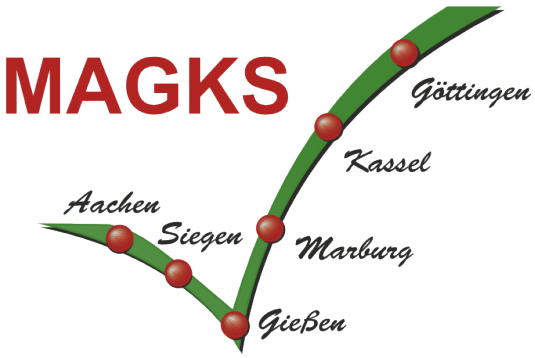

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Coordination: Bernd Hayo
Philipps-University Marburg
School of Business and Economics
Universitätsstraße 24, D-35032 Marburg
Tel: +49-6421-2823091, Fax: +49-6421-2823088, e-mail: hayo@wiwi.uni-marburg.de

Is Self-employment a Career Trap?
A Large-Scale Field Experiment in the Labor Market.

Igor Asanov[a], Maria Mavlikeeva[a*]

[a]*University of Kassel, 34109 Kassel, Germany*

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[*] Corresponding author: Maria Mavlikeeva.
Email addresses: igor.asanov@uni-kassel.de (Igor Asanov),
mavlikeeva@incher.uni-kassel.de (Maria Mavlikeeva)

Abstract

We conduct a large-scale experiment in the labor market using more than 8,000 fictitious resumes to uncover the demand-side mechanisms behind the wage penalty for the self-employed. We find that self-employed individuals, compared to wage earners, are subject to adverse treatment across different occupations. This adverse treatment is concentrated in the lower-skilled, non-managerial market. This differential treatment, conditional on managerial skills, also holds for different occupational levels and increases with the length of self-employment experience. The results suggest that self-employment leads to the development of generalist skills (useful for managerial roles) at the cost of specialist skills.

Keywords

Self-employment; Field experiment; Skills mismatch; Wage penalty; Managerial skills; Specialist skills

1. Introduction

Governments encourage entrepreneurship – a call to which many respond by taking up or continuing in self-employment. However, whether self-employment results in net benefits is an open question. Pecuniary benefits in entrepreneurship on average are lower than in wage employment due to lower earnings or slower income growth (Hamilton, 2000; Moskowitz and Vissing-Jorgensen, 2002, Hyytinen et al., 2013). Entrepreneurs may enjoy non-pecuniary benefits such as additional job satisfaction (Georgellis et al., 2007; Åstebro et al., 2014; Stephan, 2018) or generalist experience (Lazear, 2004), but these are hard to quantify.

Extant evidence, moreover, shows that entrepreneurs get a wage penalty when they return to wage employment (Bruce and Schuetze, 2004; Kaiser and Malchow-Møller, 2011; Baptista et al., 2012; Koch et al., 2021). Whether this wage penalty *after* times of self-employment adds to the monetary net losses experienced *during* self-employment depends on which mechanism drives it. However, as supply and demand simultaneously determine the lower-wage equilibrium for (prior) entrepreneurs compared to wage earners (Bruce and Schuetze, 2004; Kaiser and Malchow-Møller, 2011; Baptista et al., 2012; Failla et al., 2017; Mahieu et al., 2019; Mahieu et al., 2022), the exact mechanisms on each side are barely understood in isolation.

On the demand side, prospective employers can discount entrepreneurial experience, as they anticipate a mismatch between corporate jobs and the skills, abilities, and personal qualities of entrepreneurs (Georgellis et al., 2007; Åstebro et al., 2014). For instance, entrepreneurship requires a generalist skill set (Frese and Gielnik, 2014) that is not required in some wage market occupations. Alternatively, especially when there is uncertainty about the quality of candidates for top positions, the prospective employer may avoid hiring entrepreneurs in the upper tail of wage distribution, like high-skilled candidates (Mahieu et al., 2019). Moreover, a prospective employer might suspect that human capital depreciates in entrepreneurship, due, for example, to the absence of on-job training (Kaiser and Malchow-Møller, 2011) and therefore this employer will penalize the long length of the entrepreneurial period. However, on the supply side, free sorting into different types of occupations or types of firms based on skills, abilities, or length of the entrepreneurial period makes it challenging to understand if any of the demand mechanisms play a role (Åstebro, et al., 2011; Rosen, 1986; Elfenbein et al., 2010).

To study the demand-side factors in isolation, correspondence experiments emerge - they are used to investigate the job prospects of entrepreneurs by randomly varying the experience of candidates in applications and measuring the callback rate for interviews (Botelho and Chang, 2023; Kacperczyk and Younkin, 2021; Koellinger et al., 2015). Koellinger et al. (2015) show that self-employed human resource managers receive adverse treatment in the job market. Botelho and Chang (2023) also find that software engineers are less likely to receive a callback for an interview if they have founding experience, especially if they are successful founders. Kacperczyk and Younkin (2021) rely on the stereotype conflict theory showing that the adverse treatment of founders is less pronounced for female candidates with a history of co-founding a new venture that employs people[1] That is, some evidence shows adverse treatment of self-employed compared to wage earners on the demand side, and that founding experience seems to be penalized in hiring. However, it is unknown to which extent differential treatment of the self-employed by prospective employers is generalized across occupations and skills, which limits understanding of the underlying demand-side mechanisms of differential treatment of self-employed in the labor market.

We aim to uncover the demand-side mechanisms of the wage penalty for solo self-employed by conducting a large-scale correspondence field experiment across occupations and skill levels. We send fictitious resumés in response to real job advertisements but randomly assign employment status – solo self-employed or wage earner – and other applicant characteristics. We estimate to which extent self-employment and other characteristics determine the rate of "callback" for an interview and, thus, the differential treatment of candidates by a potential employer.

We confront predictions based on different demand-driven mechanisms in the experiment. We study the differential treatment of the self-employed in two dimensions: The occupational

[1] However, Kacperczyk and Younkin (2021) theory "pertains only to instances where individuals created new organizations" as the motives to engage in new venture creation differ from the motives to engage in self-employment e.g. co-founding a firm that employ people unlikely to signal entrepreneurship out of necessity. Finally, creation of new venture compared to solo self-employment is likely to attract different people. This is observed, for instance, in the different gender compositions of these types of activities. New ventures can be considered a male-dominated field (Kacperczyk and Younkin, 2021), with ventures founded by men receiving 35 times more investments than ventures founded by women (Gornall and Strebulaev, 2019), but the gender gap for the self-employed varies from country to country and is far lower (Klapper and Parker, 2011, ILO, 2022) and "has closed in almost every [OECD] country" (OECD, 2016) to the time of our study.

group ("horizontal") and the skill levels group ("vertical"). Assessment of differential treatment of the self-employed across occupational groups allows us to increase the generalizability of our results and form the basis for the test of the differential treatment of the self-employed across skill levels. Specifically, we chose three occupational groups, and within each occupational group we sent various applications to positions requiring different skill levels: high managerial or lower-skilled jobs of associate professionals. The differential treatment of the self-employed and wage earners across these skill level groups might be in line with the uncertainty-based mechanisms (Mahieu et al., 2019) or be explained by the fact that the self-employed are generalists as managers (Baptista et al., 2012; Lazear, 2012). These mechanisms have opposite predictions. The uncertainty-based mechanism predicts higher adverse treatment in the high-skilled market than in the lower-skilled market, as it is harder to assess high-skilled candidates. However, the (entrepreneurial) generalist skill set is less valuable in lower-skilled associate professional jobs than in high-skilled managerial jobs. To account for other explanations, we randomly vary a large set of characteristics in the resumés, like work experience, gender, and job application objective section.

We find that the solo self-employed compared to wage earners are adversely treated at the application stage of the hiring process across occupational groups. More importantly, we find that this pattern of adverse treatment of the self-employed is concentrated in associate professional positions, with almost equal treatment of the self-employed and wage earners in high-skilled managerial positions. Moreover, we observe the same relationship between managerial skill level and unfavorable treatment of self-employed applicants on a more granular level of occupations. Finally, candidates with longer periods of self-employment are less likely to be called back for an interview, especially in the market of candidates for associate professional positions. That is, evidence shows that prospective employers appreciate the development of managerial human capital in self-employment but are concerned that it comes at the cost of non-managerial human capital in the market of associate professionals.

