Inflows into and outflows from the teachers' profession in Italy.

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1 Introduction[1]

Teachers' quality and motivation are essential ingredients of students' learning[2]. Teachers' hiring and retention policies are so relevant features of the efficacy of an education system: being competitive (in terms of wages and working conditions) vis-à-vis alternative employers, screening candidates at the start and in order to maintain them in the profession are key aspects of a well functioning education system.

The Italian system is under these respects characterised by the lack of tightly enforced recruiting standards and by the paucity of career's rewards, as teachers' wages are relatively low and increase over time only mildly and in relation just to seniority, with no much factual assessment of teachers' quality and behaviour. Widespread is the feeling that low quality teachers may easily hide into the system, while individuals with better outside alternatives – a feature to some extent correlated to their quality as teachers – are more likely to leave the profession. On the other hand, precisely because of the paucity of financial career's rewards, the ones who remain in the profession could be the ones more specifically motivated to the profession as such. Yet, the specific features of the teachers' profession particularly appreciated and motivating people to choose it are not necessarily those leading to a better performance as a teacher: the just released 2008 OECD Teaching and Learning Teaching Survey for instance show that becoming a fully protected permanent employee, albeit in Italy reaching such a target takes a long interim period, is a particularly appreciated feature, being tenured being seen as a recognition of an individual's underlying value.

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[2] Such a claim has been increasingly corroborated by formal empirical econometric evidence. For example Aaronson et al. (2007) find that, among Chicago primary public schools' pupils, a standard deviation in teachers' effectiveness – as measured by the average change in the tests results of the students they were teaching at – equals one fifth of the average change associated with one additional year of schooling. Much less clear is which teachers' features drive these results; so to speak it is unclear to what extent one can be trained in order to become a good teacher or, besides the knowledge of the subject to be taught, personal psychological characteristics are the key ingredients of good teachers. To date the evidence is mixed: for instance, the already cited paper by Aaronson et al. (2007) does not find strong links between effectiveness and observable traits, including the credentials used (in the environment there studied) for selecting and paying the teachers; on the other hand Clotfelter et al. (2007) – using North Carolina data – show that teachers' experience (at least up to a few years of experience) and quality (as measured by the tests teachers themselves took while graduating) matter.

These dilemmas have been already discussed by Barbieri, Cipollone and Sestito (2008). Based upon a stylised description of teachers' career in Italy, they construct some simple indicators of teachers' motivation and satisfaction and correlate them to schools' performance. Moving along the same lines, Cipollone, Montanaro and Sestito (2009) try to identify the causal effect of those indicators upon schools' value added.

In a paper under many respects companion to the present one, Barbieri, Rossetti and Sestito (2009) – BRS hereafter – analyse the determinants of the mobility of teachers within the school system – such a mobility being the only career's opportunity for teachers remaining into the profession. Most specifically BRS look at the characteristics of the schools attracting teachers, showing that teachers progressively try to reach "easy-to-teach" schools.

In this paper we instead focus upon the inflows into and outflows from the teachers' profession. We analyse the degree of insularity of the teachers profession in Italy. So doing we also provide some quantitative underpinnings for the work by BRS, who have considered only the mobility within the profession by those tenured teachers who may decide to move from one school to another. Our results indeed show that most of the entrances and exits from the profession take place at the very early stages of the career: once having been tenured (after a lengthy permanence into precarious job positions), teachers are rather unlikely to leave the profession. Besides that we analyse the determinants of inflows into and outflows from the profession.

Ideally, we would like to identify the impact of "quality" and "motivation" upon the propensity to enter into the profession and the retention probability. In practice, we can look at individual characteristics and circumstances somehow related to workers' quality and motivation. So, the empirical econometric estimates we are going to present, besides providing a reasoned summary of the empirical evidence, do not test any specific theoretical construct.

The paper is organised as follows. In the next section we provide a short summary of the institutional set-up and of the data we are going to use. We then present a description of the main features of teachers' inflows and outflows. The fourth and fifth sections present some simple econometric estimates of the probability respectively of staying over and entering into the teacher profession. A final section concludes.

2 The teachers' career in Italy

Italy has many teachers – as its students-to-teacher ratio is among the lowest across OECD countries (10,7 in the average of primary and secondary schools vis-à-vis OECD averages of 15,1 and 13,1 respectively in primary and secondary education) – with an overrepresentation among them of females (80%), elderly people (the modal age group is 50-54 years) and individuals born in the South

(55%). The age composition is also related to the fact that during the last two decades newly tenured assignments have been rationed as only part of the retirement flow of tenured teachers has been replaced. This partial replacement policy, only quite recently coupled by more explicit attempts to cut down the number of positions to be filled, has implied that an increasing share of teachers are hired on temporary terms. So, while tenured teachers have a life-time contract[3], many positions, even if expected to last forever, are staffed through yearly contracts (hereafter dubbed TL teachers).

More precisely, TL teachers may be hired through 2 different contracts:

- annual replacement by which a teacher is appointed by the provincial office of the Ministry for the whole school year (until August 30th);
- fixed-term replacement until the end of teaching activities by which a teacher is appointed by the provincial office of the Ministry until June 30th.

Both cover positions for which either no tenured teacher has been appointed – as said, the number of tenured teachers is less than the number of positions known to have to be filled – or there is a tenured teacher who is known to be absent (for instance because of a maternity leave)[4]. These positions may emerge and may be known either well in advance or at the very beginning of the school year, in this last case the second form of TL appointment being used. Both types of TL contracts are filled by scrolling provincial lists of candidates, the same lists also used in order to allocate tenured appointments.

On top of these TL contracts, there may also be short fixed-term contracts (TS hereafter) entrusted directly by school principals in order to replace (either tenured or TL) teachers temporarily absent. The duration of the contract can vary from few days[5] to several months, depending on the length of the absence. When hiring people for a TS position, school principals have to use internal school lists based upon the same score system used for the provincial lists; these lists are however arranged directly by the individual schools. More specifically, not all aspirant teachers enrol into them and in principle an individual may enrol in a maximum of 20 schools' lists. This means that there is no perfect overlap between the pool of those getting TS positions and the pool of those getting TL and tenured positions.

On the contrary, all individuals wishing a tenured position have to enrol to the provincial lists granting access to both tenured and TL positions. They actually do it whenever allowed to. Enrolment is only for people with a relevant qualification to teach, while no such a requirement is present for TS positions. As a matter of fact, relevant qualification during the period here examined meant that teachers of pre-primary and primary schools had to obtain a tertiary degree in primary education sciences, while teachers of lower and upper secondary schools had, on top of a relevant field tertiary

[3] In the event an individual school is cutting down the number of positions to be filled, they get a preferential access to the still available positions either there, if they wish, or in other schools. The fact that many positions are filled only by untenured teachers so strengthens the employment protection of the tenured ones.

[4] Actually even an already appointed TL teacher known to be absent may have to be replaced.

[5] According to the new regulations about temporary jobs, TS teachers are now hired to substitute absent colleagues even for one day (Ministerial Decree n.131, 13 June 2007).

degree, to obtain a specific post tertiary certificate (SSIS), specifically created at the end of the 1990s[6]. Both courses had a limited yearly intake. Enrolment to the provincial lists may only happen when the lists are open. Since 2008 the lists have been "closed", banning new entries into the lists (until a given province*subject field list has been reopened because all candidates have been exhausted); correspondingly, entrances to the SSIS have been suspended as well.

In late 2008 there were 336.337 individuals enrolled into these provincial lists. Since 2007, people may enrol only in one province[7] but they may still enrol in more than one field (provided they have the relevant qualifications). On average, each individual had 1,7 applications, and so there were 583.625 applications. Not necessarily the ones queuing up for a tenured position are unemployed. Besides the ones who had a TL appointment (in late 2008 141,000 individuals, 42% of the total), there were 72.000 individuals (21%) who already had a tenured position somewhere else (in another province or another subject field). Given the lack of overlap between the process through which people get TS appointments and the provincial lists, it is unknown how many of the remaining ones (and for what amount of time) were employed as TS teachers. Also unknown is to what extent the ones still remaining are employed elsewhere. The data we are going to use in the following will provide for a description of the transitions between the different teachers' contracts and other labour market positions, but are not capable to provide information about the provincial lists here described.

Once an individual is in the provincial lists, his or her position is regulated by accumulation of actual teaching experience (both TL and TS appointements). The lists are periodically updated taking on board the new enrolments (whenever allowed to). The new ranking is prepared on the basis of service certificates (including the ones related to the TS appointments, even very short ones, above mentioned) and relevant diplomas obtained during the freeze period. The likelihood of getting a tenured position is a function of the overall amount of positions to be filled by newly tenured people – an amount related to the retirement flows and the budgetary decisions about which fraction of that turnover to be replaced by tenured people – and the seniority accumulated into the list. No performance related selection criteria are used. As a matter of fact, a teacher enrolled in the lists may even refuse a TL position just waiting for a final tenure offer; the only penalty is that when the list will be updated less service certificates may be claimed for in order to advance in the list[8]. What a teacher in the lists may not refuse is a tenure offer (if he or she refuses the offer in that province*field list would be lost). In any case rejecting a tenure offer in a given province and field would not make sense as people may still maintain their position into another list (for instance in a more preferred field); moreover, getting a tenured position means having (albeit not immediately) a preferential access to

[6] Teachers already possessing a relevant qualification had not to go through this process and were generally speaking, because of the seniority system shaping the provincial lists, the firsts in the lists.

