

Nüß, Patrick

Working Paper

Duration dependence as an unemployment stigma: Evidence from a field experiment in Germany

Economics Working Paper, No. 2018-06

Provided in Cooperation with:

Christian-Albrechts-University of Kiel, Department of Economics

Suggested Citation: Nüß, Patrick (2018) : Duration dependence as an unemployment stigma: Evidence from a field experiment in Germany, Economics Working Paper, No. 2018-06, Kiel University, Department of Economics, Kiel

This Version is available at:

<https://hdl.handle.net/10419/179941>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Duration Dependence as an Unemployment Stigma: Evidence from a Field Experiment in Germany

by Patrick Nüß



Duration Dependence as an Unemployment Stigma: Evidence from a Field Experiment in Germany

Patrick Nüß[†]

Abstract: Based on a correspondence experiment covering 3,124 fictitious job applications, the paper identifies and quantifies duration dependence in Germany, with a particular emphasis on company and vacancy characteristics as potential determinants. The experiment reveals that duration dependence manifests itself in a sharp decline of 26% to 35% in callbacks when an individual has been unemployed for 10 months, pointing to the existence of an unemployment stigma for Germany. The results are driven by labor market tightness, companies' access to applicants and screening behavior related to company size, with no evidence for an unemployment stigma determined by the contract type.

JEL classification: C93, J68, J23, J64, J71

Keywords: Field Experiments, Public Policy, Labor Demand, Unemployment Duration, Labor Discrimination

[†]Affiliations: Macroeconomic Policy Institute (IMK), Christian Albrechts-University Kiel, Germany. Mail: patrick-nuess@boeckler.de. Acknowledgements: I would like to thank Menusch Khadjavi, Dennis Snower, Luca Fumarco, Stijn Baert and Eva Van Belle as well as participants of the BeNA Workshop 2017, YEM 2017, EXEL 2017, FMM 2017, ASSA 2018, SOLE 2018 and ASE 2018 for their very helpful comments.

1 Motivation

It is well known from the literature that long-term unemployment is associated with a wide range of problems such as social illness, poverty, deteriorating physical and mental health (Van Horn, 2014), lower levels of well-being and - most seriously - higher mortality (Sullivan and von Wachter, 2009) and suicide rates (Milner et al., 2013). This is why in the aftermath of the great recession, the focus has moved to the situation of the long-term unemployed and their reintegration into the labor market.

Apart from analyzing discrimination, earlier research focused mainly on the search behavior of unemployed individuals. Long-term unemployment can be the result of search intensity (Paserman, 2008; Krueger and Mueller, 2010), the incentives provided by economic policy (Katz and Meyer, 1990; Addison et al., 2004) and discouragement (Krueger and Mueller, 2012). Additional factors such as depreciation of human capital (Ljungqvist and Sargent, 2004), a lack of work experience or the potential loss of motivation, soft skills, resilience and unobservable differences in productivity (Heckman and Singer, 1984; van den Berg and van Ours, 1996) can further prevent the long-term unemployed from finding a job. From this perspective, duration dependence - defined as the causal effect of the duration of unemployment on the job finding probability of an individual - does not exist, and the poor prospects are just the result of differences in motivation and productivity and do not reflect stigmatization of the (long-term) unemployed. The consequence for public policy is a focus on training programs and the avoidance of disincentives for unemployed individuals to reintegrate into the labor market. Recent field experiments on the prospects of the long-term unemployed reveal a low explanatory power of factors such as depreciation of human capital. Instead, they highlight the stigma of long-term unemployment as the main reason for poor prospects (Ghayad, 2013), which means that it is not any lack of skills but simply the fact of unemployment itself that is the barrier to reintegration into the labor market. While such an experiment has been carried out for Sweden and the United States, long-term unemployment is a more relevant topic in central and southern Europe, and even in Germany with its low unemployment rate. Despite recent improvements in the proportion of people in long-term unemployment, 40% of the unemployed have been without a job for longer than 12 months.

This is where the minimum wage in Germany, which was introduced in January 2015, comes into play. While many economists expect the minimum wage to have negative effects on the

labor market prospects of low-skilled workers, it allows for an exemption for the long-term unemployed (12 months) for a period of six months. This opens up an interesting opportunity for employees as well as for public policy analysis. While there is an extensive literature about active labor market policy evaluation in Germany, its effect on the long-term unemployed has been given little attention. Furthermore, there is some research on a minimum wage exemption for different groups, whereas up until now there has been no research on the minimum wage exemption for the long-term unemployed.

For this reason this paper first tries to augment the recent literature about duration dependence with a correspondence experiment providing insights into the unemployment stigma for Germany and secondly, tries to evaluate certain aspects of the minimum wage exemption for the long-term unemployed. Furthermore, this paper is the first to consider company and vacancy characteristics as potential determinants of the unemployment stigma and is able to provide evidence for strong heterogeneity of the results related to these characteristics. The rest of the paper is organized as follows. Section 2 provides an overview of recent literature on duration dependence. Section 3 gives a detailed explanation of the experimental design. Section 4 provides a non-parametric as well as multivariate analysis of the experimental dataset. Section 5 concludes.

2 Literature Review

Summarizing the literature focused on the supply side aspects, Machin and Manning (1999) argue against the relevance of duration dependence when checking for observable fixed characteristics. While the potential of the demand side for duration dependence in the matching process was pointed out at an early stage by Vishwanath (1989) and was also discussed in the literature, its significance and quantitative relevance has attracted attention in recent years with the rise of discrimination literature, especially with Oberholzer-Gee (2008) who was the first to analyze duration dependence in a field experiment. Vishwanath (1989) argues that imperfect information on workers' productivity leads companies to use an individual's (un)employment history as a signal of productivity. A long unemployment duration can be associated with a lack of motivation, creativity, flexibility and other work-relevant characteristics, finally resulting in statistical discrimination (Arrow, 1973).

As recent developments in the literature making use of the concept of correspondence exper-

iments show, there is a possibility that such stigma effects do exist. Evidence for duration dependence has been found for Switzerland (Oberholzer-Gee, 2008), Sweden (Eriksson and Rooth, 2014) and the United States (Kroft et al., 2013; Ghayad, 2013). But these findings are inconsistent with the earlier interpretation that duration dependence results purely from individual characteristics and points to the relevance of a company’s screening process as a relevant aspect of the matching process. However, further investigation of the United States by Farber et al. (2017) as well as Nunley et al. (2017) do not support these previous findings. While the comparability of these correspondence experiments is limited, due to aspects of their design, they provide a first insight and pose some new questions about duration dependence and the stigma of long-term unemployment.

When Oberholzer-Gee (2008) introduced the first correspondence experiment and found evidence for duration dependence, he augmented this with a survey, finding that duration dependence results from employers’ beliefs about productivity as well as by rational herding, the screening behavior of companies. When Kroft et al. (2013) conducted their correspondence experiment comparing the callback rates of labor markets with a different degree of labor market tightness, in line with the model of Lockwood (1991), they found that duration dependence mainly occurs in tight labor markets where unemployment duration is more informative, with most of the decline in callbacks observable in the sixth month of unemployment. To understand the relevance of human capital depreciation as a cause of duration dependence, the design of Ghayad (2013) distinguished between work experience in the same industry and others in order to understand the relevance of industry-specific human capital. He observed higher callbacks when there was previous industry-specific experience. However, after an unemployment duration of more than six months, the callbacks for unemployed persons with industry-specific human capital dropped to the level of unemployed persons with no industry-specific human capital. This implies the dominance of the stigma of long-term unemployment as the main driver of duration dependence. Eriksson and Rooth (2014) extend this earlier insight to the Swedish labor market, finding an unemployment stigma for low- and medium-skilled workers in the ninth month and observe a stronger unemployment stigma for men than for women. Furthermore they do not find any evidence of an effect on the callback rate from past unemployment spells. All these studies have in common that most of the decline in callbacks manifests itself in a sharp decline within a short period, pointing to an unemployment stigma as the main explanation for duration dependence.

While this literature points toward the crucial role of duration dependence, Farber et al. (2017) and Nunley et al. (2017) weaken these earlier findings with additional experiments for the United States in which they find no evidence of duration dependence. One reason for this mixed evidence is the strong variation in the designs with respect to age, gender, education, occupation and region - as well as the time the experiments were carried out. As pointed out by Farber et al. (2016), there are additional contextual cues in the individuals' résumés which might affect the outcome, but cannot be controlled for and therefore further limit comparability. In addition, since duration dependence is related to employers' perceptions, attitudes, and sociocultural aspects - and might be associated with the design of unemployment benefits (Ghayad, 2013; Eriksson and Rooth, 2014) - this observation is most likely to be country-dependent.

