini alla media inferiore					
1982-1991	94 completano l'obbligo e conseguono la licenza media			→ 5 escono con solo la licenza elementare: 2 lavorano come operai, 1 è disoccupato e 2 sono casalinghe		
1982-1991	15 non si iscrivono alla scuola superiore 17 si iscrivono ma poi abbandonano 9 conseguono un diploma triennale			→ 32 escono con solo la licenza media: 15 lavorano come operai, 2 come impiegati, 2 come autonomi, 6 sono disoccupati, 5 casalinghe e 1 vive di pensione non da lavoro (invalidità/reversibilità/sociale)		
1985-1994	53 conseguono un diploma di scuola media superiore			→ 9 escono con un diploma professionale (3 anni): 4 lavorano come operai, 1 come impiegato, 1 come autonomo, 1 è disoccupato e 1 è casalinga.		
1987-1996	12 conseguono diploma professionale 4-5 anni (istituto professionale; liceo artistico e istituti d'arte; magistrale; altro)	24 conseguono diploma di maturità tecnica	17 conseguono diploma di maturità liceale	→ 36 escono con un diploma maturità (5 anni): 8 operai, 14 impiegati, 1 insegnante, 1 quadro direttivo, 1 libero professionista, 2 autonomi, 3 imprenditore o socio o collabora in impresa familiare, 3 disoccupati e 3 casalinghe.		
	5 si fermano 5 si iscrivono ma poi abbandonano	16 si fermano 4 si iscrivono ma poi abbandonano	5 si fermano 1 si iscrive ma poi abbandona			
	17 conseguono un titolo universitario					
1990-1999	1 consegue dipl universitario o laurea triennale (0.5)	1 consegue dipl universitario o laurea triennale (0.5)	nessuno consegue dipl universitario o laurea triennale (0.4)	→ 17 escono con un titolo universitario (3-5 anni): 1 operaio, 6 impiegati, 2 insegnanti, 2 quadri direttivi, 1 dirigente, 2 liberi professionisti, 2 disoccupati e 1 casalinga.		
1992-2001	1 consegue laurea o laurea magistrale (1.3)	3 consegue laurea o laurea magistrale (3.1)	10 consegue laurea o laurea magistrale (9.5)			
1995-2004		nessuno consegue specializzazione post-laurea (0.3)	1 consegue specializzazione post-laurea (0.7)			

quale laurea		
4.4% matematica, fisica, chimica, biologia, scienze, farmacia	10.8% matematica, fisica, chimica, biologia, scienze, farmacia	12.1% matematica, fisica, chimica, biologia, scienze, farmacia
0.0% scienze agrarie e veterinaria	1.1% scienze agrarie e veterinaria	2.4% scienze agrarie e veterinaria
4.4% medicina e odontoiatria	1.1% medicina e odontoiatria	7.3% medicina e odontoiatria
2.2% ingegneria	14.0% ingegneria	8.5% ingegneria
2.2% architettura e urbanistica	7.5% architettura e urbanistica	3.6% architettura e urbanistica
11.1% economia e statistica	22.6% economia e statistica	9.7% economia e statistica
4.4% scienze politiche, sociologia	5.4% scienze politiche, sociologia	6.9% scienze politiche, sociologia
0.0% giurisprudenza	9.7% giurisprudenza	21.8% giurisprudenza
28.9% lettere, filosofia, lingue, pedagogia, psicologia	12.9% lettere, filosofia, lingue, pedagogia, psicologia	22.6% lettere, filosofia, lingue, pedagogia, psicologia
42.2% altro	15.1% altro	5.2% altro

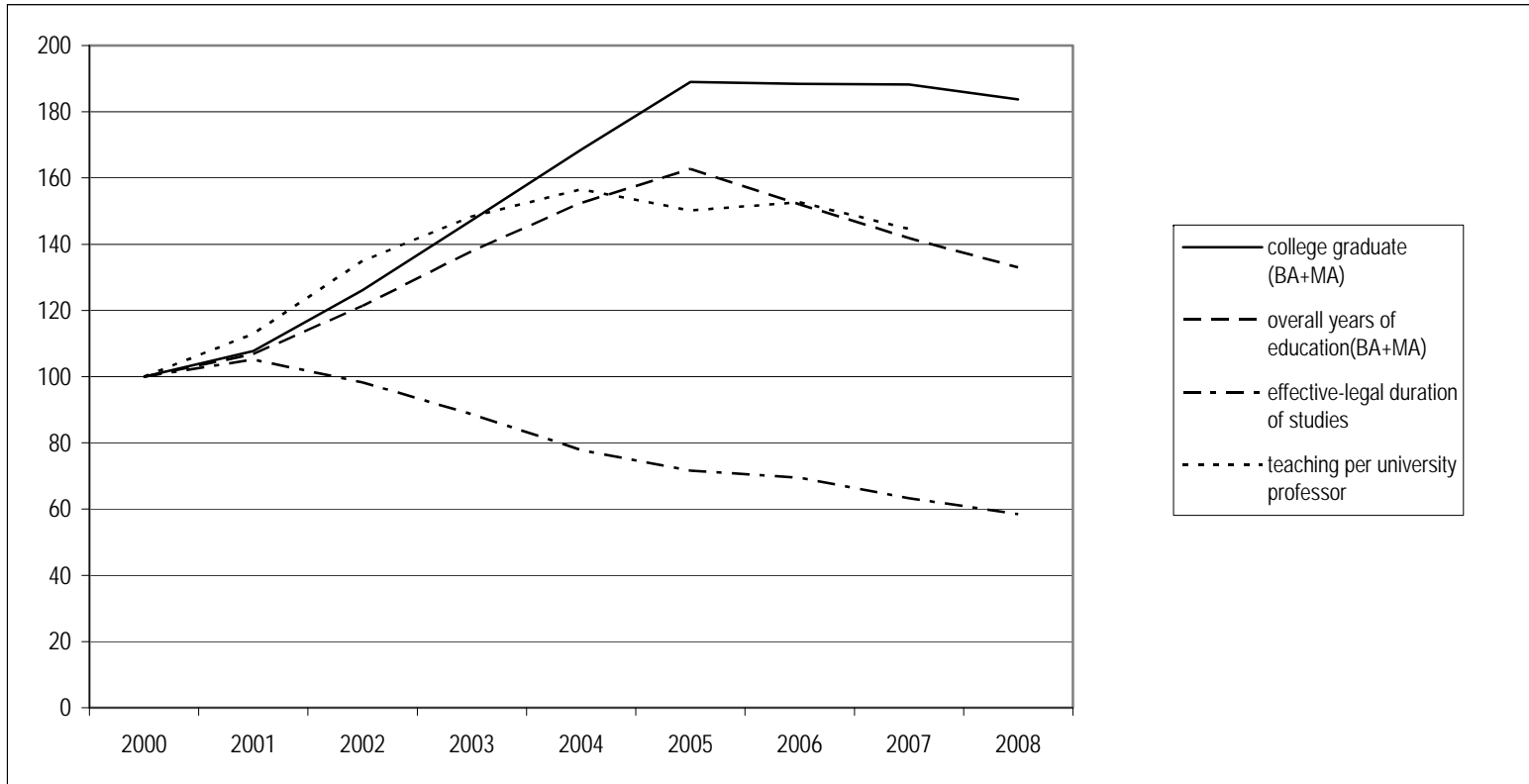
In this paper we consider the interactions of two related markets:

- a) the market for tertiary education, where families are on the demand side and universities on the supply side. The equilibrium outcome varies both by quantity (the number of graduates) and quality (whether BA or MA graduates).
- b) the labour market for graduates, where families move on the supply side and firms are on the demand side. The equilibrium outcome is now defined in terms of employment and wages for graduates.

Italy was among the forerunners in the application of the Bologna process (July 2001 – see <http://www.ehea.info>), by quickly reorganising the tertiary supply at national level.

The old university courses characterised by strong academic orientation, long duration beyond official one and high drop out rates, were replaced by 3-year BA courses followed by 2-year MA courses.

Existing evidence indicates that the change in the institutional design, offering an intermediate way out to students with a weaker background boosted college enrolment in the aftermath of the reform, creating a sort of a “bubble” in the production of human capital embedded in new graduates.



We observe an increased parental education, which makes it problematic to disentangle the effect of the reform.

Secondary school completion by parental education – Italy - 1995-2004

Highest parental educational attainment	1995	1998	2001	2004
Primary education	17.55	13.46	7.41	6.35
Lower secondary degree	34.26	35.05	32.73	31.16
Upper secondary degree	36.25	38.84	43.89	47.02
College graduate	11.93	12.65	15.96	15.47

Source: Istat survey on "Percorsi di studio e di lavoro dei diplomati"; surveys conducted in 1998, 2001, 2004, 2007 on secondary school student graduated three years earlier

Nevertheless, the reform seems associated to reducing the odds differentials in tertiary achievements for students from differently educated families.

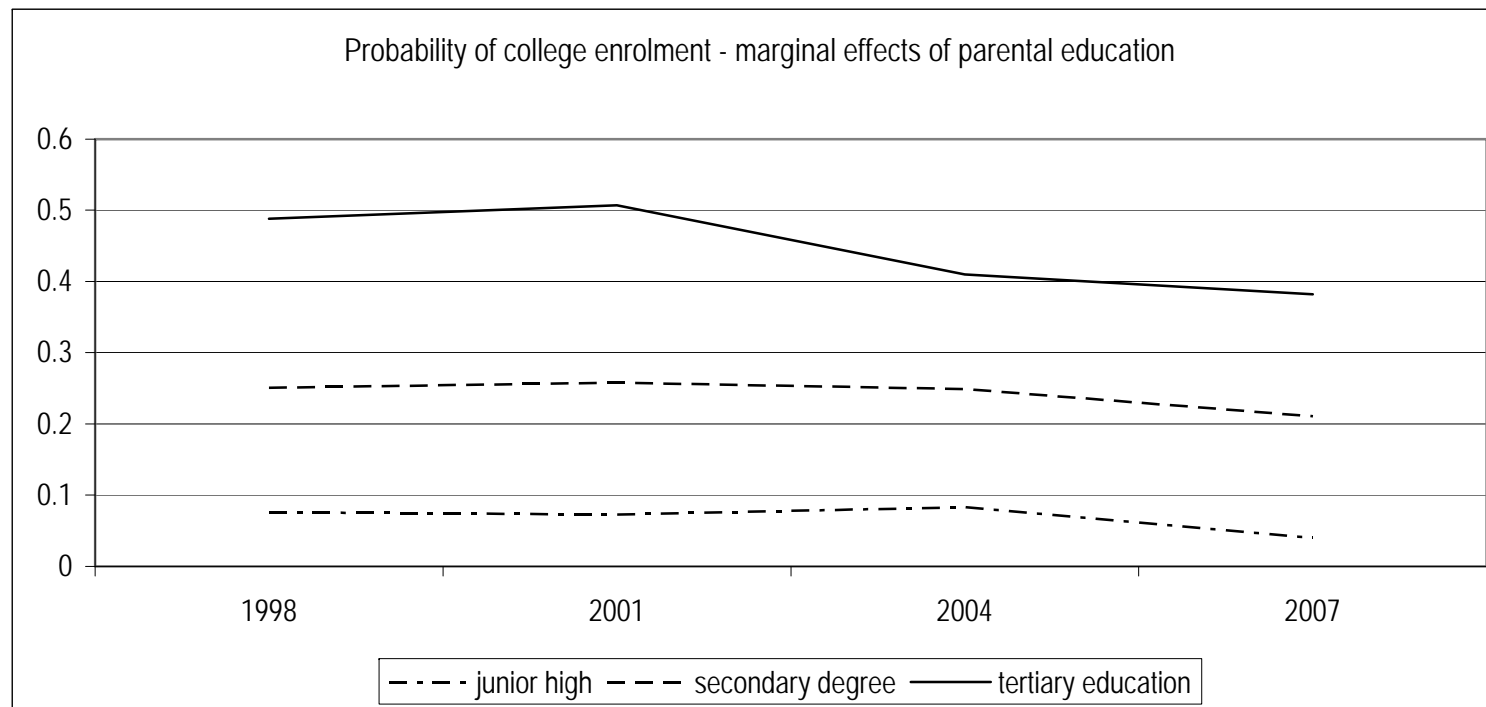
Better educated families had already saturated the possibilities of college enrolment for their offspring. As a consequence, the enrolment increase came mostly from less educated backgrounds.