2. Theoretical Framework.

The International Standard Classification of Occupations (ISCO) defines a job as "a set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment" (2008). Research on occupational choice echoes this definition by assuming equal employment opportunities for self-employed workers and wage earners with similar characteristics (Evans and Leighton, 1989; Hamilton, 2000; Praag and Ophem, 1995). Moreover, Manso (2016) shows that short-term self-employed workers, once they return to wage employment, earn a comparable rate as those who were never self-employed. Similarly, Hyytinen and Rouvinen (2008) report the same effect after controlling for unobserved differences in productivity. Thus, candidates with self-employed or wage-earning experience but otherwise comparable skills should be treated equally in the labor market.

However, numerous studies point out a wage penalty for the self-employed who return to wage employment (Bruce and Schuetze, 2004; Kaiser and Malchow-Møller, 2011; Baptista et al., 2012; Failla et al., 2017; Mahieu et al., 2019; Mahieu et al., 2022). Yet the mechanism that drives this wage penalty is not clear, as the wage is determined by both demand and supply. The evidence about low demand for applicants with self-employment experience lacks generalizability, thus hindering the ability to make conclusions about the mechanism.[2] Demand-side study of the treatment of self-employed people shows that self-employed human resource managers, compared to wage-earning human resource managers, face adverse treatment in the job market during a recession (Koellinger et al., 2015). Koellinger et al. (2015) acknowledge the limited generalizability of their results to specific occupational group, as they report the results for a specific job type: human resource managers with generalist experience. Thus, we do not know (a) if this adverse treatment can be observed in other occupational groups, thereby forming a general pattern, or if it is limited to the treatment of human resource managers, and (b) why self-employed face adverse treatment in the labor market (Koellinger et al., 2015).

The adverse treatment that is limited to human resource managers can be explained by in-

[2] In addition, in the interviews that we conducted before this experiment, human resource managers told us that self-employment status adversely affects the chances to be invited for a job interview without consensus on the reasons for it.

group favoritism (Tajfel et al., 1971), given that correspondence experiments show in-group favoritism at the selection stage of the recruitment process (Asanov and Mavlikeeva, 2023; Carlsson and Eriksson, 2019; Edo et al., 2019; Erlandsson, 2019). However, identifying significant adverse treatment of the self-employed across different professions, thereby forming a general pattern, will require digging deeper into understanding the driving mechanisms. If the self-employed candidates receive fewer callbacks than wage earners across different occupational groups, it would be alarming from both theoretical and policy perspectives. This pattern would signal potential preference-based ("taste-based") discrimination (Becker, 1957), where employers dislike working with certain groups and prefer to work with other group members.[3] It is more plausible, however, that the prospective employers will adversely treat the self-employed compared to wage earners, as the employers can use visible indicators of worker characteristics – e.g., self-employment experience – to solve the signal extraction problem. In other words, in line with the theory of statistical discrimination (Arrow, 1973; Phelps, 1972), when employers have imperfect information about an individual, they may use group characteristics like self-employment to form beliefs about the productivity of the individual. The next two main theoretical mechanisms can be put forward to support the intuition that the probability of invitation to the interview will vary for different types of the self-employed.

First, uncertainty in hiring can be determinant of the adverse treatment of the self-employed. It is harder to assess the quality of high-skilled applicants than low-skilled applicants. In response to this uncertainty, employers will offer lower wages to self-employed candidates in the upper tail of the wage distribution (Mahieu et al., 2019). In other words, prospective employers will penalize "star" employees: high-skilled applicants. Mahieu et al. (2019), using observational data, provide support to this theory. They find that the wage penalty is higher for the self-employed who are located at the upper tail of the wage distribution – candidates for the high-skill market, like high-skilled managerial positions – but not for those who come from the lower tail of wage distribution – candidates for the lower-skill market of

[3] Gneezy et al. (2012) show that a choice which might be perceived by some to be voluntary, like sexual orientation, leads to preference-based discrimination. Self-employment may be considered as a voluntary choice by employers; thus, it can be subject to preference-based discrimination.

associate professionals. Thus, if the wage penalty is generated on the demand side, where prospective employers attempt to reduce uncertainty about a candidate by penalizing "star" employees, the adverse treatment of the self-employed compared to wage-earning applicants should be more pronounced in the high-skilled job market.

Second, high-skilled jobs often require not only specialist but also managerial skills (see for instance ISCO, 2008).[4] Put it differently, high-skilled managerial positions require a generalist skill set (Lazear, 2012). However, self-employment as an entrepreneurial activity requires a generalist skill set, as well (Baptista et al., 2012; Lazear, 2012, Hartog et al., 2010), thus the self-employed can fit into wage-earning managerial positions. Moreover, in lower-skilled, non-managerial self-employment, specialist human capital will depreciate – the self-employed will be unfit for wage-employment in lower-skilled associate professional positions. Thus, the prospective employer will adversely treat candidates with self-employment experience in lower-skilled associate professional positions, rather than in the high-skilled managerial positions.

It is unclear to which extent the uncertainty in hiring at the high-skilled position or generalist managerial experience plays a stronger role in the perception of the self-employed. These processes can counter-balance each other, creating equally poor job-market prospects for self-employed and wage earners across different ISCO skill level groups. However, if not, we should see unequal treatment of the self-employed across different ISCO skill level groups in line with the two main theoretical mechanisms stated above.

In addition to the main theoretical mechanisms that we put forward, other factors can affect the job prospects of the self-employed and thus need to be accounted for. Next, we highlight crucial factors that we will have to consider in our study to perform a clear test of the above-mentioned mechanisms behind the adverse treatment of self-employed job applicants.

First, non-pecuniary preferences, stigma of failure or commitment can affect the perception of the self-employed. A prospective employer might have concerns that a self-employed worker is not a good fit for a job, as the self-employed person might have non-pecuniary preferences, like being a "lone wolf", not a team player (Blanchflower and Oswald, 1998;

[4] International Standard Classification of Occupations (ISCO).

Cooper and Saral, 2013; Hurst et al., 2011). Moreover, reasons for changing job may be unclear: For example, "stigma of failure", when the prospective employer might have a stereotype that "most self-employed applicants have failed, and this is probably one of them" (Koellinger et al., 2015). Additional information can reduce the adverse treatment of the self-employed, as it decreases uncertainty about a candidate's quality and the objective of the application.[5] For instance, Botelho and Chang (2023) prescribe that early-career former founders "should focus on ways to emphasize their ability to fit into and remain committed to the hiring firm". Therefore, the self-employed applicant can attempt to reduce employers' concerns by providing additional information in the objective section of their resumé and thereby level the playing field with other candidates. We will vary this characteristic and test if emphasizing the objective of application plays a role.

Second, human capital can depreciate in entrepreneurship over time (Williams, 2000). Adverse treatment of entrepreneurs should therefore increase across different occupational groups, or this effect can be concentrated on specific occupations. Mahieu et al. (2019), however, find that the wage penalty decreases with time in entrepreneurship, which is inconsistent with expectations. Being uncertain about predictions of the demand side, we will exogenously vary the length of self-employment to account for this potential effect.

Third, socio-demographic characteristics can affect the prospects of employment (gender, education, additional training). The self-assessed ability to be an entrepreneur drastically varies across gender and education (Thébaud, 2010; Brieger and Gielnik, M., 2020). Moreover, wage earners and self-employed individuals may participate in different training (Kaiser and Malchow-Møller, 2011). These factors can lead to different perceptions of applicants with self-employed experience, with unclear predictions for the self-employed. For instance, founders of new organizations are mostly male, and thus female founders stand out among applicants due to the stereotype conflict (Kacperczyk and Younkin, 2021). However, it is observable in the gender composition of the self-employed, unlike in founders, females constitute roughly 50% of the self-employed (ILO, 2022)[6], making it unclear if a stereotype conflict is present.