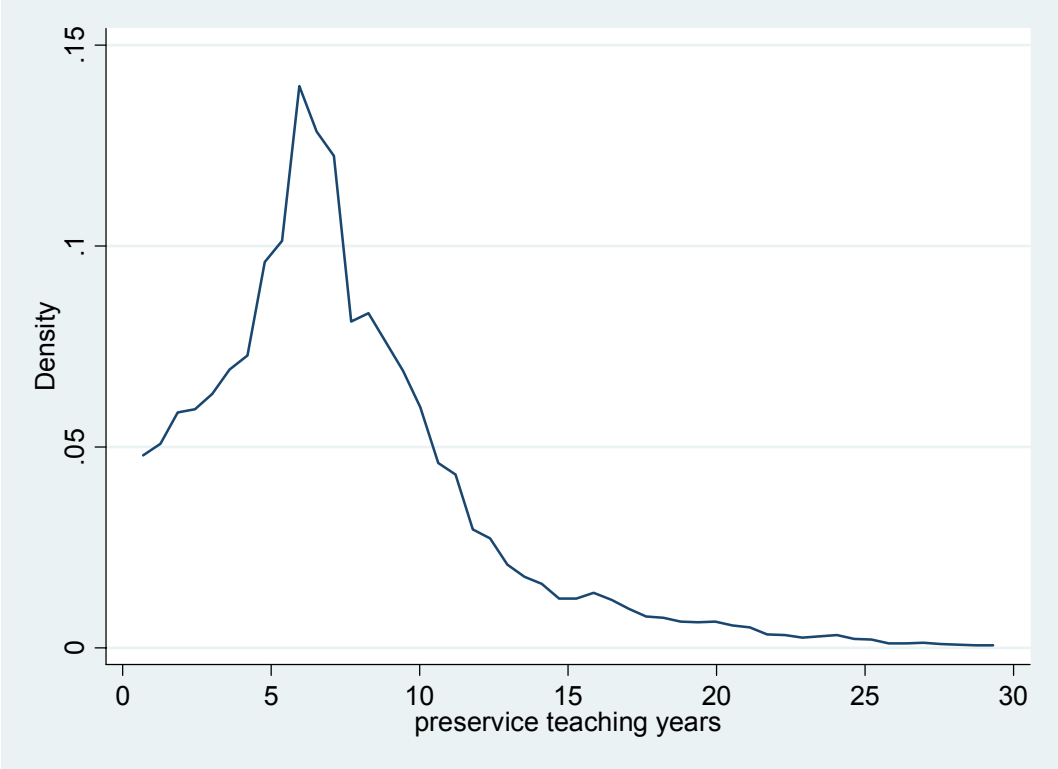
[7] In 2009, when the lists will be updated, people will be allowed to switch to a different province but in such a case they would be put at the end of the list.

[8] All temporary contracts, both TS and TL, enable teachers to accumulate points so as to improve their position in the provincial lists. The only difference is that TS appointments last less and provide for a number of points which is proportionally scaled back.

alternative locations into the system. This indeed is the main source of the large turnover of tenured teachers within the system whose drivers are analyzed by BRS.

The implications of this system is that most of selection taking place in order to get a tenured position is the self-selection of candidates possibly discouraged by the lengthiness of the process itself. Provided one is motivated and not pulled off by better alternatives, becoming a (tenured) teacher is just a matter of time. The time quite often is a very long time. On average, newly tenured teachers (considering the year 2007/08 inflow) were 41 years old and had accumulated 6 years of (possibly discontinous spells of) experience as either TL or TS teachers (Chart. 1). The supply and demand imbalances at geographical level implies that the time-to-tenure is quite differentiated over the country: newly tenured teachers in the South are on average 42 years old while those in the North are 2 years younger. As we will see later on, while very few tenured teachers leave the profession after such a lengthy and burdensome process, many aspirant teachers may decide to leave altogether the system.

Chart 1 – Years of work with temporary assignments by newly tenured teachers (2007/2008 inflow)



Notice that while on either a TL or a TS appointment teachers do not get any seniority related pay rise. The previous years of work as a (temporary) teacher will be however recognized later on when if and when they get a tenured position. Actually this postponement produces a discrete jump in the wage profile of teachers.

After having been tenured, wage advances, although not very sizable, are entirely related to seniority progression. Teachers have regular increases in the basic salary over many years and they have to wait for 35 years of service to reach their top. The economic progression is ruled by 7 seniority brackets distributed as follows: 0-2 years of service, 3-8, 9-14, 15-20, 21-27, 28-34 and 35 years. The top-to-bottom difference is up to 57% vis-à-vis average OECD figures of about 70% (table 1).

Table 1 – Teachers' salaries (2006)

	Top career to starting salary ratios			Years needed in order to reach the top salary (lower secondary education)
	Primary education	Lower secondary education	Upper secondary education	
Italy	1.47	1.50	1.57	35
OECD average	*1.71*	*1.71*	*1.72*	*24*
EU 19 average	*1.67*	*1.66*	*1.72*	*26*

At the school level there are also some additional components of the wage package, as there is a component of accessory compensation related to additional performance, as well as to the amount of the fund set aside to finance such activities, determined by the collective labour agreement. They are however of less relevance[9].

While some possible career advances arise from the chance of becoming a school principal, to a large extent the most important aspect of the career's prospects opened up after having been tenured is the enhanced possibility of moving across different schools. Individuals just tenured have to accept whichever school is offered to them[10]. As a consequence newly tenured teachers often work in undesired environments, from where they attempt to depart from as soon as they are allowed to. As better explained by BRS, the year after having been tenured[11] they start trying to move around in order to get their most desired geographical location and their most preferred school (in terms of subject taught, features of the school environment and so on). So teachers progressively (try to) move towards their most desired location. Every year about 150,000 tenured teachers (20% of the total) fill in a mobility request and 60% actually move. From our point of view here what matters is that the chances of getting what desired, or at least of getting something close to it (for instance getting in the

[9] As a rule, the available fund for accessory compensation consists of resources at school level that are divided among teachers on the basis of the annual integrative bargaining. The fund includes the payment for the activation of the instrumental functions (to the Plan for the educational offer), as well as the "fondo d'istituto" or residual funds of the previous years. Most of the resources come from the Ministry, although some contributions can be provided also by Regions, local bodies and private organisations for the implementation of projects supported by funds with specific allocations.

[10] As already said, they may remain enrolled into another list in order to enhance their chances of getting what desired: in late 2008 21% of the people enrolled into the lists were already tenured somewhere else.

[11] New legislation has limited the geographical radius of mobility immediately after having been tenured. According to Law n. 124/1999 the teacher just tenured may not move out of the province where he or she got a permanent position during the first three years of tenureship. This is the result of a gradually introduction of constraints, while before 2000 he could ask to go even in another region after the first year.

desired province and town, even if not yet in the desired neighbourhood or in the desired individual school), are governed by seniority rules.

The whole process resembles a musical chair game in three stages, in each of which seniority, with no role for the assessment of the actual performance, is the driver: before the beginning of the new school year some tenured teachers retire leaving some positions to be filled by the tenured teachers whishing to move; after this process has been settled, the newly tenured appointments are made; finally, during the early weeks and months of the new school year the positions left vacant (and those for which a tenured teacher is know to be absent over the forthcoming year) are filled by TL appointments. More continuously over the school year, temporary absences are replaced by TS appointments. Seniority in the provincial lists dictates the chances of getting a tenured position (with a life-contract) or at least a TL appointment (with an yearly contract). Later on, seniority as a tenured teacher enhances the chances to get what really desired (in terms of school's location and identity).

3 The data used

Administrative data about teachers do not include the TS group above described. As said, these positions often are the first appearance into the profession; TS teachers are also the ones more likely to leave the profession as they are not yet inserted into the seniority mechanisms above described. So administrative data are likely to miss most of the inflows into and outflows from the profession which are the focus of this paper. Moreover, even when a transition into or from the profession is identified, administrative data would not allow to identify the labour market status of those either entering into or leaving the profession[12].

It is for these reasons that hereafter we resort to the Labour Force Survey (LFS). Using its longitudinal sub-sample, we identify the previous and subsequent labour market status of people entering into and exiting from the teachers' profession. More specifically we look at the 12 months transitions computed using the first quarter surveys[13]. Given the many changes undertaken by the LFS

[12] Furthermore, administrative data provide information about very few personal characteristics, as for instance one does not even know the educational attainment of individual teachers. On the other hand they provide more precise measures of turnover and tenure and allow to track the schools (and schools' features) where people move from and to. Moreover, the specific data about desired moves by tenured teachers allow to analyze the desired moves by individuals, singling out the workers' side of the mobility processes. These are the features mostly exploited by BRS.

[13] We focus upon the first quarter of the year as this is the period in which more teachers are likely to be identified in the survey. The first quarter of the year is a period in which TL assignments are likely to have been settled. Moreover, focusing upon the first quarter we may avoid the problems related to the fact that in some months and weeks of the year (particularly over the june-august period) many temporary teachers contracts are not active. Notice that the total number of teachers identified in the LFS in the first quarter is lower than the total number of people having had (at least) a weekly teaching spell over the school year (as first quarter data do not include people who have had TS assignments over other periods of the year) and higher than the average

in 2004, we focus only upon the currently conducted survey (the so called *Rilevazione Continua sulle Forze di Lavoro*, RCFL) and we construct four yearly panels: 2004-2005, 2005-2006, 2006-2007 and 2007-2008. Dubbing t the first date and t+1 the second date of each of the four panels, we look at either the status in t+1 of those identified as teachers in t or to the status in t of those identified as teachers in t+1. In the latter case we also consider the status in period t-1 as retrospectively recollected by the respondents in the survey at time t; doing so we also restrict our attention to entrances into the teachers' profession (occurred over the t/t+1 interval) of individuals not working in period t-1, somehow netting out from the short term transitions into and out from the teachers' profession which are likely to take place given the precariousness of the early steps of the teachers' career[14].

The first step of our analysis is the identification of teachers in the cross sections at time t and t+1. We consider employed as a teacher those people working – as customarily identified in the LFS frame according to what done in the survey's reference week - whose main job description belongs to the appropriate ISCO codes[15]. The distinction according to the type of contract - between tenured, temporary long (TL) and temporary short (TS) – is also made using the LFS information. Temporary teachers are those who state their contract is temporary (according to a specific question posed to all employees about the nature of their job). The distinction between TL and TS is based upon the duration of the temporary contract itself: the selected cut-off point is 6 months as the yearly contracts of TL teachers may include both hires made on an annual basis (from 1st September to 31st August) and hires until June, which is the final month of teaching duties[16].

Tab. 2 provides a breakdown of the whole teachers sample (lumping together the four panels and considering the teachers in period t). Notice that more than 18% of the teachers are temporary ones. Of these (a bit less than) one over four are TS. Comparing our data to the administrative data the

number of full time equivalent contracts over the year (as in the latter TS teachers would be computed only for a fraction of the year).

[14] Notice that it is still possible that some people started their teachers' career in the past (say in period t-2 or earlier) having remained outside the profession (i.e. with no temporary assignment) in both t-1 and t years. Conversely, as the retrospective information collected in year t about t-1 only considers whether an individual was employed or not (in the latter case also distinguishing between inactive and job seekers, an information we do not exploit), it is possible that some of the people working in t-1 that we exclude entered into the teaching profession for the first time over the t/t+1 interval.