Enrolment rates by parental education (including drop-out) – Italy 1995-2004

	1995	1998	2001	2004
primary or less	32.95	28.84	35.05	37.72
junior high	41.32	37.91	45.59	48.45
secondary degree	63.99	59.08	67.81	69.27
tertiary education	89.99	88.12	90.54	90.32
Total	53.88	51.26	61.74	64.03

Source: Istat survey on "Percorsi di studio e di lavoro dei diplomati"; surveys conducted in 1998, 2001, 2004, 2007 on secondary school students graduated three years earlier

Thus the reform is associated (but not necessarily caused) to raising the enrolment and BA graduation probability for students from poorer backgrounds. As such the reform increased the equality of opportunity in entering university.



Source: Istat survey on "Percorsi di studio e di lavoro dei diplomati"; surveys conducted in 1998, 2001, 2004, 2007 on secondary school graduates three years earlier
Controls include gender, age and marks obtained in previous stages

Probability of college enrolment, three years after secondary school conclusion
 – Italy 1998-2007 – ordered probit – sample weights

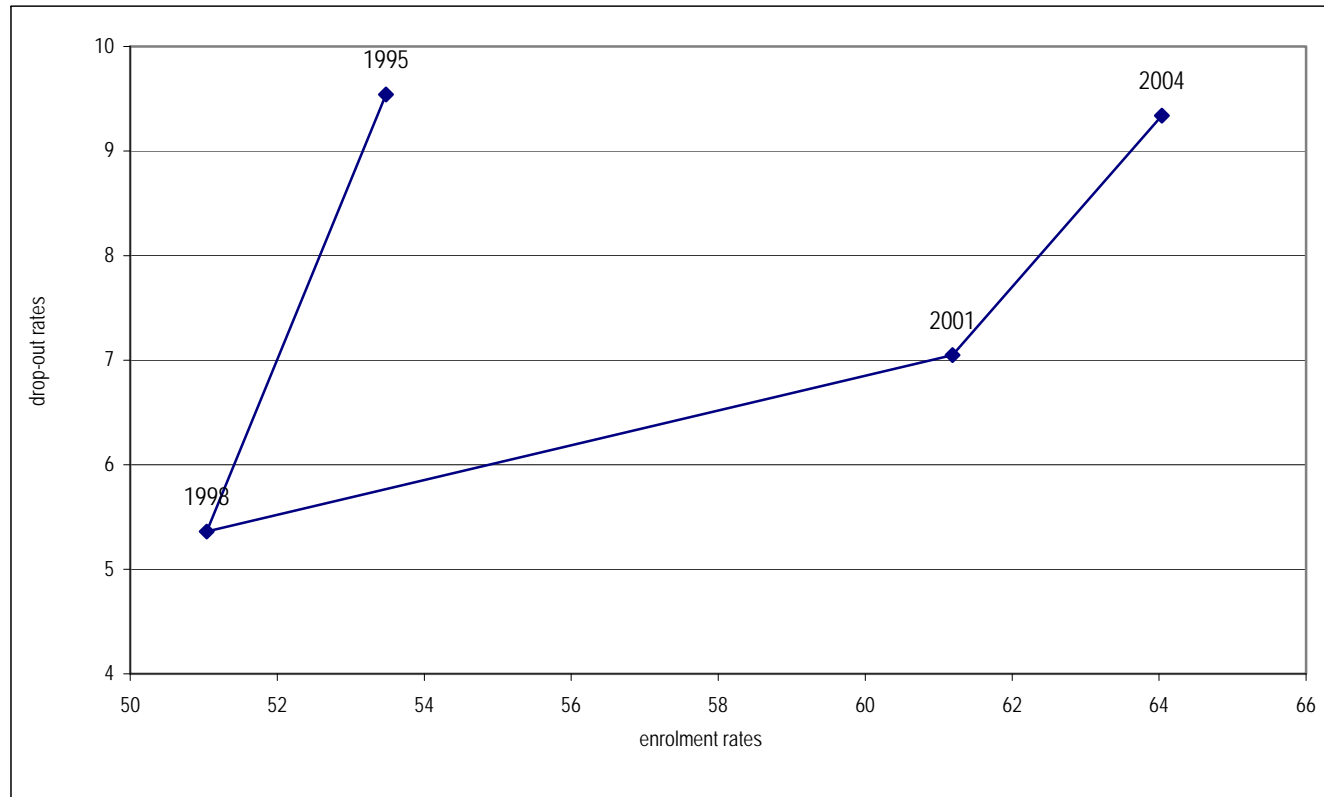
dependent variable	1998	2001	2004	2007	1998	2001	2004	2007
never enrolled	46.52	48.96	38.81	35.96	46.52	48.96	38.81	35.96
drop-out	9.54	5.36	7.05	9.34	9.54	5.36	7.05	9.34
enrolled	43.94	45.68	54.14	54.7	43.94	45.68	54.14	54.7
female	-0.013 [0.027]	0.093 [0.035]***	0.056 [0.027]**	0.16 [0.026]***	-0.164 [0.029]***	-0.074 [0.037]**	-0.121 [0.029]***	0.018 [0.029]
age	-0.05 [0.012]***	-0.238 [0.030]***	-0.349 [0.041]***	-0.356 [0.038]***	-0.04 [0.010]***	-0.106 [0.031]***	-0.162 [0.044]***	-0.257 [0.038]***
marks at exit of junior high school	0.35 [0.013]***	0.344 [0.017]***	0.358 [0.015]***	0.371 [0.014]***	0.201 [0.015]***	0.158 [0.019]***	0.2 [0.017]***	0.217 [0.015]***
number of years retine	-0.114 [0.027]***	0.044 [0.046]	0.029 [0.048]	0.053 [0.038]	-0.133 [0.027]***	-0.067 [0.049]	-0.177 [0.050]***	-0.023 [0.038]
marks at exit of junior high school	0.022 [0.002]***	0.016 [0.002]***	0.025 [0.001]***	0.023 [0.001]***	0.031 [0.002]***	0.025 [0.002]***	0.031 [0.001]***	0.028 [0.001]***
parental education=junior high	0.2 [0.039]***	0.178 [0.056]***	0.253 [0.056]***	0.151 [0.074]**	0.172 [0.040]***	0.175 [0.058]***	0.203 [0.057]***	0.155 [0.077]**
parental education=secondary degree	0.677 [0.039]***	0.673 [0.055]***	0.725 [0.054]***	0.606 [0.073]***	0.524 [0.040]***	0.566 [0.057]***	0.573 [0.056]***	0.484 [0.076]***
parental education=tertiary education	1.468 [0.058]***	1.551 [0.073]***	1.385 [0.067]***	1.245 [0.079]***	1.053 [0.063]***	1.165 [0.075]***	1.021 [0.070]***	0.909 [0.082]***
sec.school attended=technical school					0.416 [0.042]***	0.357 [0.039]***	0.552 [0.033]***	0.485 [0.032]***
sec.school attended =high school					1.345 [0.046]***	1.357 [0.046]***	1.355 [0.040]***	1.295 [0.033]***
Observations	17080	19468	19724	25880	17080	19445	19724	25880
Pseudo R-squared	0.18	0.19	0.21	0.2	0.25	0.26	0.26	0.25
Log likelihood	-339443	-294388	-313169	-330268	-313577	-269232	-291542	-307756