The review suggests there is the possibility of rejecting the idea that duration dependence purely results from an unobservable heterogeneity of the unemployed. Due to these stigma effects, companies' decision-making becomes important for the labor market prospects of the unemployed and highly relevant for understanding the matching process and the optimal design of public policy. To combat unemployment effectively, it is important to further augment the literature by a deeper insight into the demand side of the matching process. Since this direction of the literature is relatively young, and the reasons for this stigma, if it exists, is still unclear, further evidence for other countries is needed for a deeper understanding of this mechanism. Furthermore, it is striking that duration dependence results from companies' screening behavior, but no experiment takes the relevance of company characteristics and vacancies into account, which might be related to stigma determinants or companies' strategies to solve the issue. In addition, as it is common for research based on correspondence experiments, it is used to detect different treatments of groups, but apart from Farber et al. (2017) there is no attempt to analyze potential solutions. This is why, in a first step, this paper expands the literature with a correspondence experiment for Germany, as a first consideration of the relevance of company and vacancy characteristics, and in a second step tries to evaluate aspects of the minimum wage exemption as a potential solution.

3 The Experiment

3.1 A Correspondence Experiment to Evaluate Labor Market Policies

The basic idea of correspondence experiments is to send pairs of fictitious job applications for real vacancies. By monitoring the callback rates of companies, this allows an insight into their hiring decisions and - most importantly - allows a causal interpretation of the randomized characteristics of the applications. The crucial feature is that we are able to remove all the mentioned supply-side aspects and focus on the relevance of employer behavior. By using a correspondence experiment, we are able to observe all the information that is available to employers. Monitoring companies' callback rates therefore is an excellent way to analyze first-stage discrimination in the labor market. This procedure has become popular in labor economics for analyzing age discrimination (Riach, 2015; Baert et al., 2016), racial discrimination (Bertrand and Mullainathan, 2004), gender discrimination (Carlsson and Rooth, 2008) and in recent years also unemployment stigmatization (Oberholzer-Gee, 2008).

Compared to previous research that identifies the stigma of long-term unemployment, the job applications are equal in all productivity-relevant aspects, but include variations in unemployment duration between 0 (still employed) and 15 months of unemployment. In this way, we should be able to identify the timing and quantity of the stigma effect for Germany and to test an aspect of the minimum wage exemption for the long-term unemployed that takes place after 12 months of unemployment.

A first evaluation reveals that there is only minor use of the minimum wage exemption (vom Berge et al., 2016). But it is unclear whether this results from the company's potential fear of negative reciprocity in terms of lower productivity caused by the relatively low payment, or of the long-term unemployed not accepting the lower payment. If the minimum wage exemption is relevant for companies' hiring decisions, we should observe an increase in callback rates after unemployment duration of 12 months and longer, compared to unemployment duration of 11 months and other control groups in a multivariate analysis.

Additional to this principal idea of the experiment, it is important to mention the ethical dilemma, which is based on employer deception and the inconveniences caused by the job applications for companies (Riach and Rich, 2004). Generally, these experiments are justified by the well-known aspect of labor markets that discrimination takes place and is shown by the literature review, which it seems is also true of the long-term unemployed. However, as the

literature review also shows, there is still no information about unemployment stigmatization outside the United States and Sweden, which makes a further investigation crucial in order to understand whether this observation can be generalized across countries and - if this is the case - to understand what affects the timing of the stigma. Knowing this might make it possible to improve efficiency of active and passive labor market policies. Germany is interesting because of its different kind of welfare state compared to the United States and Sweden, the fact that it has a different unemployment benefit duration and its unique feature of a minimum wage exemption for the long-term unemployed. This might allow an analysis that goes further than just detecting stigmatization, and partly allows a policy evaluation. Considering all this, the inconveniences resulting from the experiment for the economy are doubtless outweighed.

3.2 General Design

The experiment was carried out between mid-June 2016 and November 2016 in 41 regions, mostly large metropolitan areas in Germany. The sample consists of 3,124 applications sent to 1,562 companies. Vacancies for seven occupations were collected from the website of the Federal Employment Agency and all available company characteristics were reconsidered for later controls. By also collecting data on companies and vacancies, we hoped to be able to identify which characteristics might determine or solve unemployment stigmatization. Regional and occupational variations of the design were intended to avoid potential occupation- and regional-specific phenomena and therefore increase the external validity of the experiment.

For the experiment, seven types of vocational training with a program duration of three years, with the majority occupied with secondary school graduates, were chosen.¹ This is important for the evaluation, since regional and sectoral differences in collective agreements determine the relevance of the minimum wage, due to the so called “favorability principle” and therefore also for the exemptions.² To ensure regional variation in addition to the regional unemployment rate as another aspect the regional Kaitz-Index was taken into account.³ Furthermore, as shown by

¹The training programs chosen were: hotel manager, office clerk, retail merchant, specialist in warehouse logistics, wholesale and foreign trader, industrial clerk and commercial agent in dialogue marketing. These kind of training programs provide an opportunity to apply for a wide range of posts such as receptionist, service, sales representatives, export/import clerk, purchase management, accountant, call center agent, customer service positions, some logistics/industry posts and several others.

²The principle of favorability is a legal principle applied in labor law by which lower level agreements are only applied when they have an advantage for the employee. This means that the minimum wage, as well as the exemption, are only relevant for a company if there is no collective agreement that sets a higher wage.

³Figures A1 to A4 in the appendix provide an insight into all potential relevant measures of labor market

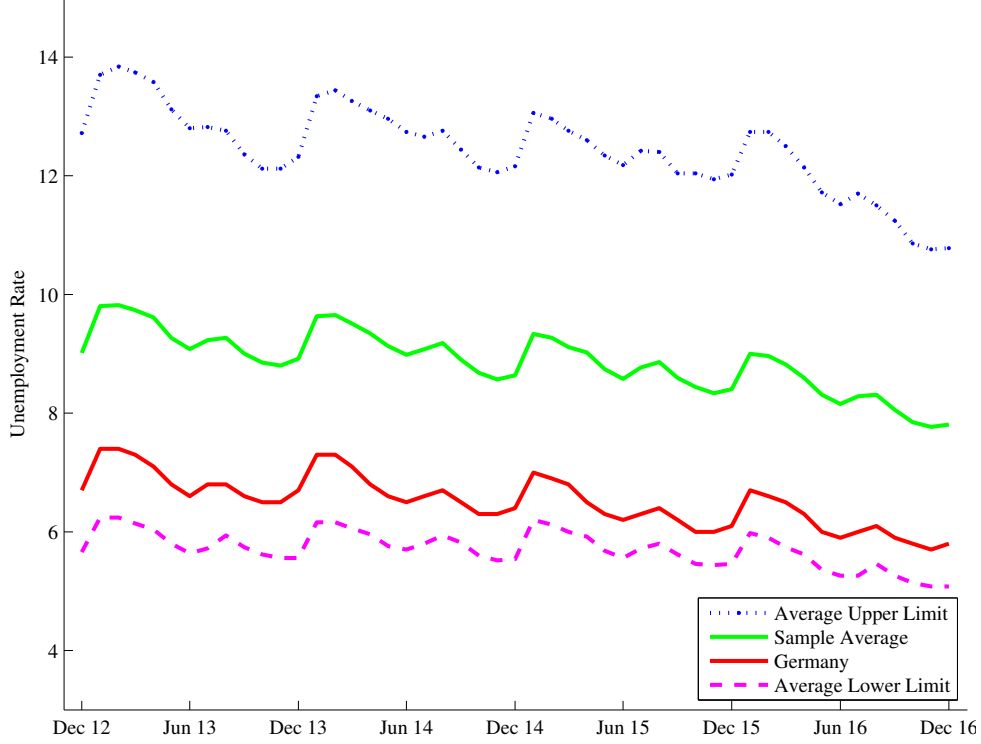


Figure 1: German Labor Market Development

Note: The upper and lower limits are calculated as the average of the 5 regions in the sample with the highest and lowest unemployment rate.

Source: Federal Employment Agency.

Eriksson and Rooth (2014), the unemployment stigma may be heterogeneous by qualification. It is well known that a lower proportion of those with a higher level of education are (long-term) unemployed. This is why choosing individuals with a secondary education and vocational training is a more promising group for understanding unemployment, and is also of higher relevance for economic policy.

To check the representativeness of the experimental sample, Figure 1 shows the overall labor market development in Germany between December 2012 and December 2016, compared with the experimental sample. While the unemployment level of the dataset is on average 2% higher than for Germany as a whole, the observable decrease in unemployment is comparable. The upper and lower limits included are the averages for the 5 regions with the best and worst performance in the sample. While further demonstrating the strong heterogeneity within Germany, a direct comparison of the higher and lower averages implies a stronger market tightening (1.9% decrease in unemployment) in recent years in regions with a high unemployment level compared to regions with a generally low unemployment level (0.6% decrease in unemployment). All these tightness identified by Kroft et al. (2013), as well as to the Kaitz-Index.

variations and considerations allows a high degree of external validity and makes the findings more representative for the German economy.