[15] It includes workers absent from their job position. Notice that including both teachers (either tenured or TL) who are not actually working during the week because of absence and their replacements (either TL or TS) our figure is larger than the number of job positions ("*cattedre*").

[16] There are some missing data as far as both the temporary nature of the contract and (more importantly) its breakdown between TL and TS contracts are concerned: we assigned the missing values using a two stage propensity score technique. In the first stage we estimate the probability of being a teacher on a temporary basis according to several socio economic characteristics (sex, age, title, family status and area of residence) and consider the distribution of the estimated probabilities for the whole sample. We then impute uncertain observations to the category of temporary teachers if the estimated probability for these observations fall within the 95% confidence interval calculated on temporary teachers only. We then classify the remaining individuals as having a permanent contract. On the same token, in the second stage we estimate the probability of being teacher hired on a short term basis (below 6 months) and impute uncertain observations consequently. These imputations are conducted exploiting the whole cross sections at time t and t+1, not the (approximately half) part of the sample for which there are longitudinal information.

weight of TL seems possibly underestimated (in the administrative data the TL are more than 15% of the total of tenured and TL people, while in our data they are a bit less than that). Lacking administrative data about TS we are unable to verify whether this is due to a compensating overestimation of TS positions, possibly related to the imprecision in the responses concerning the duration of on-going contract: more specifically, TL appointments made quite late over the school year might be counted as TS appointments according to our procedure[17]. Notice however that also tenured positions might be underestimated as some tenured teachers – particularly some of the 70,000 waiting for some alternative allocations and still enrolled as aspirant tenured teachers somewhere else in the system – might still qualify themselves as only temporarily engaged in their current school. In any case no full comparability with the administrative count is possible as the latter covers only (tenured and TL) positions in the State run schools, while the LFS sample also includes the (few) privately run schools.

Table 2- Composition of the teachers' sample at period t by socio-demographic characteristics

status at year t	Tenured teachers	yearly contracts teachers (TL)	Short term contracts teachers (TS)	All teachers
2004	1179	184	60	1423
2005	1227	202	67	1496
2006	1048	176	64	1288
2007	1135	214	56	1405
Living in the North	1915	301	85	2301
Living in the Center	574	125	37	736
Living in the South	2100	350	125	2575
Age<30	97	139	79	315
Age 30-40	752	382	117	1251
Age 41-50	2334	226	43	2603
Age >50	1406	29	8	1443
Female	1157	141	41	1339
Male	3432	635	206	4273
With at least a 0-12 child	1233	343	77	1653
With no degree	18010	229	105	2144
At least with a degree	2779	547	142	3468
Teaching in primary school	1757	257	100	2114
Teaching in a low secondary school	679	139	27	845
Teaching in an upper secondary school	1817	290	79	2186
Total	4589	776	247	5612

Source: our own elaborations on the RCFL

[17] As already said duration of the on-going contract is an often missing information and responses are plagued by heaping effects as the round numbers get a disproportional share of the responses.

4. Exits from and Entrances into the teachers' profession

Our focus is mostly upon the transitions taking place over the t/t+1 nterval. So we will consider the arrival status (in t+1) of the teachers identified in period t (the sample shown in table 2). Conversely we look at the sample of teachers in t+1, examining their status in t. Table 3 starts with the first exercise.

Table 3 – Destination at 12 months distance of Italian teachers (% of initial year t sample)

	Status at t+1						
status at t	Tenured	TL	TS	Other (non teaching) Jobs	Job seekers	Inactive (but not retired)	Retired
Tenured	92.3			2.9	0.0	1.5	3.2
TL	16.1	69.7	6.0	3.1	0.1	4.2	0.8
TS	5.5	25.0	42.1	13.1	3.3	11.1	0.0
All teachers	76.5	11.7	3.0	3.5	0.2	2.4	2.7

Source: our own elaborations on the RCFL

Considering the whole population of teachers, about 5% of them each year leave the labour market, becoming either temporarily inactive or permanently retiring from it as pensioners, 3.5% get another non-teaching job and the vast majority remains in the teaching profession. The unemployment status is a rather unlikely outcome as only 0.2% of those who were teachers in year t become unemployed 12 months later.

This picture is however a bit misleading as it conceals very differentiated patterns according to contractual arrangements. Tenured teachers are very unlikely to leave the profession (92.3% stay on) and those who leave mostly do so because they are retiring for age related reasons. The job protection they enjoy is reflected in the fact that practically none of them become unemployed (and very few become temporarily inactive). At the other extreme, TS teachers experience a rather high risk of leaving the profession in order to get another job (13% of them do so) and a slightly larger share of them (about 14%) become either unemployed or inactive, the latter status possibly concealing the presence of discouragement of job seeking activities. It is interesting to notice that TL teachers are more similar to tenured teachers than to TS ones: even if they do not yet enjoy the employment protection regime of the tenured teachers, 92% of them are still teaching in year t+1, although only in 1 case over 6 with the desired permanent contract. Only a few of them however become either unemployed (0.1%) or temporarily inactive (4.2%); furthermore, only a few (3%, about the same share evidenced among tenured teachers) move to alternative jobs.

Table A.1 breaks down the transition matrix in table 3 according to sex, age, areas, years and other characteristics broadly confirms this overall pattern. A feature worth noticing is the link between the different flows when comparing different years. Over time the probability of non tenured teachers to get a tenured position appears to be driven by the probability of tenured teachers to retire: for instance, the 2007/08 jump in retirement among tenured teachers (from 3.1 of the previous year to 6.4%) has an immediate impact upon the probability of TL teachers of getting a tenured position. Yet the latter is also affected by discretionary decisions, taken at the political level, about the number of precarious teachers to be "stabilized". All this factors will be taken into account when passing to the econometric estimates of next section by use of time dummies and other covariates, so we will discuss again compositional factors later on.

Before moving to the inflows into the profession, we look at similar transitions matrixes computed for other occupational groups. Table 4 provides a similar transition matrix for workers employed (in period t) in other branches of the public sector: the first branch includes workers in Public Administration, Defence and Compulsory Social Security (PDS) corresponding to the category 10 of the 12 branches ATECO classification; the second includes workers in Health and Social Services (HSS) which corresponds the category 11 of the ATECO classification (but for teachers). While the temporary status of workers in these two sectors may have different meanings (and origins), also in these cases we break down the whole sample according to the contractual arrangements at year t using the same statistical rules adopted for teachers. Broadly speaking it seems that teachers are much more insulated (from the outside labour market) than other public sector workers. The difference between temporary and tenured positions is also more marked in the teachers sample than in the two other public sector branches.

Table 4 – Destination at 12 months distance of other Italian public employees (% of initial year t sample)

	Status at t+1						
status at t	Tenured	TL	TS	Other Jobs	Job seekers	Inactive (but not retired)	Retired
Tenured	90.3	0.3	0.1	5.8	0.2	0.9	2.4
TL	15.1	59.8	1.9	14.2	0.0	7.3	1.7
TS	14.1	20.9	17.1	25.1	11.3	11.1	0.4
All PDS* employees	83.7	4.9	0.5	6.7	0.4	1.5	2.3
Tenured	90.2	0.5	0.2	4.8	0.2	1.8	2.2
TL	16.0	61.9	5.3	8.4	2.2	5.8	0.6
TS	12.8	29.2	25.4	10.6	9.0	12.7	0.2
All HSS** employees	78.6	8.1	2.2	5.4	0.9	2.8	1.9

(1) *Public Administration, Defence and Compulsory Social Security.*
*** Health and Other Social Services (excluding teachers)*
Source: our own elaborations on the RCFL.

Table 5 provides for a different perspective as teachers - mostly working in the public sector[18] - are compared to private sector employees. In order to take into account that teachers are mostly graduated while only a relatively small fraction of private sector's employees are graduated, we restricted the comparison to people with a tertiary degree (and so we also provide the same statistics for the teachers with a degree) as inflows into the teaching profession over our period required having a tertiary degree. In order to take into account that many job switches happens within the private sector, we also provide in this case for a further breakdown. Among the workers who had a permanent contract (equivalent to being tenured) in both year t and year t+1, we distinguish those who switched to a different employer (even if within the same broad private sector and with a new permanent contract) from those who stayed with the same employer: the former are identified as those having, in year t+1, an elapsed tenure of less than 1 year, while the latter are the remaining ones having in year t+1 an elapsed tenure of 1 year or more.

The peculiarities of teachers are in this comparison even more striking. While in the private sector also employees with a permanent contract have a significant, albeit small, risk of becoming unemployed (1.1% of them end up so), such a risk is almost inexistent for tenured teachers. On the other hand, temporary teachers have a much lower chance of getting a permanent position than temporary workers in the private sector. Furthermore, the distinction between short and long term temporary workers is almost irrelevant in the private sector, while it is a relevant feature within the teachers' sample.

Finally, we look at inflows. As an introduction to the issue we focus in table 6 upon the status (in year t) of teachers (in year t+1). The mirror image of what said about the exits is that only 4% of teachers had a non teaching position one year before: almost two thirds of them had a different job, and one third were inactive, the few ones remaining having been job seekers. Notice that a remarkable 2.5% of tenured teachers had a non teaching job one year before; while the percentages rise to 6.1 and 10.2 respectively for TL and TS, this shows that 6 out of 10 newly tenured teachers while being on the waiting lists for tenureship were not teaching the year before getting a permanent position[19]. This is not surprising as getting a tenured position – when a vacancy is made available, because some tenured teachers are retiring and at least part of these exits are going to be replaced according to a political

[18] Notice that in our teachers sample we also retained the individuals working in the (few) private schools operating in the country, as they could not have been identified with precision. Notice that however, given the fact that we dropped off the pre-primary segment of the system where private schools cover a sizable fraction of the market, very few private school's teachers are retained in our sample.

[19] These results are confirmed by the administrative data in which we more properly identify newly tenured people. At the beginning of the school year 2006/2007 the percentage of newly tenured teachers not employed as TL in the previous school year was 40%. The school year 2007/2008 showed again the same result.

decision – depends upon the seniority accumulated into the existing waiting lists, not upon the performance as a teacher the year before.

