On the Importance of Social Status for Occupational Sorting*

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Abstract

I examine how social status affects occupational sorting in a model with two occupations, academia and finance. Workers care about wages and social status, which has two components: *occupational prestige* (the occupation’s rank among other occupations) and *local status* (the worker’s within-occupation rank). The main insight is that the two components of social status act as complements: If academics value highly the local status component, then academia attracts many high-skilled workers, which increases academia’s prestige and compensates the low-ranked academics for their meager local status. Consequently, social status can influence occupational sorting profoundly if workers value both components of status.

**JEL Codes:** D64, J24, D91.

**Keywords:** occupational sorting, self-selection, social status, occupational prestige, relative concerns, status externalities.

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1 Introduction

There is abundant evidence that human beings care about their social status and that they are willing to trade pecuniary rewards for greater status.¹ These findings strongly suggest that the desire for higher status should affect workers’ occupational choices. How profoundly, however, can this desire for status affect occupational sorting in a general equilibrium, especially if there are other market imperfections present?

To see why this question matters, let us consider academia, which will serve as my lead example throughout the paper. It has long been recognized that information is much cheaper to transmit than to produce, and as such, has the attributes of a public good (Nelson, 1959; Arrow, 1962). As a result, academia, which is primarily in the business of producing information, suffers from the public good problem: Academics privately appropriate only a fraction of the social surplus they produce. If the public good problem went uncorrected, academic wages should be lower and less differentiated with skill than in the first-best solution. This distortion to wages would then distort the occupational choices. Fewer workers would join academia, and those workers would be (on average) less talented than in the optimum. The long-run growth implications of these two distortions appear dire.

However, while academic wages in many countries are lower and less differentiated than wages in other professional occupations, the number of workers in academia seems to be comparable to (say) law and the average cognitive skill of academics appears to be at least as high as that of parliamentarians, lawyers, or CEOs.² It is, of course, possible that the number and average skill of academics would be even greater in the first-best solution. The alternative explanation is, however, more interesting: The externalities associated with social status may be counteracting the distortion caused by the public

¹Huberman, Loch, and Onculer (2004) conducted a series of lab experiments in five different countries, and found that, in each country, subjects were willing to sacrifice some material gain to obtain social status that existed only for the duration of the experiment. Kwon and Milgrom (2007) studied mergers and acquisitions and found that workers are less likely to switch jobs if their within-occupation rank in the merged firm has increased. Cardoso (2012) studied job movers and found that the increase in wages associated with the change of a job decreases with their rank in the new firm. Card, Mas, Moretti, and Saez (2012) found that workers are more likely to switch jobs if they learn that they earn less than the median wage in their organization.

²Weiss and Lillard (1978) show that in the U.S., wages of researchers are lower in academia than in the private sector. Shuster, Finkelstein, Galaz Fontes, and Liu (2008) show that in the U.S., academia pays less on average than other professional, and Machin and Oswald (2000) provide evidence that in the UK, wages of academic economists are lower and less differentiated than wages of economists in the private sector. Bakija, Cole, and Heim (2010) document that there are over 5 times fewer professors and scientists among the top 0.1% earners than there are lawyers which, together with the fact that the numbers of academics and lawyers appear comparable, suggests that wages in academia are less differentiated than in law. Hussar, Zhang, Hein, Wang, Roberts, Cui, Smith, Bullock Mann, Barmer, and Dilig (2020) document that there were close to 1.5 million faculty in the U.S. in 2019; the number of lawyers in the same year did not reach 1.4 million (American Bar Association, 2019). Finally, Bó, Finan, Folke, Persson, and Rickne (2017) document in their Table II that in Sweden the average cognitive score among economics and political science professors is higher than among parliamentarians, CEOs, and lawyers and judges (but slightly smaller than among medical doctors).
good problem, so that the actual sorting into academia approximates the optimum even though academic wages are lower and less differentiated than in the first-best solution.

In this paper, I examine the circumstances under which workers’ preference for social status can counteract academia’s public good problem, so that academia attracts more workers than finance and these workers have (on average) higher skill than bankers. My model builds on the classic model of occupational sorting by Roy (1951). There is a continuum of workers, who freely join one of the two occupations: finance or academia. Each worker is endowed with some level of financial skill and some level of academic skill. The wage in finance is an exogenous function of the financial skill, and the wage in academia is an exogenous function of the academic skill. I assume that the academic and financial skills are positively interdependent, that is, that the joint distribution of these skills is more concordant than the independent distribution.

I depart from Roy’s setting in two ways. First, I assume that academia suffers from the public good problem, so that wages in academia are lower and differ less with skill than in the first-best solution. In fact, I assume that the public good problem is so strong that academics receive none of the social surplus from their research, and are thus paid only a constant wage for their teaching. As a result, in the no-status benchmark (i.e., if wages are the workers’ only reward) all workers with high enough financial skill join finance, with academia attracting only workers with low financial skill (and thus, because of the positive interdependence between academic and financial skill, also with low academic skill on average).

Second, I assume that, apart from wages, workers also care about their social status, which consists of two components: occupational prestige and local status, each determined endogenously. As is standard in the economics literature on social status (see, for example, Weiss and Fershtman (1992); Fershtman and Weiss (1993); Mani and Mullin (2004)), I assume that occupational prestige is determined by the average skill in that profession. Note that if prestige depends on the average skill, then every worker of higher-than-average skill creates a positive externality for all members of her occupation. However, as skill is two dimensional in my model, I have to make a decision whether it is the financial or the academic skill (or some combination of these) that determines prestige. I assume—somewhat arbitrarily—that prestige is determined by the financial skill and later verify that this assumption is not critical for my results.³

Local status is modeled as a linear function of the worker’s rank within her chosen profession. For example, an academic’s local status depends on how her academic skill compares to that of other academics. This means that every worker who joins a profession creates a negative externality for all workers ranking below her, and a positive externality

³I believe that this assumption provides the best baseline, as it makes it the most difficult for academia to be prestigious, and thus also for social status to counter the public good problem. In other words, if social status can counter the public good problem in academia when prestige depends on the financial skill only, it should do so when it depends on the academic skill as well.
for all workers ranking above her. The linear function is chosen so that the average local status in a profession is always equal to 0: If local status becomes more important in an occupation, then the top workers are rewarded more but the lowest-ranked workers are rewarded less. Finally, local status is allowed to enter workers’ rewards with a different weight in each occupation. This can be justified in at least two ways. First, one’s peers are a more important part of one’s reference group in more hermetic professions. Second, in occupations with more rigidly defined and more easily observable notions of achievement, local status is more salient, and hence influences one’s well-being more strongly.\(^4\) Note that, arguably, academia meets both of these criteria.

I derive three results, two negative and one positive. The first result is negative: I show that if workers cared about the prestige of their occupation but were indifferent to their own rank within the occupation, then finance would continue to attract exclusively high-skilled workers and academia would continue to attract workers with (exclusively) low financial skill and (on average) low academic skill. In addition, academia would attract fewer workers than in the no-status benchmark. In other words, the interaction between the externality associated with occupational prestige and academia’s public good problem amplifies the distortion to sorting into academia. The intuition behind this result is very similar to the argument initially outlined in Chapter X of Adam Smith’s *The Wealth of Nations* (Smith, 1776) and later formalized in Weiss and Fershtman (1992) and Fershtman and Weiss (1993): In some occupations, such as finance, wages are very dependent on skill and only a select few workers are able to make a living in them. The high talent of their members makes these professions prestigious; the high prestige, in turn, attracts a larger number of workers than the wage level itself would warrant.

The second result is negative as well: If workers cared about their rank within the occupation but not the prestige of the occupation, and if the teaching wage were low enough, then academia would either attract fewer workers than finance or attract workers that are (on average) less skilled than in finance. In other words, if the public good problem is strong and the pay for teaching is low, then at most one of the two distortions caused by the public good problem can be counteracted by the preference for local status, regardless of how strong this preference is. In this case, the intuition is novel: In order to attract workers who are highly skilled in both dimensions, academia must offer them a higher local status reward than finance. However, the higher the reward offered to high-ranked workers, the higher the punishment inflicted on the lowest-ranked academics, regardless of their skill. If the difference in the weight put on local status in academia

\(^4\)In a companion paper (Gola, 2015), I provide a microfoundation of the social status reward function and show that the weights do indeed depend on those two factors. Ager, Bursztyn, Leucht, and Voth (2019) provide empirical evidence which supports this microfoundation. Using data on victory rates and aerial deaths of German fighter pilots during World War II, they show that public recognition of a pilot’s achievements had a spillover effect on the victory and death rates of his peers, and that this spillover depended on the intensity of their prior interactions and the social distance between them.
and finance exceeds the difference between the academic wage and the lowest wage in finance, then no agent is willing to be the lowest-ranked academic and academia unravels (attracts a zero measure of workers). This imposes an upper bound on how much more important local status can be in academia than in finance in any equilibrium. If wages in academia are low, then this bound is tight and academia is unable to attract workers who are highly skilled in both dimensions, which is necessary to have a workforce that is both larger and of better quality than in finance.

The third result is positive: If local status is sufficiently important in academia than in finance and the taste for occupational prestige is sufficiently strong, then academia can attract an arbitrarily large number of workers while maintaining a higher average quality of workforce than finance. In other words, the interaction between the taste for local status and the taste for occupational prestige is able to counteract both distortions caused by academia’s public good problem, regardless of how strong the public good problem is. The intuition is, again, novel: Suppose for now that the government strives to maintain a fixed size of the academic sector and achieves this goal by adjusting the teaching wage. In such a case, if local status becomes more important in academia, then academia attracts workers who are more skilled on average, which increases academia’s prestige. The greater the taste for prestige, the more this higher prestige means to the lowest-ranked academic, and thus the lower the wage level needed to maintain the desired size of academia. In that sense, occupational prestige and local status act as complements in regard to the non-wage compensation received by the lowest-ranked academic. Returning to the case where the academic wage is constant and the size of academia varies, the complementarity between occupational prestige and local status implies that if the taste for prestige is arbitrarily high, then—regardless of how low academic wages are—local status can be arbitrarily more important in academia than in finance, without having an adverse effect on academia’s size. Finally, high local status rewards for skilled workers allow academia to attract talent.

The main message of my paper is thus that if the public good problem in academia is strong enough and the teaching wage is low enough, then neither of the two social status components can (on its own) counter the public good problem. However, the interaction between these two components can always counter the public good problem, provided that (a) the two skills are positively interdependent, (b) local status in academia is sufficiently more important than in finance, and (c) the taste for occupational prestige is sufficiently strong. This message is remarkably robust. The only other assumption which matters at all is that occupational prestige is determined by the financial skill; however, the message remains unchanged as long as the characteristic which determines prestige is positively interdependent with the academic skill.

