ISSN 1397-4831

WORKING PAPER 04-4

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Evidence from a Sample of Top Economists

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JEL classification: J41, M51

Keywords : Fast track, Incentives, Sorting, Productivity, Economic departments

Abstract

In this paper, we analyze the timing of promotions in academic departments. Contrary to previous attempts in the empirical literature, we test alternative theories of fast tracks by adding a measure of performance in our analysis. We find that learning from past performance is an important factor to explain the time spent as assistant and associate professor. In addition, our analysis shows the existence of a handicapping policy: individuals who had a fast promotion in the past are less likely to be promoted quickly again. We also find that the handicap is relative, that it does not survive the whole career and that it is possible for these individuals to beat it if they achieve a given level of productivity. We interpret our findings as evidence that incentives and sorting matter in academia and that using relative handicaps can help to balance these two concerns. Finally, we look at the productivity pattern of individuals with different career profiles and find that fast tracks are always more productive than their pairs, even after the last promotion, what suggests an effective selection process.

*The dataset set used in this paper was jointly built with Tom Coupé and Frédéric Warzynski. I thank Mathias Dewatripont, Patrick Legros, Canice Prendergast, Paul Seabright, Bruno van Pottelsberghe and Frédéric Warzynski for discussions and helpful comments.

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1 Introduction

Economists have only recently devoted a lot of attention to careers in organizations. One specific aspect which has been analyzed is whether there are systematic fast tracks, i.e. whether agents promoted quickly at one level are promoted more quickly at the next level. Evidence from sociology [Rosenbaum (1979), Brüderl et al. (1991), Podolny and Baron (1997)] and economics [Baker et al. (1994), Ariga et al. (1999)] suggests that this is the case. But the question of why this is observed remains open. Baker et al. (1994) interpret this finding as evidence of learning about individual ability, while Ariga et al. (1999) suggest that more elaborate models incorporating firm specific human capital acquisition are needed to explain their results.

In contrast, the theoretical literature has rather studied why organizations might deliberately choose to favor the winner of the first round in the second round of a multi period contest. Several theoretical explanations have been proposed to explain this feature. The firm can decide to act this way to induce human capital acquisition [Prendergast (1992)]. Under asymmetric learning, the firm can have incentives to exaggerate promotion prospects. Therefore, a credible way to signal high ability can be to promote the worker to a more difficult task. An early promotion reveals information on future promotion prospects and induces investment in human capital, but at the cost of inefficient task allocation. Under symmetric learning[1], firms can use different training policies to induce human capital accumulation. When wages can not be renegotiated, the optimal training consists in handicapping the winner of the first round until the probability of winning the tournament is $\frac{1}{2}$. On the contrary, when wages can be renegotiated, the winner of the first round receives more training[2].

The firm can also find it optimal to introduce a bias in favor of the winner of the first round to improve the incentives of identical agents in the first period [Meyer (1992)]. Even if the bias leads to a loss of incentives in the second period, it is outweighed by the gain of incentives in the first period. Biased contests can

[1] This case is probably more suited to academia where an important dimension of individual performance, i.e. research, is easily observed.

[2] The model assumes that talent is more important at the higher rank. This is a credible assumption in the case of firms but could be dubious in the case of academic departments where tasks are relatively similar in all hierarchical levels.

also be optimal for learning purposes. If output is a stochastic function of ability but not of effort, a win in the second period by the loser of the first period is informative under a positive bias while it is not the case under no bias [Meyer (1991)]. However, when both learning and incentives matter, these different objectives can be conflicting : "When the first-period result is informative about relative abilities, the effort-maximizing bias in the second period will typically favor the first-period loser, offsetting the probable difference in abilities. (...) Hence the choice of second period bias might have opposite implications for employee incentives and for learning by the organization and which employee should be favored may depend on the relative sensitivity to bias of pre-promotion and post-promotion profits" [Meyer (1992), pp 182-183].

There also exists other potential situations where the bias could favor the loser [Meyer (1992)]. If the loss of promoting the less able exceeds the gain from promoting the more able, and if the principal has the choice to promote neither of the contestants, then the optimal strategy is to set a negative bias for the leader, and promote him at the end of the second period only if he wins the second race as well. Otherwise, nobody is promoted.

While the previous papers consider a two period set-up where the timing of each period is fixed, they can nevertheless generate interesting predictions for the analysis of the timing of careers. In these models, the introduction of a *bias* is made by rewarding the winner or the loser of the first round *with a promotion*. When the time spent at a given layer is not fixed, a natural interpretation of these models is to consider that the bias can also be made *via the speed of promotions*. For example, a positive [negative] bias is introduced if a fast promotion at the first layer implies a fast [slow] promotion at the second layer.