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

However this was a quantity effect, which was accompanied by a possible reduction in the quality of the newly produced human capital. Indirect evidence of this outcome emerges when observing the transitions from the BA to the MA level (and in the access to course which were not reformed along the line of the Bologna Process, namely Medicine and Law), which remained highly selective from a social point of view.

Behaviour of secondary school graduate, three years after graduation – Italy 1995-2004

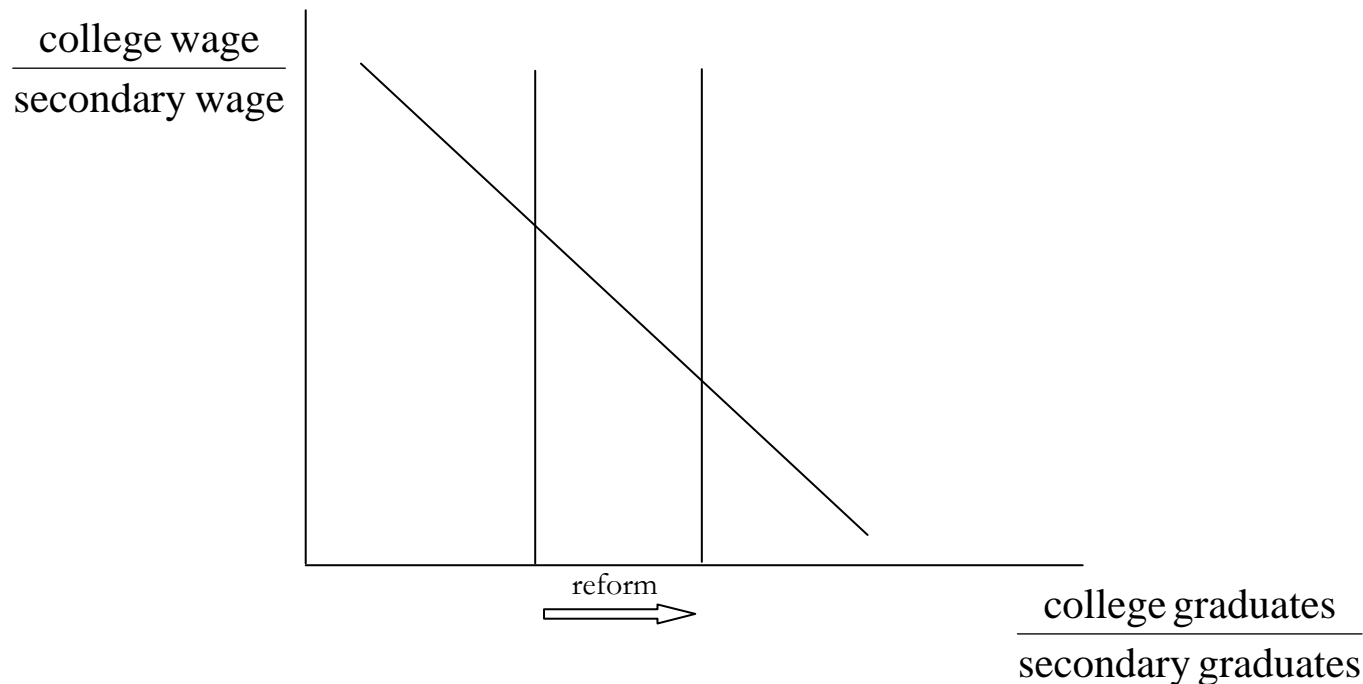


Thus the newly BA-graduates entered a labour market in weaker position, competing against old-degree graduates and MA-graduate.