3.3 Design of the Applications

The following section provides a detailed description of the fictitious job applications used for the field experiment. For each occupation, two types of templates (A/B) were designed, consisting of a résumé and a motivation letter. To make the applications realistic, the basic idea for the templates came from examples available online and comments on the Federal Employment Agency website. All applicants were single males, had secondary education, were aged between 25 and 27 as indicated by their date of birth, and had completed vocational training in one out of 7 programs. After they finished their training, they had gained additional work experience in the same company, were unemployed for up to half a year before finding a job in another company for several years, and had a final unemployment duration of between 0 and 15 months. The unemployment duration was independently assigned and is therefore robust against the critique by Phillips (2016). To avoid discrimination caused by gender, race or ethnicity, all applicants were male, born in Germany and – more importantly - had one of six typical German first names and surnames, where the first names were chosen from the most popular boy names of the age cohort, excluding names with a potential negative connotation.⁴

To ensure relevant work experience, real vacancies for the occupations were checked in March/April and the most commonly required skills were included in the work experience of the applicants. Adequate English skills, occupation-specific computer skills⁵, hobbies as well as a driver's license were added to all applications. When the vacancy demanded the knowledge of further language or computer skills, they were adjusted on the résumé. To avoid detection resulting from close links between companies, the last/current job position of the applicants was not in the same city as the job they applied for, except in the case of city-states Hamburg and Berlin.

After their design, all applications were compared with real job applications. All information about the name, birthplace, previous employers as well as the unemployment duration was randomized to ensure no systematic bias in the analysis. The unemployment duration was im-

⁴The name Kevin is often associated with a low social status. This can be illustrated by the term "Alpha Kevin". This was one of the favorites in the rankings for German Youth Word of the Year and means "the stupidest of them all".

⁵As, for example knowledge of SAP or DATEV.

plicitly indicated by the end date of their last job.⁶ All applications were sent without references, but in the résumé it was mentioned that the applicant would bring them with him to the job interview if required. While the design tried to include the labor market tightness aspect of Kroft et al. (2013), all applicants were in their late 20's as in Ghayad (2013) and Eriksson and Rooth (2014). While avoiding the research gap in gender and age resulting from Farber et al. (2017) and Nunley et al. (2017) the design allowed a young age comparison between the United States, Sweden and Germany.

3.4 Measurement of Callbacks

Each of the resulting six names was linked to an individual phone number and an email address. The callbacks were received by email and by telephone via a linked voice mail. Due to the fake postal addresses, the experiment was not able to cover callbacks by mail. In this experiment, out of 1,562 companies, four sent an email, mentioning the failure to contact the applicant by mail. To avoid detection as well as for ethical reasons only one vacancy per company was used and each was addressed by two applicants. For the same reason every invitation was immediately declined. Every company was allowed a callback within a month, but in order to take into consideration more aspects of vacancies, when companies were looking for an employee for a later starting date, it was allowed to callback until the planned starting date for the job. The precise direction of the effect was unclear. On the one hand, there might be an increase in the number of callbacks relative to other vacancies because there was get more time. On the other hand, vacancies advertised early might increase the number of applicants - which could decrease the number of invitations. It could also be possible that, as stated by Farber et al. (2017), companies immediately hiring staff were more in need and less likely to reject the long-term unemployed.

In the literature there are commonly two ways to distinguish between positive callbacks. Category 1 defines callbacks in a strict way that only interprets a callback as positive when it is a clear invitation to a job interview. Category 2 is a less strict version that also interprets a callback as positive when the applicant was were offered an alternative job proposal, asked to contact the recruiter, or asked for further information. In this analysis, both categorizations were used, with one difference resulting in a third category of callbacks. When companies not

⁶An example résumé can be found in the Appendix.

only asked for further information but also for certificates and references, they were not counted in callback category 2, since there might be several companies that asked for references without prior screening of the job application. To test the potential sensitivity of the results, category 3 included all invitations in category 2, augmented by those companies requesting certificates and references.

3.5 Limitations of the Experiment

As a result of the concept of correspondence experiments as well as the chosen design, the experiment has some limitations. Correspondence experiments are only able to detect discrimination in the first stage of the hiring process, while discrimination can occur along several dimensions such as the wage, working time or a requirement for higher qualifications (Abraham et al., 2016). The findings are limited to the chosen vacancy channel. However, as shown by Franz (2013), the Federal Employment Agency is the most popular source for job searches. Furthermore, social networks commonly used as a source (Calvo-Armengol, 2004) cannot be accounted for at all. Additionally, as mentioned earlier, the design limits the experiment to a young work force as in Eriksson and Rooth (2014) and Ghayad (2013), and also focuses on males only. Since the findings of Kroft et al. (2013) imply that the unemployment stigma depends on labor market tightness, this means it cannot be guaranteed to be a permanent phenomenon. By having occupational as well as geographical variation over 41 regions in Germany, this should maximize the external validity of the findings for a young low- and medium-skilled male work force depending on the current labor market situation.

4 Experimental Results

4.1 Non-parametric Evidence

Table 1 provides a detailed overview of the probability of job invitations dependent on several subcategories, for all callback measures, augmented by the difference between the callback measures 3 and 2 ($3 - 2$) and provides all subcategories' share of collective agreements. The first row contains the overall sample showing the callbacks depending on the different categories, ranging from 20.9% to 35.6%. The experimental sample has a coverage of collective agreements of 18%.

Table 1: Callback Rates and Share of Collective Agreements depending on Subcategories

	N	Callbacks Category				Collective Agreements
		1	2	3	3 – 2	
Overall	3124	0.209	0.269	0.356	0.099	0.181
Occupations						
Hotel Manager	422	0.446	0.507	0.628	0.130	0.408
Office Clerk	538	0.056	0.087	0.151	0.073	0.175
Retail Merchant	462	0.193	0.273	0.305	0.041	0.078
Warehouse Logistic Specialist	494	0.215	0.267	0.332	0.077	0.168
Wholesale Foreign Trader	440	0.123	0.155	0.280	0.139	0.159
Industrial Clerk	398	0.123	0.168	0.314	0.158	0.156
Dialogue Marketing Agent	370	0.368	0.505	0.573	0.089	0.127
Company Size						
< 6 employees	410	0.181	0.261	0.300	0.056	0.073
6 to 50 employees	1580	0.227	0.270	0.344	0.081	0.139
> 50 employees	1134	0.193	0.271	0.392	0.138	0.277
Job Start						
Immediately	1834	0.208	0.265	0.346	0.092	0.177
Within the next 4 weeks	812	0.217	0.293	0.381	0.102	0.165
Later	478	0.197	0.245	0.352	0.119	0.222
Contract Type						
Permanent Contract	2058	0.212	0.270	0.348	0.092	0.165
Non-Permanent Contract	1066	0.202	0.268	0.371	0.111	0.211
Collective Agreement	564	0.261	0.323	0.472	0.154	1.000

Notes: Callbacks show the probability of a job interview; “Collective agreements” indicates the share of collective agreements.

The current data of the Federal Statistical Office displays a coverage of collective agreements for Germany of 47% in 2016. This difference can be explained by the fact that collective agreements are related to higher wages, which might lead to lower turnovers and therefore fewer vacancies.

The callback overview provides initial evidence of potentially relevant aspects. Remarkably, the callback rates strongly depend on the occupation concerned. Comparing different measures of callback categories between the strict and relaxed definition of callbacks, a strong increase in job invitations for the callback category 2 for dialogue marketing agents can be observed, and this can be explained by the nature of its job activity on the phone. Besides this, on average, a high share of collective agreements for hotel managers can be observed. Under more detailed scrutiny, Table 1 indicates no notable pattern for company size, starting date or contract type with respect to callback rates. However, the likelihood of companies’ asking for references is twice as high in the case of large companies compared to medium companies and even three times as likely as for small companies, which points to potential differences in their screening