The rest of the paper is structured as follows. Section 1.1 discusses further the related literature. Section 2 develops the model and motivates my modeling choices. Section 3
derives the main results. Section 4 discusses why none of the simplifying assumptions are critical. Section 5 concludes. Appendix A contains the proofs omitted in the main body of the paper.

1.1 Related Literature

There exists only a handful of papers explicitly interested in the impact that social status has on sorting into occupations, most of them written by Chaim Fershtman and Yoram Weiss. In the model examined in Weiss and Fershtman (1992) and Fershtman and Weiss (1993), workers are \textit{ex ante} homogenous in skill but can choose how much education to acquire: The prestige of each occupation depends on the average wage and average educational level in that occupation. Fershtman, Murphy, and Weiss (1996) embed an extension of that model into an endogenous growth model and show that the preference for social status may crowd out high-ability/low-wealth workers from the growth-enhancing occupation. Mani and Mullin (2004) introduce occupational prestige into a standard Roy’s model with log-normally distributed skill. In contrast to the present paper, they assume that occupational prestige depends on the average of the occupation-specific skill, and that its importance in each occupation is proportional to that occupation’s size.\footnote{Albornoz, Cabrales, and Hauk (2020) is also relevant, even though it is not explicitly concerned with social status. The authors develop a Roy’s model with independently distributed skills and endogenous choice of effort in which there are productivity spillovers within occupations. These spillovers act similarly to occupational prestige.} To the best of my knowledge, the only other article that examines the impact of local status on occupational sorting is the companion of this paper (Gola, 2015), in which I introduce both components of social status into the two-sector assignment model from Gola (2020) and derive the distributional consequences of an increase in the importance of local status. However, in that paper the number of jobs in each sector is fixed, which means that the occupational prestige component of the reward is competed away and has no impact on sorting.

Robert Frank has examined (in Frank (1984) and Frank (1986)) how local status affects workers’ sorting into firms. However, the impact of social status on sorting across firms is fundamentally different from its impact on occupational sorting. A firm takes into account the effect of its hiring decisions on the well-being of its other employees, and thus internalizes the externalities produced by within-firm local status. An occupation consists of workers employed by many independent firms, none of which considers the effect of its hiring decisions on everyone else in that profession. Thus within-firm local status influences mostly internal wage structures, whereas within-occupation local status affects mostly occupational sorting and only indirectly wage structures.

There are a number of papers which examine sorting across entities other than occupations or firms and allow for the presence of relative concerns between and within
groups, but do not interpret these concerns as occupational prestige and local status, respectively. Among these, Damiano, Li, and Suen (2010) is most relevant, even though, in contrast to this paper, it focuses on how the externalities caused by relative concerns distort sorting, rather than on how these externalities can counter other distortions. In that model, workers choose between two organizations, and their only concerns are their own rank and the average skill within their chosen organization. The authors themselves count the assumptions that each organization has a fixed capacity and that skill is one dimensional as two of the three main limitations of their article. While each of these assumptions affects the results, the fixed-capacity assumption is more limiting, because it is always binding in the specifications of interest: The lowest-ranked workers in one organization strictly prefer to join the other organization but are unable to do so. Fixing the size of an occupation/organization makes the model more tractable but means that within-group relative concerns do not create a trade-off between quality and size (which thus cannot be alleviated by between-group relative concerns), as is the case with free entry. Apart from Damiano et al. (2010) and its follow-up (Damiano et al., 2012), the papers by de Bartolome (1990), Becker and Murphy (2000), and Morgan, Sisak, and Várda (2018) are also relevant. de Bartolome (1990) and Becker and Murphy (2000) consider the impact of between-group relative concerns on residential sorting in models with binary ability. Morgan et al. (2018) examine sorting into contests, in a setting where the success in each contest depends only on one’s relative position among the participants.

There is a small literature concerned with how academic institutions correct the distortion caused by the public good nature of information. Dasgupta and David (1987, 1994) provide an informal but very insightful discussion of the crucial role played by research priority: Being the first person to make a scientific discovery brings fame and respect, which creates incentives to exert effort and presumably attracts talented workers to academia (to the extent that the ability to generate discoveries is correlated with talent). This reasoning is formalized in Jeon and Menicucci (2008), where a model is considered in which the quality of the peer-review process determines whether fame accrues to the authors of actual scientific achievements: If this is the case and workers care about fame sufficiently strongly, then academia is able to attract superior talent. In that model, one receives the same fame reward whether there are many or just a few discoveries being made; thus there is no trade-off between the quality and the size of the workforce in academia. Alternatively, one could take the view that the level of fame depends on how important a discovery is compared to others that are being made, in which case the desire

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6 The third is the absence of explicit objective functions for the two organizations, which is relaxed in Damiano, Li, and Suen (2012) and irrelevant in the context of occupational sorting.

7 The assumption of one-dimensional skill is critical for the results in their Section 4. With two-dimensional skill, there is no equivalence between the two-group assignment model and the relative concern model, because with two dimensions the lowest-ranked workers in each group must receive the same reward (this follows immediately from Lemma 1 in Gola (2020)).
for fame would be very similar to local status.

Finally, my results are related to the general theory of the second best (Lipsey and Lancaster, 1956), which states that if there exists a distortion that cannot be removed, the second-best solution involves introducing further distortions. In the light of this remarkable result, it is not surprising that the externalities caused by social status can counter academia’s public good problem. Nevertheless, the crucial role played by the interaction between the two components of social status is non-trivial.

2 The Model

There is a unit measure of workers, and there are two occupations: academia and finance. Each agent is fully described by her skills \((x_A, x_F) \in [0, 1]^2\), where \(x_A\) and \(x_F\) are the skills used in academia and finance, respectively. The marginal distributions of \(x_F\) and \(x_A\) are standard uniform, which means that the joint distribution of skills \(C\) is a copula (e.g., Sklar, 1959; Joe, 1997). In addition, \(C\) is symmetric and twice continuously differentiable and has a strictly positive density in its support. Finally, I assume that \(C(x_A, x_F) > x_A x_F\) for all \((x_A, x_F) \in (0, 1)^2\), which means that the two skills are positively interdependent.

Entry into each sector is free: Workers who join academia will be called academics, and workers who join finance will be called bankers. The occupational choice \(S(x_A, x_F) \in [0, 1]\) is the probability with which agent \((x_A, x_F)\) joins academia. A sorting \(S : [0, 1]^2 \rightarrow [0, 1]\) describes the occupational choices of all workers. I will restrict attention to non-degenerate sortings, that is, sortings which result in a strictly positive measure of workers in each occupation. Given a non-degenerate sorting \(S\), the distributions \(G_A\) of the academic skill in academia and \(G_F\) of the financial skill in finance are

\[
G_A(x_A; S) = \frac{1}{M(S)} \int_0^{x_A} \int_0^1 S(r,s) \frac{\partial^2}{\partial x_A \partial x_F} C(r,s) \, ds \, dr
\]

\[
G_F(x_F; S) = \frac{1}{1 - M(S)} \int_0^{x_F} \int_0^1 (1 - S(r,s)) \frac{\partial^2}{\partial x_A \partial x_F} C(r,s) \, dr \, ds,
\]

where \(M(S) \in (0,1)\) is the size of the academic sector and \((1 - M(S))\) is the size of the financial sector, hence

\[
M(S) = \int_0^1 \int_0^1 S(r,s) \frac{\partial^2}{\partial x_A \partial x_F} C(r,s) \, dr \, ds.
\]

Note that sortings that differ on at most a zero measure of workers result in the same distributions of skill. Henceforth, I will omit the \(S\) in \(G_i(\cdot, S)\) and \(M(S)\) whenever the sorting is clear from the context.

Workers’ rewards depend on wages, the prestige of the occupation they join and their position within that occupation (local status), with the latter two being endogenous (i.e.,
dependent on sorting). I will now introduce the three components of rewards, and then derive the total reward function and define the equilibrium. After that I will briefly motivate the way in which I model social status (Section 2.1).

**Occupational Prestige** Occupational prestige can be thought of as the component of social status which is common to all members of a given profession. Following the literature, the prestige of a profession depends on the occupational average of some characteristic (Fershtman et al., 1996; Mani and Mullin, 2004). Here, this characteristic is the financial skill. Thus in any non-degenerate sorting the occupational prestiges \( o_F, o_A \) of finance and academia, respectively, are given by

\[
  o_F = 2\bar{x}_F - 1, \\
  o_A = 2\bar{x}_A - 1 = -\frac{1 - M}{M} o_F,
\]

where \( \bar{x}_i \) is the average financial skill among members of profession \( i \). This definition implies that the ranking of occupations with respect to prestige depends only on the sign of \( o_A \). If \( o_A \) is strictly positive, then the relative prestige of academia, \( o_A - o_F = \frac{o_A}{1 - M} \), is strictly positive and we will say that academia is the prestigious occupation; otherwise, academia is not prestigious.

**Local Status** Local status depends on the agent’s rank in the occupation-specific skill among other members of her profession. Specifically, the local status of agent \((x_A, x_F)\) who joins occupation \( i \) is

\[
  s_i(x_i) = 2G_i(x_i) - 1.
\]

**Wages** The marginal product of each worker is an exogenous function of the worker’s occupation-specific skill. A worker \((x_A, x_F)\) produces \( m_A(x_A) \) if she joins academia and \( m_F(x_F) \) if she joins finance, where the functions \( m_A, m_F \) are twice continuously differentiable and have a strictly positive first derivative \( m'_i > 0 \). I assume that workers in finance earn their marginal product, so that \( w_F(x_F) = m_F(x_F) \). In academia, part of the marginal product, denoted by \( r \), comes from research, and the other part, denoted by \( w_A \), comes from teaching; the latter part does not depend on skill. The research part is affected by the public good problem, so that academics receive only a fraction of the marginal product from their research. In general, therefore, the wage in academia is given by \( w_A(x_A) = w_A + gr(x_A) \), where \( w_A \in (w_F(0), w_F(1)) \) and \( g \in [0, 1] \) determines how severe the public good problem is. As I am interested in whether social status can counter the public good problem even if the latter is very strong, I will set \( g \) to 0, so that \( w_A(x_A) = w_A \).
Rewards and (Compensated) Equilibrium

Given a sorting $S$, the reward of an agent $(x_A, x_F)$ from joining occupation $i \in \{A, F\}$ is a weighted sum of her wage, the prestige of occupation $i$, and her local status within it:

$$t_i(x_i; S) = w_i(x_i) + l_i s_i(x_i, S) + k o_i(S),$$

where $l_i \geq 0$ is the importance of local status rewards in occupation $i$ and $k$ is the population-wide taste for prestige. In my analysis, I will be interested either in symmetric changes to $l_A$ and $l_F$ or in changes to $l_A$ only. For that reason, it will be convenient to rewrite $l_A$ as the sum of the overall importance of local status (relative to wages) $l_F$ and the importance of local status in academia (relative to finance) $\delta \equiv l_A - l_F$.

