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Productivity crowding-out in labor markets with motivated workers☆

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ABSTRACT

When workers' intrinsic motivation matters, a wage increase has mixed consequences on applicants' productivity and motivation, as shown in public service, healthcare, education and politics. In a simple theoretical framework where ability and motivation are workers' private information, we rationalize these differentiated responses and identify intuitive conditions for higher wages inducing self-selection of more (or less) productive and motivated workers. The selection patterns depend both on the statistical association between workers' characteristics and on the difference between the incentivized returns to ability across sectors. We emphasize a crowding-out effect of wage on workers' productivity that has not been analyzed in the theoretical literature before.

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1. Introduction

When deciding whether to apply for and to accept a job, prospective civil servants, teachers, health professionals, and politicians do not only respond to standard extrinsic motivations (i.e. wages) but also, possibly, to non-pecuniary ones. Teachers often care about the achievements of their students, many health professionals are intrinsically interested in the well-being of their patients, dedicated bureaucrats value their public service motivation, and politicians may be publicly-spirited regarding their political duties.

In these environments, the empirical evidence on the impact of a wage increase on the characteristics of the (incoming) workforce is controversial. Several papers focus on workers' skills, and find that higher wages increase applicants' ability,

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measured by different proxies.[1] Important exceptions are Merlo et al. (2010) and Fisman et al. (2015). who document the opposite result in the case o f politicians: in their studies, higher wages decrease members of the Parliament's quality. Workers' motivation has also attracted some attention. On the one hand, the field experiment analyzed in Dal Bó et al. (2013) shows that higher salaries attract workers who are more skilled and have a higher public service motivation. On the other hand, in the lab experiment by Banuri and Keefer (2016), higher salaries lead to a less socially motivated pool of public servants, but do not affect skills as measured by education and income. Our theoretical model provides a general and unifying explanation about such contrasting evidence and offers intuitive conditions for higher wages to attract more (or less) skilled and motivated workers.[2]

We study workers' self-selection in labor markets where intrinsic motivation may matter (i.e. in vocational labor markets), workers are heterogeneous with respect to both their ability and intrinsic motivation and the latter characteristics are workers' private information. We show that the consequences of changes in the wage offered in the vocational market on the characteristics of the pool of applicants fundamentally depend on how ability and motivation are statistically associated in the population of potential workers and on the relative steepness of incentive schemes across the vocational and the non-vocational sectors.[3] We provide an encompassing theory of how the degree of association between workers' ability and motivation determines the impact of a wage increase on the composition of the active workforce in vocational sectors. Such a unified theoretical framework accounting for the functioning of different labor markets where intrinsic motivation matters is new and reconciles the contrasting empirical evidence (discussed in detail in Section 4.2). We also document some striking and unexpected results. We show that when the statistical association between workers' attributes is positive and large and the incentive scheme is less effective in the vocational than in the non-vocational sector, then higher wages in the vocational sector attract workers with lower motivation *and* lower ability on average. This reduces productivity in the vocational sector.

Although our results show that the statistical association between ability and motivation plays a key role, it has been overlooked in the literature on screening and sorting of workers into different sectors of the labor market. We can expect that this statistical association varies in interesting and systematic ways across sectors with different vocational jobs and/or various cultural and historical backgrounds (see also the empirical works described in Sections 4.2). These elements and the broad picture we provide are useful for the ongoing debate on how to increase the supply and the quality of the workforce in vocational markets, as we elaborate in Section 5.

Our model is also remarkably simple. We begin with the classical lemons problem *à la* (Akerlof, 1970), where firms cannot condition their wage payments upon workers' productivity while workers' opportunity cost of accepting the job is increasing in their productivity, i.e. some returns to ability exist in the opt-out sector. Given that only relatively less capable workers are willing to accept the job at any given wage, the relevant sector will be characterized by an inefficiently low employment rate and by a low expected productivity of active workers. Moreover, the expected productivity of active workers will always be monotonically increasing in the wage rate: higher salaries will attract more productive workers in the relevant sector.

Consider now a vocational market in which workers also privately know how much they are motivated for the job offered by firms in the vocational sector. How does this second source of workers' private information affect the lemons problem? How does the pool of active workers change with the wage rate? In particular, do higher salaries still attract more productive workers?

In our setting, intrinsic motivation is interpreted as a benefit accruing to workers when they are employed in the vocational sector. Hence, highly motivated workers have lower reservation wages than poorly motivated colleagues because the former receive a larger premium for they motivation. *Ceteris paribus*, this implies a *propitious selection* into the vocational sector because only the most motivated workers are willing to apply for the job.[4]

For a close comparison with the standard lemons model, we analyze first the case in which in the vocational market the wage is uniform (no incentives). In the opt-out sector, instead, a screening mechanism is in place so that some 'incentivized' returns to ability exist. We show that, in a vocational market where both adverse selection about productivity and propitious selection about motivation coexist, the lemons problem is less severe with respect to the situation in which workers only differ in their productivity and motivation plays no role. Indeed, when intrinsic motivation matters, the expected productivity of active workers increases and thus production inefficiencies due to adverse selection are mitigated. Although workers' motivation has no direct impact on the firms' output in our setting, it indirectly affects the sector's overall production by means of the self-selection mechanism of workers into the vocational market.

As a consequence of both adverse and propitious selection effects, we expect more skilled but less motivated workers to enter the market as the wage increases.[5] Assuming that workers' attributes are normally distributed, the previous intuition

[1] See Gagliarducci and Nannicini (2013), Ferraz and Finan (2011) and Dolton and Marcenaro-Gutierrez (2011), among others.

[2] More details about the empirical and the scant theoretical literature are provided in Section 4.

[3] We call 'steepness of the incentive scheme' the degree to which the workers' information rent is increasing in their ability. Specifically, a high-powered incentive scheme translates into a wage schedule characterized by high returns to ability.

[4] *Propitious*or *advantageous selection* are the terms used in opposition to *adverse selection* to indicate the possible propitious self-selection of low-risk consumers into the insurance market when bidimensional private information on consumer's characteristics exists (see the excellent survey by Einav and Finkelstein (2011)).

[5] On this point see, among others, Heyes (2005), Delfgaauw and Dur (2007) and Dal Bó et al. (2013).

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