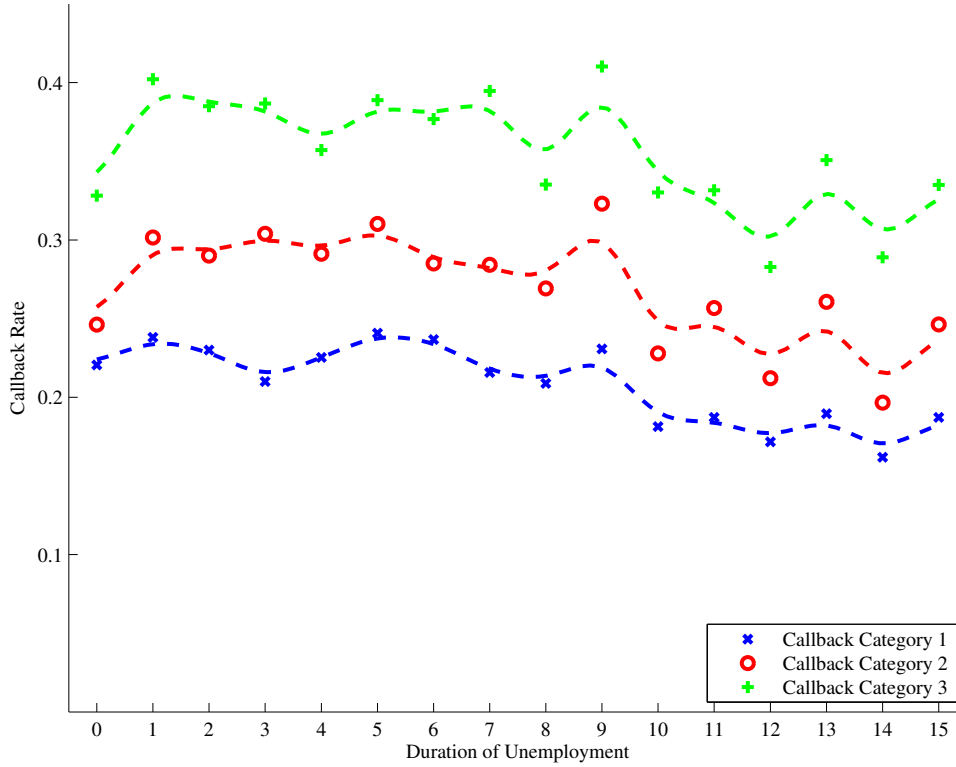


Figure 2: Callbacks over the Unemployment Duration

Note: Callback Category 1 includes all callbacks that clearly requested a job interview; Callback Category 2 includes all kind of requests revealing an interest in the applicant, excluding reference requests; Callback Category 3 includes all requests, including reference requests; Dashed lines are the smoothed callbacks resulting from kernel smoothing with a smoothing parameter of 0.6.

behavior. Furthermore, large companies are also several times more likely to have a collective agreement. But still, both patterns do not seem to have any effect on the callbacks.

The prediction of the literature arguing duration dependence is purely the result of (un)observable heterogeneity in productivity (Machin and Manning, 1999), is a constant of callbacks over the unemployment duration. A preliminary look at the aggregated data using kernel smoothing in Figure 2 shows the development of callbacks using all three implemented callback categories, which clearly rejects the idea of constant callback rates over the duration of unemployment. Overall, the development shows the expected pattern of previous research with correspondence experiments focusing on duration dependence. Currently employed applicants (duration 0) are less likely to receive positive callbacks compared to newly unemployed applicants. In Figure 2, this can be confirmed for the callback categories 2 and 3. Generally, in the case of duration dependence we expect to observe high callback rates for individuals with a low unemployment duration and vice versa. In the case of all callback categories, we can observe decreasing call-

backs over the unemployment duration that mainly manifests itself in a sharp decrease in the callbacks when an individual has been unemployed for 10 months. Taking this observed timing of the stigma effect as a reference point, the callback ratio of the categories are 1.26, 1.26 and 1.19, implying that the stigma of long-term unemployment decreases the callback rates by between 19% to 26% when an individual has been unemployed for 10 months or longer. The previous literature supposes that the timing of the stigma effect coincides with the maturity of unemployment benefits (Ghayad, 2013; Eriksson and Rooth, 2014). The argument is that a longer provision of unemployment benefits allows for a longer job search, increasing the time before companies become suspicious about an unemployed person’s productivity. While the duration of unemployment benefits in Germany is 12 months, the expected pattern can roughly be confirmed. It is also of interest for this paper to find out more about the development of callbacks in the case of unemployment lasting 12 months or longer. When the company has an interest in the minimum wage exemption, we would expect to observe an increase in job invitations for applicants with an unemployment duration exceeding 12 months, but this cannot be observed.

Going into more detail, callback category 3 was generated from the possibility that companies might ask for certificates and references before reading the application at all, which would imply that these callbacks were less informative for the analysis. When we separate the additional callbacks resulting from category 3, we can observe a constant line without any interpretable change in callbacks over the unemployment duration, and at first glance this confirms the suggestion and their lower information value. As a result of these initial insights, the following analysis will focus on callback measure category 2, since it seems to be the most promising with respect to the expected patterns from the literature and the quality of the information concerned. Both alternative measures will be considered as robustness checks in the multivariate analysis. As pointed out by Kroft et al. (2013), duration dependence mainly occurs in tight labor markets where the unemployment duration provides more information about the applicant’s productivity. This effect even overcompensates the relatively higher opportunity costs of keeping a vacancy open during a period of low unemployment. As shown earlier, the German labor market is characterized by a large heterogeneity in regional labor market tightness in terms of the unemployment rate, and this allows us to test the representativeness of the quantitative effect of the unemployment stigma. For this purpose, the regional labor market tightness is considered to be the unemployment rate, vacancy/unemployment ratio and the change in the unemployment

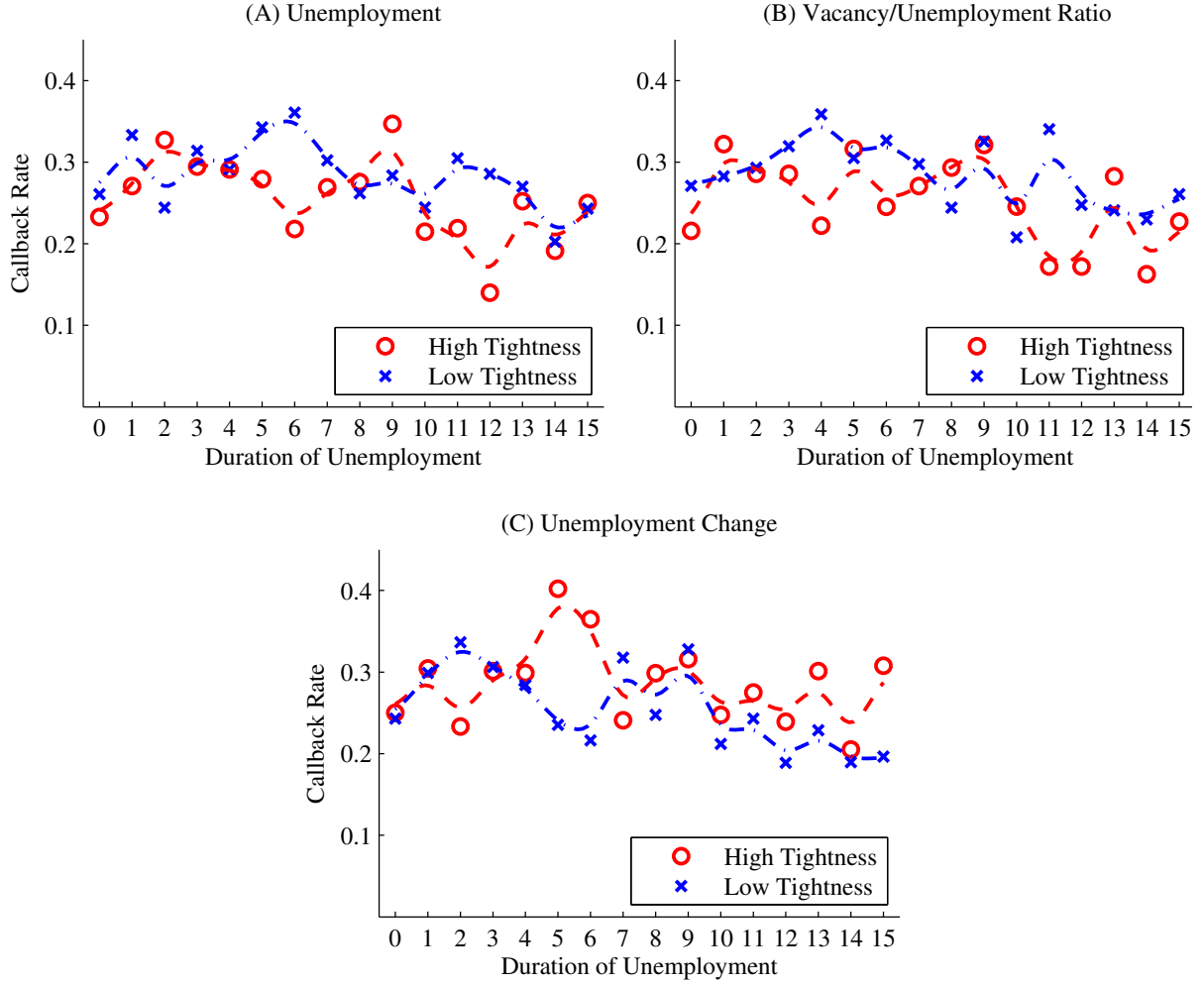


Figure 3: Callbacks over the Unemployment Duration (by Market Tightness)

Note: Following Callback Category 2, includes all kind of requests revealing interest in the applicant, excluding reference requests; In panel A, high tightness implies a regional unemployment rate of $\leq 8.4\%$ and low tightness an unemployment rate of $> 8.4\%$ for 2016; In panel B, high tightness implies a regional vacancy/unemployment ratio of ≥ 0.24 and low tightness an vacancy/unemployment ratio of < 0.24 for 2016; In panel C, high tightness implies a decrease in the unemployment rate of $\geq 1\%$ and low tightness a decrease in the unemployment rate of $< 1\%$ for 2016; Dashed lines are the smoothed callbacks resulting from kernel smoothing with a smoothing parameter of 0.6.

rate in Figure 3.⁷ The breakdown of the sample into higher and lower tightness follows a simple splitting into two halves, which fits the high tightness subsample to the overall unemployment rate in Germany.