Our analysis is in the vein of recent empirical exercises that have analyzed fast tracks using firm's personnel records. Baker et al. (1994) use data of a medium-sized U.S. firm in a service industry. They show the promotions and exit rates by tenure at the second level of the hierarchy versus the time to promotion from the first to the second level. They find that "holding tenure constant, promotion rates decrease with tenure in the previous level", providing evidence of a learning process about the agent's ability. Another empirical paper that looks at the issue is Ariga et al. (1999). They use personnel data from a

large Japanese firm in the manufacturing industry. They test econometrically whether the time spent in a lower level has an influence on the probability to be promoted in an upper level. They find that this variable has a strong, significant and negative effect, what they interpret as evidence of fast tracks. The fast track effect survives even when they control for fixed effects, what can be interpreted as evidence that a pure learning explanation is not the only explanation, but suggests rather that individuals with higher ability either receive more training or are allocated to tasks favoring their advancement. This explanation is in line with the Gibbons and Waldman (1999) building blocks model. The problem with these two papers is the lack of performance measurement, which impedes them to test the reasons behind fast tracks. Chiappori et al. (1999) focus on other specific questions about the timing of promotions, using data of a French state-owned firm. They consider individuals who have the same position in the firm's hierarchy at date 0 and date 2 but have different intermediate careers at date 1. They propose a test of a property of wage dynamics which is that late beginners [the ones promoted at the beginning of date 2] exhibit better career prospects than early starters [the ones already promoted at date 1]. The advantage of their approach is that their empirical strategy allows them to overcome the lack of data on individual performance.

These papers have analyzed the personnel policy of large firms in the financial, manufacturing or public sector. Here we focus on a completely different working environment as we consider the timing of promotion in economic departments using a sample of top economists. The academic labor market displays several peculiar aspects that are likely to influence the promotion policies of the departments.

The most important feature for our purpose is that research performance is easily measurable, publicly observable and standard to the profession. We are therefore able to use performance in our empirical analysis and thus control for the learning hypotheses, what represents a significant improvement with respect to the existing studies. The second characteristics of the academic profession is that jobs do not tend to vary along the hierarchy. The task assignment explanation is therefore not likely to play an important role in the promotion decision, what could reduce the attractiveness of fast tracks. Thirdly, research represents only one of the tasks of the everyday life of economists, other tasks

being teaching, administrative duties, etc... If the promotion decision is taken according to different criteria, then the performance dimension which is more easily observable should receive less weight than would have been optimal in the absence of the other tasks, in line with the Holmström and Milgrom (1991) explanation. But multitasking does not stand as an obvious candidate to affect the timing of promotion.

We analyze the timing of promotions for a sample of 323 top economists and test for the existence of fast tracks. We look whether the time spent at the first layer [assistant] has an impact on the time spent at the second layer [associate], taking into account individual performance. We find that research performance is strongly related to the time spent at each layer and that individuals promoted quickly from assistant to associate professor are less likely to be promoted quickly from associate to full professor. This result is robust to the choice of various specifications. The bias set against the faster is however relative: the individuals who spent one year less than the average in the first stage being only handicapped of 6 months in the next stage. We also find that individuals can beat this handicap if they are productive enough during the second stage. We reach similar conclusions when using a broader definition of fast track and see that the handicap does not survive the whole career, as individuals quickly promoted in the past are the ones who experience the fastest careers. These findings can be explained by a will to balance incentives and sorting issues, as in an environment where performance is informative about relative abilities, incentives require a handicapping policy while the opposite is true for sorting. We offer alternative explanations for our results and propose simple tests to discriminate between them. We finally look at the impact of different timing of careers on individual performance. We find that fast tracks are always more productive than their pairs, even after the last promotion, what suggests an effective selection process.

The paper is structured as follows. Section 2 describes the dataset. In section 3, we analyze the timing of promotions and test for the existence of fast tracks in our sample, using different definitions. Section 4 looks if different career paths lead to different behavior in research performance. Finally, section 5 concludes.

2 Data

The main dataset used is described in details in Coupé et al. (2003). It provides information about the career and research performance of 652 top academic economists for the period 1969-1998. For each individual, we know how many years was spent in each rank before being promoted to the next. In this paper, we only consider a well defined subset of these individuals. We define three conditions to include them in our analysis: (1) they must have become professor in 1998, (2) they have followed the hierarchical ladder and (3) they have spent their entire career in universities. This leaves us with 323 individuals.