They were also negatively selected, since almost two thirds of BA-graduates proceeded to the following MA-degree.

Since BA and MA degree were not sufficiently differentiated neither in terms of subjects nor in terms of training-to-work, and the firms did not perceived a substantial difference between the twos (at least so far), the BA-graduate found themselves competing in the labour market with secondary school graduates.

In a standard demand-supply framework, an increase in relative supply (associated to wage flexibility) should reduce their relative wage premium, while increasing their relative employment.



An (at least temporary) excess supply, in presence of substitutability with lower educational certificates, could have been adjusted by a decline in the wage premium. Unless demand expanded in the same direction....

The decline in the wage premium reinforced the incentive to proceed to the MA level for those students who could afford it, thus undoing most of the expected gains of the reform, in terms of overall length of the academic career.

At the same time, the disappointment associated to the decline in the wage premium, combined to the likely effect of the economic crises on family resources (in the absence of student financial aid) may explain the recent decline in the enrolment rate at the BA level.

We may resort to the most recent waves of the Bank of Italy Survey on Household Incomes and Wealth-SHIW to study these dynamics. We selected individuals aged 26-35, in order to focus on the youngest cohorts entering the labour market.

Population aged 26-35 by educational attainment – SHIW 1998-2008

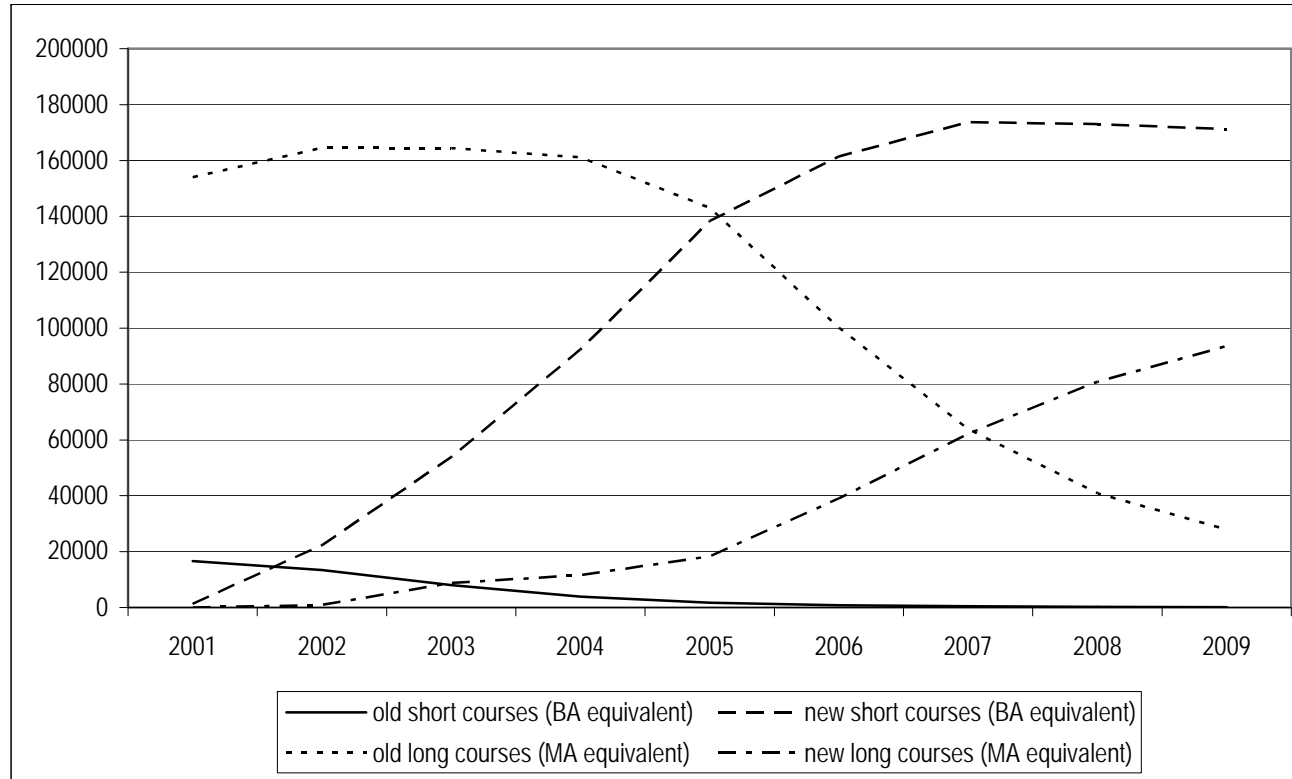
	1998	2000	2002	2004	2006	2008	
no degree	0.57	0.87	0.74	0.48	0.41	0.52	reference case
primary education (licenza elementare)	4.19	4.2	3.67	3.15	1.69	2.93	
lower secondary degree (licenza media)	32.7	32.34	31.79	31.18	30.21	25.89	
vocation degree (3 years)	6.76	8.24	7.46	7.54	8.68	9.28	
secondary school degree (maturità - 5 years)	41.59	39.01	40.91	39.95	38.89	40.42	
tertiary BA-equivalent degree (dipl. universitario/laurea triennale - 3 years)	1.39	1.6	1.22	1.48	1.74	2.41	few cases
tertiary MA-equivalent degree (laurea quadriennale/laurea magistrale - 3+2 years)	12.64	13.57	14.06	15.99	17.92	17.56	
postgraduate degree (PhD and similars)	0.17	0.17	0.15	0.24	0.46	0.99	
Total	100.00	100.00	100.00	100.00	100.00	100.00	
Observations	2960	2999	2696	2508	2188	2094	

Reform was approved in 1999 (and subsequently adjusted in 2004) – first BA graduates expected in 2003, first MA graduates expected in 2005. But transition from old system to new one was allowed and encouraged. Implementation was country-wide, with a delay of at maximum of 1 year.