Separating the dataset into two samples based on the unemployment rate (Panel A) and the vacancy/unemployment ratio (Panel B), confirms the earlier observed unemployment stigma in month 10. Both cases point to an even stronger stigma effect of long-term unemployment, with

⁷As an alternative measure, unemployment across occupations would be an interesting aspect, but has been omitted on the grounds of data availability.

a callback ratio of 1.35 and 1.34, compared to their lower tightness counterparts (1.18 and 1.20). This strongly supports the robustness of the relevance of regional labor market tightness for the stigma of long-term unemployment. Using the change in unemployment in Panel C as a third measure of labor market tightness is less promising than the two alternatives. In fact, the opposite of the expected outcome is observable. As discussed in Figure 1, regions with low average unemployment levels recorded lower decreases in the unemployment rate compared to regions with high unemployment, having a strong impact on the categorization of this labor market tightness measure. This can be interpreted as a higher relevance of the general regional labor market conditions for companies' screening behavior than the business cycle. Despite this first evidence, a multivariate analysis is needed to ensure the robustness of these findings with respect to several controls. This becomes especially important when making a judgement concerning the relevance of the minimum wage exemption.

4.2 Multivariate Analysis

For the empirical part, the analysis will concentrate on multivariate methods, namely OLS, Logit and Probit estimations augmented by several potential fixed effects. The econometric strategy splits into two approaches. The first approach specifies the basic idea of duration dependence analyzing the relevance of continuous decreases of callbacks and stigma effects specified as a sharp decrease in callbacks within a month. The estimations will follow equation 1.

$$Callback_i = \beta_0 + \beta_1 Emp_i + \beta_2 UD_i + \beta_3 S_i + \beta_4 UD_i \times S_i + X_i \beta_5 + \varepsilon_i \quad (1)$$

Where β_0 is a constant, β_1 is the effect of the dummy for the current employment status, which takes the value 1 if currently employed and 0 otherwise. β_2 is the effect of an additional month of unemployment. β_3 is the effect of an unemployment stigma which takes 1 if unemployed for 10 months or longer, otherwise 0, motivated by the non-parametric occurrence of the unemployment stigma. β_4 is a test for a potential change in the slope of the unemployment duration after the occurrence of the unemployment stigma after 9 months. β_5 includes the effects of various fixed effects for regions, occupations, names, and the layout of the application.

The second approach follows equation 2 and will analyze the relevance of the minimum wage exemption for long-term unemployed individuals. As mentioned earlier, Germany allows an exemption from the minimum wage if an individual has been unemployed for 12 months or

Table 2: The Effect of Unemployment Duration on the Probability of Callback

	(1)	(2)	(3)	(4)	(5)
Employed	-0.0564 (0.0370)	-0.0434 (0.0343)	-0.0246 (0.0389)	-0.0194 (0.0398)	-0.0232 (0.0401)
Months Unemployed	-0.0045** (0.0019)		0.0038 (0.0036)	0.0047 (0.0040)	0.0041 (0.0041)
Stigma		-0.0575*** (0.0168)	-0.0858*** (0.0317)		-0.0727 (0.0990)
Months Unemployed \times Stigma				-0.0072*** (0.0028)	-0.0012 (0.0087)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269
N	3124	3124	3124	3124	3124
pseudo R^2	0.1076	0.1093	0.1096	0.1095	0.1096
Probit	X	X	X	X	X
Occupation	X	X	X	X	X
Layout	X	X	X	X	X
Week	X	X	X	X	X
Order	X	X	X	X	X

Notes: Dependent variable is the probability of receiving an invitation for a job interview, following Callback Category 2; The table reports marginal effects for the probability of a callback; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

longer. Ceteris paribus, this would imply an advantage for workers with a duration exceeding this limit. Because of the favorability principle, this exemption is only relevant for companies without a collective agreement. This is why equation 2 is an augmentation of the first approach.

$$\begin{aligned}
\text{Callback}_i = & \beta_0 + \beta_1 \text{Emp}_i + \beta_2 \text{UD}_i + \beta_3 \text{S}_i + \beta_4 \text{UD}_i^{\text{Larger12m}} + \beta_5 \text{CA}_i \\
& + \beta_6 \text{MW}_i + X_i \beta_7 + \varepsilon_i
\end{aligned} \tag{2}$$

The augmentation is based on an unemployment duration dummy in case of unemployment exceeding 12 months $\text{UD}_i^{\text{Larger12m}}$ and callbacks resulting from a collective agreement CA_i . Using the term MW_i equal to 1 if $\text{UD}_i^{\text{Larger12m}}$ is equal to 1 and no collective agreement exists, which finally should result in β_6 as the effect of the minimum wage exemption on companies' hiring decision. In this analysis, we are therefore able to analyze possible effects of companies' awareness of/willingness for the exemption itself.⁸ Table 2 reports results based on Probit estimates while controlling for the most important factors of the experimental design, namely occupation, layout, week and order of the applications. Due to the nature of correspondence experiments, it allows a direct causal interpretation of the estimates. Specification 1 implies a

⁸It is important to mention that the experimental design is not ideal for the evaluation of the minimum wage exemption, since it requires the company's willingness and knowledge of the minimum wage exemption and is further weakened by the small proportion of collective agreements in the experimental sample. As an alternative, the minimum wage exemption can be evaluated in a better way by sending certificates for the authorization of the minimum wage exemption directly with the job application.

decrease in job invitations of approximately 0.5% with each additional month of unemployment, significant at the 5% level.⁹ When specifying duration dependence as a stigma only, column 2 implies a decrease in job invitations when unemployed for 10 months by 5.8%, significant at the 1% level. Combining the unemployment duration variable with the stigma dummy results in a positive but insignificant coefficient for the unemployment duration, but an even stronger and significant stigma effect. Considering a change in the slope in month 10 without the stigma dummy, the effect size and significance are comparable with the previous estimates. When checking for differences in the slope before and after the stigma in combination with the stigma dummy, the estimates reveal no significant results. For all specifications, employed individuals have lower but insignificant callbacks. Because previous findings suggest there is a steady decrease, it is important to control for this possibility in the following analysis, which is why specification 3 will be concentrated on in the further analysis. All the following findings for specification 3 are also in line when using specification 1, 2 and 4¹⁰, even more robust and with higher statistical significance.

Table 3 provides evidence for the robustness of the baseline specification with respect to a set of alternative controls. The step-by-step extension of controls in the first four columns shows the robustness of the baseline findings. The same stable results as for the first four columns are observable for regional fixed effects and also when removing temporary employment agencies (TEA) from the sample. As before, these results are further investigated for robustness by alternative callback definitions as well as with OLS and Logit, resulting largely in the same results, with lower statistical significance with regard to alternative callback definitions. The signs of the coefficients are the same across models, and the same variables are statistically significant in each of them. In most estimations, being employed decreases the probability of callbacks and as in the baseline specifications, the unemployment duration shows a positive, but economically irrelevant and insignificant trend. Apart from these main findings, there is also an additional interesting and robust observation with respect to the weekly control variable. While there is no specific pattern for most weekly controls, when sending a job application in the last week of a month, there is an overall decrease in callbacks of 6.3% observable, which is almost as large as the stigma of long-term unemployment itself. A possible reason is signaling of deferred

⁹Note that the marginal effect of a Probit estimate is not constant over the variation in the unemployment duration, which is why here OLS would be preferable. However, first OLS estimates in the analysis are approximately equal in their coefficients and second, a specification focusing on the unemployment duration only is not the most promising specification for the further investigation.

¹⁰This additional robustness checks are provided in the Appendix. An overview of all other specifications, with respect to OLS and Logit as well as to all callback categories is available on request.