Table 5 – Destination at 12 months distance of Italian graduates: private sector employees vis-à-vis teachers (% of initial year t sample)

	Status at t+1						
status at t	Tenured	TL	TS	Other Jobs	Job seekers	Inactive (but not retired)	Retired
Tenured	92.7			2.6	0.1	1.9	2.8
TL	14.8	72.6	5.7	2.4	0.2	3.3	0.9
TS	3.8	30.0	42.5	9.6	2.9	11.2	0.0
All Teachers	75.0	14.0	3.0	2.9	0.2	2.5	2.3
	Elapsed tenure						
	>1 year | <1 year						
Tenured	85.6 | 3.3	0.9	2.1	3.3	1.1	3.2	0.5
TL	33.9	38.9	10.8	6.0	5.0	5.5	
TS	34.2	28.7	13.6	9.6	4.9	8.0	1.0
All private sector employees	82.8	4.7	3.2	3.8	1.5	3.5	0.5

Source: our own elaborations on the RCFL

Table 6 – Provenience of teachers (% of final year t+1sample)

	Status at t+1			
Status at t	Tenured	TL	TS	All teachers
Tenured teachers	92.7			74.6
TL teachers	3.0	72.1	19.0	13.9
TS teachers	0.3	8.6	44.4	3.7
Other jobs	2.5	6.1	10.2	3.4
Job seekers	0.2	2.5	7.3	0.9
Inactive	1.3	10.7	19.0	3.5
Total	100	100	100	100

Source: our own elaborations on the RCFL

As made clear by Tables 3 and 6, many of the transitions into and out of a specific contractual teaching arrangements take place within the teachers profession, as people progressively move from more precarious to more stable assignments (possibly with spells of joblessness in between them). In order to focus upon entrances into the profession, in Table 7 we exclude individuals who in time t were already teaching (either as tenured or with a temporary assignment); furthermore, we restrict our sample to relatively young people (those between 25 and 45 years old) and who already had a

tertiary degree in year t. The table further breaks down this group (25-45 years old people who were not teaching in t and who got a teaching appointment over the t/t+1 interval) according to the labour market status in t and the contractual arrangement as teacher in t+1. For each labour market status in t (employed with a permanent contract[20], being a temporary worker, being a job seeker or inactive) we also distinguish those working in t-1 from those not working in t-1 (using the recollection provided by the respondent in the time t survey). As already said, the latter group allows us to better identify new entrants into the teaching profession: by definition those who were not working in time t-1 were not teaching in t-1 and so we can exclude people who in period t were just experiencing a temporary halt to an already started teaching career. While this is only an approximation – on one hand we may overshoot our goal as some of those working in t-1 might have been employed in activities different from teaching, on the other hand our definition of new entrants might include people who already had, in period t-2 or even earlier, a teaching experience – it is the best approximation we are capable to arrive at in our source.

Table 7 Previous labour market status of people transiting into teaching over the t/t+1 interval (% of final year sample): 25-45 years old graduates

	Status at t+1			
Status at t and earlier (1)	Tenured	TL	TS	all teachers
Permanent contract in t/employed in t-1	69.31	21.86	23.10	35.00
Temporary contract in t/employed in t-1	1.24	3.31	6.65	3.44
Job seeker in t/ employed in t-1	5.57	2.61	2.12	3.31
Inactive in t/ employed in t-1	7.42	15.92	1.04	10.51
Permanent contract in t/not employed in t-1		2.45		1.27
Temporary contract in t/not employed in t-1		5.19		2.70
Job seeker in t/ not employed in t-1	3.54	12.62	17.82	11.24
Inactive in t/ not employed in t-1	12.92	36.04	49.28	32.52
employed in t-1	83.54	43.71	32.91	52.27
not employed in t-1	16.46	56.29	67.09	47.73
Total	100	100	100	100

(1) Permanent contract in t includes the self-employed. Permanent and temporary contracts in t exclude teachers in t.

Source: our own elaborations on the RCFL

Transitions into tenured positions are mostly made by individuals who were already employed in t (more than 2 over 3); an even larger percentage (83%) of those transiting to tenured positions in t+1 were employed in t-1. Quite likely, these individuals, while not teaching in t, had some teaching spells in the past. Both values shrink considerably for those transiting to untenured positions: the ones employed in t-1 are respectively 44% and 33 % of those transiting to a TL and a TS position in t+1; about 25% and 30% of those transiting respectively to a TL and a TS position in t+1 were working in t.

[20] This includes self-employment.

This confirms our idea that focusing upon individuals who were not employed in t-1 we can reduce the risk of including transitions to a teacher position which are the final stage of a longer path. While clearly reducing the inflows sample size, focusing upon individuals who were neither teaching in t nor working in t-1 allows us to focus upon truly new entrances into the profession, which we know mostly taking place through the TL and TS gates.

Table 8 presents the same data but through different lenses. We consider the probability of transiting into one of the three teaching states (tenure, TL and TS) over the t/t+1 interval for the different t and t-1 labour market states already considered. Considering all the possible starting states, transitions into tenured positions represent a sizable amount: 0.36% of individuals transit to tenured positions, 1.33% being the overall probability of getting an unqualified teacher position. If however we focus upon the individuals who were not employed in t-1 the chances of getting a tenured position shrinks to 0.23%, those of getting an unqualified teaching position increasing to 2.41%. Becoming an untenured teacher is so a likely event, worth to be studied, for these people.

Notice that for the individuals employed in t-1 – the ones we are going to exclude – getting a teacher position, both a tenured and (particularly) a TL position, is a rather likely event if they had been either inactive or job seekers in t. 8% of the individuals who were inactive in t and not employed in t-1 get a TL position in t+1 (2% get a tenured position). Excluding these inflows is a safer choice as it is quite likely that these individuals had already started a teacher career, being not teaching in t having been only a temporary halt to their teaching career. Yet, our feeling is that the identification of the entries into the profession may be rather imprecise, as many of the people not employed in t-1 and out of the profession in t may have had previous spells as teacher before t-1. So it is likely that some of the inflows we observe are not truly first entrances into the profession.

Table 8 Probability of transiting into teaching over the t/t+1 interval (% of initial year sample): 25-45 years old graduates

	Status at t+1			
Status at t and earlier (1)	Tenured	TL	TS	all teachers
Permanent contract in t/employed in t-1	0.38	0.23	0.10	0.70
Temporary contract in t/employed in t-1	0.08	0.44	0.35	0.87
Job seeker in t/ employed in t-1	2.50	2.25	0.73	5.48
Inactive in t/ employed in t-1	1.96	8.04	0.21	10.21
Permanent contract in t/not employed in t-1	0.00	0.38	0.00	0.38
Temporary contract in t/not employed in t-1	0.00	1.42	0.00	1.42
Job seeker in t/ not employed in t-1	0.21	1.41	0.80	2.42
Inactive in t/ not employed in t-1	0.36	1.91	1.05	3.32
employed in t-1	0.41	0.41	0.12	0.94
not employed in t-1	0.23	1.48	0.71	2.41
Total	0.36	0.69	0.28	1.33

(1) Permanent contract in t includes the self-employed. Permanent and temporary contracts in t exclude teachers in t.

Source: our own elaborations on the RCFL

Focusing upon what we can do, i.e. restricting the attention to the individuals not employed in t-1, it appears that the labour market status in t has a sizable impact upon the transition probabilities. The ones more likely to transit to teaching – which we use as an approximation of first entrances into such a profession – are the ones who were either inactive or job seekers in t. The ones less likely to make such a transition are the ones who have a (non teaching) job in t, particularly if such a job is a permanent one. Notice that such a pattern is confirmed both when considering inflows into a tenured position – for whom the assumption that we are identifying new entrants and not re-entrants into the profession is somehow more questionable – and when restricting the attention to inflows into a temporary position, these latter in any case being more likely events. This confirms the insularity pattern of the teachers' profession: new hires mostly come from the ranks of people not employed elsewhere.

5 Determinants of teachers' inflows and retentions

Our aim is to investigate the determinants of entrances into and exits from the profession of teacher in order to understand whether positive or negative selection mechanisms dominate. Taking into account what already said about the paucity of career's rewards in the teachers' profession, we would like to know whether those who access to and remain in the profession are those most motivated or those least able. Clearly, our data do not allow us to measure motivation and quality (neither general working abilities nor abilities more specifically related to the teacher profession). We may only infer something from some measurable characteristics which are likely to be related to workers' ability and motivation and we may try to understand whether this lead to a better or a worse (in terms of teaching effectiveness) teachers pool.

We start our analysis by looking at the decision of entering into the teaching profession. As already said we approximate the (first) entry into the profession by focusing upon 25-45 years old graduates who were neither teaching in t nor working (more generally) in t-1 and we analyse the probability of getting a teaching position over the t/t+1 interval. We restrict to these age brackets as entrances of older individuals are extremely unlikely to represent first entries into the profession[21]; for the same reasons we restrict the sample to individuals not employed in t-1. As already said, the extent to which we so approximate first entrances into the teacher's profession is questionable, particularly for those cases in which people are getting a tenured position: entering directly into a tenured position is quite unlikely and so the ones becoming a tenured teacher over the t/t+1 interval are very likely to have had a previous teaching experience. As we are going to explain, we so use two different definitions of

[21] As said before, currently only people with a tertiary degree can access into the profession (elderly teachers may stay over even if not graduated, this being a particularly relevant case far primary schools' teachers).

becoming a teacher, respectively including or excluding those who get a tenured position in t+1. The most restrictive case is a bit safer but at the cost of further shrinking the transitions into the profession observed in our sample.

More broadly, we consider three different models and two different definitions of entry into the teacher profession. The three models differ according to what are the alternatives to becoming a teacher: in the first case (*model 1*) we just compare becoming a teacher to everything else (i.e. individuals may have been both inactive and active in non-teaching activities in period t+1); in the second specification (*model 2*), we restrict the sample to individuals who are active in t+1 (they may be either working elsewhere or unemployed); the third and final specification (*model 3*) restricts the sample to those who are working in t+1 (so the alternative exit considered is working in a non-teaching job). The two definitions of entry into the teacher profession differ according to the inclusion or exclusion of transitions into tenured positions. In the most restrictive definition we consider only transitions into a temporary position, while in the alternative definition we also consider those individuals who got a tenured position. In the following we will present the most restrictive definition, also because the larger sample show qualitatively similar results.