year	old system (vecchio ordinamento)				new system (nuovo ordinamento)				Overall total
	4-to-6-year old degrees (lauree quadriennali)	3-year BA degrees (diplomi universitari)	2-year old degrees (scuole dirette a fini speciali)	Total graduates old system (vecchio ordinamento)	3-year BA (lauree triennali)	2-year MA (lauree specialistiche)	4-to-6-year reformed old degrees (lauree specialistiche a ciclo unico)*	Total graduates new system (nuovo ordinamento)	
2001	153.976	16.201	355	170.532	1.267	1	6	1.274	171.806
2002	164.531	13.012	355	177.898	22.304	99	817	23.220	201.118
2003	164.375	7.800	221	172.396	53.747	2.971	5.825	62.543	234.939
2004	161.050	3.829	92	164.971	92.304	4.247	7.299	103.850	268.821
2005	142.993	1.625	64	144.682	138.307	10.454	7.855	156.616	301.298
2006	100.078	784	26	100.888	161.445	29.620	9.423	200.488	301.376
2007	63.864	433	13	64.310	173.671	50.538	11.616	235.825	300.135
2008	40.864	224	2	41.090	173.054	65.411	15.422	253.887	294.977
2009	27.882	129	4	28.015	171.208	74.090	19.485	264.783	292.798

* Medical school, Law, Veterinary science – Source: CNVSU, 11th report on Italian university

Impossible to identify geographical or temporal discontinuities to be exploited for causal analysis.



Short courses (BA equivalent) from the new system outdid equivalent courses almost immediately in 2001, while it took 7 years to achieve the same with respect to long courses (MA equivalent) in 2008.

Given the heterogeneity in labour force participation, we study labour market return by modelling self-selection into employment (including self-employed) and measuring impact onto labour earnings (including income from self-employed, converting negative values into zero).

employment rates - pop 26-35

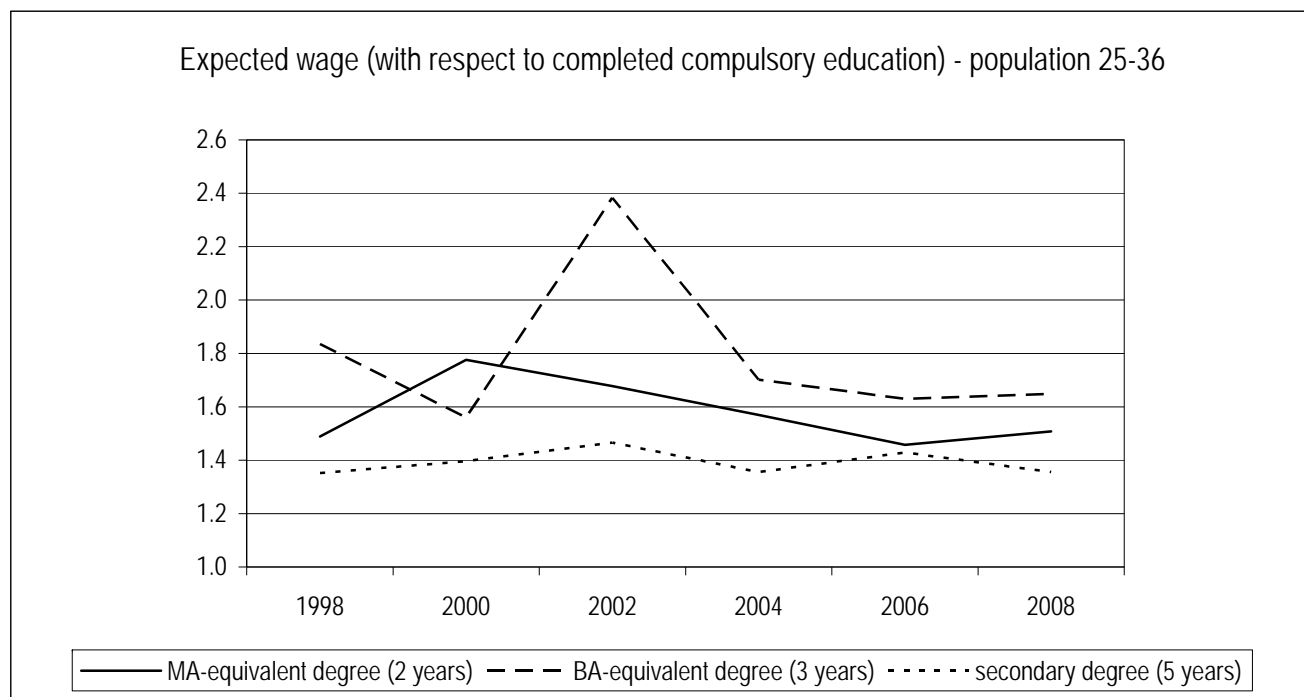
	1998	2000	2002	2004	2006	2008
vocation degree (3 years)	77.50	79.84	84.58	80.63	79.9	79.59
secondary school degree (maturità - 5 years)	65.42	66.47	68.47	71.12	73.48	73.07
tertiary BA-equivalent degree (dipl. universitario/laurea triennale - 3 years)	88.10	79.17	84.85	73.68	81.58	58.82
tertiary MA-equivalent degree (laurea quadriennale/laurea magistrale - 3+2 years)	62.43	68.6	66.23	67.08	69.75	68.19
entire population	63.50	65.5	67.07	67.74	70.19	68.29

Heckman selection into employment and return to education – Italy – population 26-35 – sample weights