Before I define what constitutes an equilibrium in this model, let me first introduce the more general concept of a compensated equilibrium.

**Definition 1.** A sorting $S^c$ constitutes a compensated equilibrium if and only if (a) $S^c$ is non-degenerate and (b) there exists some compensating differential $c \in \mathbb{R}$ such that for all $(x_A, x_F, p) \in [0, 1]^3$,

$$(S^c(x_A, x_F) - p)(t_A(x_A; S^c) + c) \geq (S^c(x_A, x_F) - p)t_F(x_F; S^c)$$

The sum of the academic reward and the compensating differential will be called the compensated reward. Condition (8) stipulates that the economy is in a compensated equilibrium if there exists a compensating differential that ensures that each academic receives at least as high a compensated reward in academia as the reward she would receive in finance (and vice versa), taking the sorting decisions of other workers as given.

Compensated equilibria have a number of properties that make them interesting. Most importantly, they are closely related to the equilibria of this model. In equilibrium, workers join the occupation that maximizes their reward, taking the sorting decisions of all other workers as given. Thus a sorting constitutes an equilibrium if and only if it constitutes a compensated equilibrium for $c = 0$.

Secondly, the taste for prestige $k$ determines only which compensated equilibria constitute an equilibrium, but it leaves the set of compensated equilibria unaffected. That is, if a sorting $S$ constitutes a compensated equilibrium for some $k' \geq 0$, then it constitutes a compensated equilibrium for all $k \geq 0$. This is a consequence of the fact that occupational prestige enters rewards as a constant, and it thus plays a role similar to that of the compensating differential.

2.1 Discussion

In this section, I briefly comment on the social status components and the taste parameters.
**Occupational Prestige**  Occupational prestige has two properties in this model. First, as prestige depends on the same skill dimension in the two occupations, it is of zero sum, that is, any change in sorting leaves the sum of occupational prestige rewards unchanged. This is standard in the economics literature on social status (e.g., Fershtman et al., 1996), presumably because it implies that prestige redistributes social welfare but does not create it, hence it can be ignored in efficiency considerations. Note that although prestige has to depend on the same characteristic in the two sectors for this to be the case, the exact choice of that characteristic is arbitrary: It could equally well be the academic skill or some combination of the academic and financial skills. I chose the financial skill, because this assumption makes prestigious academia less likely. In Section 4.3, I explain why this assumption is not critical for the message of the paper.

Second, Equations (4) and (5) ensure that the sum of all agents’ occupational prestige rewards does not depend on the taste parameter $k$, because $(1 - M)O_F + MO_A = 0$. Therefore, changes in the taste for prestige affect welfare only indirectly, through their impact on sorting.

**Local Status**  Local status is usually defined as the esteem one receives from one’s reference group (Frank, 1984). In this model, occupation is the only possible reference group, and esteem is modeled as one’s rank. The assumption that the within-occupation ranking is based on the occupation-specific skill is natural, as the esteem received from peers is likely to be strongly related to how well the agent performs her job. A common alternative is to assume that the ranking depends on income (Hopkins and Kornienko, 2004). This is equivalent to my assumption if $g > 0$; I allow $g$ to be greater than 0 in Section 4.2.

**The Importance of Social Status Components**  The taste for occupational prestige is assumed to be the same in the two occupations. This assumption simplifies the exposition and ensures that the sum of the occupational prestige rewards is equal to 0, but it has no impact on the formal results (see Section 4.5).

Unlike the taste for prestige, the taste for local status is allowed to be occupation dependent. This is plausible, because the extent to which people care about local status will depend on the extent to which their peers belong to their reference group (i.e., how socially hermetic the profession is) and how easily observable ranks are (i.e., it depends on the precision and availability of rankings), both of which differ across occupations. Note also that even if $l_A \neq l_F$ the average social status reward in the population is still equal to 0, which would not be the case if $k_A \neq k_F$. 

11
3 Impact of Social Status on Sorting

3.1 The No-Status Case

Let us first consider, as a benchmark, what happens if there are no social status rewards, that is, \( t_i(x_i, S) = w_i(x_i) \). Then the equilibrium is trivial: There exists a cutoff value \( \Psi^b = w_F^{-1}(w_A) \) such that all workers with \( x_F > \Psi^b \) join finance and all workers with \( x_F < \Psi^b \) join academia. This is because rewards are constant in academia but differ with skill in finance, and thus any agent who would earn less than the academic wage \( w_A \) in finance joins academia, and everyone else becomes a banker. Furthermore, as all financial sector workers are more skilled in finance than any academic, it follows that \( o_A = \Psi^b - 1 \) and \( o_F = \Psi^b \), which means that the relative prestige of academia is negative and equal to \(-1\). Finally, in order to determine which occupation attracts workers of higher skill, I will focus on the average academic skill among academics, denoted by \( \bar{x}_A \), and the average financial skill among bankers, denoted by \( \bar{x}_F \). Because only workers with \( x_F \leq \Psi^b \) join academia, it follows that \( G_A(x_A) = C(x_A, \Psi^b)/\Psi^b > x_A \), and thus \( \bar{x}_A < 0.5 < \bar{x}_F \), which means that, on average, academia attracts less skilled workers than finance does.

3.2 Prestige-Only Equilibrium

To see the effect of occupational prestige on sorting, let us find the equilibrium in the case where workers care only about wages and prestige, but not local status, that is, in the case where \( t_i(x_F, S) = w_i(x_i) + ko_i(S) \).

**Theorem 1** (Occupational Prestige: Limits of Impact). Suppose \( l_A = l_F = 0 \). (i) An equilibrium exists if and only if \( w_A - k > w_F(0) \). In any equilibrium, (ii) there exists a cutoff value \( \Psi^p = w_F^{-1}(w_A - k) \) such that all workers with \( x_F > \Psi^p \) join finance and everyone else joins academia, which implies that (iii) \( \bar{x}_A < \bar{x}_F \). (iv) Compared to the no-status equilibrium, there are fewer academics and the relative prestige of academia is unchanged.

**Proof.** Note that as long as \( k = 0 \), the analysis in Section 3.1 holds for any value of \( w_A \), including arbitrary \( w'_A = w_A + c \). Therefore, by Definition 1 and the fact that the set of compensated equilibria does not depend on \( k \), it follows that in any compensated equilibrium \( S^c \), (a) there exists a cutoff value \( \Psi^p \) such that all workers with \( x_F > \Psi^p \) join finance and everyone else joins academia, (b) the relative prestige of academia is \(-1\), and (c) \( \bar{x}_A < 0.5 < \bar{x}_F \). Any agent with \( x_F = \Psi^p \) will be indifferent between finance and academia, hence \( w_F(\Psi^p) = w_A - k \), which immediately yields \( \Psi^p = w_F^{-1}(w_A - k) \), as claimed. Finally, for the equilibrium sorting to be non-degenerate, it must be the case that \( \Psi^p \in (0, 1) \), which is impossible if \( w_A - k \leq w_F(0) \). 

\[ \square \]
As in the no-status equilibrium, there exists a cutoff value of $x_F$ that fully determines sorting. Because all academics benefit from prestige in equal measure, rewards are still constant in academia but differentiated in finance. Thus all workers with high financial skill join finance, making it necessarily more prestigious than academia. This in turn implies that the introduction of taste for prestige makes academia even less rewarded than before, decreasing its size. With constant rewards in academia, prestigious academia simply cannot be sustained: High prestige would predominantly lure in workers of low financial skill, making academia less prestigious than finance.

3.3 Local Status Equilibrium

In this section, I consider what happens if workers care about local status but not occupational prestige, in which case rewards are given by $t_A(x_A) = w_A + (l_F + \delta)(2G_A(x_A) - 1)$ and $t_F(x_F) = w_F(x_F) + l_F(2G_F(x_F) - 1)$. First, in Section 3.3.1, I characterize compensated equilibria and (a) prove that they are unique for a given size of academia and (b) examine how they depend on $\delta$ (the importance of local status in academia relative to finance) and $l_F$ (the overall importance of local status). Later, in Section 3.3.2, I use these results to establish how much of an impact workers’ desire for local status can have on occupational sorting.

3.3.1 Compensated Equilibria

Unlike in the no-status and prestige-only cases, if $l_F + \delta > 0$ then academic rewards are increasing in skill. Thus workers with higher academic skill are more willing to join academia than the less skilled ones, and the cutoff value $\Psi(x_A)$ of the financial skill is non-decreasing in the academic skill. Any non-decreasing mapping $\Psi : [0, 1] \rightarrow [0, 1]$ of values of academic skill to the corresponding cutoff values will be called a separation function. A separation function fully determines sorting, with

$$S(x_A, x_F) = \begin{cases} 
1 & \text{if } \Psi(x_A) \geq x_F, \\
0 & \text{if } \Psi(x_A) < x_F.
\end{cases}$$

(9)

Figure 1 depicts how a separation function determines the sorting of workers into occupations. A compensated equilibrium separation function will be denoted by $\psi_c$ and defined as a separation function that induces a sorting which constitutes a compensated equilibrium. A separation function $\psi$ is an equilibrium separation function if the sorting it induces constitutes a compensated equilibrium for $c = 0$.

**Proposition 1** ($M$-Uniqueness). The mapping from the set of academia sizes $(0, 1)$ to the set of compensated equilibria is one to one, with $S^c(M)$ denoting the compensated equilibrium that corresponds to size $M$. 

13
Proof. The size of academia is determined uniquely by an $S^c$ (by Equations (3) and (9)); thus it suffices to show that there exists exactly one compensated equilibrium for any given $M \in (0, 1)$.

Naturally, a separation function $\Psi$ induces a compensated equilibrium only if $\Psi$ itself is non-degenerate, that is, if the set $D(\Psi) = \{x_A \in [0, 1] : \Psi(x_A) \in (0, 1)\}$ has a strictly positive measure. Given a non-degenerate separation function $\Psi$, we can easily derive the density of the occupation-specific skill in each occupation. The density in academia is

$$g_A(x_A; \Psi) = \frac{\partial}{\partial x_A} C(x_A, \Psi(x_A))$$

(10)

because $\Pr(X_F \leq \Psi(x_A)|X_A = x_a) = \frac{\partial}{\partial x_A} C(x_A, \Psi(x_A))$. To characterize the density in finance, we can use (an extension of) a right inverse of $\Psi$, denoted by $\Phi : [0, 1] \rightarrow [0, 1]$: $\Phi(x_F) = \sup\{x_A \in [0, 1] : \Psi(x_A) < x_F\}$.