The variables we consider as possible determinants of the entry decisions are the 4 labour market status variables in t already used in the previous section (job seekers, inactive people, permanent employed, including the self-employed, and those employed with a temporary contract). Among the ones employed we also consider whether the individual had a secondary work activity and was searching for an alternative job, both factors possibly hinting at the fact that the currently held (non-teaching) job was not a truly desired position. Always along related lines, we also experimented with a dummy identifying those people commuting for work reasons out of their province of residence: again the idea is that (long distance) commuters are less satisfied about their current situation and are ready to change; similarly, we also inserted a dummy for those people who were absent from work (i.e. with no actual working hours during the reference week of the year t LFS).

Besides these variables we consider age (a linear and a quadratic term), sex (further singling out those females who are married), educational attainment (distinguishing between humanities and non-humanities degrees), a dummy for having kids below 12 years of age and a dummy for the presence of work experiences in the past (besides the one eventually going on at time t).

Notice that all these variables may proxy for both taste shifts and the value (and availability) of labour market alternatives: for instance, the educational attainment dummies may capture both the differences in the available job alternatives and the fact that the humanities group include people for whom teaching had been the motivating factor in the selection of their University majors. Furthermore, the empirical effects are not always easy to interpret: for instance, what can be said about the well known fact that females are overrepresented among teachers? While the feminilization of the teacher profession has been often considered as a negative signal – hinting to the fact that only

workers with less alternatives opt for such a profession[22] - one of the possible driving factors behind it - the fact that females are more likely to be discriminated in other jobs - might imply that the best female workers opt for teaching[23]. We also considered a set of dummies based upon the time to completion of the tertiary degree, possibly proxying for (academic) ability. The dummies are constructed by using the distribution of the ages at graduation for all graduated with less than 45 years in 4 different fields of study (humanities, social sciences, science and technology, other). Time to completion is considered *fast (slow)* if an individual belongs to the first (last) third of the distribution of age at completion of the relevant field of study. After some experimenatio, only one dummy, that for fast time to completion, has been retained in the estimates.

In order to capture the labour market context we finally inserted year and area-wide dummies, so as to capture differences over time and in the local labour market.

In order to further analyze the role of the labour market context we also constructed a couple of indicators (measured at the provincial level). The first captures the flow of alternative job opportunities, as measured by the new non-teaching job openings over the t-t+1 interval. The second measures the amount of vacancies in the education system possibly available for the temporary teachers. More precisely, the latter is defined as the ratio of the number of job positions unfilled by permanent teachers at the end of year t, used as a proxy of teaching opportunities in year t+1. The data are collected at school level and aggregated at province level and the variable is entered only for the temporary teachers. The former indicator is given by the inflows in the other sectors of the economy always measured at the provincial level[24], used as a proxy of the labour demand in the non-teaching sectors of the economy. Notice that this latter variable might suffer from endogeneity problems as the inflows to non-teaching jobs might reflect the shift of potential candidates from teaching to non-teaching positions. So we experimented with both the effective turnover measure at the provincial level (*turnover*) and an alternative variable constructed in such a way to minimize the endogeneity problems now described; in the latter case we use the weights of 12 different sectors in each province in year t-1in order to aggregate the turnover rates measured at the national level separately for each of the 12 sectors (*weighted turnover*). As the latter experiment does not change the overall result, we limit ourselves to report here the former results. As the two indicators are not computable in some provinces, the estimates are shown for both the overall sample, omitting them, and the sub-sample for which these variables are available.

Table 9 Probability of becoming a temporary teacher – marginal impacts

[22] Notice that in this reasoning feminilization matters as a signal, not because of an unproved lower productivity of female workers.

[23] So it is the interplay of access and wage patterns of the different professions which matter for the average quality of the female teachers' pool: see Hoxby and Leigh, 2004 for an application to the US case.

[24] More precisely we consider the share of the employed in non teaching occupations in t+1 who started their current job during the last 12 months.

	All exits in t+1		People active in t+1		People employed in t+1	
age	0.011	0.009	0.006	0.003	0.007	0.005
	[0.262]	[0.244]	[0.228]	[0.225]	[0.205]	[0.194]
Age squared	0.011	-0.011	-0.004	-0.004	-0.008	-0.004
	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]
centre	0.001	0.004	0.001	0.003	0.001	0.003
	[0.004]	[0.005]	[0.003]	[0.004]	[0.003]	[0.004]
South	0.000	0.003	0.000	0.003	0.001	0.004
	[0.002]	[0.003]	[0.002]	[0.003]	[0.002]	[0.003]
Job seeker	-0.003**	-0.002	-0.005***	-0.004***	-0.003**	-0.002**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Employed as a temp.	-0.005**	-0.004*	-0.005***	-0.005***	-0.005***	-0.004***
	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]
Employed as a perm.	-0.009***	-0.008***	-0.012***	-0.010***	-0.014***	-0.012***
	[0.002]	[0.001]	[0.002]	[0.002]	[0.003]	[0.003]
females	-0.002	-0.004*	-0.001	-0.002	0.000	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]
commuter	0.029	0.026	0.025	0.023	0.02	0.017
	[0.023]	[0.022]	[0.020]	[0.019]	[0.017]	[0.015]
With a secondary job	-0.006***	-0.005***	-0.005***	-0.004***	-0.004***	-0.003***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Employed looking for an alternative job	-0.015***	-0.014***	-0.018***	-0.018***	-0.020***	-0.020***
	[0.003]	[0.003]	[0.004]	[0.004]	[0.005]	[0.005]
Fast in getting a tertiary degree	0.005	0.005	0.005	0.006	0.005	0.005
	[0.003]	[0.004]	[0.004]	[0.004]	[0.003]	[0.004]
Non humanities degree	-0.024***	-0.023***	-0.025***	-0.025***	-0.022***	-0.020***
	[0.005]	[0.005]	[0.006]	[0.006]	[0.006]	[0.006]
Had other job experiences (before 30 years)	0.007	0.007	0.004	0.005	0.004	0.004
	[0.011]	[0.011]	[0.008]	[0.009]	[0.007]	[0.007]
School vacancies rate		0.101		0.085		0.085
		[0.033]		[0.030]		[0.027]
Turnover in non teaching jobs		0.032		0.002		0.008
		[0.041]		[0.037]		[0.029]
Year 2005	0.006	0.004	0.005	0.005	0.004	0.004
	[0.004]	[0.003]	[0.004]	[0.003]	[0.004]	[0.003]
Year 2006	0.004	0.002	0.004	0.003	0.002	0.001
	[0.004]	[0.003]	[0.004]	[0.003]	[0.003]	[0.002]
Year 2007	0.001	0	0.001	0.001	0	0
	[0.003]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
No. of Observations	2830	2686	1649	1558	1243	1164
Rsquared	0.14	0.14	0.21	0.21	0.26	0.25

Standard errors in brackets ***significant at 1% level; **significant at 5% level; * significant at 10% level;

The most sizable effects are those stemming from the labour market status at time t and educational attainment. For the latter it appears that those who graduated in non humanities majors are less likely transiting to a teaching position: such an effect may simply uncover the fact that these

people have more work alternatives or simply the fact that those who selected a humanity degree were more committed to the teaching profession. While we have no possibility to select among these two alternatives, we tend to prefer the latter as an explanation given that the impact of this effect does not change when moving from model 1 – where we compare the probability of becoming a teacher to all possible alternatives – to models 2 and 3 – where the alternative exits are restricted to those either active or employed in period t+1.

As for the labour market status, both being a job seeker and being employed reduce the chances of getting a teaching position over the subsequent 12 months. The ones least likely to becoming a teacher are the individuals with a permanent job position in period t. Notice that, among those employed, having a secondary job position and being looking for an alternative job – both hints of the fact that the primary position currently held is not particularly satisfactory and significant – further reduce the chances of transiting to a teaching position. The former impact is somehow stronger when considering models 2 and 3, where the alternative exits considered do exclude inactivity in t+1. In models 2 and 3 also the negative impact of being employed with a permanent contract is somehow stronger.

Apart from these minor differences the 3 models do not differ very much from each other. Neither the other covariates show any remarkable and consistent pattern. The presence of school vacancies has the expected positive impact upon the probability of getting a teacher position, but it is never statistically significant. Even less significant from a statistical point of view, and with a wrong (positive) sign is the turnover rate.

All in all, our reading is that the forthcoming teachers are people somehow apart from the rest of the labour market. Those having a permanent alternative job and those less active in looking around for a job as well as those currently providing less work effort (as signalled by the presence of a secondary job position) are the ones least likely to becoming a teacher.

This is a result to be taken on board when moving to analyse the outflows from the teacher profession. Here the estimates are likely to be more precise as the identification of teachers and exits from the profession are much more precisely identified by our data. As for the entrances, we allow for three different specifications, progressively moving from one where all other alternatives are considered – *model 1* – to one in which only the alternative employment alternatives are compared to staying within the teacher profession – *model 3*. The first model implicitly equates all exits from the profession – retiring, moving to an alternative job or becoming jobless (with or without active search of a new job). In *model 3* – where only people who are still employed in t+1 are considered in the sample – we more explicitly focus upon the (predominantly voluntarily) transitions to job alternatives. In between these two extremes we also consider *model 2,* where we clean the data from the exits from the labour force: we compare those who stay into the profession to those who leave the profession but

are still in the labour market, having either (predominantly voluntarily) left the profession for an alternative job or (predominantly involuntarily) lost their teaching assignment[25].

Notice that while for inflows we restricted the sample to people relatively young and with a tertiary degree (as these are the ones for which makes sense to analyse the decision to start a teacher career), the outflows will be initially analysed considering the whole teachers' population. In model 1 this means that many exits will be retirement events. Later on we will also restrict our attention to teachers at the beginning of their career, using the same 45 years age threshold already used when considering the inflows. We will do this as part of an attempt to focus upon relevant sub-samples, also splitting the sample along gender lines. Further notice that, while we have just stressed the selectivity of the process through which people start their teacher's career, we do not formally model the fact that teachers have been not randomly selected into the profession. The limited retrospective information in our data do not allow us to implement any explicit strategy of this nature.

As already stressed when discussing the inflows, the data at our disposal do not allow to capture the value of the job alternatives available to each individual. In other words, we are unable to compare the wage (and other working conditions features) as a teacher to that available in alternative occupations. Actually we observe neither of them. What we may control for are characteristics which, taking into account the rather undifferentiated nature of the wage accruing to teachers in Italy, are likely to capture the availability of and the economic value attached to job alternatives as well as the different value attached to the teachers profession by different groups in the population. So our estimates provide for a reasoned interpretation of some stylised facts as the variables we use may act as taste shifters as well as a measure of the existing alternative opportunities. The variables empirically considered are very similar to those already introduced when discussing the inflows. The main difference is that now many of them refer to the details of the teaching job currently held.