[5] For instance, information about criminal convictions decreases racial discrimination as it allows prospective employer to use this information rather than rely on group characteristics (Agan and Starr, 2018) or stereotypes (Bordalo et al., 2016).

[6] The International Labour Organization (ILO).

Thus, to mitigate the influence of potential confounders, we will exogenously vary socio-demographic characteristics to account for the potential distortion of the perception.

3. Experimental Design

To assess job prospects for solo self-employed individuals and wage earners at the selection stage of the recruitment process, we sent 8,600 resumés to 2,150 job vacancies advertised in Russian labor market between March and August 2017 (we finished data collection in December 2017).[7] We randomly assigned (1) if the applicant was self-employed or worked for a company, and (2) if their resumé included an objective section. We applied within-subject design to control for vacancy-specific effects: We sent four types of resumés in random order for each vacancy.[8]

We cross-randomized the objective section to analyze if reducing uncertainty about non-pecuniary preferences of applicants benefits self-employed individuals more than it does with wage earners; specifically, how it influences the likelihood they are invited for a job interview. Before performing the experiment, we consulted several human resources managers from large and medium-sized companies on their hiring practices. The results show that potential employers are less likely to invite a self-employed person for an interview because of concerns regarding the applicant's ability to fit in or commit to the company (regarding the mismatch between the preferences of self-employed and organizational culture), or why they are searching for a job in the wage market, which is consistent with theoretical literature. The prevailing preference of the self-employed for independence (non-team player) may cause potential employers to doubt their employability (Blanchflower and Oswald, 1998; Cooper and

[7] We choose the Russian labor market for the experiment, as attitudes towards entrepreneurs in Russia are close to the world average and have been relatively stable in the years (see Appendix A.1) before our study. Moreover, the job application process in Russia allows for a clean comparison of applicants with wage earning or self-employed experience. Job applicants in Russia just need to send a resumé, without, for example, reference letters, which can be complicated for the self-employed to provide.

[8] The correspondence experiments assume a certain level of deception, as fictitious resumés are sent in response to actual vacancies. To minimize the interruption of the hiring process, we contacted all the recruiters after receiving a positive callback for the fictitious applicants and rejected their invitations for an interview. The dataset is anonymized. We provide this experiment following the ethically sensitive approach recommended for this correspondence study by the Central Ethics Committee at the University of Kassel.

Saral, 2013; Hurst et al., 2011; Failla et al., 2017). Additionally, the stigma of failure may play a role: If potential employers believe that a self-employed person wants to switch to wage employment because their business failed, they may become less desirable job candidates (Mahieu et al., 2019). Therefore, we designed the objective sections to articulate implicitly or explicitly the reason for changing jobs – "I would like to move to a new professional level", "gain experience in new areas" – or reduce concerns about not being a team player – "working in a team", "I see myself as a valuable member of a team".[9]

To keep the setting realistic, we chose occupations which commonly included both solo self-employed individuals and wage earners; associate professionals and managers; and which have demand for applicants. This narrowed our range of choices to the following three occupational fields: Finance, information technology (IT) and public relations (PR). Further we choose two from the first three major skill groups according to the International Standard Classification of Occupations (ISCO): Managers (group 1, skill levels 3 and 4) and associate professionals (group 3, skill level 3). Managers are generally considered high-skilled, while associate professionals are considered lower-skilled. We applied for similar occupations in each group.

We sent resumés for the following managerial positions: Finance Managers (1211), Advertising and Public Relations Managers (1222), Information and Communications Technology Services Managers (1330); and the following associate professional positions: Accounting Associate Professionals (3313), Conference and Event Planners (3332), Information and Communications Technology Operations Technicians (3511).[10] All applications and resumés corresponded to the jobs advertised in sector, responsibilities, and duties. All fictional applicants have been employed in a single position for several years after

[9] Here are examples of objective sections:

"I would like to move to a new professional level, working in a team. I would like to have an opportunity to apply my gained experience, acquiring new skills at the same time." or

"I would like to work in a company where my professional skills and personal qualities could be a significant contribution to the long-term success of the common venture." or

"I aim to gain experience in new areas and to develop myself in a friendly, and vigorous energetic team." or

"I strive for professional growth, expanding the scope of my knowledge and skills. I see myself as a valuable member of a team."

[10] International Standard Classification of Occupations codes 2008 in parentheses.

graduating by the time of the job application

The duties of self-employed individuals can differ from those performed by wage earners, and this can influence an employer's hiring decision (Lazear, 2005). Since this might influence experimental validity, we constructed a database that combined the job duties of both self-employed persons and wage earners. Neither of the sets of resumés contained information which might make an employer favor a particular candidate based on their job responsibilities. For example, the data did not provide information on how many workers are or were supervised by the applicant.

Self-employed individuals participate in different training activities than wage earners, which can change the perceived value of their resumés by prospective employers (Kaiser and Malchow-Møller, 2011). To avoid a quality gap between applicants with self-employed and wage-earning experience, all resumés included lists of additional training selected at random but relevant to the industry of application.

4. Experimental Procedure

Resumé-generating process. To begin creating our fictional resumés, we first analyzed a large set of real resumés posted online. This allowed us to create a database of resumé sections. All our resumés include the following sections: Heading (name, mobile telephone, e-mail, date of birth), Work experience, Education, Professional skills, Personal qualities, Advanced training, and Language skills.

We developed a program that generates resumés based on our database of resumé sections. It randomly chooses applicant's gender and constructs full names. It then randomly selects information from every section to create a full resumé according to the target occupation and the type of resumé sent. The layout of the resumés is also random. These elements contribute to addressing Heckman's (1998) critique of correspondence experiments.

Application process. We identified suitable vacancies on various online job search websites and sent resumés directly to prospective employers. In some cases, the advertisement included contact information; in others, we obtained it from the *Career* or *Vacancies* pages on

the websites of the companies posting the job openings.

Mailing. Our computer program sent four types of resumés for each vacancy in random order and with a large time lag between them. All the applications contained a cover letter in which the candidate expressed his or her interest in the advertised job position. The wording of the cover letter was derived from a random set of cover letters created for the experiment. To ensure the application is realistic and targeted to a specific vacancy, the program contains an electronic form that includes the following lines: job vacancy, recipient's e-mail, web source, and name of contact person (if given). This information was used to generate the cover letter, which was used for the subsequent four applications and attached to randomly generated resumés. In several cases, the program failed to send all four types of resumé for some vacancies – both the vacancies and the resumés were excluded from the main analysis. The total number of resumés submitted was 8,651, of which 8,328 are included in our analysis.[11] Table 1 shows the balance among the resumé characteristics: We achieved a balance in applicant characteristics, industries, and occupations in line with our experimental design.

Response tracking. All resumés included mobile telephone numbers and e-mail addresses in their contact information. We tracked responses via phone or e-mail. We assigned a unique phone number to every type of resumé (out of 8) and generated a unique e-mail mailbox for each candidate.

Potential employers in Russia mostly used phone numbers to invite applicants for interviews or to request additional information about the candidate. In only 19% of cases there was an invitation for an interview or a request for additional information sent by e-mail and not duplicated by a phone call. Thus, our main outcome variable – "callback" rate – is whether an employer calls or emails the applicant to invite them for an interview or to request additional information.

To ensure correct identification of the resumés that resulted in a response, we called the employer back. In a few cases, multiple attempts failed to get a response; in some other cases, the employer phone number was not revealed. Since we could not confirm the interest of these

[11] The results do not change if we include in the analysis those vacancies and the corresponding resumés.

employers in the applicant, we dropped these cases from our analysis.[12]

Table 1: Summary Statistics of Resumés.