In academia, the hierarchy resumes to three layers: assistant, associate and full professor. Therefore, to analyze the timing of promotions and see whether there exists fast tracks, we need individuals who have already attained the last layer of the hierarchy. This sampling procedure leads by definition to the existence of a survival bias. This implies that we can only interpret our findings for the subsample of economists studied. Note that the bias is less critical than it would have been in the case of firms: sooner or later academics attain the last layer of the hierarchy while this is not true for individuals employed in firms. Taking only individuals who have followed the hierarchical ladder is used for simplification. We have also considered non hierarchical promotions and results were unchanged. The third conditions is also innocuous.

There is substantial heterogeneity among individuals as to how many years they spend in a given position, as shown in table 1. For all the individuals who were promoted to associate professor, the number of years they spent as assistant professor varies between 1 and 15 years. For individuals who were promoted to professor, a similar conclusion prevails. Some individuals are promoted quickly from rank 1 [assistant professor] to rank 2 [associate professor], and similarly from rank 2 to rank 3 [full professor]. We define a *fast track* as someone who is promoted in a time span equal or lower than 3 years in each of the promotions. Table 2 reports the proportion of fast track in our sample. This is the case for 12.1% of the individuals. The largest proportion of individuals in our sample are promoted to the next level in more than three years during the two spells.

TABLE 1: Number of Years Spent in Lower Ranks

time as assistant professor (years)	Number of individuals	time as associate professor (years)	Number of individuals	time as assistant and associate professor (years)	Number of individuals
1	9	1	21	2	1
2	21	2	39	3	2
3	59	3	76	4	3
4	65	4	70	5	24
5	71	5	59	6	37
6	53	6	31	7	38
7	32	7	14	8	49
8	9	8	7	9	55
9	1	9	2	10	52
10	1	11	1	11	23
12	1	13	1	12	15
15	1	14	2	13	8
				14	10
				15	2
				17	1
				18	2
				20	1
	323		323		323

TABLE 2: Number and Proportion of Fast Tracks

		Number of Years as Associate		
		$\leq$ 3 years	$>$ 3 years	#
Number of Years As Assistant	$\leq$ 3 years	39 (12.1%)	50 (15.5%)	89
	$>$ 3 years	97 (30.0%)	137 (42.4%)	234
		136	187	323

TABLE 3: Time to Promotion in Level 1 versus Time to Promotion in Level 2

Years at level 1		Years at Level 2 (associate) before promotion									
(assistant)	Statistics	1	2	3	4	5	6	7	8	9	10 +
1	Promotion rate (%)	11	0	0	25	33	50	50	0	100	-
	N	1	0	0	2	2	2	1	0	1	0
2	Promotion rate (%)	10	11	24	46	43	25	67	100	-	-
	N	2	2	4	6	3	1	2	1	0	0
3	Promotion rate (%)	2	21	37	24	64	38	20	50	0	100
	N	1	12	17	7	14	3	1	2	0	2
4	Promotion rate (%)	9	8	28	33	54	75	0	67	0	100
	N	6	5	15	13	14	9	0	2	0	1
5	Promotion rate (%)	10	16	30	42	50	55	80	0	0	100
	N	7	10	16	16	11	6	4	0	0	1
6	Promotion rate (%)	2	6	31	50	53	38	40	67	100	-
	N	1	3	15	17	9	3	2	2	1	0
7	Promotion rate (%)	3	13	33	33	33	63	100	-	-	-
	N	1	4	9	6	4	5	3	0	0	0
8	Promotion rate (%)	11	25	0	33	25	67	100	-	-	-
	N	1	2	0	2	1	2	1	0	0	0
9	Promotion rate (%)	100	-	-	-	-	-	-	-	-	-
	N	1	0	0	0	0	0	0	0	0	0
10 +	Promotion rate (%)	0	33	0	50	100	-	-	-	-	-
	N	0	1	0	1	1	0	0	0	0	0
All	Promotion rate (%)	7	13	29	37	50	53	52	54	33	100
	N	21	39	76	70	59	31	14	7	2	4

To provide a first impression about the link between the two time period spent in each rank before promotion, we construct a table which shows the number and promotion rate of individuals promoted to professors ranked by the number of years that they spent in the lower ranks [table 3]. This table is similar to table 4 in Baker et al. (1994). Conclusions from this simple exercise are much less clear cut than the findings of Baker et al. (1994). Summary statistics do not tend to favor a policy of systematic fast track, at least when looking at the raw numbers. However, it is important to control for performance when assessing the impact of the time spent in a lower rank on the time spent on the subsequent one. In the next sections, we analyze the timing of promotion, as well as the determinants and consequences of being fast track.

3 The Timing of Promotions

We first test whether there exists systematic fast track in our sample of top economists. We consider that individuals are on a *fast track* if after having been *promoted quickly at the first stage* [from assistant to associate professor], they *experience again a quick promotion at the next stage* [from associate to full professor].