Actually the first set of variables relates to the 3 contractual arrangements of our teachers – the tenured, the TL and the TS groups. From the previous section we already know that most of the exits happen during the first (long) period during which teachers only get temporary assignments, while tenured teachers mostly stay over until retirement.

On top of the dummies for contractual arrangements, we consider age (given the longer time span here analysed we use dummies for under 30, 30-40, 41-50 and over 50 individuals), sex (further singling out those females who are married) and educational attainment (distinguishing between humanities and non-humanities degrees as well as a third group of those having at most an upper secondary diploma) and a few features concerning the family situation of the teacher (after some experimentation we inserted a dummy for having kids below 12 years of age).

[25] We attach the voluntarily/involuntarily labels to some of the different exits with some cautioness: as said in section 3, some temporary teachers may voluntarily reject a new temporary assignment - so ending up as non employed in year t+1 – as they maintain their long standing position in the waiting lists for the access to a tenured position; on the other hand, some temporary teachers may get an alternative job after having been unable to find a new temporary assignment as a teacher.

All these variables may proxy for both taste shifts and the value (and availability) of labour market alternatives: as already said, the educational attainment dummies may for example capture both the differences in the available job alternatives (among graduates and others as well as within different groups of graduates) and the fact that the humanities group include people for whom teaching had been the motivating factor in the selection of their University majors. While they are not always easy to interpret, in some cases some more precise interpretation may be provided: so the presence of kids in the household is likely to capture the fact that some of the factors motivating teachers are the enhanced possibilities for individuals (living in households) with heavier care-duties, factors as such unlikely to be reflected into a superior teaching quality. Along similar lines, one can also interpret the fact that the probability of staying over as a teacher is affected by the dummy for married females (more than by the female dummy per se). In both cases the likely interpretation is that individuals appreciating the teachers profession for its work-family life balancing opportunities are more likely to stay over as teacher[26], this motivational aspect having (at best) no relationship with teaching effectiveness.

A motivational interpretation may be also provided for the use of a dummy variable for those teachers who in period t had a secondary job. It should capture the lack of motivation into the teacher profession[27]. Differently from the inflows models, we do not include the dummy for the individuals searching for an alternative job position, which somehow already identifies people at risk of transiting elsewhere[28]. Along the same lines, we also consider a quadratic in the elapsed tenure – so that we take care of the progressive selection of those who stay over as a teacher - and a dummy for having had different job experiences (for those less than 30 years old).

A motivational interpretation may be also given to the dummy for primary school teachers[29] as they normally follow a specific educational track: it captures the fact that primary schools' teachers are a pool of individuals self-selected quite early, during their high-school heyday, while other groups of teachers are more likely to be include individuals pushed towards teaching by the paucity of job alternatives. Always along related lines, we also inserted a dummy identifying those teachers commuting for work reasons out of their province of residence: again the idea is that (long distance) commuters are less satisfied about their job as a teacher and more likely to leave it[30]. Similarly, we also

[26] Coherent with the effects here cited are the results of the job satisfaction questions posed to teachers in the 3rd teachers survey conducted by IARD. Among the job features more favorably (unfavourably) appreciated by teachers is the hours (wage) regime: see Barbieri and Farinelli (2009).

[27] Although the reduced work-hours load of the teacher profession might be a factor inducing people to select it precisely because it allows to have a secondary job position.

[28] As a robustness check we also looked at a specification including such a variable. Its impact is negative and significant; its inclusion would also reduce the statistical significance of some other covariates, like having had other job experiences, leaving however unchanged the results form a qualitative point of view.

[29] Although in principle it might also capture the differences in the availability of teachers' jobs, something which however we more directly capture at the local market context (see later).

[30] As a matter of fact, most of these commuters are very long distance commuters, moving from the South to the North. Many of them are possibly hoping, one day, to get a position as a teacher back-home, exploiting the allocation and mobility processes described in section 3 (and further explored by BRS). Notice that we also tried

inserted a dummy for teachers who were absent from work (i.e. with no actual teaching activity during the reference week of the year t LFS). Finally, we considered the dummies for the time to completion of the tertiary degree.

As already made for inflows, in order to capture the labour market context we finally inserted year and area-wide dummies, so as to capture differences over time (as already seen, in some years there had been both many retirement flows and many temporary teachers getting a tenured position) and in the local labour market (as well known, many less alternative opportunities are available in the depressed South).

We tested the model alternatively with and without the two contextual indicators, turnover and vacancy, but the latter is introduced only for TS teachers because of its better performance in this subgroup.

Table 10 provides the results for all three different specifications (models 1 to 3 alternatively with and without the vacancy and turnover rates). The most relevant result is that teachers' contractual arrangements matter also after having considered the heterogeneity of the teachers in the three groups. However, the TL group is much more similar to the tenured one than to the TS individuals. For the latter group we find a weakly significant impact of the vacancy rate and only in model 2. Considering the turnover rate, the sign of the impact is negative as expected, showing that labour demand shifts in other non teaching activities reduce the probability of staying over as a teacher. However the impact is statistically not significant and no significant differences arise between the use of the turnover or the weighted turnover. So, for sake of simplicity we stick at the use of the turnover measure.

There are also important hints at the presence of motivational factors. Irrespective of contractual arrangements, married females and teachers with kids (less than 12 years of age) are more likely to stay in the profession. Also teachers who had a second job and (to a less extent) who had been absent from their teaching position during the week are more likely to leave the profession. To a large extent these motivational features are not positively related to teaching effectiveness, as it is unlikely that being attracted by the opportunities to better take care of own kids enhances teaching effectiveness. However, no precise test of such a negative self-selection process is possible with the data here used.

While the overall pattern does not change across the 3 different models, there are some suggestive differences, particularly when comparing the two extremes. The effect of age is more pronounced in model 1, as in this case the alternatives to stay over as a teacher include retirement (strongly affected by age). Also the impact of having kids of 0-12 years of age is much more pronounced in model 1 than in the two other models: staying over as a teacher is a viable alternative to retirement from the labour market for parents of young children. Tenure has also a much more relevant impact in discriminating

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an alternative specification with a dummy for the individuals who declare that they changed their residence for work-related reasons. This mover dummy was never statistically significant (its impact being 0.0001 with a standard error of 0.0159 in model (1)).

those who stay over as a teachers form all the others (including the ones retiring from the labour market). Most importantly, the contractual arrangements as a teacher are more relevant in such a case than when discriminating those staying over as a teacher from those moving to an alternative job. This is likely to reflect the fact that many temporary teachers, particularly those with a very short term contract (the TS group), are likely to step down from the teacher career but only temporarily: they loose their contract but they do not move to an alternative job, probably remaining on a waiting queue.

Table 10 Probability of remaining a teacher - marginal impacts from the basic specification

	Mod. (1)		Mod. (2)		Mod. (3)	
Age 30-40	0.051***	0.051***	0.035***	0.035***	0.012	0.014
	[0.011]	[0.012]	[0.008]	[0.009]	[0.008]	[0.009]
Age 41-50	0.092***	0.093***	0.061***	0.061***	0.021*	0.024*
	[0.016]	[0.019]	[0.012]	[0.015]	[0.011]	[0.014]
Age over 50	0.022	0.022	0.044***	0.044***	0.017*	0.021**
	[0.016]	[0.018]	[0.009]	[0.010]	[0.009]	[0.010]
Center	0.011	0.012	0.007	0.005	0	0.001
	[0.009]	[0.010]	[0.008]	[0.009]	[0.006]	[0.006]
South/Islands	0.008	0.014*	0.007	0.007	0	0.002
	[0.006]	[0.008]	[0.005]	[0.006]	[0.004]	[0.005]
Female	0.016*	0.014	0.017*	0.015	0.020**	0.018**
	[0.010]	[0.010]	[0.009]	[0.009]	[0.008]	[0.008]
Fem Married	0.009	0.003	0.017**	0.012	0.014**	0.012*
	[0.009]	[0.009]	[0.008]	[0.008]	[0.006]	[0.006]
Primary school teacher	0.015*	0.017**	0.014**	0.015**	0.010*	0.011**
	[0.008]	[0.008]	[0.007]	[0.006]	[0.005]	[0.005]
childr.0-12	0.028***	0.033***	0.015**	0.019***	0.006	0.008
	[0.008]	[0.007]	[0.006]	[0.006]	[0.005]	[0.005]
Annuals	-0.016	-0.015	-0.009	-0.007	0.005	0.007
	[0.012]	[0.013]	[0.010]	[0.010]	[0.006]	[0.006]
Short term	-0.155***	-0.374**	-0.127***	-0.331**	-0.057***	-0.085
	[0.032]	[0.175]	[0.028]	[0.164]	[0.019]	[0.083]
With a humanities degree	0.044***	0.044***	0.038***	0.037***	0.031***	0.031***
	[0.008]	[0.009]	[0.006]	[0.006]	[0.005]	[0.005]
Graduates having with a different degree	0.031***	0.030***	0.029***	0.028***	0.020***	0.019***
	[0.009]	[0.009]	[0.007]	[0.007]	[0.005]	[0.005]
With a secondary work activity	-0.033*	-0.037**	-0.032**	-0.037**	-0.038***	-0.039***
	[0.017]	[0.019]	[0.014]	[0.016]	[0.012]	[0.013]
With 0 actual teaching hours	-0.014	-0.015	-0.016	-0.018	0.001	-0.002
	[0.011]	[0.012]	[0.011]	[0.012]	[0.008]	[0.009]
Commuters	-0.03	-0.028	-0.02	-0.018	-0.009	-0.008
	[0.018]	[0.018]	[0.014]	[0.014]	[0.009]	[0.009]
Having had other work experiences (for people <30 years old)	0.032**	0.031**	0.023**	0.021*	0.007	0.006
	[0.013]	[0.015]	[0.010]	[0.011]	[0.009]	[0.011]
Being on training	0.024***	0.030***	0.012*	0.018***	0.007	0.008

	[0.008]	[0.008]	[0.007]	[0.007]	[0.005]	[0.005]
Slow in getting a tertiary degree	-0.015	-0.016	-0.010	-0.011	-0.004	-0.003
	[0.010]	[0.011]	[0.008]	[0.009]	[0.006]	[0.007]
Study while working	-0.027*	-0.031**	-0.033**	-0.035**	-0.021**	-0.023**
	[0.015]	[0.016]	[0.013]	[0.014]	[0.010]	[0.011]
Tenure	0.071***	0.066***	0.057***	0.055***	0.029***	0.034***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Tenure sq.	-0.071***	-0.069***	-0.049***	-0.043***	-0.020***	-0.021***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Turnover rate		-0.483		-0.036		-0.006
		[0.170]		[0.132]		[0.099]
Vacancy rate*Short Term		1.702		1.309*		0.210
		[0.341]		[0.247]		[0.153]
2005	-0.007	-0.004	-0.009	-0.008	-0.007	-0.007
	[0.010]	[0.011]	[0.008]	[0.009]	[0.006]	[0.006]
2006	-0.030**	-0.025**	-0.023**	-0.019*	-0.015**	-0.017**
	[0.012]	[0.012]	[0.011]	[0.010]	[0.007]	[0.008]
2007	-0.018	-0.016	-0.012	-0.012	-0.008	-0.01
	[0.012]	[0.013]	[0.010]	[0.011]	[0.007]	[0.008]
Observations	5612	5053	5462	4911	5315	4789
Rsq	0.13	0.13	0.14	0.14	0.14	0.13

Standard errors in brackets ***significant at 1% level; **significant at 5% level; * significant at 10% level; for the tenure and squared tenure indicator we report the impact of a standard deviation increase in the turnover rate.