	Self-Employed	Wage Earners	Associate Professionals	Managers
Number of Resumés (N)	*4164*	*4164*	*4268*	*4060*
Objective Section (%)	50.0	50.0	50.0	50.0
Managerial Position (%)	48.8	48.8	0.0	100.0
Experience in Months	52.96 (11.32)	52.75 (11.26)	52.92 (11.29)	52.78 (11.30)
Age in Years	28.41 (0.58)	28.40 (0.58)	28.41 (0.58)	28.40 (0.58)
Female (%)	49.3	50.8	50.1	50.0
Univ. Min. Score	48.88 (8.86)	48.63 (8.67)	48.64 (8.68)	48.88 (8.85)
Industry (%)				
Finance	35.4	35.4	35.1	35.6
IT	34.4	34.4	35.0	33.8
Marketing	30.3	30.3	29.9	30.6
Occupation (%)				
Accounting Prof.	18.0	18.0	35.1	0.0
IT Technicians	17.9	17.9	35.0	0.0
Event Planners	15.3	15.3	29.9	0.0
Finance Managers	17.3	17.3	0.0	35.6
IT Managers	16.5	16.5	0.0	33.8
PR Managers	14.9	14.9	0.0	30.6

Note: The table reports means or percentage for the resumé characteristics listed on the left. The standard deviation for continuous variables is in parentheses.

[12] However, if we include these calls, our main results do not change, and this attrition problem is independent of the treatment.

5. Results

5.1 Summary

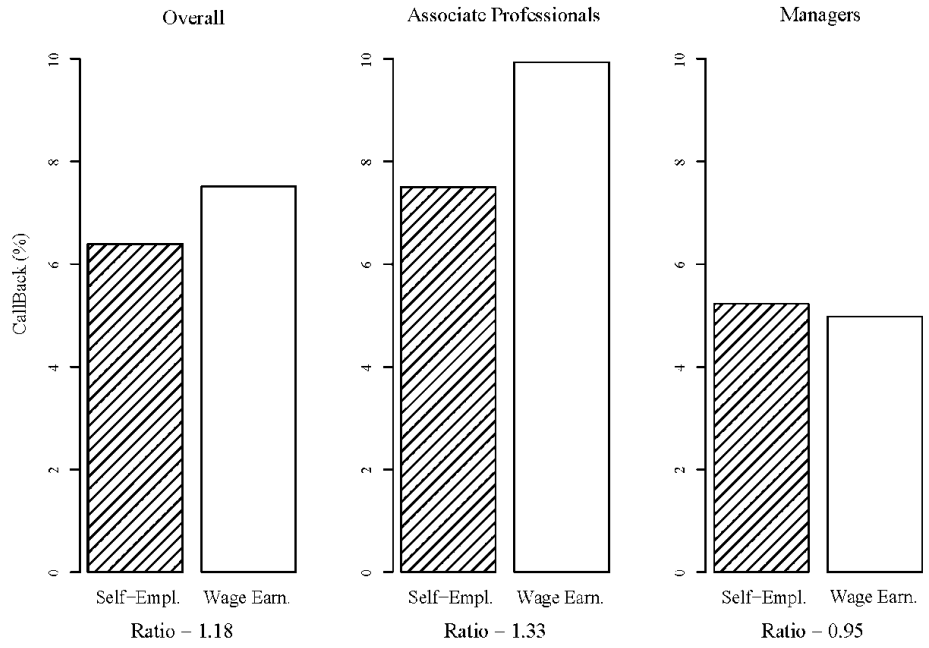
Table 2 and Figure 1 present callback rates by employment status. The solo self-employed received fewer on average callbacks than applicants with wage employment experience in different ISCO occupational groups. The callback rate is 18% higher for the applicant with wage-earning experience (1.13 percentage points over base rate of 6.39).

However, this result is driven entirely by the disparity between callback rates for the self-employed and wage earners in lower-skilled associate professional positions. Wage earner applicants in these positions receive 33% more callbacks than the self-employed (2.43 percentage points over the base rate of 7.50); whereas we observed no advantage for wage earners in managerial positions. On the contrary, wage earners in managerial positions receive 5% fewer callbacks than the self-employed in similar positions (-0.24 percentage points over the base rate of 5.22).

Table 2: Summary Table of Callback Rates.

	Self-Employed	Wage Earners	Ratio
Overall	6.39	7.52	1.18
Associate Professionals	7.50	9.93	1.33
Managers	5.22	4.98	0.95
Number of Resumés (N)	*4164*	*4164*	

Fig 1: Callback Rate by Group (based on ISCO standards).



5.2 Regression Analysis

To assess the significance of the observed results, we use a linear probability model with robust standard errors clustered at the vacancy level.[13][14] Table 3 reports the results of the estimations.

Table 3, column (1) shows that the self-employed are significantly less likely to be called for an interview than wage earners (p-value=0.012). As a control, we also test if the callback rate is the same for managers and associate professionals. Again, as expected, we find that the callback rate is higher for associate professionals (p-value=1.41×10^{-5}). The magnitude and statistical significance of these results remain unchanged if we include the set of control variables e.g., gender, presence of objective section (see Table 3, column 2).

[13] In this section we provide the analysis in line with registered pre-analysis plan. Pre-analysis plan available upon request.

[14] The results hold if we assess significance of the results with a probit model, but interpretation of the probit model can be misleading in the case of interactions (Ai and Norton, 2003). Thus, we report with a simple linear probability model.

Table 3: Callback Rate and Self-Employed Status.

	Dependent variable:			
	Callback			
	(1)	(2)	(3)	(4)
Self-Employed	-0.01**	-0.01**	0.002	0.003
	(0.004)	(0.004)	(0.01)	(0.01)
Self-Employed x Associate Professionals			-0.03***	-0.03***
			(0.01)	(0.01)
Associate Professionals	0.04***	0.03***	0.05***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	0.06***	0.002	0.05***	-0.005
	(0.01)	(0.01)	(0.01)	(0.01)
Controls	No	Yes	No	Yes
Industry Fixed Effects	No	Yes	No	Yes
Number of Resumés (N)	*8,328*	*8,328*	*8,328*	*8,328*
Log Likelihood	-393.16	-328.04	-390.25	-325.13

Notes: Linear Probability models. Robust-clustered standard errors at the vacancy level are in parentheses. In columns (2), and (4), we control for the applicant's gender, objective section, if the cover letter has a contact name, order of the letter, subject line, type of cover message and industry fixed effects. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Next, we assess whether the treatment of self-employed candidates varies depending on job ISCO skills level in order to test theories about the nature of the unfavorable treatment of the self-employed (see Table 3, column 3). We observe heterogeneous treatment of self-employed applicants in different markets (p-value=0.003).[15] More importantly, we see that self-employed associate professionals are less likely to receive callbacks, which contradicts our expectations based on uncertainty theory (Mahieu et al., 2019), but in line with idea that self-employment as an entrepreneurial activity requires a generalist skill set (Baptista et al., 2012; Lazear, 2012).

Finally, we test whether the objective section mitigates the differential treatment of the self-employed. The objective section increases the callback rate both for self-employed and wage-earners (p-value=0.026). However, we find no evidence that the increase in the number of callbacks for self-employed is higher than for wage earners (p-value=0.223).[16] Furthermore,

[15] The results are robust to the inclusion of a set of controls (see Table 3, column 4).

[16] We do not see that an objective section that emphasizes the willingness to work in a team improves the chances

we estimate the same set of regressions using a mixed-effects model with vacancy random effects instead of clustering, to account directly for vacancy heterogeneity. The results remain unchanged (considering that we directly account for vacancy-specific effects).[17]

To summarize, we find strong evidence of heterogeneous treatment of solo self-employed across different ISCO skill level groups – self-employed associate professionals are treated less favorably than wage-earning associate professionals. However, an objective section does not improve this treatment. Additionally, we do not find support for the uncertainty-based model of adverse treatment for the self-employed. In this case, the self-employed should be less likely to be invited for the interview than wage earners in high-skilled managerial positions, and the objective section, which provides additional information about the qualities of a candidate, should improve their job prospects.

The observed pattern can be explained by the view that the self-employed could be considered generalists as managers (Baptista et al., 2012; Lazear, 2012). In high-skilled managerial positions, prospective employers can expect a good fit for the self-employed candidate, whereas employers suspect that the non-managerial human capital of self-employed associate professionals depreciates over time. Thus, employers might be less interested in candidates with long self-employment experience (see further analysis subsection 5.2.2).[18] We elucidate these explanations in supplementary analyses.