Clearly,

$$g_F(x_F; \Psi) = \frac{\partial}{\partial x_A} C(\Phi(x_F), x_F)$$

(11)

Of course, if $\Psi(x_A) = 0$, then all workers with skill $x_A$ join finance, and if $\Psi(x_A) = 1$, then all workers with skill $x_A$ join academia. Consider the infimum and supremum of the set $D(\Psi)$, denoted by $x_A^i$ and $x_A^s$ respectively. Because $\Psi$ is increasing, it follows that all workers with $x_A < x_A^i$ join finance and all workers with $x_A > x_A^s$ join academia. Analogously, all workers with $x_F < x_F^i \equiv \Psi(x_A^i)$ join academia and all workers with
$x_F > x_F^s \equiv \Psi(x_A^s)$ join finance. The points $(x_A^i, x_F^i)$ and $(x_A^s, x_F^s)$ are marked in Figure 1.

As $t_F(\cdot)$ is continuous, for any compensated equilibrium separation function $\psi^c$ there must exist some $c \in \mathbb{R}$ such that

$$t_F(\psi^c(x_A)) = t_A(x_A) + c$$

(12)

for all $x_A \in [x_A^i(\psi^c), x_A^s(\psi^c)]$. Define

$$F(x_A, x_F) \equiv \frac{M}{1 - M} \left( \frac{0.5(1 - M)w_F(x_F) - \delta \frac{\partial}{\partial x_F} C(x_A, x_F)}{(l_F + \delta) \frac{\partial}{\partial x_A} C(x_A, x_F)} + \frac{\partial}{\partial x_A} C(x_A, x_F) \right)$$

and consider a separation function $\Psi$ that solves the following initial-value problem:

$$\Psi'(x_A) = 1/F(x_A, \Psi(x_A)) \text{ and } \Psi(x_A^i) = x_A^i$$

(13)

for $x \in [x_A^i, x_A^s]$. Because $F(x_A, x_F)$ is Lipshitz continuous in $x_A$, this initial-value problem has a unique solution on $D(\Psi)$ for a given $(x_F^i, x_A^i)$, which then in turn determines $(x_A^s, x_F^s)$. The resulting separation function, denoted by $\Psi(\cdot, x_A^i, x_F^i)$, is a compensated equilibrium separation function resulting in size $M$ (for $c = w_F(x_F^i) + \delta - w_A$) if and only if

$$M = \int_0^1 \frac{\partial}{\partial x_A} C(\Psi(r, x_F^i, x_A^i), r) \, dr,$$

(14)

$$0 = \min \{x_F^i, x_A^i \}.$$  

(15)

The second condition is implied by the definition of $x_A^i$.

Suppose that $x_F^i = 0$. Then the unique solution is $\Psi(x_A) = 0$. This implies that the RHS of Equation (14) is equal to $0 < M$ and, thus, $x_F^i > 0$ and $x_A^i = 0$ in any compensated equilibrium by Equation (15). Similarly, if $x_F^i = 1$ then $\Psi(x_A) = 1$ for all $x_A$, and the RHS of Equation (14) is equal to $1 > M$. Finally, by Theorem 6 in Birkhoff and Rota (1969) and the Comparison Theorem (Theorem 4 in the Appendix of this paper), $\Psi$ is continuous and strictly increasing in $x_F^i$; thus there exists a unique $x_F^i \in (0, 1)$ for which $\Psi(\cdot, x_F^i, 0)$ is a compensated equilibrium separation function resulting in $M$.

For every non-degenerate size of academia $M \in (0, 1)$, there exists a unique compensated equilibrium $S^c(M)$. This is consistent with the interpretation of $c$ as a compensating differential: Academics need to be paid this much more to ensure that $M$ academic jobs will be filled. The $M$-Uniqueness property forms the cornerstone of my analysis, because it allows me to study how the compensating differential and the distribution of skill in each occupation change (a) with academia’s size for given taste parameters, which will be useful for proving uniqueness, and (b) with taste parameters for a given $M$, which will be crucial for establishing how much of an impact social status has on occupational sorting.
Lemma 1 (c-Uniqueness). If \( k = 0 \), the mapping from the set of compensating differentials \( c \in (w_F(0) - w_A + \delta, w_F(1) - w_A + \delta) \) to the set of almost equilibria is one-to-one, with \( c \) increasing in \( M \).

Proof. Recall that \( c = w_F(x_F^1) - w_A + \delta \). As any \( S^c \) corresponds to a unique \( x_F^1 \in (0, 1) \), the corresponding \( c \) is also unique and is contained in \( (w_F(0) - w_A + \delta, w_F(1) - w_A + \delta) \). Second, consider any \( c \in (w_F(0) - w_A + \delta, w_F(1) - w_A + \delta) \). Notice that in any compensated equilibrium that corresponds to this \( c \) it must be the case that \( x_F = w_F^{-1}(c + w_A - \delta) \in (0, 1) \) and \( x_A^1 = 0 \). For any \( M \in (0, 1) \), this defines an initial-value problem of the form given by Equation (13). Thus the existence and uniqueness of a compensated equilibrium separation function follow from reasoning analogous to that in the proof of Proposition 1, except that this time \( x_F^1 \) is constant and \( M \in (0, 1) \) is variable. Finally, \( c \) is increasing in \( M \) if \( x_F^1 \) is increasing in \( M \). Consider any \( M'' > M' \) and suppose that \( x_F^1(M'') \leq x_F^1(M') \). Then by Equation (14) and the Comparison Theorem, we have that \( M'' \leq M' \). Contradiction! \( \square \)

In the local-status-only case, the compensating differential increases with the size of academia. This is intuitive: In order to attract more workers to academia, academics need to be better compensated. This logic does not necessarily apply if \( k > 0 \), because relative prestige can be non-monotonic is academia’s size. Therefore, if workers care about prestige, the increase in academia’s size might itself provide them with a higher reward. Unfortunately, this means that multiplicity of equilibria is going to be a concern in the general case, that is, where workers care about both prestige and local status.

Lemma 2 (Comparative Statics). If a change in the taste parameters \((l_F, \delta)\) or the wage function \(w_F\) causes a strict decrease in \(F(x_A, x_F)\) for all \((x_A, x_F) \in (0, 1)^2\), then it also causes an increase in \(G_F(x_F)\) for all \(x_F \in [0, 1]\) (and strictly for some) and a decrease in \(G_A(x_A)\) for all \(x_A \in [0, 1]\) (and strictly for some), in any \(S^c(M)\).

Proof. (i) It follows immediately from the Comparison Theorem that if \(F(x_A, x_F)\) decreases strictly for all \((x_A, x_F) \in (0, 1)^2\) and \(\psi^c(x_A'; M)\) increases for some \(x_A' \in (0, 1)\), then \(\psi^c(x_A'; M)\) must strictly increase for all \(x_A \in [x_A', 1]\). As a strict increase in \(\psi^c(\cdot, M)\) for all \(x_A \) violates Equation (14), there must exist some \(x_A''\) such that \(\psi^c(\cdot, M)\) falls strictly for all \(x_A < x_A''\) and increases otherwise; therefore, there must also exist such \(x_A''\) that \(\phi^c(\cdot, M)\) strictly increases for all \(x_F < x_F''\) and falls otherwise. This proves the result. \( \square \)

The function \(1/F(x_A, x_F)\) captures the extent to which rewards differ with skill in academia relative to the extent to which rewards differ with skill in finance. If rewards become more differentiated with skill in academia (relative to finance), then the distribution of skill improves in academia and worsens in finance, both in the sense of first-order stochastic dominance. Intuitively, more differentiation in rewards increases the rewards.
of high-skilled workers and punishes low-skilled workers; the size of academia is kept constant by adjustments to the compensating differential.  

The Comparative Statics Lemma can be used to examine the impact of both an increase in the importance of local status in academia relative to finance (an increase in $\delta$ that keeps $l_F$ constant) and an increase in the overall importance of local status (an increase in $l_F$ that keeps $\delta$ constant). In particular, we have that

$$\frac{\partial}{\partial \delta} F(x_A, x_F) < 0 \quad \text{and} \quad \left( \frac{\partial}{\partial l_F} F(x_A, x_F) < 0 \iff \delta \leq 0.5 \left( 1 - M \right) \frac{w'_F(x_F)}{\frac{\partial}{\partial x_F} C(x_A, x_F)} \right).$$

(16)

Thus an increase in $\delta$ always improves the distribution of skill in academia, whereas an increase in $l_F$ improves the distribution of skill in academia as long as the importance of local status in academia relative to finance is not too high. Specifically, if local status rewards are symmetric across occupations ($\delta = 0$), then an increase in the overall local status intensity improves the distribution of skill in academia.

Because we are ultimately interested in how strongly social status can affect occupational sorting, it is going to be useful to understand what happens in each compensated equilibrium in the limit as local status becomes infinitely more important than wages.

**Lemma 3** (Limiting Compensated Equilibrium). Fix $M \in (0, 1)$ and $\delta \in \mathbb{R}$, and consider the limit of $S^c(M)$ as $l_F \to \infty$. If $M \geq (\leq) 0.5$, then $\lim_{l_F \to \infty} G^*_A(x) \geq (\leq) \lim_{l_F \to \infty} G^*_F(x)$ for all $x \in [0, 1]$.

**Lemma 4** ((A)symmetric Local Status Rewards). Define $w'_{F_{\min}} \equiv \min_{x_F \in [0, 1]} w'_F(x_F)$.

(i) There exists some $y \in (0, 0.5)$ such that if $\delta \leq \min\{yw'_{F_{\min}}, l_F\}$ and $M \in [0.5, 1)$, then

---

8This mechanism is very similar to parts (i) and (ii) of Proposition 2 in Gola (2020), where firms in both sectors provide workers with just enough compensation to ensure that the size of each sector remains unchanged.
Lemma 4(i) states that finance continues to attract workers of (on average) higher skill than academia in compensated equilibria in which academia is large \((M \geq 0.5)\) as long as the importance of local status in academia relative to finance remains sufficiently small. The intuition behind this result builds on the intuition behind Lemmas 2 and 3: If local status rewards are symmetric across occupations \((\delta = 0)\) and finance is small, then finance attracts better workers than academia even if wages are of no importance whatsoever (Lemma 3). As wages differ with skill in finance, finance must also attract workers of (on average) higher skill if \(l_F \) is finite and wages matter at least a little (Equation (16) and the Comparative Statics Lemma). Naturally, then, finance continues to attract workers of (on average) higher skill if local status is just slightly more important in academia than in finance.