	1998		2000		2002		2004		2006		2008	
	log(earnings)	employed	log(earnings)	employed	log(earnings)	employed	log(earnings)	employed	log(earnings)	employed	log(earnings)	employed
female	0.093 [0.045]**	-0.653 [0.070]***	-0.04 [0.035]	-0.536 [0.074]***	0.006 [0.037]	-0.685 [0.077]***	-0.044 [0.040]	-0.53 [0.089]***	-0.066 [0.035]*	-0.564 [0.082]***	-0.041 [0.041]	-0.619 [0.089]***
age	0.013 [0.007]*	0.044 [0.012]***	0.018 [0.005]***	0.039 [0.012]***	0.011 [0.006]*	0.057 [0.012]***	0.013 [0.007]*	0.059 [0.014]***	0.026 [0.006]***	0.037 [0.014]***	0.006 [0.007]	0.065 [0.014]***
part-time	-0.629 [0.064]***		-0.567 [0.057]***		-0.694 [0.054]***		-0.533 [0.066]***		-0.57 [0.044]***		-0.494 [0.062]***	
vocation degree (3 years)	0.037 [0.063]	0.335 [0.139]**	0.003 [0.059]	0.438 [0.134]***	-0.092 [0.059]	0.629 [0.153]***	0.06 [0.059]	0.331 [0.156]**	0.037 [0.045]	0.221 [0.123]*	0.016 [0.074]	0.331 [0.146]**
secondary school degree (maturità – 5 years)	0.1 [0.049]**	0.229 [0.074]***	0.103 [0.039]***	0.266 [0.077]***	0.109 [0.039]***	0.322 [0.077]***	0.078 [0.046]*	0.258 [0.088]***	0.122 [0.039]***	0.273 [0.092]***	0.116 [0.045]***	0.215 [0.093]**
tertiary BA-equivalent degree (dipl. universitario/laurea triennale - 3 years)	-0.03 [0.133]	0.891 [0.285]***	-0.049 [0.114]	0.64 [0.288]**	0.144 [0.078]*	1.082 [0.207]***	0.171 [0.157]	0.453 [0.296]	0.163 [0.102]	0.401 [0.245]	0.158 [0.094]*	0.424 [0.257]*
tertiary MA-equivalent degree (laurea quadriennale/laurea magistrale – 3+2 years)	0.275 [0.071]***	0.168 [0.123]	0.281 [0.057]***	0.386 [0.128]***	0.141 [0.081]*	0.47 [0.129]***	0.283 [0.065]***	0.224 [0.152]	0.227 [0.058]***	0.188 [0.122]	0.246 [0.065]***	0.21 [0.137]
postgraduate degree (PhD and similars)	0.308 [0.222]	0.447 [0.390]	0.091 [0.073]	4.084 [0.461]***	-0.113 [0.091]	0.865 [0.347]**	0.88 [0.186]***	-0.537 [0.510]	0.192 [0.159]	-0.463 [0.403]	0.31 [0.284]	-0.14 [0.408]
number of children		-0.078 [0.030]***		-0.083 [0.032]**		-0.139 [0.030]***		-0.067 [0.036]*		-0.106 [0.035]***		-0.102 [0.036]***
Observations	2554	2554	2633	2633	2375	2375	2246	2246	1974	1974	1917	1917
Log likelihood	-2551.54		-2521.21		-2469.1		-2340.16		-1929		-2033.25	

Source: SHIW - Robust standard errors in brackets - * significant at 10%; ** significant at 5%; *** significant at 1%
robust weighed estimates - Selection based on regional dummies (not shown) and number children.

A concise way to visualise the return dynamics is constructing the gain on expected income, equal to $(1 + \beta_{empl}) \cdot (1 + \beta_{earn})$. Apart from initial fluctuations in BA return (due to the small sample size), there is a clear reduction in the relative gain for college graduation, irrespective from BA or MA.



But the labour market did not remained constant in the meanwhile. Significant labour legislation reforms occurred almost contemporaneously. We notice that the emergence of non standard contracts does not seem to penalise BA-graduate more than MA-graduate.

non standard labour contract share - pop 26-35

	2000	2002	2004	2006	2008
vocation degree (3 years)	7.1	7.1	8.0	14.0	22.6
secondary school degree (maturità - 5 years)	11.66	10.3	13.2	15.2	13.6
tertiary BA-equivalent degree (dipl. universitario/laurea triennale - 3 years)	18.18	17.4	20.0	28.0	26.9
tertiary MA-equivalent degree (laurea quadriennale/laurea magistrale - 3+2 years)	22.43	21.2	25.2	30.5	32.9
entire population	14.66	13.07	14.86	18.76	20.31

However looking at multivariate analysis coefficient, university degrees seemed to protect against precariousness at start, but later on they followed the general trend.

Ordered probit estimates for non standard labour contracts – Italy - population 26-35 – sample weights

distribution of the dependent variable	2000	2002	2004	2006	2008
temporary work agency	1.23	0.86	0.89	1.94	2.44
temporary contract	13.44	12.21	13.97	16.82	17.87
open-end contract	85.34	86.93	85.14	81.24	79.69
vocation degree (3 years)	0.423 [0.206]**	0.146 [0.255]	0.314 [0.222]	-0.153 [0.229]	-0.315 [0.180]*
secondary school degree (maturità – 5 years)	0.313 [0.118]***	0.248 [0.132]*	0.152 [0.127]	0.063 [0.137]	0.259 [0.137]*
tertiary BA-equivalent degree (dipl. universitario/laurea triennale - 3 years)	-0.124 [0.321]	-0.013 [0.475]	-1.06 [0.407]***	-0.648 [0.349]*	0.207 [0.371]
tertiary MA-equivalent degree (laurea quadriennale/laurea magistrale – 3+2 years)	-0.122 [0.177]	-0.429 [0.174]**	-0.239 [0.144]*	-0.228 [0.149]	-0.171 [0.159]
postgraduate degree (PhD and similars)	4.899 [0.297]***	-0.008 [0.732]	3.966 [0.209]***	-1.578 [0.398]***	1.016 [0.407]**
age	0.036 [0.017]**	0.072 [0.018]***	0.069 [0.018]***	0.079 [0.020]***	0.051 [0.019]***
female	-0.31 [0.117]***	-0.08 [0.126]	-0.074 [0.121]	-0.109 [0.116]	0.029 [0.114]
part-time	-0.987 [0.131]***	-1.067 [0.136]***	-1.157 [0.144]***	-0.842 [0.136]***	-0.877 [0.162]***
Observations	1625	1515	1460	1338	1270
Pseudo R-squared	0.22	0.19	0.21	0.13	0.11
Log likelihood	-659.08	-566.45	-585.39	-706.89	-776.2

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

An issue which remains unsolved is the perception of firms of what has changed in the human capital output of tertiary education.