Table 3: The Effect of Unemployment Duration on the Probability of Callback (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Employed	-0.0285 (0.0389)	-0.0357 (0.0391)	-0.0326 (0.0391)	-0.0327 (0.0390)	-0.0392 (0.0389)	-0.0224 (0.0383)	0.0075 (0.0332)	-0.0401 (0.0435)	-0.0235 (0.0353)	-0.0277 (0.0392)
Months Unemployed	0.0040 (0.0036)	0.0038 (0.0036)	0.0038 (0.0036)	0.0039 (0.0036)	0.0035 (0.0036)	0.0025 (0.0036)	0.0023 (0.0032)	0.0024 (0.0040)	0.0036 (0.0034)	0.0038 (0.0035)
Stigma	-0.0870*** (0.0317)	-0.0854*** (0.0317)	-0.0871*** (0.0318)	-0.0873*** (0.0318)	-0.0831*** (0.0317)	-0.0729** (0.0321)	-0.0579** (0.0280)	-0.0721** (0.0353)	-0.0779*** (0.0295)	-0.0828*** (0.0312)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269	0.264	0.209	0.356	0.269	0.269
N	3124	3124	3124	3124	3124	3038	3124	3124	3124	3124
(pseudo) R^2	0.1143	0.1143	0.1442	0.1443	0.1706	0.1451	0.1443	0.1111	0.1629	0.1450
Callbacks 2	X	X	X	X	X	X			X	X
Probit	X	X	X	X	X	X	X	X		
Baseline Controls	X	X	X	X	X	X	X	X	X	X
Distance	X	X	X	X	X	X	X	X	X	X
Company Infos		X	X	X	X	X	X	X	X	X
Vacancy Infos			X	X	X	X	X	X	X	X
Contract Infos				X	X	X	X	X	X	X
Regional FE								X	X	X
Exclude TEA						X				
Callbacks 1							X			
Callbacks 3								X		
OLS									X	
Logit										X

Notes: Dependent variable is the probability of receiving an invitation for a job interview; The table reports marginal effects for the probability of a callback; The baseline controls are those listed in Table 2; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

work, interpreted as low motivation and work morale. As for the previous evidence, estimates reported in Table 3 indicate overall robust evidence for the existence of duration dependence in terms of an unemployment stigma in Germany.

However, the sample has on average a lower tightness than Germany as a whole, implying an underestimation of the true quantitative stigma effect. To avoid neglecting an important piece of robustness and representativeness of the experiment, the data are also proof of the potential relevance of labor market tightness as provided by Kroft et al. (2013). Due to the insignificance of the trend component, a specification using $\log(month\ unemployed)$ as proposed by Kroft et al. (2013) leads to insignificant results and is thus avoided. But as the non-parametric evidence suggests, there is a relevance of labor market tightness.

Following the earlier non-parametric procedure, the results in Table 4 support the relevance of labor market tightness for duration dependence. Compared to the full sample in column 1, there is an increasing stigma effect in tight labor markets conditional on the regional unemployment rate and the vacancy/unemployment ratio, while revealing negative but insignificant coefficients for their low tightness counterparts. To focus on the representativeness, the full sample is representative with respect to its vacancy/unemployment ratio for Germany, which is also the case for the high tightness unemployment rate sample. This implies a representative stigma of long-term unemployment for Germany of 26% to 35%.

In the next step, the analysis investigates the impact of the minimum wage exemption on the already mentioned feature of the favorability principle. Column 1 covers the full sample including the maximum set of controls from previous analysis and column 2 the same without temporary employment agencies. Furthermore, additional estimations change the specification of duration dependence and vary the sample size by excluding observations before the unemployment stigma. The results of all samples and specifications point to the irrelevance of the minimum wage exemption for companies' hiring decisions, with even a negative (yet only on the 10% level significant) coefficient for the relevant companies. Next, we consider the possibility that these findings are not related to the minimum wage exemption, but rather to alternative relevant company- and vacancy-specific characteristics that might determine the unemployment stigma. As the following shows, this does allow for interesting additional insights that not only explain the failure of the evaluation but also provide an explanation for the mixed evidence from the literature.

As opposed to the randomized unemployment duration, the company- and vacancy-specific char-

Table 4: The Effect of Labor Market Conditions on the Unemployment Stigma

	(1)	(2)		(3)		(4)		(5)
	Full Sample	Unemployment Rate		Vacancy/Unemployment Ratio		High Tightness		Low Tightness
Employed	-0.0327 (0.0390)	High Tightness	-0.0345 (0.0518)	Low Tightness	-0.0289 (0.0590)	High Tightness	-0.0374 (0.0559)	-0.0338 (0.0549)
Months Unemployed	0.0039 (0.0036)	High Tightness	0.0057 (0.0048)	Low Tightness	0.0020 (0.0055)	High Tightness	0.0049 (0.0051)	0.0028 (0.0051)
Stigma	-0.0873*** (0.0318)	High Tightness	-0.1216*** (0.0418)	Low Tightness	-0.0460 (0.0489)	High Tightness	-0.1054** (0.0434)	-0.0696 (0.0464)
Average Callback Rate	0.269	High Tightness	0.269	Low Tightness	0.269	High Tightness	0.269	0.269
N	3124	High Tightness	1678	Low Tightness	1446	High Tightness	1510	1614
pseudo R^2	0.1443	High Tightness	0.1660	Low Tightness	0.1398	High Tightness	0.1703	0.1352

Notes: Dependent variable is the probability of receiving an invitation for a job interview, following Callback Category 2; The table reports probit marginal effects for the probability of a callback; The controls are those listed in Table 3 specification (4); Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: The Effect of the Minimum Wage Exemption on Callbacks

	(1)	(2)	(3)	(4)	(5)
Employed	-0.0325 (0.0398)	-0.0209 (0.0392)			
Months Unemployed	0.0039 (0.0039)	0.0028 (0.0040)	-0.0041 (0.0138)		
Stigma	-0.0877*** (0.0318)	-0.0728** (0.0321)			
Minimum Wage Exemption	-0.0728 (0.0522)	-0.0730 (0.0529)	-0.0995* (0.0638)	-0.1141* (0.0624)	-0.0901 (0.0644)
Average Callback Rate	0.269	0.264	0.234	0.234	0.231
N	3124	3038	1187	1187	1159
pseudo R^2	0.1448	0.1456	0.1921	0.1920	0.1904
Months Unemployed > 9			X	X	X
Exclude TEA		X			X

Notes: Dependent variable is the probability of receiving an invitation for a job interview, following Callback Category 2; The table reports probit marginal effects for the probability of a callback; The controls are those listed in Table 3 specification (4); Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

acteristics are not experimentally manipulated. As a result, these characteristics can correlate with unobservable characteristics relevant for the unemployment stigma allowing only limited interpretation. Furthermore, it is important to point to the limited power of estimates that do not make it possible to provide statistical significance for characteristics with a relatively low effect.

We first consider company size as relevant for the recruitment process from several aspects. The level of prominence increases with company size, increasing the number of applicants, which allows a more selective applicant screening, decreasing the interest in the long-term unemployed. On the other hand, larger companies are more likely to have a dedicated human resources department, focusing exclusively on the screening process. Large companies are also more likely to have works councils (Addison et al., 2003), influencing the screening processes. This is also supported by the observation of Table 1 that larger companies are three times more likely to ask for references, which would imply they are more able to detect unobservable heterogeneity at a later screening stage or may be less concerned about potential risk, as this is spread across their own employees. Ultimately, this could decrease interest in the signal of the unemployment duration. Similarly we would expect the opposite to be true for small companies, with a low level of prominence resulting in fewer applicants, which in turn does not permit them to be selective. Small companies also have less standardized processes, making them more likely to rely on the unemployment duration as a signal.

The argument that limited prominence leads to a smaller applicant pool, should have similar effects as if companies are in immediate need of new employees. This would be in line with Farber et al. (2017), who observe that companies with immediate needs are more likely to invite long-term unemployed individuals. Thanks to the available vacancy information, we are able to test this hypothesis by using companies searching for applicants for the earliest possible start date in addition to the number of positions that are to be filled.

The last two characteristics are the contract type and the presence of a collective agreement. A permanent contract, as well as higher wages resulting from a collective agreement, should increase the number of applicants. This, again allows companies to be more selective in the screening process, to the disadvantage of the long-term unemployed. From a European perspective, the contract type becomes even more relevant, given the higher degree of employment protection in Europe, compared with the United States. As Boockmann and Hagen (2008) show, temporary contracts are a potentially relevant instrument for companies' screening processes that could break the unemployment stigma. The implication for the long-term unemployed and job centers, would be to concentrate their search effort on vacancies with temporary contracts to ensure efficient reintegration into the labor market. For policymakers, this would imply that weakening employment protection or increasing the probation period, could weaken the unemployment stigma.