Lemma 4(ii), in contrast, states that in compensated equilibria in which academia is small \((M < 0.5)\), academia can attract workers who are (on average) of higher skill than bankers, even if local status is equally important in the two occupations, as long as local status is sufficiently important overall. Again, this is a straightforward consequence of Lemma 3: In the limit, when only local status matters, if the size of academia is small, academia must attract workers who are more skilled at research than bankers are at finance. Thus by continuity, the same must be the case if workers care about wages, but only a little bit.

Lemma 4(iii) states that, for any fixed level of the overall importance of local status, if local status becomes sufficiently important in academia relative to finance, then academia attracts workers of (on average) higher skill than finance does. If the importance of local status in academia relative to finance is very high, then academia attracts all workers who are very highly skilled at research. Because the two skills are interdependent, this means that academia also attracts most of the workers who are very highly skilled at finance.

3.3.2 Equilibrium

I now use Lemmas 1 and 4 to examine how much of an impact the taste for local status can have on equilibrium sorting, using the fact that any equilibrium is a compensated equilibrium with \( c = 0. \)

Theorem 2 (Local Status: Limits of Impact). Suppose that \( k = 0. \)

(i) An equilibrium exists if and only if \( \delta \in (w_A - w_F(1), w_A - w_F(0)) \equiv I_W, \) in which case
the equilibrium is unique.
(ii) There exists some $(\delta, l_F) \in I_W \times \mathbb{R}_{\geq 0}^2$ such that $\bar{x}_F^\delta < \bar{x}_A^\delta$ in the unique equilibrium.
(iii) Any size of academia $M \in (0, 1)$ can be sustained in the unique equilibrium for some choice of $(\delta, l_F) \in I_W \times \mathbb{R}_{\geq 0}^2$.
(iv) There exists some $w_A^* > w_F(0)$ such that if $w_A \leq w_A^*$, then in the unique equilibrium either $M < 0.5$ or $\bar{x}_F^\delta > \bar{x}_A^\delta$ for any choice of $(\delta, l_F) \in I_W \times \mathbb{R}_{\geq 0}^2$.

Proof. (i) This follows immediately from Lemma 1: $0 \in (w_F(0) - w_A + \delta, w_F(1) - w_A + \delta)$ if and only if $\delta \in (w_A - w_F(1), w_A - w_F(0))$, and the compensated equilibrium that corresponds to $c = 0$ is unique.

(ii) Choose some $M' \in (0, \min\{\Psi^b, 0.5\})$ and set $l_F$ to $l_F^* > l_F$, where $l_F^*$ is as in Lemma 4(ii). As long as $\delta = 0$, the least skilled banker has skill $x_F^\delta = \Psi^b$ (because $w_F(x_F^\delta) = w_A - \delta$), and thus $M \geq \Psi^b > M'$ in equilibrium regardless of $l_F$. Now consider the compensated equilibrium $S^c(M')$. First, as $c$ is increasing in $M$, it follows that $c(M') < 0$. Second, by Lemmas 2 and 4(ii), if $l_F > l_F^*$ and $\delta \geq 0$ then $\bar{x}_A^\delta > \bar{x}_F^\delta$. Finally, if $\delta = w_A - w_F(0)$ then $c(M') > 0$. As $\psi^c(\cdot; M, \delta)$ is continuous in $\delta$, there exists some $\delta' \in (0, w_A - w_F(0))$ for which $c(M) = 0$. Thus if $(\delta, l_F) = (\delta', l_F^*)$, then $M = M'$ and $\bar{x}_A^\delta > \bar{x}_F^\delta$ in equilibrium.

(iii) If $M \geq \Psi^b$, then it suffices to set $\delta$ to $w_A - w_F(M)$ and $l_F$ to $-\delta > 0$. If $M < \Psi^b$, then $c(M) < 0$ if $\delta = l_F = 0$, and $c(M) > 0$ if $\delta = w_A - w_F(0)$ and $l_F = 0$, and the result follows by continuity of $c(M)$ with respect to $\delta$.

(iv) Set $w_A^* = \min\{y, 1/8\}w_{F_{\text{min}}}^\prime + w_F(0)$, so that by (i) the equilibrium exists only if $\delta < \min\{y, 1/8\}w_{F_{\text{min}}}^\prime$. Thus by Lemma 4(i) it suffices to show that if $l_F < \delta$, then $M < 0.5$ in any equilibrium. Suppose, by way of contradiction, that $l_F < \delta$ and $M \geq 0.5$. The latter implies that $x_F^\delta > 0.5$, which yields

$$w_F(0.5) - l_F < w_F(x_F^\delta) + l_F(2G_F(x_F^\delta) - 1) = w_A + l_A(2G_A(x_A^\delta) - 1) \leq w_A + l_A.$$ 

As $l_A - l_F < w_A - w_F(0)$ by (i) and $w_F(0.5) \geq w_F(0) + 0.5w_{F_{\text{min}}}^\prime$, it follows that

$$0.5w_{F_{\text{min}}}^\prime < w_A - w_F(0) + l_A - l_F + 2l_F < 2(w_A - w_F(0)) + 2l_F < 0.25w_{F_{\text{min}}}^\prime + 2l_F,$$

which immediately implies that $\delta < 0.125w_{F_{\text{min}}}^\prime < l_F$. Contradiction! 

The main take-away from Theorem 2 is that the relative nature of local status introduces a trade-off between the equilibrium size and quality of academia’s workforce, and that this trade-off is particularly stark if academic wages are low. If local status becomes very important in academia relative to finance ($\delta \geq w_A - w_F(0)$), then the lowest-ranked academic receives a lower reward than a banker of skill 0, regardless of that academic’s skill! Hence no equilibrium with a positive size of academia can be supported: If the
lowest-ranked worker leaves academia, the previously second-lowest-ranked worker becomes lowest-ranked and leaves too. This leads to a complete unraveling of the academic sector. Therefore, the relative nature of local status imposes a bound on the importance of local status in academia relative to finance. In particular, if academic wages are low, then local status can be only slightly more important in academia than in finance.

Of course, we know from Lemma 4(ii) that academia can attract workers of (on average) higher skill than finance even if local status is of similar importance in the two occupations, provided that workers care about local status sufficiently strongly ($l_F$ is sufficiently high). However, this can be the case only if academia is the smaller occupation. Conversely, academia can be arbitrarily large in equilibrium; again, however, if $w_A$ is low, then this is possible only if local status is much more important in finance than in academia ($\delta \approx w_A - w_F(1)$), in which case finance attracts higher-quality talent.

For academics to be both more skilled (on average) and more plentiful than bankers, local status must be sufficiently more important in academia than in finance (by Lemma 4(i)), which is impossible if the academic wage is only slightly higher than the lowest wage in finance. Therefore, there is a limit on the impact that local status can have on occupational sorting on its own.

### 3.4 The Interaction between Prestige and Local Status

In this section, I consider what happens if workers care about both occupational prestige and local status, in which case rewards are given by

$$
t_A(x_A) = w_A + (l_F + \delta)(2G_A(x_A) - 1) + k_{oA}$$

and

$$
t_F(x_F) = w_F(x_F) + l_F(2G_F(x_F) - 1) + k_{oF}.
$$

Crucially, because the set of compensated equilibria does not depend on $k$, the results from Section 3.3.1 remain relevant in this section.

**Theorem 3** (Social Status and Occupational Sorting). For any $M' \in (0,1)$ and any $l_F \geq 0$, there exists some $(\bar{\delta}, \bar{k}) \in \mathbb{R}_{>0}^2$ such that if $(\delta, k) > (\bar{\delta}, \bar{k})$ then (i) academia is large ($M > M'$) and prestigious ($o_A - o_F > 0$) and attracts higher-quality talent than finance ($\bar{x}_A - \bar{x}_F > 0$) in all equilibria; and (ii) the set of equilibria is non-empty.

**Proof.** (i) Fix $M'$ and $l_F$, and choose some $\delta > \max\{\delta^*, w_A - w_F(0)\} \equiv \bar{\delta}$, where $\delta^*$ is as in Lemma 4(iii). This immediately implies that $o_A > o_F$ in any equilibrium, provided such an equilibrium exists, as otherwise $w_A - \delta + k(o_A - o_F) < w_F(0)$ and academia unravels. The fact that $o_A > o_F$ implies further that $\bar{x}_A > \bar{x}_F$, because self-selection ensures that workers who join academia must be (on average) better in the academic skill than in the financial skill, and thus $\bar{x}_A - \bar{x}_F$ is larger. This is shown formally in Lemma 5 in the Appendix.) Further, the fact that $\delta > \delta^*$ implies that $o_A - o_F > 2d > 0$ in any compensated

\[\text{20}\]
equilibrium with \( M \leq M' \) (by Lemma 4(iii)). Consider any \( k' > \frac{w_F(1) - w_A + \delta}{2d} \equiv \bar{k} \). It follows from Equation (12) and the definition of compensated equilibria that

\[
c = w_F(x_F^i) - w_A + \delta - k'(o_A - o_F),
\]

which is strictly negative for any \( M \leq M' \). Hence there exists no equilibrium for \( M \leq M' \), so \( M > M' \) in any equilibrium.

What is left is to show that there exists at least one equilibrium. Let us temporarily set \( k \) to 0, consider any \( c \in (w_F(\frac{1}{2}) - w_A + \delta, w_F(1) - w_A + \delta) \), and note that Lemma 1 implies that there exists a unique \( S^c(M'') \) that corresponds to this \( c \). Further, because \( w_F(x_F^i) = w_A - \delta + c \), it follows that \( x_F^i > \frac{1}{2} \) in this compensated equilibrium, and hence \( \bar{x}_F > 0.5 \) and \( o_A - o_F < 0 \). The last inequality immediately implies that \( M > M' \) in this compensated equilibrium. Finally, as the set of compensated equilibria does not depend on \( k \), this compensated equilibrium exists if \( k = k' \), where \( c(k') > 0 \) because of academia’s negative prestige. As \( c(k', M') < 0 \) and \( c(k', M'') > 0 \), the continuity of \( \psi^c \) with respect to \( M \) implies that there has to exist some \( M > M' \) for which \( c(k') = 0 \), which concludes the proof.