If we take a given distribution of (unobservable) ability in the population (say a uniform distribution) and we suppose that human capital is formed by the combination of three elements: individual ability, time spent in education and "quality" of the educational process, we get the following expression

$$HC = \frac{\textit{ability} \cdot \textit{years}}{(1 - \textit{dropout})}$$

where the degree of selectivity is intended to capture the "quality" of the education imparted and is proxied by the (inverse of the complement of) drop-out rate.

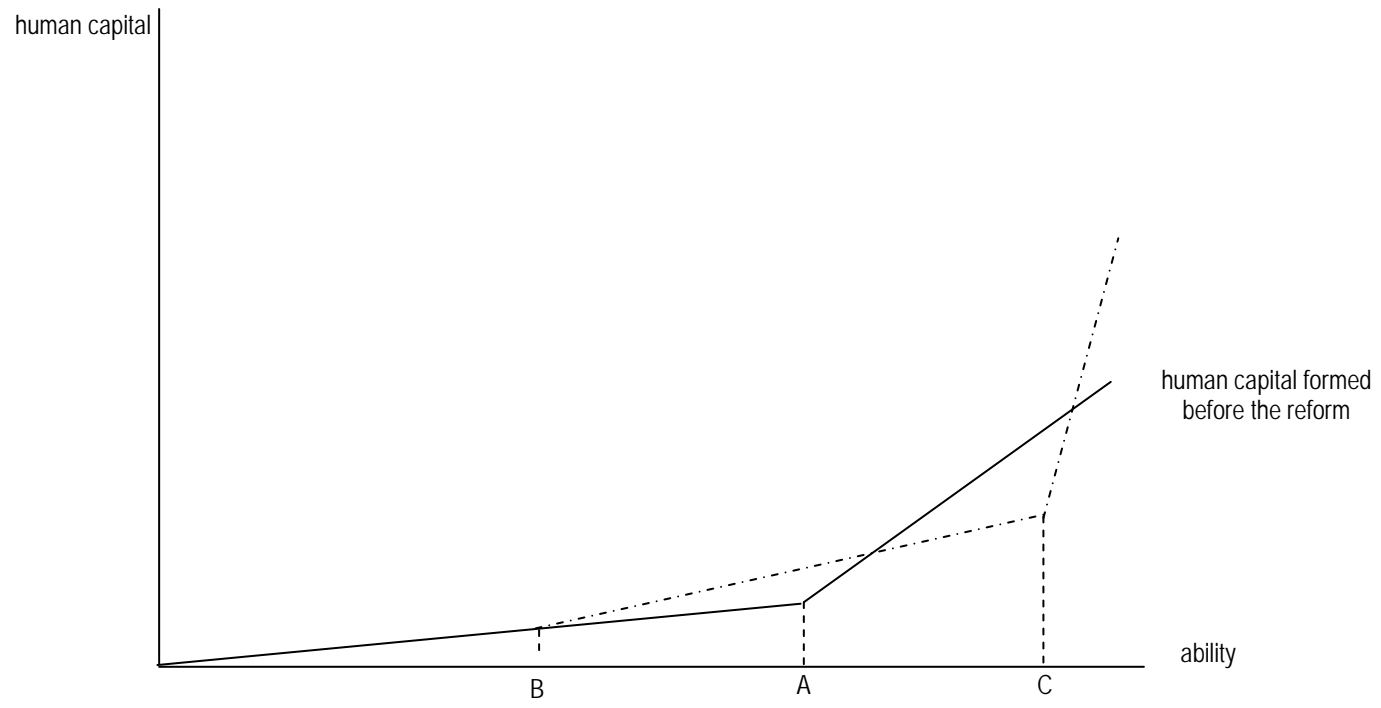
In graphical terms, the pre-reform supply of human capital which was available in the labour market is represented by the solid line: individuals with ability below the A level did not attend university, while individuals above A did attend, with a probability of success equal to $(1 - dropout)$. In expected terms, college attendance yields more human capital per unit of ability for two reasons: it lasts longer and it is more selective than secondary schools.

The reform introduced two main changes:

- i) it lowered the threshold for attending BA course (from A to B), thanks to a shorter duration and a reduction in selectivity (which ceteris paribus reduces the slope of the educational production function – see dashed line)
- ii) it introduced a second selection threshold associated to MA degrees, which consists of longer attendance (from the 4-year courses before the reform to the 3+2-year courses after it) and more stringent selectivity (which explains the steeper proportion of the dashed line).

If we interpret these line as the cumulative frequency function of skills (and wages) available in the labour market before and after the reform, we notice that the overall effect of the reform onto the accumulation of human capital may be either sign (the integrals of the two lines may be ranked in alternative ways).

Nevertheless, we should observe an increased polarisation, associated to the emergence of top rank workers (who benefited from the reform given their high endowment of ability) accompanied by low ability graduate workers, replacing pre-reform not-graduate workers in their jobs.



Tentative conclusions

- ① Reform was effective in expanding the human capital supply in Italy.
- ② This was accomplished through increased equality of opportunity in BA enrolment, despite the declining market value of this degree.
- ③ The relative return (in expected values) of university graduation is still sizeable, but is on a declining trend (→ supply is expanding beyond demand)
- ④ Firms did not appreciate the increased variety of human capital appearing in the market (see Villosio and DePaoli)
- ⑤ The increased variety accompanied by different level of selectivity in access may contribute to earnings polarisation