5.3 Supplementary analysis

5.3.1 Skill Level by Occupation and Self-employment Status

We have looked at the treatment of the self-employed only in the aggregated (associate professionals and high-skilled managers) labor markets. However, within the labor market the

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of the self-employed to receive a callback. The explanation could be that an employer (considering statistics) is less concerned about the team-player qualities of specific self-employed workers, if self-employed workers generally exhibit the same tendency for teamwork as wage earners. Indeed, in the lab-in-the-field experiment with entrepreneurs, managers, and employees, Czibor et al. (2017) provide evidence that disputes the belief that entrepreneurs are solo players.

[17] The results remain unchanged if we use a regression model with the vacancies as a fixed effect.

[18] Additionally, the theory of self-selection into self-employment based on ability can potentially indirectly explain the observed pattern (Lazear, 2005; Åstebro et al., 2011): Workers in the tails of the (lower) ability distribution self-select into self-employment, and thus employers consider them to be potentially less valuable candidates.

required skills of candidates vary by occupational fields, as well. Therefore, to assess the robustness of the results and better understand the reasons for observed regularity, we want to test whether the pattern of adverse treatment of self-employed applicants is persistent and holds at a more granular level.[19] If companies treat the self-employed less favorably than wage earners depending on their managerial skill level, this effect should be evident at both the aggregate (associate professionals and managers) market level and at the occupation level.

To test this, we use the Occupational Information Network (O*NET) classification of the skills required for each occupation. We construct an index of the required skill level for each occupation based on the managerial skills per occupation according to O*NET: Management of Financial Resource, Management of Material Resources, Management of Personnel Resources, and Time Management. As in Deming (2017), we convert the average score by occupation from the O*NET scale to a 0–10 scale in order to obtain a weighted percentile ranking.

We use the U.S. Bureau of Labor Statistics crosswalk with O*NET Standard Occupational Classification and ISCO codes to match the managerial skills weighted percentile rankings, which are based on O*NET values, and occupation-based rankings, which are based on ISCO classifications. Compared to associate professional jobs, managerial jobs have higher required skill values, according to the index based on O*NET values.[20] The index shows some variability, which helps to explain whether adverse treatment of the self-employed depends on the managerial skill level of the occupation.

We use a linear probability model with robust standard errors clustered at the vacancy level to assess whether treatment of the self-employed compared to wage earners depends on the level of skills required for the occupation. The results are reported in Table 4.

[19] In addition, if the pattern of adverse treatment based on managerial skill level also holds at the occupation level, it will provide additional evidence against the view that employers simply dislike working with self-employed.

[20] High-skill managerial occupations: Information and Communications Technology Services Managers (skill level: 6.44), Finance Managers (skill level: 6.07), Advertising and Public Relations Managers (skill level: 6.04). Lower-skilled associate professional occupations: Conference and Event Planners (skill level: 6); Information and Communications Technology Operations Technicians (skill level: 4.42); Accounting Associate Professionals (skill level: 2.83).

Table 4: Callback Rate and Level of Managerial Skills by Occupation (O*NET).

	Dependent variable:			
	Callback			
	(1)	(2)	(3)	(4)
Self-Employed x Level of Managerial Skills Required	0.01**	0.04***	0.01**	0.01**
	(0.004)	(0.01)	(0.004)	(0.004)
Level of Managerial Skills Required	-0.02***	-0.02***	-0.01**	-0.01*
	(0.004)	(0.004)	(0.01)	(0.01)
Self-Employed	-0.06***	-0.06***	-0.06***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Associate Professionals			0.02*	0.02*
			(0.01)	(0.01)
Constant	0.17***	0.11***	0.13***	0.08**
	(0.02)	(0.03)	(0.03)	(0.03)
Controls	No	Yes	No	Yes
Number of Resumés (N)	*8,328*	*8,328*	*8,328*	*8,328*
Log Likelihood	-390.26	-344.31	-386.29	-339.41

Notes: Linear probability models. Robust-clustered standard errors at the vacancy level are in parentheses. In columns (2) and (4) we control for the applicant's gender, objective section, if the cover letter has a contact name, order of the letter, subject line, and type of cover message. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

We focus on the interaction term between employment status and required skill level (see Table 4, row 1). We see that self-employed candidates are more likely to be called for an interview at higher levels of required managerial skills (p-value=0.012): the self-employed are treated better with an increase in managerial skill level. Put differently: the lower the managerial skill level of a self-employed candidate, the more likely they will be treated adversely compared to a candidate with wage-earning experience.

As a robustness check, we also control for the aggregate associate professional and manager level (ISCO classification) to check whether the pattern holds for the occupation level (see Table 4, columns 3 and 4). The relation does not change (p-value=0.012), which suggests that the self-employed are treated adversely compared to wage earners depending on the required managerial skill level of the occupation. Moreover, it shows that this association is robust to the difference in the tightness of the labor market (non-managerial market is less tight) and inclusion of the control of the level of non-managerial skill required.

5.3.2 Callback Rate and Experience

We are interested in whether the treatment of solo self-employed applicants depends on their experience due to the potential depreciation of low-skilled specialist human capital in self-employment. First, we take advantage of the fact that length of employment was assigned randomly and interact employment status with the length of employment experience in months. Table 5 reports the results.

We see that longer self-employed experience leads to a lower likelihood of the applicant being called for an interview (see Table 5, row 1 in columns 1, and 2).[21] This suggests that employers read the resumés received and treat the self-employed worse than wage earners because of their specific experience. Moreover, we do not see that an associate professional candidate's length of experience is treated in a specific manner (see Table 5 , row 3 in columns 3, and 4), whereas the self-employed experience is penalized (see Table 5 , row 1 in columns 3 and 5).

We can presume that this pattern is especially pronounced for associate professionals rather than managers due to the potential depreciation of low-skilled specialist human capital in self-employment. We test this conjecture by interacting employment status and length of employment experience with the type of occupation (associate professionals or managers). We find that longer self-employment experience is especially penalized for associate professionals (see Table 5, row 4 in columns 5 and 6).

[21] This pattern holds if we account for the gender of the applicant or type of industry. We also do not see that self-employment status is particularly penalized for female applicants or in a specific industry.

Table 5: Callback Rate and Experience Length.

	Dependent variable:					
	Callback					
	(1)	(2)	(3)	(4)	(5)	(6)
Self-Empl. x Experience L.	-0.001**	-0.001**	-0.001**	-0.001**	0.0001	0.0001
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.001)	(0.001)
Self-Empl. x Assoc. Prof.			-0.03***	-0.03***	0.09*	0.09*
			(0.01)	(0.01)	(0.05)	(0.05)
Experience L. x Assoc. Prof.			-0.0000	-0.0000	0.001	0.001
			(0.001)	(0.001)	(0.001)	(0.001)
Self-Empl. x Experience L . x Assoc. Prof.					-0.002**	-0.002**
					(0.001)	(0.001)
Self-Empl.	0.04***	0.03***	0.05*	0.05	-0.005	-0.01
	(0.01)	(0.01)	(0.03)	(0.03)	(0.04)	(0.04)
Experience L.	0.001	0.0005	0.001	0.0005	0.0000	-0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Constant	0.03	0.004	0.02	-0.004	0.05**	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Controls	No	Yes	No	Yes	No	Yes
Number of Resumés (N)	*8,328*	*8,328*	*8,328*	*8,328*	*8,328*	*8,328*
Log Likelihood	-391.12	-353.42	-388.23	-350.54	-385.84	-348.22

Notes: Linear probability model. Robust-clustered standard errors at the vacancy level are in parentheses. In columns (2), (4), (6) we control for objective section, if cover letter has a contact name, order of the letter, subject line, and type of cover message. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

This evidence is consistent with the theory that the self-employed are considered generalists (Baptista et al., 2012; Lazear, 2012), and in lower-skilled, non-managerial positions, their specialist human capital depreciates. Thus, employers are less interested in candidates with long self-employment experience in the lower-skilled, non-managerial occupations.