Theorem 3 states that if the importance of local status in academia relative to finance is sufficiently high and workers care about occupational prestige sufficiently strongly, then there must exist an equilibrium, and academia must be large and prestigious and attract workers of (on average) higher skill than finance in any equilibrium. This result is quite remarkable: Given that, on its own, occupational prestige decreases the size of academia, one might expect that Theorem 2 captures the absolute limit of what social status can accomplish. And yet it turns out that the interaction between the two status components can have an arbitrarily strong impact on sorting.\(^{10}\)

How is this possible? As the joint impact of occupational prestige and local status is much greater than the sum of their individual impacts, it stands to reason that there exists some complementarity between the two components of social status. Specifically, occupational prestige and local status act as complements in regard to the compensation \( w_A - (l_F + \delta) + k(o_A(M) - o_F(M)) \) received by the lowest-ranked academic in the compensated equilibrium \( S^c(M) \):

\[
\frac{\partial^2}{\partial k \partial \delta} (w_A - (l_F + \delta) + k(o_A(M) - o_F(M))) = \frac{\partial}{\partial \delta} (o_A(M) - o_F(M)) > 0,
\]

where the inequality follows from Lemma 2 and Equation (16). Intuitively, in any compensated equilibrium, high \( \delta \) provides the differentiation of rewards needed for academia to attract workers of high skill, which increases the prestige of academia. Once the av-

\(^{10}\)It is also worth noting that Theorem 3 holds \( l_F \) fixed, just as Theorem 2 kept \( k \) fixed. Thus the two results allow for the same number of degrees of freedom.
verage skill of academics is high enough, the taste for occupational prestige increases the level of rewards in academia, instead of decreasing it as in the prestige-only case. This in turn relaxes the bound on the importance of local status in academia relative to finance, which prevents the unraveling of academia when $\delta$ is high.

4 Robustness Checks

In this section, I relax the various simplifying assumptions from Section 2, one by one, in order to examine how critical each of them is for the results. In particular, I argue that the main message of the paper (“the impact of each component of status on sorting is limited, but their joint impact is not”) survives as long as the two occupation-specific skills are interdependent and occupational prestige depends on a random variable which is positively interdependent with academic skill.

4.1 Marginal Distributions of Skill

In Section 2, I assumed that the marginal distributions of skill are standard uniform. By making this assumption, I have simply characterized each worker by her ranks in the unconditional marginal distributions of skill. However, in constrast to Gola (2020), this assumption is not entirely without loss of generality: The marginal distributions of skill affect the average of the occupation specific skill, which I use to define occupational prestige and to compare the quality of the workforce in the two occupations. Nevertheless, each of the three theorems in the paper can be proved for any symmetric choice of marginal distributions ($C(1, x) = C(x, 1)$), that is, as long as we use the same standards when comparing skills across occupations. To understand why, recall Lemma 4, which describes the circumstances under which finance must attract workers of (on average) higher/lower skill than academia. A careful reading of the proof of that lemma reveals that while the precise values of the cutoffs $l^*_F$ and $\delta^*$ depend on the choice of the marginal distributions of skill, the existence of such cutoffs does not, and thus the statement of Lemma 4 would be exactly the same for any choice of marginal distributions of skill.\footnote{The reasoning in Section 3.1 (and thus also in Theorem 1) and in Lemma 5 (which is used in Theorem 3) relies on first-order stochastic dominance and thus holds trivially as long as $C(1, x_F) = C(x_A, 1)$.}

4.2 The Public Good Problem

The assumption that $g = 0$ plays a role similar to the requirement that $w_A < w^*_A$ in Theorem 2(iv): My results imply that, on its own, neither component of social status is able to counter the impact of the public good problem on sorting if the public good problem is sufficiently strong. This conclusion is continuous in $g$: There exists some
$g^* > 0$ such that Theorems 1 and 2 hold for all $g < g^*.^{12}$ Theorem 3 would, of course, hold for any finite $g$.

### 4.3 Arbitrary Prestige Characteristics

In this section, I relax the assumption that occupational prestige depends on the financial skill, while retaining the assumption that the average prestige reward in the population is equal to 0. Specifically, consider any random variable $X_P \in [x_P^l, x_P^h]$ that has a strictly increasing and continuously differentiable distribution $Z : [x_P^l, x_P^h] \to [0, 1]$. This variable need not depend perfectly on either the financial or the academic skill; instead, $X_P$ could be a combination of characteristics that the society finds commendable: intelligence, creativity, courage, honesty, etc. Denote the joint distribution of the financial skill, the academic skill and the prestige characteristic by $J$, with $J(x_A, x_F, x_P^l) = C(x_A, x_F) > x_F x_A$. I impose no restrictions on $J$ other than those inherited from $C$ and $Z$.

Without loss of generality, I restrict attention to sortings which can be induced by a separation function.\(^{13}\) One feature of such sorting is that $S(x_A, x_F) \in (0, 1)$ for only a zero measure of workers. Thus we can define the occupational prestige in academia and finance as follows:

$$
\alpha_F \equiv \frac{\bar{x}_F^P}{E(X_P)} - 1 = \frac{E(X_P|S(x_A, x_F) = 0)}{E(X_P)} - 1 \tag{17}
$$

$$
\alpha_A \equiv \frac{\bar{x}_A^P}{E(X_P)} - 1 = \frac{E(X_P|S(x_A, x_F) = 1)}{E(X_P)} - 1 \tag{18}
$$

This functional form ensures that, as in the baseline, the average occupational prestige reward in the population is equal to 0, and hence an increase in the taste for prestige affects welfare only through sorting.\(^{14}\)

The main message of my paper holds as long as $J(x_A, 1, x_P) > x_F Z(x_P)$ for all $(x_A, x_P) \in (0, 1) \times [x_P^l, x_P^h]$, that is, as long as the academic skill is positively interdependent with the prestige characteristics. To be more specific, let me discuss each of the main results separately. Trivially, if only occupational prestige matters, then there still must exist a single cutoff of financial skill such that all workers with $x_F > \Psi^p$ join finance; this, together with $C(x_A, x_F) > x_F x_A$, ensures that $\bar{x}_A > \bar{x}_F^P$ in any equilibrium. It thus follows that occupational prestige cannot, on its own, cause academia to attract work-

---

\(^{12}\)In the case of Theorem 2, this follows essentially from (a) the fact that if $l_F \to \infty$ and $M \geq 0.5$ then $\bar{x}_A \leq \bar{x}_F$ in $S^c(M)$ for any finite $g$ (Lemma 3) and (b) the continuity of the compensated equilibrium with respect to $g$. In the case of Theorem 1, the proof, which is available on request, is much more involved.

\(^{13}\)The fact that any sorting that constitutes a compensated equilibrium can be described by a separation function relied only on the assumption that the compensated reward in finance is increasing in skill, an assumption which is retained throughout.

\(^{14}\)Note that if $X_P = X_F$, then $\bar{x}_P = \frac{1}{2}$ and the expression for occupational prestige reduces to the one from the baseline model.
ers of (on average) higher skill than finance does.\footnote{This result is continuous in \(g\), in the same sense as in Section 4.2 (proof available on request). If we were to assume that \(J(1, x_F, x_P) > x_F Z(x_P)\), then an increase in \(k\) would decrease the size of academia, hence Theorem 1 would carry over in its entirety. This latter result, however, is not continuous in \(g\), that is, it will not necessarily hold even for very small \(g > 0\).} Theorem 2 is obviously completely unaffected, as it describes only what happens if workers do not care about occupational prestige.

While I was unable to prove that Theorem 3 carries over unchanged if \(x_P \neq x_F\), it is very easy to show a result with the same message. Namely, for any \(M' \in (0, 1)\) and any \(l_F \geq 0\), there must exist some \((\delta, k) \in \mathbb{R}^2_0\) for which there exists an equilibrium in which academia is large \((M \geq M')\), is more prestigious than finance \((o_A > o_F)\) and attracts workers of higher skill than finance \((\bar{x}_A > \bar{x}_F)\).\footnote{It should be clear from the proof of Lemma 4(iii), that this result holds for both the financial skill and the prestige characteristics. That is, for any fixed \(M\), if we set \(\delta\) high enough, then \(o_A > o_F\) and \(\bar{x}_A > \bar{x}_F\) in \(S^c(M)\). If, in addition, we set \(\delta\) to some value greater than \(w_A - w_F(0)\), then for \(k = 0\) it must be the case that \(c(M) > 0\). However, \(c(M)\) increases linearly in \(k\) because \(o_A > o_F\), and thus we can always find some \(k > 0\) for which \(c(M') = 0\).} This result is weaker than Theorem 3 in two ways. First, while it would hold for any sufficiently high \(\delta\), it might fail if \(k\) is too large. Second, it does not guarantee that all non-degenerate equilibria will have the property that \(M \geq M', o_A > o_F\), and \(\bar{x}_A > \bar{x}_F\).

Finally, it is worth explaining why the assumption \(J(x_A, 1, x_F) > x_A Z(x_P)\) plays a critical role. Essentially, the positive interdependence between the academic skill and the prestige characteristics guarantees that if academia attracts mostly workers who are highly skilled academics, then academia is prestigious. If this assumption is violated, it might be impossible for academia to both be prestigious and attract workers of (on average) higher skill than finance; and if academia is not prestigious, then it might be impossible for academia to both be larger than finance and attract workers of higher skill than finance (by Theorem 2).

### 4.4 Skill Interdependence

The assumption that \(C(x_A, x_F) > x_A x_F\) is natural in the context of sorting into academia and finance, as both occupations rely heavily on cognitive skills. Furthermore, if this assumption is violated, then it does not make sense to use the requirements that \(\bar{x}_A > \bar{x}_F\) and that academia is larger than some arbitrary \(M'\) as an indication that social status is able to counter the impact of the public good problem on selection. To see why, consider the no-status baseline and assume that \(x_A = 1 - x_F\), that is, that financial and academic skills are perfectly negatively correlated. In that case, we have that \(\bar{x}_A = (2 - M)/2\) and \(\bar{x}_F = (1 + M)/2\) in any equilibrium, and hence that \(\bar{x}_F > \bar{x}_A\) if and only if \(M > 0.5\). Thus if skills are perfectly negatively interdependent, then even if one occupation offers infinitely more-differentiated wages than the other occupation, it can attract workers of
higher skill only if it is smaller than the other occupation.\footnote{If skills are imperfectly negatively interdependent, then it is possible for finance to attract workers of (on average) higher skill than academia and be the larger occupation, but not arbitrarily large.} It follows, therefore, that in the first-best solution we can have $\bar{x}_A > \bar{x}_F$ only if $M < 0.5$.