We use two variables describing a fast promotion from rank 1 [assistant professor] to rank 2 [associate professor]:

$NASTP$, *the number of years spent as assistant professor*

$FAST13$, *a dummy variable, equal to 1 if the individual is promoted from assistant to associate professor in 3 years or less and 0 otherwise*

We also introduce two variables to describe a fast promotion from rank 2 [associate] to rank 3 [full professor]:

$NASSP$, *the number of years spent as associate professor*

$FAST23$, *a dummy variable, equal to 1 if the individual is promoted from associate to professor in 3 years or less and 0 otherwise*

A test for the existence of fast track is to see whether $NASTP$ (or $FAST13$) has an effect on $NASSP$ (or $FAST23$). We control for the production since last promotion ($PSLP$), which we interact with EXP to check whether new information becomes less valuable as the researcher becomes more experienced, in line with learning theory. The measure of production that we use is publications weighted by the impact factor of the journal. The impact factor is equal to the citations in year t to the articles published in journals J in *t-1* and *t-2* divided by the number of articles published in J in *t-1* and *t-2*. This reflects the number of citations that can be expected for an article published in J, measured one or two years after publications[3]. We perform the following standard OLS regressions:

$$NASSP_i = \beta_0 + \beta_1 NASTP_i + \beta_2 PSLP_i + \beta_3 PSLP_i * EXP_i + \varepsilon_i \quad (1)$$

$$NASSP_i = \beta_0' + \beta_1' FAST13_i + \beta_2' PSLP_i + \beta_3' PSLP_i * EXP_i + \varepsilon_i' \quad (2)$$

and the following probit estimations:

$$FAST23^* = \eta_0 + \eta_1 NASTP_i + \eta_2 PSLP_i + \eta_3 PSLP_i * EXP_i + \tau_i \quad (3)$$

$$FAST23^* = \eta_0' + \eta_1' FAST13_i + \eta_2' PSLP_i + \eta_3' PSLP_i * EXP_i + \tau_i' \quad (4)$$

where $FAST23_i = 1$ if $FAST23_i^* > 0$

$FAST23_i = 0$ if $FAST23_i^* \leq 0$

Table 4A provides the estimates of the regressions of $NASSP$ [specification (1), column 1 and 2] and $FAST23$ [specification (2), column 1 and 2]. First, we see that performance has a significant and positive effect on the speed at which associate professors are promoted full professor: the highest the productivity of an associate professor, the less years it takes to achieve the promotion to full professor. We also see that the effect of performance diminishes with experience what suggest the existence of a learning process about ability, as predicted by learning models. Moreover, the sensitivity of the speed of promotions to performance vanishes around 7 years and turns negative thereafter. This appears to

[3] We used this weighting technique because it is one of the most objective definition of the productivity of academic economists. However, we have performed our analysis with alternative weighting schemes of publications and the results remained unchanged.

indicate that learning takes place only the 7 first years of the career and that productivity no longer positively influences the speed of the career afterwards.

Second, we see that $NASTP$ has a negative effect on $NASSP$, and $FAST13$ has a negative effect on $FAST23$. Having been promoted quickly in the past decreases the chances of being promoted quickly in the future. The estimates of Eq.(1) show that, all other things being equal, an individual who spent one year less than the average as assistant professor will spend around 6 months more than the average as associate professor. The negative relationship between the two timings of promotions indicates that the individuals who were fast at the first stage are handicapped with respect to their slower pairs at the second stage. This handicap however is relative and not absolute as the faster academics are only handicapped in the second stage by 54% of the time that they have gained in the first stage. The other specifications lead to similar conclusions. Note that the most informative specification is the one testing Eq.(1) as it uses non dichotomic variables and thus contains more variation.

These findings are in line with the handicapping theory: a bias is set against the individuals who have been quick in the past [the "winners"] to offset the likely edge in ability [Prendergast (1991) and Meyer (1992)]. The results also show that individuals can beat this handicap if they are productive enough during the second stage. This could be because the speed of the first promotion does not convey enough information about the individual to put him on a fast track and that the loss of promoting the less able exceeds the gain from promoting the more able [Meyer (1991)]. Therefore taking into account the performance of the second stage is needed to decide which individuals should be on a fast track. We also checked whether this handicapping effect was holding on when we considered only individuals in similar departments. This test allows to control for institution-specific effect linked to reputation. We ran the same specification as in table 4 by category of university[4]. We found that the time spent as assistant

[4]Seven categories are defined based on the rankings of economis departments: the top 2 (category 7, Chicago and Harvard), the close contenders (category 6, those ranked between 3rd and 9th), the contenders (category 5, between the 10th and the 24th position), the upper middle ranked (category 4, those ranked between 25th ad 49th), the lower middle ranked (category 3, between the 50th and the 100th), the low ranked (category 2, between the 100th and 300th position) and the very low ranked (category 1, those under the 300th position).