5.3.3 *Callback Rate, Self-employment and Socio-Demographic Characteristics*

We want to understand how socio-demographic characteristics of applicants such as gender, age, education affect job prospects of self-employed. Due to the stereotype (conflict) solo self-employed females can be treated worse (better) than solo self-employed male. Since

our computer program randomly assigns female names to half of the resumés, we can test this conjecture by interacting employment status and gender (Table 9 in Appendix B reports the results). In line with the literature (see Asanov and Mavlikeeva, 2023; Gornall and Strebulaev, 2019), we find that female applicants are more likely to be invited for an interview than male applicants (p-value=2.7999x10^{-5}, see Table 9 in Appendix B, row 1 in columns 1 and 2). However, we find no evidence that the treatment of solo self-employed female candidates is different than the treatment of solo self-employed male candidates (p-value=0.62, see Table 6, columns 3 and 4). We also do not see that the treatment of solo self-employed female candidates is different from the treatment of solo self-employed male candidates in each of six occupations (analyzed as subsamples or interaction), by industry (analyzed as subsamples or interaction) or by occupational skill-level groups. Taken together, we do not see heterogeneous treatment of solo self-employed applicants based on their gender.

Given that in our study the applicants are relatively young, the stereotype conflict may arise due to the age that can be wrongly attributed to the length of employment experience as both are collinear. However, our computer program allowed us to randomly vary these two characteristics, covering different combinations of age and experience. We therefore test if the differential adverse treatment of self-employed among different occupational skill-level groups is driven by age or experience. We analyze in the same regression (a) interaction between length of employment experience, employment status and the type of occupation (associate professionals or managers) and (b) interaction between age, employment status, and the type of occupation. We do not find that younger candidates improve their chances at managerial positions, but we still see that longer experience is especially penalized for associate professionals (p-value=0.03). This observation provides further support that employers are less interested in candidates with long self-employment experience in the lower-skilled market of associate professionals.

Finally, quality of educational background can signal the value of the candidate that can change the adverse treatment of the self-employed as a prospective employer can see differently human capital deprecation or infer the quality of the candidate from their education. We randomly assign the university that the applicant graduated from, thus, we can study if

educational background changes prospects of the self-employed. We proxy quality of the educational background by using the minimal score at the uniform entrance state exam of the university that applicant graduated from (as continuous value, if this score of university is above median, or in bottom or top 5 percentile). We interact these values with employment status. We do not find that educational background changes on average the prospects of the self-employed at the selection stage of the recruitment process. We further interact quality of the educational background with employment status and the type of occupation (associate professionals or managers). We do not observe that educational background improves the prospects of the self-employed depending on the type of occupation (associate professionals or managers).

6. Discussion

The results of the experiment show that solo self-employed applicants are treated adversely compared to wage earners, but this adverse treatment is concentrated in associate professionals. Solo self-employed applicants do not receive fewer callbacks than wage earners when applying for high-skilled managerial positions. However, solo self-employed associate professionals have a lower chance of receiving a callback than wage earners in similar positions. This differential treatment of self-employed in different occupational categories is in line with the theory of statistical discrimination. We further discuss the potential drivers.

Uncertainty-Based Models. Prospective employers must solve signal extraction problems to decide whether to hire a candidate. Moreover, uncertainty about candidate qualities can play a crucial role in hiring decisions (Kuhnen and Oyer, 2016). Uncertainty in hiring can be more pronounced for the "stars" market of high-skilled managerial positions (Mahieu et al., 2019). Therefore, the prospective employer might be reluctant to hire candidates with self-employed experience to high-skilled managerial positions, but less concerned about self-employed experience for lower-skilled associate professional positions. Indeed, Mahieu et al. (2019) find in an observational study that the wage penalty is higher for the self-employed at the upper tail of wage distribution – i.e., high-skilled managerial positions. On the contrary, we see that lower-skilled associated professionals are penalized at the application stage more than wage

earners, but not high-skilled managers. Thus, our experimental results, which are based on studying the demand-side factors in isolation, contradict the theory that uncertainty is a key driver of differential treatment of the self-employed.

Non-pecuniary Preferences, Commitment, or Stigma of Failure. The self-employed might be perceived as not being team players or having other non-pecuniary preferences. Moreover, prospective employers might be unsure about commitment level and objectives of applying for wage employment after self-employment experience. Thus, additional information about candidate objectives in applications should reduce these concerns, with this effect being homogeneous among all occupational groups. We see that the presence of an objective section on a job application increases the likelihood of receiving a callback for all applicants, but we do not find evidence that it is particularly helpful for the self-employed.[22] That is, we do not find support for the explanation that stereotypes about non-pecuniary preferences or stigma of failure are key drivers of the differential treatment of solo self-employed and wage earners.

Stereotype Conflict. Kacperczyk and Younkin (2021) theorize that negative stereotypes about the low level of organizational commitment and company fit of ex-entrepreneurs should be mitigated for female candidates, as entrepreneurial background is less informative for prospective employers if they observe the female candidate in male-typed activity (entrepreneurship). They find that female ex-founders are penalized less often than male ex-founders in the application process, which supports their hypothesis about stereotype conflict.

Founders with employees differ in many aspects from the solo self-employed, particularly, due to the different motives to engage in entrepreneurship (Kacperczyk and Younkin, 2021). Perhaps, that is why we do not find that solo self-employed females are penalized less often than solo self-employed males, neither in the overall sample (8,328 resumés) nor in any of the

[22] Note that we apply 2X2 design randomly, varying both employment status (self-employed vs. wage earner) and if the objective section is present in the application. We sent those four resumés in random order for the same vacancy, using the statistical power of within-subject (vacancy) design and mitigating the vacancy-specific effects by design. Even if one interprets the absence of an objective section as a "negative" signal, we estimate interaction between two treatments. Put differently, we estimate if a difference exists because of the presence of additional information in the differential treatment of self-employed and wage earners. Thus, we can argue that we do not see that the difference in the amount of information present in the application of the self-employed is treated differently than that of wage earners. Finally, we would argue that the baseline (most common case) is that applicants do not provide objectives in their applications, as we saw the opposite while reviewing large sets of real online resumés to create our database of resumé sections. Thus, "negative" signal explanation is unlikely.

six occupations we applied for (more than 1,100 resumés in each occupation). However, we also do not see that the better or top educational background saves the self-employed from adverse treatment on average or when they apply for non-managerial positions. Moreover, a long length of self-employment rather than age worsens prospects of the self-employed in application for non-managerial positions. That is, stereotype conflict can barely explain differential treatment of the self-employed in our study.

Generalist vs. Specialist Human Capital. Entrepreneurs and self-employed perform several roles and manage many tasks necessary to run their own business. Therefore, they should become generalists, having more balanced skill investment strategy compared to wage earners who end up specializing in core skill (Lazear, 2004). Put it differently, the pattern of accumulating human capital for people with self-employed experience will differ from those with wage earning experience (Lazear, 2005). As a result, "jack-of- all-trades" self-employed will have a relative disadvantage in specialist skill compared to a wage earner, being at the same time a good candidate for the job that requires generalist skill set e.g., manager who combines and manage different resource (Lazear, 2005).

Under imperfect information about candidates, prospective employers may use beliefs about these group characteristics (self-employed or wage earner) to solve signal extraction problem in line with statistical discrimination theory (Arrow, 1973; Phelps, 1972). Thus, prospective employers will treat on average self-employed experience differently depending on if the job requires mostly generalist or specialist skills. Namely, prospective employers can anticipate that the self-employed are well-suited for managerial positions, which require both specialist knowledge and general skills to manage resources. However, prospective employers can be concerned that self-employment experience impedes development of non-managerial skills and avoid hiring self-employed for associate professional positions. Limited personal non-managerial development will worsen with the length of self-employment experience, for example, because of reduced time spent on specialist tasks or an absence of on-the-job specialist training (Kaiser and Malchow-Møller, 2011).