4.5 Asymmetric Taste for Prestige

In Section 2, I assumed that the taste for occupational prestige is the same in the two occupations. Suppose, instead, that the taste for prestige differs between academia and finance, that is, $k_A \neq k_F$. By Equation (5), the difference in occupational prestige rewards between academia and finance would become $(k_F + k_A M/M_A) o_F$. Consider an equilibrium of the altered model with $M^* \in (0,1)$. Then any such equilibrium can be supported in my model for $k = \frac{1}{2}(k_F + k_A M/M_A)$ with all other primitives of the model unchanged. Thus all the results in Section 3 would hold for $k_A \neq k_F$, and in this sense the assumption that $k_A = k_F$ is without loss of generality.

4.6 Symmetric Importance of Local Status

Unlike the taste for prestige, I allowed the taste for local status to be occupation dependent in Section 2. As I explained in the Introduction and Section 2.1, there are very good theoretical and empirical reasons to make this assumption. Nevertheless, it is worth stressing that the condition $l_A \neq l_F$ is absolutely critical for Theorem 3 to hold. If the importance of local status were required to be symmetric across sectors, then the limit of the impact that social status can have on occupational sorting would be given by parts (ii)–(iv) of Theorem 2: It would always be possible to sustain an equilibrium in which academia attracts workers of (on average) higher skill than finance, and it would always be possible to sustain an equilibrium in which academia is arbitrarily large, but it would never be possible to sustain an equilibrium in which academia is larger than finance and attracts workers of (on average) higher skill than finance.\footnote{The first statement follows from reasoning analogous to that in the proof of Theorem 2(ii), with the difference that one needs to vary $k$ rather than $\delta$ in order to set $c(M')$ to 0 (using the fact that for $l_F$ slightly larger than $l_F^*$, we must have $\bar{x}_A > \bar{x}_F$ and $o_F > o_A$). The second statement follows from the fact that $M \to 1$ as $l_F \to \infty$ (which is implied by Equation (13) and the fact that $x_i^F$ is constant in $l_F$). The third statement is implied by Lemma 4(i).}

4.7 Endogenous Wages

In Section 2, I assumed that the marginal product of worker $(x_A, x_F)$ is an exogenous function of her occupation-specific skill, and that it is equal to $m_A(x_A)$ if she joins academia and to $m_F(x_F)$ if she joins finance. Alternatively, one could follow Heckman and Sedlacek (1985) and assume that the marginal product depends on sorting. In this section, I briefly explain why allowing for endogenous marginal product (and thus also wages)
would leave the statements of Theorem 1(iii), Theorem 2(iv) and Theorem 3 (and thus also the message of the paper) unchanged.

To be specific, define the functions

$$M_A(S) \equiv M \int_0^1 m_A(x) dG_A(x; S)$$

and

$$M_F(S) \equiv (1 - M) \int_0^1 m_F(x) dG_F(x; S).$$

Suppose that the marginal product of worker \((x_A, x_F)\) in occupation \(i\) under sorting \(S\) is equal to \(p_i(M_i(S))m_i(x_i)\), where \(p_i : [0, \bar{M}_i] \to \mathbb{R}_{>0}\) is decreasing and continuous and \(\bar{M}_i = \int_0^1 m_i(x) dx\). As a result, the wage of worker \((x_A, x_F)\) in finance is \(w_F(x_F; M_F) = p_F(M_F)m_F(x_F)\), and her wage in academia is \(w_A(x_A; M_A) = p_A(M_A)w_A\). Finally, to ensure that there exists an equilibrium in the no-status benchmark, let us assume that \(w_A \in (\frac{p_F(M_F)}{p_A(M_A)}m_F(0), \frac{p_F(0)}{p_A(M_A)}m_F(1))\).

Now, I define a new concept, of a *twice-compensated equilibrium*, and redefine the concepts of a compensated equilibrium and an equilibrium for the context of the model with endogenous wages.

**Definition 2.** A sorting \(S^p\) constitutes a *twice-compensated equilibrium* if and only if (a) \(S^p\) is non-degenerate and (b) there exist some *compensating differential* \(c_d \in \mathbb{R}\) and a *compensating price* \(c_p \in \mathbb{R}_{>0}\) such that for all \((x_A, x_F)\) in \([0, 1]^3\),

$$\left(S^c(x_A, x_F) - p\right)(s_A(x_A; S^c) + c_d) \geq \left(S^c(x_A, x_F) - p\right)(c_p m_F(x_F) + s_F(x_F; S^c)). \quad (19)$$

A sorting \(S^c\) constitutes a compensated equilibrium if it constitutes a twice-compensated equilibrium with \(c_p = p_F(M_F(S^c))\). A sorting \(S^c\) constitutes an equilibrium if it constitutes a compensated equilibrium with \(c_d = w_A p_A(M_A(S^c)) + k(o_A(S^c) - o_F(S^c))\).

Of course, a sorting \(S^c\) can constitute a compensated equilibrium only if it constitutes a twice-compensated equilibrium for some \(c_p \in [p_F(0), p_F(m_F(1))]\). The crucial insight is that the set of compensated equilibria that correspond to \(c_p \in [p_F(0), p_F(m_F(1))]\) is the same as the union over \(c_p \in [p_F(0), p_F(m_F(1))]\) of the sets of compensated equilibria of the baseline model that correspond to specifications in which \(w_F(x_F) = c_p m_F(x_F)\).

Because the compensated equilibrium of the baseline model is continuous in \(c_p\), the crucial results derived for the compensated equilibria of the baseline model (specifically, the discussion in Section 3.1, Proposition 1, and Lemma 4) have exact analogues if wages are endogenous. To understand the intuition behind this, consider Lemma 4(iii) as an example. The result from Section 3.3 implies that regardless of the extent to which wages in finance differ with skill, we can always make local status so important in academia that academia is more prestigious than finance. As wages in finance differ with skill the most if \(c_p = p_F(m_F(1))\), it follows that if \(\delta > \delta^*(p_F(m_F(1)))\) then academia must be more prestigious than finance in the compensated equilibrium of the model with endogenous wages.
wages. Given this insight, it is very easy to show that Theorem 1(iii), Theorem 2(iv) and Theorem 3 remain unchanged if wages are endogenous.\(^\text{19}\)

5 Conclusions

In this paper, I proposed a simple model of occupational sorting with social status concerns. The main insight is that there exists a complementarity between the two most commonly considered components of social status: occupational prestige and local status. If academia pays a sufficiently low common wage, then neither of the two components can, on its own, sustain equilibria in which academia is larger and attracts workers of (on average) higher skill than finance. If, however, workers care sufficiently strongly about occupational prestige and local status is sufficiently more important in academia than in finance, then academia will always be larger than finance while also attracting workers of (on average) higher skill than finance.

The big remaining question is, of course, How strongly do workers actually care about social status? While this is an empirical question, it is worth noting that the strength of the desire for status depends on the extent to which workers’ real wages depend on their choice of occupation and their occupation-specific skill. In particular, if income taxes were very high, then the choice of occupation would result in very small differences in the real wage, which would make occupational prestige a relatively important aspect of occupational choice. Indeed, one can show that the statement of Theorem 3 must hold as long as the linear tax rate and the ratio \(l_A/l_F\) are both high enough.\(^\text{20}\)

A Omitted Proofs and Results

The Comparison Theorem

The following, well-known result plays a key role in many of the proofs in the paper.

**Theorem 4** (Comparison Theorem). Let \(h\) and \(k\) be solutions of the differential equations

\[
h'(x) = A(x, h(x)), \quad k'(x) = B(x, k(x))
\]

respectively, where \(A(x, y) \leq B(x, y)\) for \(x \in [a, b]\) and \(A\) and \(B\) are Lipshitz-continuous in \(h\) and \(k\), respectively. Let also \(h(a) \leq k(a)\). Then \(h(x) \leq k(x)\) for all \(x \in (a, b]\). If, further, \(A(x, h(a)) < B(x, h(a))\) or \(h(a) < k(a)\), then \(h(x) < k(x)\) for all \(x \in (a, b]\)

\(^{19}\)In the case of Theorem 2(iv), the impossibility holds for \(w_A \in \left(\frac{p_F(m_F)}{p_A(0)}m_F(0), w_A^*\right)\).

\(^{20}\)The ratio \(l_A/l_F\) is exogenously given in this paper, but it could plausibly be manipulated by the government. For example, the government could introduce and advertise (possibly non-pecuniary) awards for the best research (and thus increase \(l_A\)) or increase excise taxation on conspicuous consumption (which would likely have an effect similar to that of a decrease in \(l_F\)).
Proof. It follows immediately from Theorem 8, Corollary 1 and Corollary 2 in Birkhoff and Rota (1969). □

Proof of Lemma 4

Consider a separation function \( \psi^a \) which solves:

\[
\frac{\partial}{\partial x_A} \psi^a(x_A) = \left( M \left( \frac{0.5\beta w^F_F(\psi^a(x_A)) - \frac{1-\beta \delta}{1-M} \frac{\partial}{\partial x_A} C(x_A, \psi^a(x_A))}{\frac{\partial}{\partial x_A} C(x_A, \psi^a(x_A))} \right) \right)^{-1}
\]

if \( x_A \in (x^a_a, x^a_A) \);

\[
M = \int_0^1 \frac{\partial}{\partial x_A} C(\psi^a(r, x^F_F, x^A_A), r)dr.
\]

Because \( x^a_A > 0 \) implies \( \psi^a(x^a_A) = 0 \), it follows by the same logic as in the proof of Proposition 1 that \( x^a_A = 0 \). Further, \( x^a_A > 1 - M \), as otherwise the RHS of Equation (21) must be larger than \( M \). Choose some \( \bar{x}_A \in (0, 1 - M) \subset (x^a_a, x^a_A) \) and suppose that \( \psi^a(\bar{x}_A) = \alpha \). Because the RHS of Equation (20) is Lipshitz-continuous on \((0, 1)^2\), it follows from Theorem 4.32 in Precup (2018) that there exists a unique \( \psi^a(\cdot; \alpha) \) which solves the initial value problem given by Equation (20) and \( \psi^a(\bar{x}_A) = \alpha \). Thus, it follows by a reasoning analogous to that in the last paragraph of the proof of Proposition 1 that for any \( \beta \) there exists a unique \( \psi^e \) that satisfies Equations (20) and (21).

Clearly, the problem defined by Equations (20) and (21) is equivalent to the problem defined by Equations (13)-(14) for \( \beta = 1/(l_F + \delta) \), as long as \( \beta > 0 \). As \( \psi^a(\cdot; \beta) \) is continuous in \( \beta \), it follows that \( \lim_{l_F \to \infty} \psi^e(\cdot; M; l_F) = \psi^a(\cdot; M, \beta = 0) \), so that the limiting compensating equilibrium exists and is unique.