TABLE 4A: Do systematic fast tracks exist? - All individuals

	(1)			(2)			(3)	
Dep.var.:	$NASSP_i$			$FAST23_i$			$NFULL_i$	
$NASTP_i$	-0.54***	-	-	0.18***	-	-	0.46***	-
	(-14.36)			(8.56)			(12.11)	
$FAST13_i$	-	1.45***	2.07***	-	-0.40***	-0.64***	-	-0.91***
		(9.06)	(13.47)		(-6.23)	(-6.70)		(-5.65)
$PSLP_i$	-0.67***	-0.55***	-0.17***	0.26***	0.22***	0.02	-0.67***	-0.81***
	(-20.37)	(-15.67)	(-3.41)	(9.17)	(8.54)	(0.42)	(-20.37)	(-22.99)
$PSLP_i$*EXP_i	0.09***	0.08***	0.03***	-0.04***	-0.03***	-0.01	0.09***	0.10***
	(27.74)	(22.63)	(5.06)	(-9.48)	(-9.66)	(-1.12)	(27.74)	(29.57)
EXP_i	-	-	0.79***	-	-	-0.69***	-	-
			(7.19)			(-5.05)		
$EXPSQ_i$	-	-	-0.02***	-	-	0.02***	-	-
			(-2.89)			(4.67)		
Constant	5.92***	2.81***	-2.70***	-	-	-	5.92***	8.50***
	(24.95)	(19.43)	(-4.49)				(24.95)	(58.45)
Log likelihood	-	-	-	-95.50	-127.26	-111.31	-	-
Pseudo R^2	-	-	-	0.57	0.42	0.49	-	-
Adj.R^2	0.73	0.64	0.73	-	-	-	0.85	0.80
Nr. Obs.	323							

Specification (1) and (3): OLS estimation, t-stat equivalent in parentheses;***/** denote resp. significance at 1%/5%

Specification (2): probit estimation, marginal changes; t-stat equivalent in parentheses; ***/** denote resp. significance at 1%/5%

had a negative effect on the time spent as associate in all categories of universities. However, the coefficient was smaller for higher level universities, for which sorting might be a more important constraint[5].

Up to now, we have defined a fast track with respect to the timing of each subsequent promotions. We could also use a *broader definition* and consider not only the time spent at each layer, but the *whole time spent to attain the last level in the hierarchy.* What we want to test is if individuals who have been quickly promoted at the first stage, despite their handicap, still have a faster career than the ones who have been slowly promoted at the first stage. In other words, does the handicap hold for the whole career?

We use a new variable to describe a fast career: *NFULL, the number of years spent before being promoted to professor.* We run the following OLS regressions:

$$NFULL_i = \alpha_0 + \alpha_1 NASTP_i + \alpha_2 PSLP_i + \alpha_3 PSLP_i * EXP_i + \omega_i \qquad (5)$$

$$NFULL_i = \alpha_0^{'} + \alpha_1^{'} FAST13_i + \alpha_2^{'} PSLP_i + \alpha_3^{'} PSLP_i * EXP_i + \omega_i^{'} \qquad (6)$$

The third specification of table 4A reports the estimates of the regressions of $NFULL$. We can see that the handicap does not survive the whole career. Individuals who have been quickly promoted in the past are the ones who experience the fastest careers. Those who have been promoted in the first stage in less than four years will have on average a career path nearly one year shorter than the ones who spent more time at the first stage. Note also that, as in previous estimations, performance positively affects the timing of the career and that this effect decreases with experience.

Up to now, we have found that, after the first stage of the career, the fastest individuals are handicapped with respect to their slower colleagues. However, this handicap is relative, it only holds for the second stage and does not spread to the whole career path. Such a result could be explained by the need to balance incentives and sorting issues. In an environment where performance

[5] As an additional test, we also applied the tools of duration analysis. We estimated whether the duration of the stay as assistant professor has an influence on the hazard rate of leaving the state of associate professor, i.e. being promoted professor, controlling for the other factors that we have already considered, in particular production. We used a discrete time proportional hazard model (Prentice and Gloecker, 1978). Our results were similar to the previous ones.

is informative about relative abilities, incentives would require a handicapping policy while the opposite is true for sorting. Therefore, designing handicaps that are *in fine* relative could be a way to achieve the trade-off between sorting and incentives.