Our results support the explanation that, relying on group characteristics, prospective employers treat the self-employed differently conditional on if job requires generalist or specialist skill. We see that the self-employed are competitive with the wage earners for high-

skilled managerial positions (ISCO group 1, skill levels 3 and 4), but the self-employed are penalized for associate professional positions (ISCO group 3, skill level 3 only). At the more granular level, we also see that self-employed experience is less often penalized for the occupations that require managerial skills, based on the O*NET classification of skills.[23] Finally, we see that (randomly assigned) longer self-employment spells are penalized more often, particularly for associate professional positions.

Our results also indirectly support the theory of self-selection into self-employment based on ability (Lazear, 2005; Åstebro et al., 2011), as an underlying reason for staying in self-employment as an associate professional can be low ability. However, the ability of a candidate can be only indirectly inferred from their resumé, and we do not investigate the treatment of self-employed individuals for positions with a high concentration of low-ability candidates. Therefore, our evidence rather favors the explanation that the development of general managerial skills in self-employment valued differently across occupations is the driver of the differential treatment of the self-employed at the selection stage of the recruitment process.

7. Conclusion

We conducted a large-scale correspondence field experiment to assess the differential treatment of solo self-employed in the labor market to understand the demand-side mechanisms of the entrepreneurial wage penalty (Bruce and Schuetze, 2004; Kaiser and Malchow-Møller, 2011; Baptista et al., 2012; Failla et al., 2017; Mahieu et al., 2019). We found that at the

[23] This relation holds if we control for associate professional positions. That is, this relation is robust to the difference in the tightness of the labor markets and the difference in the level of non-managerial skill required. Considering the absence of consensus on the relation between the inequality in hiring and the labor market tightness, no unique mechanism driving this correlation is singled out in previous research. Existing literature on ethnic labor inequality provides contradictory findings: Whereas some studies detect a negative correlation between the labor market tightness and the ethnic employment gap (Baert et al. 2015; Kopp, 2020), other evidence provides support for a completely opposite effect (Carlsson et al., 2018). Self-employment, however, as an applicant's characteristic, can be considered closer to unemployment than ethnic status, given, especially, that the applicants are penalized for longer self-employment periods However, longer unemployment periods are adversely treated in tight labor markets (Kroft et al., 2013; Nüß, 2018), where a vacancy is hard to fill, and screening is more important, like the market for high-skilled managerial positions. These findings contradict the results of our experiment: no adverse treatment of the self-employed in high-skilled managerial positions is observed.

application stage of the hiring process employers treat the self-employed adversely on average compared to wage earners across different occupational groups. However, we show that this is only part of a larger, more interesting story: The adverse treatment of self-employed individuals is observed in lower-skilled associate professional positions but not in high-skilled managerial positions. We confirm this observation at a more granular level by showing the same relation applies to occupation level: The lower the level of managerial skills required for the occupation, the less competitive are the applications with self-employed experience. Moreover, a further analysis shows that employers penalize long self-employment experience in particular.

This observed pattern of differential treatment of the self-employed in different occupational skill level groups goes in line with statistical nature of discrimination (Arrow, 1973; Phelps, 1972).[24] The adverse treatment seen only among lower-skilled associate professional positions provides some support of the theory of self-selection into self-employment based on ability (Lazear, 2005; Åstebro et al., 2011). However, the key explanation for the observed pattern is the development of general managerial skills in self-employment or depreciation of self-employed non-managerial human capital with time, as we see that longer self-employment experience is especially penalized in non-managerial associate professional positions. That is, employers fear skill-mismatch of the self-employed since self-employment leads to the development of generalist skills (useful for managers) at the cost of specialist skills (Baptista et al., 2012; Lazear, 2004, 2005, 2012).

The study design allows us to highlight the causal nature of the estimates uncovering demand-side mechanism of adverse treatment of the self-employed at the selection stage of the recruitment process. We randomly varied all applicant resumé characteristics to achieve comparability across employment and other characteristics.[25] We ran the preregistered experiment with high statistical power following the study protocol to assess the existence of differential treatment of the self-employed and if it is homogenous for different occupational

[24] In addition, we do not observe the objective section helping the self-employed more than wage earners (although it increases callback rates) casts doubt on the idea that self-employed individuals earn less only because they have special non-pecuniary preferences, for example, for autonomy. That is, we do not find support for the lack of commitment or stigma of failure (Landier, 2005).

[25] Moreover, our experiment is novel in that we assure external validity of the correspondence experiment in a new context, which has not been the subject of correspondence studies prior to our experiment, by replicating for this context the direction and magnitude of ethnic minority discrimination found across the world (see Appendix A.2.).

groups (pre-determined sample size, treatment arms, type of markets).[26]

The main limitation of our experiment is that we do not observe hiring decisions, only callback rates. Thus, the income differential between the solo self-employed and wage earners should be attributed to adverse treatment of the self-employed at the application stage under the assumption that the hiring process strongly affects job prospects. Also, we applied for jobs commonly filled by both the self-employed and wage earners, and which are advertised publicly: High-skilled managers (ISCO group 1, skill levels 3 and 4) or lower-skilled associate professionals (ISCO group 3, skill level 3) according to ISCO-08. Thus, we do not investigate the treatment of self-employed individuals at the lowest level of the skills ladder in jobs that require simple or routine physical or manual work.

In short, we show that self-employed associate professionals are treated adversely in the labor market. This unfavorable treatment of the self-employed is consistent with the theory of the development of managerial human capital in self-employment at the cost of non-managerial human capital. It has some important implications for policy. First, it is important to consider the net benefits of entrepreneurship, for example, in the case of promotion of self-employment through the provision of entrepreneurial training (for students). Second, targeted cost-effective policy should be developed to support opportunity-driven entrepreneurship. Third, we provide evidence that nascent self-employed working at the level of associate professionals should be cautious about staying self-employed or should consider applying for managerial positions if they plan on returning to wage employment.

[26]This study is registered in the AEA RCT Registry with the unique identifying number AEARCTR-0001308: https://doi.org/10.1257/rct.1308-22.1

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Appendix A

Appendix A.1. Context

Russia being a large country with a population of over 144 million and a wide variety of market segments presents a fruitful platform for entrepreneurial development. The upswing of self-employed workers was observed in 2000 when the new government implemented several reforms and regulations aimed at reducing bureaucratic barriers and strengthening legal protection of self-employment (Aidis et al., 2008; Puffer et al., 2010) reaching about 4 million solo self-employed people in 2008 and staying around this number for a decade up to the time of the experiment. According to the International Labour Organisation Report, in 2017 6.6% of employed individuals were self-employed, compared with 6.3% in USA and 10.2% in Germany (ILO, 2017). 63.4% of respondents in Russia consider entrepreneurship as a good career choice with a global average of 62%, ranked 31 out of 61 countries; 65.6% respondents assign high status to entrepreneurs ranked 39 out 61(GEM Report, 2016/2017). Those attitudes have barely changed in Russia for a decade up to the time of the experiment (GEM Report, 2016/2017).

One of the main distinguishing features of Russian self-employed is the high level of education and human capital (Szerb and Trumbull, 2018). In 2016, 48.8% of early entrepreneurs and 43.9% of owner-managers of established businesses had earned a degree in higher education, whereas the rest usually held a secondary education degree (Verkhovskaya and Aleksandrova, 2017). This observation finds support in another GEM proxy reflecting the level of entrepreneurial education at post school stage: Russia ranked in the middle on this indicator – 33 from 65 countries (GEM Report, 2016/2017). These factors make the Russian context interesting to evaluate the prospects of solo self-employed candidates switching to wage employment.

However, we entered uncharted territory as our study was the first correspondence experiment in the context of Russia in 2017 (Zschirnt and Ruedin, 2016).[27] As every country and every context is special and unique, the results of the study in one setting do not necessarily

[27] Later, Bessudnov and Shcherbak (2020) provided way richer assessment of ethnic discrimination across Russia, but we use ethnic part of the experiment only to assess the experimental validity of the method in the new context (see our timeline and start date of intervention in AEARCTR-0001308: https://doi.org/10.1257/rct.1308-22.1)

translate to another. To address this issue, we propose a novel approach. We aim to test the external validity of the experiment in a new context (Russia) by assessing the level of discrimination in the Russian labor market against ethnic minorities, which is the most common focus of correspondence studies around the world. We want to see if the global results of ethnic discrimination hold in the new context, thus testing the generalizability of the results of our experiments across different contexts.