Set \( \beta = 0 \). Because \( G^a_A(x^a_A) = G^a_F(x^a_F) = 0 \), integrating Equation (20) reveals that \( G^a_F(\psi^a(x_A)) = G^a_A(x_A) \) for any \( M \), which implies that \( x^a_A = x^a_F = 1 \). Note that if \( M = 0.5 \), then \( \psi^a(x_A) = x_A \). As the RHS of Equation (20) is decreasing in \( M \), it follows from the Comparison Theorem that if \( M \geq (\leq) 0.5 \) and \( \psi^a(x_A) < (>) x_A \) for any \( x_A \in (0, 1) \), then \( x^a_F \neq 1 (x^a_A \neq 1) \); contradiction! Therefore, if \( M \geq (\leq) 0.5 \) then \( \psi^a(x_A) \geq (\leq) x_A \) for all \( x_A \), which implies that \( G^a_F(x) \leq (\geq) G^a_A(x) \).

Proof of Lemma 4

(i) I will prove this in three steps.

STEP 1: In any almost equilibrium, if \( M \geq 0.5 \) and \( \delta \leq 0.5(1 - M)w^F_{F,\min} \) then \( \bar{x}_F^F > \bar{x}_A^A \).

This follows immediately from Equation (16), Lemma 2 and Lemma 3.

---

21Note that the RHS in Equation (20) is Lipshitz-continuous on \((0, 1] \times [0, 1]^2\) for any \( \beta \geq 0 \).

22The RHS of Equation (20) is Lipshitz-continuous on \( x_A \in [x, 1] \) for any \( x > 0 \), so the Comparison Theorem applies.
Stating the second step requires additional notation. First, for any $M \in [0.5, 1]$ denote the $x_A \in (0, 1)$ for which $\min_{x_F \in [0,1]} \frac{\partial}{\partial x_F} C(x_A, x_F) = 2(1 - M)$ by $x'_A(M)$. Second, define

$$t(M) \equiv \max_{x_F \in [0,1]} \frac{\partial}{\partial x_F} C(x'_A(M), x_F) \in [1 - M, 1].$$

The difference $t(M) - (1 - M)$ depends on how interdependent the two skills are, with higher $t$ typically corresponding to higher degree of interdependence.

**STEP 2:** If $\delta \leq l_F(\frac{M}{l(M)} \frac{M - 3}{2M - 1} - 1)$ and $M \geq 0.5$, then $x^F_F > x^A_A$.

Define $\alpha = \frac{l(M)l_A}{Ml_F}$; note that $\delta \leq l_F(\frac{M}{l(M)} \frac{M - 3}{2M - 1} - 1)$ and $M \geq 0.5$ imply $1 - \alpha \geq 0$.

First, I will show that, for any $x_F$, either $G_F(x_F) \leq \alpha x_F$ or $G_F(x_F) \leq 2x_F - 1$, which would imply that

$$x_F - G_F(x_F) \geq \begin{cases} (1 - \alpha)x_F \quad & \text{if } x_F \in [0, 1/(2 - \alpha)] \\ 1 - x_F \quad & \text{if } x_F \in (1/(2 - \alpha), 1]. \end{cases}$$

(22)

**Case 1:** $x_F \leq x^c_F$. In that case, $G_F(x_F) = 0 \leq \alpha x_F$ and the result follows immediately.

**Case 2:** $x_F \in (x^c_F, \psi^c(x'_A(M))]$. First, note that in this case we have $x_F \leq x^c_F$. It follows, therefore, that $\frac{\partial}{\partial x_F} C(\phi^c(x_F), x_F) \leq \frac{\partial}{\partial x_F} C((x'_A(M), x_F) \leq t(M) < 1$. Because all workers join some occupation, it follows that

$$MG_A(\phi^c(x_F)) + (1 - M)G_F(x_F) = C(\phi^c(x_F), x_F),$$

which implies that $G_A(\phi^c(x_F)) \leq \frac{C(\phi^c(x_F), x_F)}{M}$. Equations (8) and (9) imply that $t_F(x_F) \leq t_A(\phi^c(x_F))$ and that $t_F(x^c_F) = t_A(\phi^c(x^c_F))$. Taking the difference, we arrive at

$$G_F(x_F) \leq G_F(x_F) + \frac{w_F(x_F) - w_F(x^c_F)}{2l_F} \leq \frac{l_A}{l_F} G_A(\phi^c(x_F)) \leq \frac{l_A}{Ml_F} C(\phi^c(x_F), x_F) \leq \frac{t(M)l_A}{Ml_F}.\$$

**Case 3:** $x_F \in [\psi^c(x'_A), 1]$. In that case, $g_F(x_F) \geq \frac{\partial}{\partial x_F} C(x'_A(M), x_F)/(1 - M) \geq 2$. As $1 - G_F(x_F) = \int_{x_F}^{1} g_F(r)dr$, it follows that $G_F(x_F) \leq 1 - 2(1 - x_F) = 2x_F - 1$.

Second, denote by $G'_i(\cdot)$ the cdf of the distribution of $X_i$ among workers who joined occupation $j \neq i$ and notice that $x_A - G_A(x) < 1 - M$, because $x_A - MG_A(x_A) = (1 - M)G'_A(x_A)$.

Finally, because

$$x^c_i - 0.5 = \int_{0}^{1} x - G_i(x) \, dx,$$

---

23 $x'_A(M)$ exists and is unique, because $\min_{x_F \in [0,1]} \frac{\partial}{\partial x_F} C(x_A, x_F)$ is continuous and strictly increasing in $x_A$ by the Envelope Theorem, and $\frac{\partial}{\partial x_F} C(0, x_F) = 0$, $\frac{\partial}{\partial x_F} C(1, x_F) = 1$.

24 From the definition of set $D(\psi^c)$ and the increasingness of $\psi^c$ follows that $\max_{x_F \in [0,1]} \psi^c(x_A) = x^c_F$. 29
it follows that \( \bar{x}_F^E - 0.5 \geq (1-\alpha)/(2(2-\alpha)) \) and \( \bar{x}_A^A - 0.5 < 1 - M \), so that

\[
\bar{x}_F^E - \bar{x}_A^A > (1-\alpha)/(2(2-\alpha) + M - 1).
\]

It follows that \( \bar{x}_F^E > \bar{x}_A^A \), because \( \delta \geq I_F(M/M) 4M-3 / 2M-1 - 1 \).

STEP 3: There exists an \( \bar{M} \in (3/4, 1) \), such that \( M/M ) 4M-3 / 2M-1 \geq 2 \) for all \( M \in (\bar{M}, 1) \).

As \( \partial \delta_x F(x_A, x_F) = 0 \) if and only if \( x_A = 0 \), it follows that \( x_A'(0) = 0 \) and thus \( t(1) = 0 \). Because \( t(M) \) is differentiable by the Envelope Theorem, it is also continuous and the result follows.

Together, Steps 1 to 3 prove the result, with \( y = 1 - \bar{M} \).

(ii) The result follows from Lemmas 2 and 3 and the fact that \( \psi^c(\cdot; M; l_F) \) is continuous in \( l_F \).

(iii) Observe that

\[
\bar{x}_F^A = G_A(x_A^A)E(X_F|S^c(X_A, X_F)) = 1, X_A < x_A^c + (1 - G_A(x_A^c))E(X_F|X_A \geq x_A^c).
\]

Therefore, it is sufficient to show that \( E(X_F|X_A \geq x_A^c) \) is bounded above 0.5 and that

\( G_A(x_A^c) \approx 0 \) for sufficiently high \( l_A \).

First, I will bound \( G_A(x_A^c) \) from above. By Equation (12), we have that

\[
w_F(1) - w_F(0) + 2l_F \geq w_F(x_A^c) - w_F(x_F^c) + 2l_F G_F(\psi(x_A)) = 2l_F G_A(x_A^c),
\]

which implies that \( G_A(x_A^c) \leq \frac{0.5(w_F(1)-w_F(0)+2l_F)}{l_A} \).

Second, I will bound \( E(X_F|X_A \geq x_A^c) \) from below. Because all workers with \( x_A > x_A^c \) join academia, it must be the case that \( x_A^c > 1 - M \geq 1 - M' \) in any compensated equilibrium. Clearly, thus \( E(X_F|X_A \geq x_A^c) \geq b \equiv \min_{x_A \in [1-3M', 1]} E(X_F|X_A \geq x_A) \).

Denote \( \Pr(X_F \leq x_F|X_A \geq x_A) \) by \( F(x_F|x_A) \); because \( (1 - F(x_F|x_A))(1 - x_A) = 1 - x_A - x_F + C(x_A, x_F) \) it follows from \( C(x_A, x_F) > x_A x_F \) that \( F(x_F|x_A) < x_F \) for all \( (x_A, x_F) \in (0, 1)^2 \). We have, thus, that \( b > 0.5 \).

To conclude the proof, set \( d = 0.5(b-0.5) \). It follows that if \( \delta \geq \frac{b(w_F(1)-w_F(0)+2l_F)}{l_A} \) then \( \bar{x}_F^A > 0.5 + d \).

**Lemma 5** (Selection). In any compensated equilibrium, \( \bar{x}_A^A > \bar{x}_F^A \).

Because all workers join some occupation, we have

\[
MG_A(x) + (1 - M)G_F(\psi^c(x)) = C(x, \psi^c(x)). \tag{24}
\]

Subtracting \( MG_A(x) + (1 - M)G_F(x) = x \), where \( G_A^A(\cdot) \) is defined as in the proof of Lemma 4 (i), from Equation (24) yields

\[
M(G_A(x) - G_A^A(x)) = C(\psi^a(x), x) - x + (1 - M)(G_F(x) - G_F(\psi^a(x))).
\]
I claim that the RHS of this equation is always negative. First of all, note that by the Frechet-Hoeffding Theorem, we have that \( C(\psi^a(x), x) \leq \min\{\psi^a(x), x\} \). Suppose that \( \psi^a(x) \geq x \), then \( C(\psi^a(x), x) - x \leq 0 \) and the RHS is less than \((1-M)(G_F(x) - G_F(\psi^a(x))\), which is weakly negative. Suppose, instead, that \( \psi^a(x) < x \), then \( C(\psi^a(x), x) - x \leq \psi^a(x) - x \) and

\[
M \left( G_A(x) - G_F^A(x) \right) \leq \int_x^{\psi^a(x)} \frac{\partial}{\partial x} C(r, \phi^a(r)) - 1 \, dr \leq 0,
\]

as required. Thus \( G_A(x) - G_F^A(x) \leq 0 \) and the distribution of \( X_A \) among academics first order stochastically dominates the distribution of \( X_F \) among academics.

References