In table 11 we provider the results of some experiments on the contextual indicator concerning the alternative job openings available in the rest of the provincial labour market. The exercises have been conducted reverting to the models already presented in table 10. The idea is to verify whether the labour demand shifts occurring in the external labour market exercise a stronger pull effect among some subgroups of teachers. While far from being precise, the results provide for some useful hints. The pull effect is for instance more relevant for teachers with a humanities degree, for teachers who have a secondary activity, for teachers with a short elapsed tenure, for teachers who have a temporary contractual arrangement and, only weakly, for teachers still enrolled in the University. All in all, this is a further confirmation that most of the selection takes place at a relatively early stage of the teachers' career and that the fact that the insularity of the teachers labour market with respect to the external labour market is somehow related to the presence of some strong motivational factors behind the choice to be a teacher.

Table 11 Effects of labour demand shifts in non teaching sectors: Marginal impact of a standard deviation increase in the turnover rate

	Mod. (1)	Mod. (2)	Mod. (3)
Turn*Hum degree	-1.029	-0.781*	-0.627*
	[0.316]	[0.224]	[0.164]
Turn*non Hum degree	0.252	0.651	0.214
	[0.301]	[0.263]	[0.163]
Turn*diploma	-0.453	0.190	0.275
	[0.232]	[0.188]	[0.129]
Turn*TL	-0.585	-0.799	-0.786**
	[0.341]	[0.254]	[0.178]
Turn*TS	-1.427	-1.112	-0.904
	[0.421]	[0.317]	[0.215]
Turnover*Tenured	0.033	0.228***	-0.010
	[0.012]	[0.023]	[0.006]
Turn*Temporary	-0.881	-0.916**	-0.835***
	[0.271]	[0.197]	[0.142]
Turn*2job	-3.565***	-2.560***	-1.767***
	[0.712]	[0.515]	[0.300]
Turn*(1-2job)	-0.314	0.128	0.149
	[0.167]	[0.136]	[0.101]
Turn*study while working	-1.425*	-0.944	-0.754
	[0.381]	[0.316]	[0.245]
Turn*(1-study while working)	-0.324	0.131	0.114
	[0.183]	[0.149]	[0.104]
Turn*elapsed tenure<10 years	-0.941	-0.883*	-0.663*
	[0.332]	[0.231]	[0.181]
Turn*elapsed tenure>=10 year	-0.339	0.403	0.343
	[0.191]	[0.176]	[0.119]
Turn*married female	-0.181	0.273	0.226
	[0.221]	[0.193]	[0.147]
Turn*(1-married female)	-0.815*	-0.330	-0.189
	[0.241]	[0.186]	[0.122]
Turn*commuters	0.935	1.025	-0.083
	[0.496]	[0.381]	[0.226]
Turn*(1-commuters)	-0.626*	-0.157	0.002
	[0.169]	[0.135]	[0.101]

Standard errors in brackets; ***significant at 1% level; **significant at 5% level; * significant at 10% level;

In order to further analyse the differences among subgroups of teachers we resort to splitting our sample according to age (respectively below and above 45 years of age) and gender. More specifically we focus upon females below 45 years of age (the other attempts being available from the Authors) as females are the most relevant subgroup of the teachers' population and youths are the most interesting group making explicit career' decisions. Table 12 replicates the format of table 10 for this

group and Table 13 further replicates the exercise concerning the turnover indicator for the young females sub-sample. Apart from some differences for some covariates - like age, tenure or having little kids, which has no more impact has almost all married people in the sample share this characteristic - the results previously shown are broadly confirmed when focusing upon such a sub-sample.

Table 12 Probability of remaining a teacher - marginal impacts from the basic specification females under 45 years of age

	Mod. (1)		Mod. (2)		Mod. (3)	
Age 30-40	0.061***	0.066***	0.060***	0.063***	0.015	0.021
	[0.017]	[0.020]	[0.017]	[0.019]	[0.012]	[0.015]
Age 41-45	0.048***	0.056***	0.048***	0.056***	0.006	0.015
	[0.014]	[0.015]	[0.013]	[0.014]	[0.012]	[0.012]
Center	0.013	0.020*	0.011	0.018	0.000	0.007
	[0.011]	[0.012]	[0.011]	[0.012]	[0.008]	[0.008]
South/Islands	0.005	0.022*	0.004	0.019	-0.004	0.007
	[0.010]	[0.013]	[0.010]	[0.013]	[0.007]	[0.009]
Married	0.029§	0.008	0.029§	0.007	0.026**	0.020*
	[0.018]	[0.014]	[0.018]	[0.014]	[0.010]	[0.010]
primary school	0.014	0.021*	0.016	0.023*	0.011	0.015*
	[0.013]	[0.013]	[0.013]	[0.012]	[0.008]	[0.008]
childr.0-12	0.006	0.023	0.008	0.024	-0.005	-0.002
	[0.017]	[0.016]	[0.017]	[0.016]	[0.009]	[0.009]
Annuals	-0.018	-0.024*	-0.017	-0.023	0.003	0.001
	[0.014]	[0.015]	[0.013]	[0.014]	[0.007]	[0.008]
Short term	-0.131***	-0.495**	-0.127***	-0.487**	-0.032**	-0.169
	[0.033]	[0.201]	[0.032]	[0.203]	[0.016]	[0.139]
With a humanities degree	0.024*	0.027**	0.024*	0.027**	0.019***	0.017**
	[0.013]	[0.013]	[0.012]	[0.013]	[0.007]	[0.008]
Graduates having with a different degree	-0.005	-0.003	-0.002	0.000	-0.001	-0.005
	[0.017]	[0.017]	[0.016]	[0.016]	[0.008]	[0.010]
With a secondary work activity	-0.021	-0.015	-0.022	-0.015	-0.041*	-0.028
	[0.025]	[0.024]	[0.025]	[0.024]	[0.022]	[0.019]
With 0 actual teaching hours	-0.053***	-0.052**	-0.054***	-0.053**	-0.013	-0.017
	[0.020]	[0.024]	[0.020]	[0.024]	[0.013]	[0.014]
Commuters	-0.015	-0.012	-0.014	-0.011	0.003	0.005
	[0.022]	[0.021]	[0.021]	[0.020]	[0.008]	[0.008]
Having had other work experiences (for people <30 years old)	0.025*	0.026**	0.025**	0.026**	0.000	0.002
	[0.013]	[0.013]	[0.013]	[0.013]	[0.012]	[0.013]
On training	0.032***	0.033***	0.031***	0.032***	0.012**	0.011
	[0.010]	[0.011]	[0.010]	[0.011]	[0.006]	[0.007]
Slow in getting a tertiary degree	-0.006	-0.01	-0.004	-0.008	-0.003	-0.002
	[0.014]	[0.016]	[0.014]	[0.015]	[0.009]	[0.010]
study while working	-0.019	-0.015	-0.016	-0.011	0.007	0.01
	[0.024]	[0.026]	[0.024]	[0.026]	[0.009]	[0.009]
Tenure	0.020***	0.020***	0.021***	0.020***	0.015***	0.014***

	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Turnover rate		-0.855*		-0.842*		-0.605*
		[0.216]		[0.214]		[0.143]
Vacancy rate*Short Term		3.159**		3.196**		1.080
		[0.349]		[0.346]		[0.187]
2005	-0.016	-0.012	-0.019	-0.015	-0.006	-0.005
	[0.016]	[0.017]	[0.016]	[0.017]	[0.009]	[0.010]
2006	-0.031*	-0.028	-0.034*	-0.032*	-0.016	-0.018
	[0.018]	[0.018]	[0.019]	[0.018]	[0.011]	[0.012]
2007	-0.003	0.002	-0.006	-0.002	0.004	0.007
	[0.015]	[0.016]	[0.015]	[0.016]	[0.009]	[0.009]
Observations	1868	1637	1867	1636	1787	1568
Rsq	0.16	0.17	0.17	0.17	0.16	0.16

Standard errors in brackets; ***significant at 1% level; **significant at 5% level; * significant at 10% level; for the tenure indicator we report the impact of a standard deviation increase in the turnover rate.