Alternative Explanations

Human capital accumulation

We have interpreted our previous findings as evidence of handicapping policies for incentives and sorting reasons. However, an alternative explanation for these results could be human capital accumulation. If the accumulation of human capital is crucial for the firm [in this case the university] and individuals do not differ much in their accumulation process, then those receiving a fast promotion at the beginning will have accumulated less human capital and will have to wait longer for their next promotion[6]. We therefore need to prove whether our results are due to a handicapping or to a human capital story. We perform the estimations of Eq.(2) and (4) with experience (EXP) and experience squared ($EXPSQ$) to control for the human capital accumulation hypothesis. The estimates of the regressions are reported in table 4A [third column of specification (1) and (2)]. We can see that the conclusions are similar than in the previous regressions, even if the magnitude of the coefficient is slightly different. However, we have to be aware of the possible colinearity problems in our specifications [experience and the timing of promotions being highly correlated].

Another way to test for the human capital hypothesis is the following: if human capital accumulation is all that matters for career paths, then individuals who were slow at the beginning should have better careers than those who were fast, due to a higher level of human capital[7]. The $NFULL$ specification of previous subsection already showed us that being fast at the beginning leads to a better career in term of timing. We also look at the most successful academics [promoted to full professor in less than 7 years] and see what their first career path look like. Among the 67 (out of 312) who attain the level of full professor in less than 7 years, only 27% took more than 3 years to be promoted

[6] This issue was raised by Baker et al. (1994) and Chappiori et al (1999).

[7] This test is based on Chappiori, Valentin and Salanié (1999).

associate professor. Moreover, 55% of the quick assistant professors made it to full in less than 7 years while it was only the case for 8% of the slow assistant professors. This shows that the most successful individuals have spent few years at the first stage while the human capital accumulation hypothesis predicts the opposite. We therefore conclude that differences in career profiles can not only be explained by differences in human capital accumulation.

Tenure

A potential problem that could undermine our results is that, in the previous regressions, we have considered both tenured and untenured associate professors. It could be that these individuals exhibit different behaviors and that the only potential candidates for fast tracks are the tenured associate professors and not the whole sample. Therefore, not discriminating between the two could have led to biases in our results. To control for this possibility, we run the same regressions as before but only for the subsample of tenured associate professors. Estimates are provided in table 4B. We can see that the results remain unchanged. Differences in tenure status can thus not explain our results.

Endogeneity issues

In the specifications used for the regressions of table 4A and 4B, we have used the number of years as assistant professor ($NASTP$) as an explanatory variable. If $NASTP$ is determined by the productivity of the individual during this period and if individual productivity is correlated across time, this could raise endogeneity issues. To address this problem, we follow a two steps strategy. First, we regress $NASTP$ over the performance when assistant and performance interacted with experience (Eq.(7)]. Then, we replace $NASTP$ by its estimated value, $NASTPE$, in the estimation of $NASSP$ [Eq.(8)].

$$NASTP_i = \gamma_0 + \gamma_1 PSLP_i + \gamma_3 PSLP_i * EXP_i + \varphi_i \tag{7}$$

$$NASSP_i = \delta_0 + \delta_1 NASTPE_i + \delta_2 PSLP_i + \delta_3 PSLP_i * EXP_i + \upsilon_i \tag{8}$$

Results are shown in table 5, [1st column of specification (1)]. We can see that the effect is even stronger than before once we control for endogeneity.

TABLE 4B: Do systematic fast tracks exist? - Tenured associate

Tenured associate professors only								
	(1)			(2)			(3)	
Dep.var.:	$NASSP_i$			$FAST23_i$			$NFULL_i$	
$NASTP_i$	-0.58***	-	-	0.07***	-	-	0.42***	-
	(-8.72)			(4.64)			(6.36)	
$FAST13_i$	-	1.56***	1.92***	-	-0.27***	-0.44***	-	-0.58**
		(5.25)	(6.65)		(-3.71)	(-3.39)		(-1.99)
$PSLP_i$	-0.72***	-0.57***	-0.29**	0.10***	0.21***	-0.03	-0.72***	-0.87***
	(-13.05)	(-9.70)	(-2.44)	(4.66)	(4.50)	(-0.27)	(-13.905)	(-15.00)
$PSLP_i$*EXP_i	0.08***	0.07***	0.04***	-0.01***	-0.03***	-0.001	0.08***	0.10***
	(17.22)	(13.64)	(3.21)	(-4.72)	(-5.07)	(-0.10)	(17.22)	(18.48)
EXP_i	-	-	0.71***	-	-	-0.75***	-	
			(2.99)			(-2.75)		
$EXPSQ_i$	-	-	-0.02	-	-	0.03*	-	
			(-1.31)			(1.92)		
Constant	6.70***	3.32***	-1.62	-	-	-	6.70***	9.11***
	(15.91)	(13.97)	(-1.34)				(15.91)	(38.70)
Log likelihood	-	-	-	-24.48	-39.92	-36.63	-	-
Pseudo R^2	-	-	-	0.62	0.38	0.43	-	-
Adj.R^2	0.76	0.67	0.73	-	-	-	0.86	0.80
Nr. Obs.	101							