Table 6 provides overall evidence for strong heterogeneity of the unemployment stigma based on company- and vacancy-specific characteristics. A consideration of all potential determinants reveals a decrease in job invitations of 10 to 18 percentage points for companies with more than 50 employees. This effect is significant at the 1% level. While there is no significant difference in the unemployment stigma observable for companies with 6 to 50 employees, compared to larger companies, there is a significantly lower stigma for companies with fewer than 6 employees. The lower unemployment stigma in small companies, together with the positive coefficient of companies with immediate needs, both support the idea that companies with a smaller applicant pool are less selective in the screening process. Considering the relevance of the contract type, the estimates show a weak tendency for temporary contracts to lower the unemployment stigma, despite the expected smaller applicant pool and the potential relevance of temporary contracts as a screening instrument, the statistical insignificance as well as the limited effect, both go against the contract type being an important determinant for the unemployment stigma. Given the previous discussion, most coefficients have their expected sign. This is, however, not the case

Table 6: Potential Stigma Determinants

	(1)	(2)	(3)	(4)	(5)
Employed	-0.0496 (0.0386)	-0.0498 (0.0385)	-0.0491 (0.0384)	-0.0493 (0.0384)	-0.0498 (0.0384)
Months Unemployed	0.0008 (0.0036)	0.0009 (0.0036)	0.0009 (0.0036)	0.0008 (0.0036)	0.0008 (0.0036)
Stigma	-0.0999** (0.0391)	-0.1495*** (0.0470)	-0.1843*** (0.0521)	-0.1759*** (0.0542)	-0.1626*** (0.0540)
Stigma x (6 to 50 Employees)	0.0288 (0.0366)	0.0310 (0.0370)	0.0435 (0.0381)	0.0426 (0.0382)	0.0423 (0.0382)
Stigma x (< 6 Employees)	0.1052** (0.0527)	0.1086** (0.0527)	0.1284** (0.0542)	0.1269** (0.0542)	0.1264** (0.0542)
Stigma x Immediate Need		0.0581* (0.0338)	0.0567* (0.0339)	0.0571* (0.0339)	0.0606* (0.0340)
Stigma x Open Positions		0.0080 (0.0104)	0.0092 (0.0105)	0.0091 (0.0105)	0.0088 (0.0106)
Stigma x Temporary Contract			0.0387 (0.0353)	0.0380 (0.0354)	0.0390 (0.0353)
Stigma x Collective Agreement			0.0596 (0.0432)	0.0593 (0.0432)	0.0593 (0.0431)
Stigma x Unemp. Tightness				-0.0150 (0.0273)	
Stigma x V/U Ratio Tightness					-0.0420 (0.0268)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269
N	3124	3124	3124	3124	3124
pseudo R^2	0.0543	0.0553	0.0562	0.0563	0.0569

Notes: Dependent variable is the probability of receiving an invitation for a job interview, following Callback Category 2; The table reports probit marginal effects for the probability of a callback; The controls are those listed in Table 3 specification (4); Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

for companies with collective agreements. Companies with a collective agreement tend to be more likely to invite long-term unemployed persons to a job interview, which explains the failure of the attempt of the minimum wage evaluation. An increasing applicant pool should lead to fewer callbacks for the long-term unemployed. A possible explanation for this is that companies providing higher wages are more intensive in their screening process and therefore rely less on the unemployment duration as a signal.¹¹ Further sensitivity analysis, including the previous labor market tightness considerations in columns 4 and 5 of Table 6, suggest the robustness of the potential stigma determinants. Even though the labor market tightness variables are insignificant, they show the expected sign, revealing an increasing unemployment stigma, with a tightening labor market. All these results are robust for OLS, Logit and Probit as well as

¹¹This variable is for some specifications significant on the 10% level.

for the callback categories 2 and 3, but not for the callback category 1 with its lower variation resulting from its overall lower callback rates.

5 Conclusion

This paper provides a correspondence experiment aimed at reaching new evidence about the stigma of long-term unemployment. While past research focused on the search behavior of unemployed individuals where duration dependence is the result of differences in motivation and productivity and does not reflect stigmatization of (long-term) unemployed, recent research points to the relevance of companies' screening behavior for duration dependence. The aim of the experiment was to identify and quantify the stigma of long-term unemployment in Germany, test the relevance of company and vacancy characteristics and analyze aspects of the minimum wage exemption for the long-term unemployed.

In the case of all callback categories, we can observe decreasing callbacks over the unemployment duration, mainly observable in terms of a sharp decrease of callbacks when a person was unemployed for 10 months or longer. The experimental design is based on young applicants as in Ghayad (2013) and Eriksson and Rooth (2014) in order to provide better comparability between countries. Despite the mixed evidence resulting from recent experiments by Farber et al. (2017) and Nunley et al. (2017), this paper supports the existence of duration dependence in Germany. Overall, the significance and size of the effect is stable over all specifications and points to a sharp decrease in callbacks by 8.5 to 12 percentage points, implying an unemployment stigma of between 26% and 35% for a representative sample for Germany. Despite the failure of the minimum wage exemption evaluation, investigation of company and vacancy characteristics allows further insight into determinants of the unemployment stigma, providing a potential explanation for the mixed evidence of previous studies. The results are largely driven by labor market tightness, as previously shown by Kroft et al. (2013), and companies' screening behavior related to their size. The results suggest that the unemployment stigma is driven by larger companies with lower callbacks of up to 18 percentage points (55%), with no evidence for an unemployment stigma for small companies. There is, moreover, no evidence for an unemployment stigma determined by the contract type - which contradicts employment protection as a potentially relevant aspect for European labor markets. The observed strong heterogeneity related to the characteristic of the vacancy and company therefore provide a potential explanation for the mixed evidence of

previous experiments.

Due to these stigma effects, companies' hiring decisions become important for the labor market prospects of the unemployed, and are highly relevant for understanding the matching process and the optimal design – for example the optimal timing of training programs to avoid carrying unemployed individuals into the stigma - and the relation of the unemployment stigma and the duration of unemployment benefits. The question, however, remains as to whether these findings are also representative for the working population as a whole or just for a young population. Without question, even if the stigma is a youth phenomenon, it is important for economic policy. When the unemployment stigma is a young workers' problem and even when previous spells of unemployment have no effect, work experience and therefore wages and future labor market outcomes will be affected.

It is important to further extend the literature on duration dependence to consider the gender aspect as well as covering additional age cohorts in order to acquire deeper insights into the mechanism of duration dependence at work. Furthermore, an extension of these experiments to cover other countries would be fruitful in order to ensure its relation to labor market structures and more importantly, its potential relevance for efficient design of active and passive labor market policies.

A Appendix

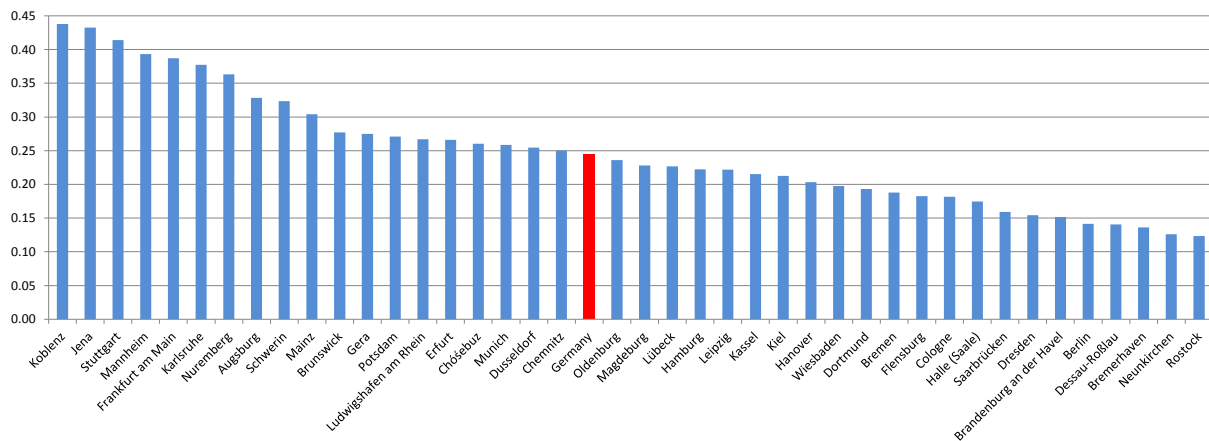


Figure A1: Regional Tightness

Source: Federal Employment Agency; Average 2016.; Own calculations.

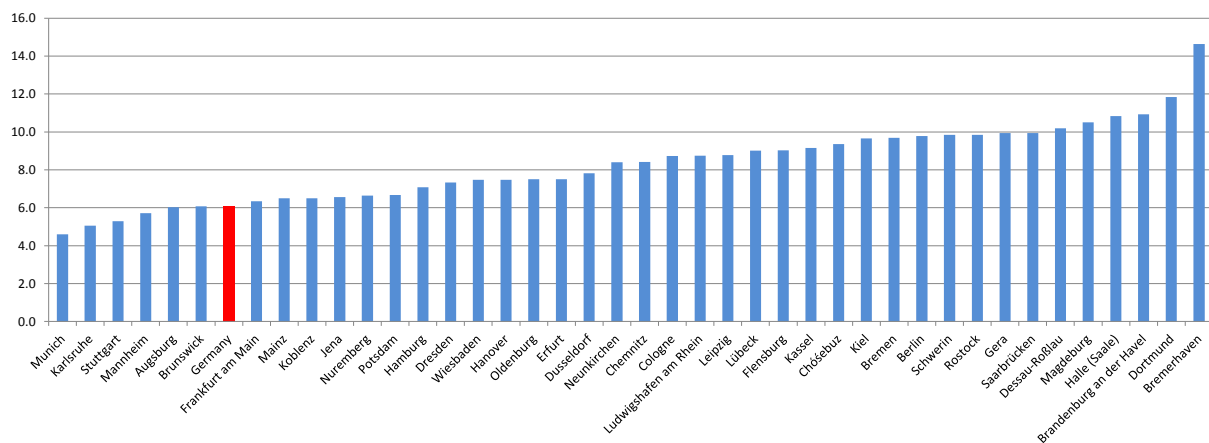


Figure A2: Regional Unemployment

Source: Federal Employment Agency; Average 2016.