Appendix A.2. Ethnic Minority Status

Appendix A.2.1. Theoretical Framework

To assess racial discrimination, we sent 4,052 resumés in response to 1,013 vacancies advertised between March and June 2017.[28] Our fictional study subjects were representatives of Central Asian states. These nationalities represent one of the largest immigrant groups in Russia, and as ethnic minorities are subject to racial prejudice (Bessudnov, 2016).

In the resumés, we randomly varied ethnic majority (Slavic) and ethnic minority-sounding names of individuals with equal quality. To create our names dataset, we used Civil Registry Office (ZAGS) online reports. Candidates include both males and females aged between 23 and 25 years.

We also varied whether the individual had work experience (average 2 years) or was a recent graduate (no work experience). We chose a broad range of occupations with the highest number of advertised job openings that did or did not require face-to-face interaction with clients. We limited the choice to six occupations (ISCO code and skill level in parentheses) : Advertising and Marketing Professionals (2431, skill level 4), Real Estate Agents and Property Managers (3334, skill level 3), General Office Clerks (4110, skill level 2), Answering Service Operator (4223, skill level 2), Receptionists (general) (4226, skill level 2), Messengers, Package Deliverers and Luggage Porters (9621, skill level 1). Our database included the duties performed by our candidates in all the above professions, their professional skills, university education, and soft skills acquisition.

All the resumés include a section on language, as this can be an important signal for prospective employers of the candidate's productivity. Both groups of candidates with ethnic majority and ethnic minority-sounding names have native fluency in spoken and written Russian. Additionally, we randomly assigned one foreign language and the level of fluency. All the subjects had basic, good, very good, or excellent command of English, German, Spanish, or French. Table 6 shows that the resumé characteristics for the ethnic part of the experiment are also balanced.

[28] Bessudnov and Shcherbak (2020) collected data for the assessment of ethnic discrimination between June 2017 and January 2018.

Table 6: Summary Statistics of Resumés.

	Ethnic Minority	Ethnic Majority	No Experience	Experience
Number of Resumés (N)	*2014*	*2014*	*2014*	*2014*
Experience in Months	13.03 (13.71)	12.50 (13.49)	0.00 (0.00)	25.53 (6.63)
Age in Years	23.83 (0.77)	23.79 (0.76)	23.31 (0.59)	24.31 (0.57)
Female (%)	52.1	50.0	52.4	49.7
Univ. Min. Score	50.52 (5.62)	50.25 (5.24)	50.34 (5.36)	50.43 (5.50)
Face-to-face (%)	49.8	49.8	49.8	49.8
ISCO Skill Level (%)				
1	19.7	19.7	19.7	19.7
2	40.0	40.0	40.0	40.0
3	20.2	20.2	20.2	20.2
4	20.1	20.1	20.1	20.1
Occupation (%)				
Messengers	16.4	16.4	16.4	16.4
Receptionists	16.6	16.6	16.6	16.6
Service Operator	16.7	16.7	16.7	16.7
Office Clerks	16.9	16.9	16.9	16.9
Real Estate Agents	16.8	16.8	16.8	16.8
Marketing Prof.	16.7	16.7	16.7	16.7

Note: The table reports means or percentage for the resumé characteristics listed on the left. The standard deviation is in parentheses.

Appendix A.2.2. Results

Table 7 presents callback rates by ethnicity status. We see that the ethnic minorities received fewer callbacks than ethnic majority applicants. The relative callback ratio between these groups is 1.64 (4.67 percentage points over the base rate of 7.3), which is comparable to the level of discrimination found around the world (Bertrand and Duflo, 2016; Zschirnt and Ruedin, 2016).[29] We observe that discrimination does not decrease with the subject's experience (no experience

[29] Based on 43 correspondence studies from around the world the average relative callback rate is 1.55 (Zschirnt and Ruedin, 2016).

–1.49; with experience –1.77), which is also in line with other studies (e.g., Bertrand and Mullainathan, 2004).

Table 7: Summary Table of Callback Rates by Ethnicity and Work Experience.

	Ethnic Minority	Ethnic Majority	Ratio
Overall	7.3	11.97	1.64
No Experience	6.33	9.42	1.49
Experience	8.24	14.57	1.77
Number of Resumés (N)	*2014*	*2014*	

Thus, we replicate the common findings in the literature in a different context, which ensures the validity of our main experiment. Appendix A.3.2 reports an assessment of the significance of those results.

Appendix A.2.3. Regression Analysis

To assess the significance of the observed results in the ethnic part of the experiment, we rely on a linear probability model with robust standard errors clustered at the vacancy level.[30] The results of estimations are reported in Table 8.

Table 8, column 1 shows that ethnic majority applicants are more likely to receive a callback than ethnic minorities (p-value=8.703×10^{-12}). We also observe that experience (average 2 years of experience) increases callback rate (p-value=8.687×10^{-8}). Next, we test whether discrimination is reduced by work experience (Table 8, column 3). However, we do not find that work experience significantly reduces discrimination against ethnic minorities. The results are robust to the inclusion of controls, including a variable for jobs that require face-to-face

[30] The pre-analysis plan is available upon request.

interaction (Table 8, columns 2 and 4).

Table 8: Determinants of Callback by Ethnicity and Work Experience.

	Dependent variable:			
	Callback			
	(1)	(2)	(3)	(4)
Ethnic Majority	0.05***	0.05***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Ethnic Majority x Experience (2 years)			0.03*	0.04*
			(0.02)	(0.02)
Experience (2 years)	0.04***	0.03*	0.02*	0.01
	(0.01)	(0.01)	(0.01)	(0.02)
Constant	0.06***	0.08**	0.06***	0.09**
	(0.01)	(0.04)	(0.01)	(0.04)
Controls	*No*	*Yes*	*No*	*Yes*
Face-to-Face Job	*No*	*Yes*	*No*	*Yes*
Number of Resumés (N)	*4,028*	*4,028*	*4,028*	*4,028*
Log Likelihood	-780.00	-748.00	-778.00	-746.00

Notes: Linear probability models. Robust-clustered standard errors at the vacancy level are in parentheses. In columns (2) and (4), we control for applicant gender, if the cover letter has a contact name, order of the letter, subject line, type of cover letter, or if the job requires face-to-face interaction. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Finally, we test whether the effect of employment experience is higher than the effect of ethnic discrimination. We found no difference in the magnitudes of ethnic discrimination and the experience variable (p-value=0.185), but in line with our expectations we can reject the null-hypothesis that the degree of the ethnic discrimination effect is the same as the degree of the effect of one year of employment experience (p-value=2.747×10^{-6}). The results are in line with previous findings (Bertrand and Mullainathan, 2004).

Appendix B

Table 9: Callback Rate and Gender.

	Dependent variable:			
	Callback			
	(1)	(2)	(3)	(4)
Female	0.03***	0.03***	0.02***	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)
Self-Employed x Female			0.01	0.01
			(0.01)	(0.01)
Self-Employed	-0.01**	-0.01**	-0.01*	-0.01*
	(0.01)	(0.01)	(0.01)	(0.01)
Associate Professionals	0.04***	0.03***	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	0.04***	0.002	0.04***	0.004
	(0.01)	(0.01)	(0.01)	(0.01)
Controls	*No*	*Yes*	*No*	*Yes*
Industry Fixed Effects	*No*	*Yes*	*No*	*Yes*
Number of Resumés (N)	*8,328*	*8,328*	*8,328*	*8,328*
Log Likelihood	-381.52	-328.04	-381.39	-327.86

Notes: Linear probability models. Robust-clustered standard errors at the vacancy level are in parentheses. In columns (2) and (4), we control for the objective section, if the cover letter has a contact name, order of the letter, subject line, type of cover letter, and industry fixed effects. *p < 0.1; **p < 0.05; ***p < 0.01