Specification (1) and (3): OLS estimation, t-stat equivalent in parentheses; ***/** denote resp. significance at 1%/5%

Specification (2): probit estimation, marginal changes; t-stat equivalent in parentheses; ***/** denote resp. significance at 1%/5%

TABLE 5: Do systematic fast tracks exist? - 2SLS estimation

	(1)		(2)	
Dep.var.:	$NASSP_i$		$NFULL_i$	
$NASTPE_i$	-0.69***	-	0.43***	-
	(-9.70)		(5.84)	
φ_i	-	-0.53***	-	0.55***
		(-9.19)		(10.37)
$PSLP_i$	-0.54***	-0.57***	-0.81***	-0.73***
	(-15.97)	(-15.90)	(-23.65)	(-22.18)
$PSLP_i$*EXP_i	0.07***	0.08***	0.09***	0.09***
	(23.13)	(22.70)	(30.37)	(29.42)
Constant	6.37***	3.29***	6.31***	8.08***
	(17.08)	(22.68)	(16.62)	(60.79)
Nr. Obs.	323			
Adj.R^2	0.65	0.64	0.80	0.83

OLS estimation, t-stat equivalent in parentheses
***/** denote resp. significance at 1%/5%

Because the residual φ_i represents the unexplained part of the time spent as assistant, a negative value could be interpreted as a promotion that occurred earlier than it should have been. This allows us to do an extra test by using the residual as explanatory variable instead of $NASTP$:

$$NASSP_i = \delta_0^{'} + \delta_1^{'}\varphi_i + \delta_2^{'}PSLP_i + \delta_3^{'}PSLP_i * EXP_i + \upsilon_i^{'} \tag{9}$$

We find that the first period noise is negatively related to the time spent as associate professor [table 5, 2nd column of specification (1)], again providing evidence of a handicapping policy. We also performed the same analysis for the estimations of $NFULL$ and the conclusions were the same as before [table 5, specification (2)].

4 Productivity and the Timing of Careers

Up to now, we have analyzed the timing of promotions. In this section, we want to see if individuals who spent different amount of time at each layer have a different behavior in term of productivity. We first look at the productivity of individuals after the last promotion [to full professor]. The first question we ask is the following: *are fast individuals more productive after being promoted to full professor*. In other words, is the early selection effective? We compare the average productivity of four groups of individuals: the ones who have spent less than 4 years in each layer (*fast tracks*), the ones who have spent less than 4 years at the first layer and more than 3 years at the second layer (*early fast*), the ones who have spent more than 3 years at the first layer and less than 4 years at the second layer (*late fast*) and the ones who have spent more than 4 years at each layer (*not fast*).

Table 6 reports the average productivity three years and five years after being promoted full professor. We can see that three years after the promotion to full professor, the most productive individuals are the fast tracks, followed by the late fast and then the two other groups. The difference in means is statistically significant for the fast tracks (t-value of 2.0) and for the late fast (t-value of 2.0). Over a span of five years, the most productive are still the fast tracks but we can no longer discriminate between the three other groups (i.e. the difference is only statistically significant for the fast tracks, t-value of 2.9). These figures show that the individuals who have the most successful careers are also the ones who are the best performers ex post. Therefore, early selection appears to be effective "cherry picking".

Another interesting aspect is to see how the productivity of each group evolves along the career. In figure 1, we first compare the profile of each of the four former groups. We can see that the fast tracks are not only the most productive individuals five years after the promotion to professor: they are the most productive along the whole career. This is especially striking at the beginning of the career while at the end, differences vanish. We also use an alternative definition and split the sample in two groups, according to the number of years spent before being promoted to full professor [7 years being the separation point].

TABLE 6: Average productivity and the timing of careers

A. Average productivity on a period of three years after promotion to professor

		Number of Years as Associate	
		≤ 3 years	> 3 years
Number of Years As Assistant	≤ 3 years	5.97	2.75
		(8.8)	(2.9)
	> 3 years	3.41	2.38
		(4.7)	(2.0)

Number of individuals: 272

Average productivity: 3.21

standard errors in parentheses

B. Average productivity on a period of five years after promotion to professor

		Number of Years as Associate	
		≤ 3 years	> 3 years
Number of Years As Assistant	≤ 3 years	9.98	4.60
		(10.6)	(3.5)
	> 3 years	5.42	4.80
		(3.8)	(3.27)