Table 13 Effects of labour demand shifts in non teaching sectors: Marginal impact of a standard deviation increase in the turnover rate

	Mod. (1)	Mod. (2)	Mod. (3)
Turn*diploma	-0.769	-0.715	-0.418
	[0.310]	[0.305]	[0.183]
Turn*Hum degree	-1.426**	-1.359*	-1.035**
	[0.350]	[0.346]	[0.218]
Turn*non Hum degree	-0.136	-0.267	-0.388
	[0.450]	[0.445]	[0.228]
Turn*TL	-1.518**	-1.464*	-0.981**
	[0.336]	[0.333]	[0.192]
Turn*TS	-1.186	-1.147	-1.310**
	[0.446]	[0.440]	[0.258]
Turn*Tenured	-0.055	-0.096	0.145
	[0.363]	[0.365]	[0.191]
Turn*Temporary	-1.405**	-1.355**	-1.099***
	[0.282]	[0.280]	[0.174]
Turn*slow	-0.979	-1.092	-0.786*
	[0.406]	[0.408]	[0.225]
Turn*(1-slow)	-0.809	-0.753	-0.549*
	[0.258]	[0.256]	[0.148]
Turn*2job	-3.661*	-3.582*	-2.390**
	[1.026]	[1.012]	[0.573]
Turn*(1-2job)	-0.717	-0.708	-0.483*
	[0.210]	[0.208]	[0.132]
Turn*study while working	-0.526	-0.789	0.237
	[0.781]	[0.800]	[0.392]
Turn*(1-study while working)	-0.904*	-0.851*	-0.674**
	[0.228]	[0.226]	[0.135]
Turn*elapsed tenure<10 years	-1.338**	-1.289**	-1.036***
	[0.299]	[0.294]	[0.196]

Turn*elapsed tenure>=10 years	-0.216	-0.248	0.096
	[0.319]	[0.317]	[0.211]
Turn*zero actual working hours	-2.428**	-2.353**	-1.177
	[0.614]	[0.608]	[0.398]
Turn*actual working hours	-0.63	-0.628	-0.545**
	[0.223]	[0.221]	[0.127]
Turn*married	-0.45	-0.476	-0.399
	[0.257]	[0.255]	[0.160]
Turn*(1-married)	-1.438**	-1.369**	-0.860**
	[0.357]	[0.352]	[0.214]
Turn*commuter	1.468	1.498	-0.85
	[0.703]	[0.692]	[0.340]
Turn*(1-commuter)	-1.240***	-1.233***	-0.569**
	[0.228]	[0.226]	[0.136]

Standard errors in brackets; ***significant at 1% level; **significant at 5% level; * significant at 10% level;

Conclusions

This paper has extensively described inflows into and outflows from teachers' ranks in Italy. Teachers appear under many respect a profession quite insulated from the outside labour market. People pursuing such a career go through an extremely lengthy period of precariousness, the precariousness itself, and not the presence of any explicit assessment of their capabilities (through assessment of what done on the job or through more academic tests), being the only threshold to be overpassed in order to get access to a tenured position. Those entering into such a process and staying over it are so those with less external job opportunities. Moreover, some of the features which increase the probability of staying over this lengthy process are not all related to features related to the efficacy of their teaching activity: our estimates, as well as some survey evidence, show for instance that among the job features most appreciated are those related to the possibility of pursuing other interests and duties (most specifically family care duties).

The above picture raises several policy issues, concerning the selectivity of the access and progression to the teachers' career and the possible use of financial incentives. As a matter of fact, the insularity of the teachers' profession raises some doubts about the possibility of using monetary financial incentives in order to motivate more and better people to become teachers. To put it rather bluntly, people becoming and staying over as teachers are people who to a large extent selected ex ante such a profession. The use of monetary rewards is under many respects reasonable and to a large extent fair and acceptable by a vats majority of people, for instance in order to take account of the fact that for some fields there is paucity of prospective teachers or that it would be fair to compensate teachers accepting to staying over in the most difficult educational environments. Yet it risks running against the basic non financial motivation of the professional choice made by many teachers. While a possibly totally different world is in principle possible, the existing population of teachers is likely to

be less reactive to financial incentives. Moreover, a totally different world, with teachers made by people quite responsive to financial incentives might have its own drawbacks in terms of motivation (the more so if the financial rewards would be designed in such a way to jeopardise the team nature of the teachers' activity in the school). On the other hand, these considerations further reinforce the need of strengthening the capability of the school system to effectively assess teachers' abilities, instead of relying upon a system in which everybody may be tenured provided he or she is ready to wait a sufficiently long period of time. Simply imposing tile limits to the possibility of tenured teachers to move over the country risks increasing the segmentation of the teachers' labour market and does not seem to provide a substitute for a proper assessment of teachers, with a more active role of the individual schools in the recruiting process.

References

Aaronson D., Barrow L. e W. Sander (2002), "Teachers and Student Achievement in Chicago Public High School", *Journal of Labour Economics*, Vol. 25-1, 2007, pp. 95-136.

Barbieri, G., Cipollone, P., Sestito, P. (2007) "Labour market for teachers: demographic characteristics and allocative mechanisms" *Giornale degli Economisti e Annali di Economia,* Vol. 66, n.3, pag335-374.

Barbieri, G., Rossetti, C. e Sestito, O. (2009) "The determinants of teachers' mobility. Evidence from a panel of Italian teachers" mimeo.

Bertola, G. and Checchi, D. (2008) "Motivazione, incentivi e carriere degli insegnanti italiani" *Fondazione Givanni Agnelli Working Papers,* n.5

Bonesronning H., Falch T., Strom B. (2003). "Teacher sorting, teacher quality, and student composition" *European Economic Review*, 49(2), 457-483.

Clotfelter C. T., H.F. Ladd, and J.L.Vigador (2007), "How and Why do Teacher Credentials Matter for Student Achievement?", NBER Working Paper n. 12828

Cocoran, S., P., Evans, W., N. and Schwab, R., M. (2004) "Changing Labor-Market Opportunities for Women and the Quality of Teachers, 1957-2000" *American Economic Review*, Vol 94, n.2.

Dolton P. (1990) "The Economics of UK Teacher Supply" *Economic Journal*, 100(400), 91-104.

Dolton P., Van der Klauw W. (1995). "Leaving Teaching in the U.K.: A Duration Analysis". *Economic Journal,* 105, b431-444.

Fondazione Giovanni Agnelli (2009) "Rapporto sulkla scuola in Italia 2009", Laterza Editore, Roma.

Hanushek E.A., Kain J.F., Rivkin S.G. (2004) "Why Public Schools Lose Teachers". Journal of Human Resources, 39(2), 326-354.

Hoxby, C., M. and Leigh, A. (2004) "Pulled Away or Pushed Out? Explaining the Decline of Teacher Aptitude in the United States" *American Economic Review*, Vol 94, n.2.

Murnane R.J., Olsen R. (1990) "The Effects of Salaries and Opportunity Costs on Length of Stay in Teaching: Evidence form North Carolina" *Journal of Human Resources*, 25(1): 106-124.

Stinebrickner T. (2002) "An Analysis of Occupational Change and Departure from the Labor Force: Evidence of the Reasons that Teachers Leave" *Journal of Human Resources*, 37(1), 192-216.

Appendix: transitions among teachers' subgroups

Status at year t	Tenured				TL						TS					
Status at year t+1	Tenured teachers	Other jobs	Inactive/ job seeker	Retired	TS teachers	TL teachers	Tenured teachers	Other jobs	Inactive/ job seeker	Retired	TS teachers	TL teachers	Tenured teachers	Other jobs	Inactive/ job seeker	Retired
2004	95	2.2	1.3	1.4	11.8	67.4	14.8	1.5	3.4	1.1	34.7	23.4	10.3	15.1	16.6	0.0
2005	93.9	3.1	1.1	1.9	4.8	72.6	17.8	1.3	3.5	0.0	39.5	23.5	7.0	14.9	15.1	0.0
2006	90.5	4.2	2.2	3.1	4.1	69.1	13.6	6.0	5.5	1.8	54.2	22.1	3.7	9.7	10.3	0.0
2007	89.7	2.3	1.7	6.4	3.7	69.8	17.9	3.5	4.9	0.2	36.2	32.7	0.7	13.7	16.6	0.0
Living in the North	92	3.2	1.9	2.9	5.1	65.5	20.4	3.1	4.2	1.7	25.6	41.2	4.9	13.9	14.3	0.0
Living in the Center	91.4	2.7	2.0	3.9	7.1	71.1	6.1	2.3	6.1	0.0	72.9	8.8	1.6	7.7	9.0	0.0
Living in the South/Is.	93	2.8	1.0	3.3	6.3	73.1	13.3	3.6	3.5	0.2	36.7	22.2	8.1	15.7	17.4	0.0
Age<30	88.5	7.8	3.6	0.0	10.1	61.2	10.8	7.5	10.4	0.0	36.2	22.5	3.0	14.0	23.4	0.0
Age 30-40	94.3	3.2	2.5	0.0	6.4	73.2	14.6	2.6	3.3	0.0	50.4	27.5	4.1	8.9	11.2	0.0
Age 41-50	96.1	2.8	1.1	0.1	3.6	72.4	20.2	1.2	1.6	1.0	35.7	22.3	13.3	19.0	9.6	0.0
Age >50	84.7	2.6	1.7	11	0.0	46.4	28.8	2.6	9.9	12.3	7.50	27.1	19.1	44.2	2.0	0.0
Male	89.5	5.6	0.9	4.0	5.1	66	16.9	6.0	5.7	0.3	33.9	22.3	12.3	24.6	6.7	0.0
Female	93.2	2.1	1.8	3.0	6.2	70.4	15.9	2.6	4.1	0.8	43.7	25.5	4.1	10.8	15.9	0.0
With a 0-12 child	96.3	2	1.6	0.1	4.8	76.1	13.5	2.5	3.1	0.0	56	21.4	3.2	5.8	13.6	0.0
With no degree	91.7	3.4	1.0	3.9	6.8	61.8	19.4	5.1	6.6	0.3	41.5	17.7	7.9	18.1	14.7	0.0
With a degree	92.7	2.6	2.0	2.8	5.7	72.6	14.8	2.4	3.5	0.9	42.5	30.0	3.8	9.6	14.1	0.0
Teaching in Prim. sch.	93.3	2.3	1.3	3.1	5.7	62.5	22.9	2.3	6.2	0.4	43.5	26.3	7.0	14.2	8.9	0.0
Teach. in Low. Sec. sch.	91.4	2.2	0.6	5.8	2.9	66.4	22.0	3.1	5.6	0.0	48.6	33.8	1.9	2.1	13.7	0.0
Teach. in Up. Sec. sch.	94.3	3.1	2.0	2.5	9.7	74.7	12.2	2.1	1.5	1.3	48.2	26.6	2.8	13.8	17.9	2.4
total	**92.3**	**2.9**	**1.5**	**3.2**	**6.0**	**69.7**	**16.1**	**3.1**	**4.3**	**0.8**	**42.1**	**25.0**	**5.5**	**13.1**	**14.4**	**0.0**

Table A.1 Transitions of the Italian teachers according to several social indicators. Source: LFS