Number of individuals: 201

Average productivity: 5.61

standard errors in parentheses

FIGURE 1: Productivity along the career - time spent at each layer

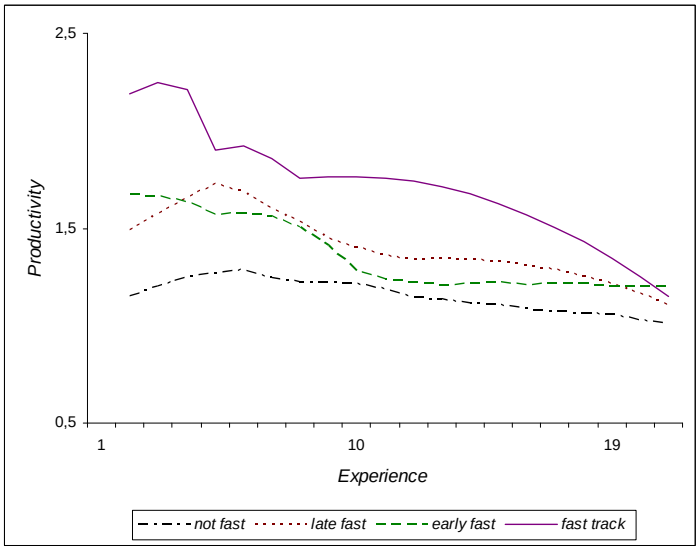

FIGURE 2: Productivity along the career - time to full professor

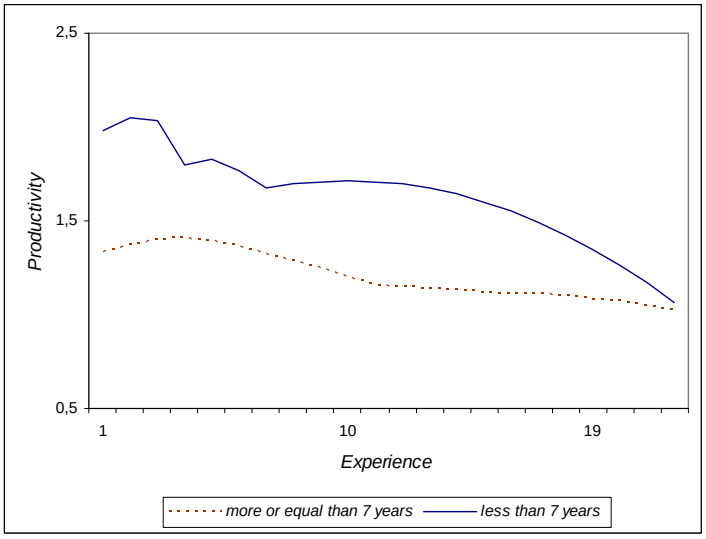

Figure 2 shows us that the conclusion is the same using this other definition: the fast individuals are always the most productive, whatever the year in their career.

Previously, we have detected the existence of a handicapping policy for the faster academics of the first stage and we have shown that these individuals were able to beat the handicap if they were productive enough during the second stage. Our interpretation of these results was that the timing of the first stage was not informative enough to put an individual on a fast track and that taking into account other information, as the performance in the second stage, was needed to take such a decision. The present analysis comforts our previous argument that the purpose of such a decision was an effective selection as fast tracks always exhibit a higher productivity than their pairs.

5 Conclusion

In this paper, we have analyzed the timing of promotions in academic departments. Contrary to previous attempts in the empirical literature, we have tested alternative theories of fast tracks by adding a measure of performance in our analysis. We have found that learning from past performance was an important factor to explain the time spent as assistant and associate professor. In addition, our analysis has shown the existence of a handicapping policy: individuals who had a fast promotion in the past were less likely to be promoted quickly again. We have also seen that the handicap was relative and that it was possible for these individuals to beat it if they achieved a given level of productivity. When using a broader definition of being fast in academia, we have shown that the handicap did not hold for the whole career and that the individuals promoted quickly at the beginning were also the ones who experienced the fastest and most successful careers.

We have linked our results to incentives and sorting issues. To set a negative bias against those promoted quickly in the first stage can improve incentives for all contestants and reestablish a balanced contest, as it compensates for the likely differences in ability. However, a strong handicap can be detrimental for

sorting concerns, as it may lead to the selection of inadequate individuals [i.e. give a promotion first to the less able]. We have interpreted our findings as evidence that incentives and sorting matter in academia and that using relative handicaps can help to balance these two concerns. We have also taken into account other potential explanations for our results, as human capital accumulation and tenure. We have shown that, even if they play a role, they can not explain our results on the timing of careers.

Finally, we have looked at the productivity pattern of individuals with different career profiles. We have found that fast tracks are always the most productive academics, whatever the year of their career. The difference is especially striking at the beginning of their career but they are also more productive than their pairs after the last promotion, what shows an efficient selection process. Our analysis suggests the need for richer datasets in order to improve our knowledge of the dynamics of careers.

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