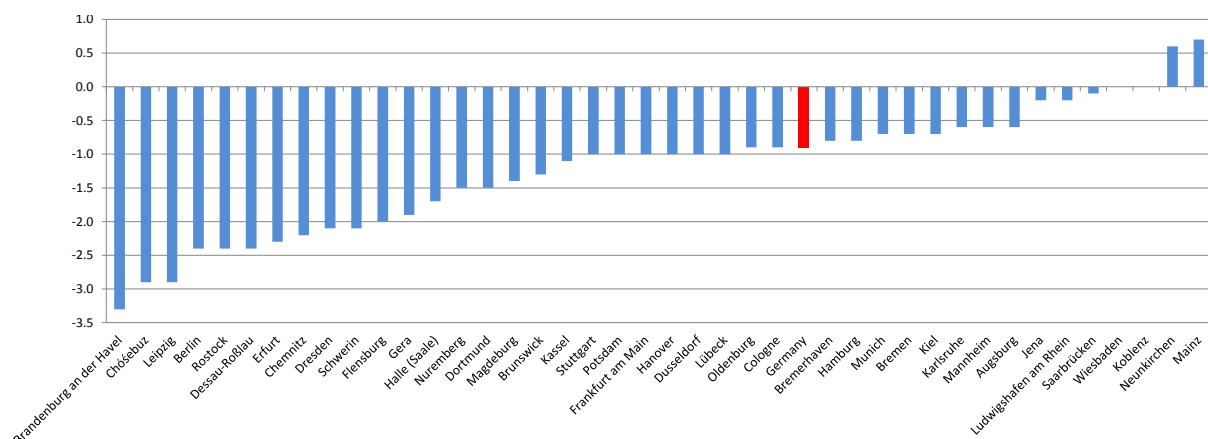


Figure A3: Unemployment Change December 2012 to December 2016

Source: Federal Employment Agency; Average 2016.

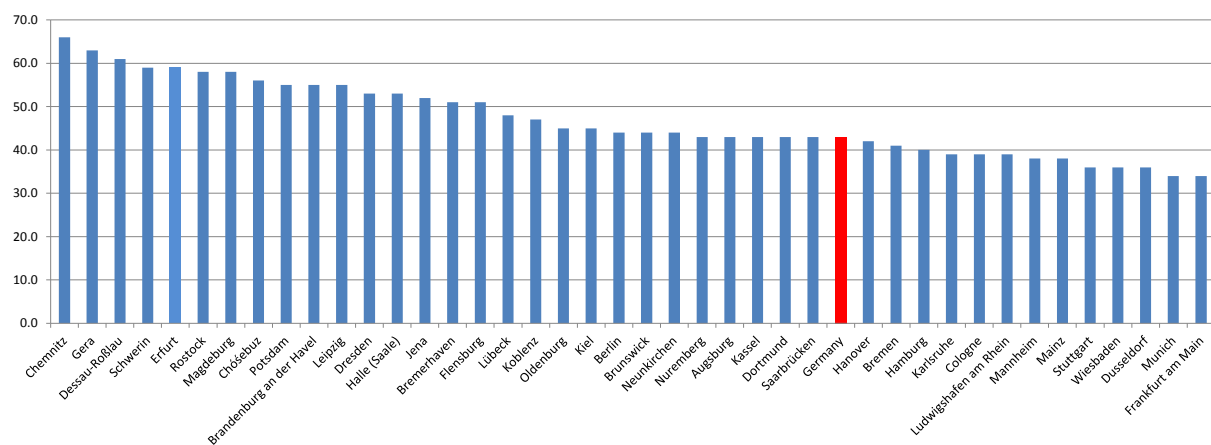


Figure A4: Regional Kaitz Index

Source: DeStatis - Structure of Earnings Survey 2014.

References

- Abraham, K. G., J. C. Haltiwanger, K. Sandusky, and J. Spletzer (2016). The Consequences of Long Term Unemployment: Evidence from Matched Employer-Employee Data. NBER Working Papers 22665, National Bureau of Economic Research, Inc.
- Addison, J. T., L. Bellmann, C. Schnabel, and J. Wagner (2003). German Works Councils Old and New: Incidence, Coverage and Determinants. *Schmollers Jahrbuch : Journal of Applied Social Science Studies / Zeitschrift für Wirtschafts- und Sozialwissenschaften* 123(3), 339–358.
- Addison, J. T., M. Centeno, and P. Portugal (2004). Reservation Wages, Search Duration, and Accepted Wages in Europe. IZA Discussion Papers 1252, Institute for the Study of Labor (IZA).
- Arrow, K. J. (1973). The Theory of Discrimination. In O. Ashenfelter and A. Rees (Eds.), *Discrimination in Labor Markets*. Princeton University Press.
- Baert, S., J. Norga, Y. Thuy, and M. Van Hecke (2016). Getting grey hairs in the labour market. An alternative experiment on age discrimination. *Journal of Economic Psychology* 57(C), 86–101.
- Bertrand, M. and S. Mullainathan (2004). Are Emily and Greg More Employable Than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination. *American Economic Review* 94(4), 991–1013.
- Boockmann, B. and T. Hagen (2008). Fixed-term Contracts as Sorting Mechanisms: Evidence from Job Durations in West Germany. *Labour Economics* 15(5), 984–1005.
- Calvo-Armengol, A. (2004). Job Contact Networks. *Journal of Economic Theory* 115(1), 191–206.
- Carlsson, M. and D.-O. Rooth (2008). An Experimental Study of Sex Segregation in the Swedish Labour Market: Is Discrimination the Explanation? IZA Discussion Papers 3811, Institute for the Study of Labor (IZA).
- Eriksson, S. and D.-O. Rooth (2014). Do Employers Use Unemployment as a Sorting Criterion When Hiring? Evidence from a Field Experiment. *American Economic Review* 104(3), 1014–39.

- Farber, H. S., D. Silverman, and T. von Wachter (2016). Determinants of Callbacks to Job Applications: An Audit Study. *American Economic Review* 106(5), 314–318.
- Farber, H. S., D. Silverman, and T. von Wachter (2017). Factors Determining Callbacks to Job Applications by the Unemployed: An Audit Study. *The Russell Sage Foundation Journal of the Social Sciences* 3(3), 168–201.
- Franz, W. (2013). *Arbeitsmarktökonomik*. Springer-Verlag.
- Ghayad, R. (2013). The Jobless Trap. Job Market Paper, Northeastern University.
- Heckman, J. and B. Singer (1984). The Identifiability of the Proportional Hazard Model. *Review of Economic Studies* 51(2), 231–241.
- Katz, L. F. and B. D. Meyer (1990). Unemployment Insurance, Recall Expectations, and Unemployment Outcomes. *The Quarterly Journal of Economics* 105(4), 973–1002.
- Kroft, K., F. Lange, and M. J. Notowidigdo (2013). Duration Dependence and Labor Market Conditions: Evidence from a Field Experiment. *The Quarterly Journal of Economics* 128(3), 1123–1167.
- Krueger, A. B. and A. I. Mueller (2010). Job Search and Unemployment Insurance: New Evidence from Time Use Data. *Journal of Public Economics* 94(3-4), 298–307.
- Krueger, A. B. and A. I. Mueller (2012). The lot of the Unemployed: A Time Use Perspective. *Journal of the European Economic Association* 10(4), 765–794.
- Ljungqvist, L. and T. J. Sargent (2004). European Unemployment and Turbulence Revisited in a Matching Model. *Journal of the European Economic Association* 2(2-3), 456–468.
- Lockwood, B. (1991). Information Externalities in the Labour Market and the Duration of Unemployment. *The Review of Economic Studies* 58(4), 733–753.
- Machin, S. and A. Manning (1999). The Causes and Consequences of Long-Term Unemployment in Europe. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics*, Volume 3 of *Handbook of Labor Economics*, Chapter 47, pp. 3085–3139. Elsevier.
- Milner, A., A. Page, and A. D. LaMontagne (2013). Long-Term Unemployment and Suicide: a Systematic Review and Meta-Analysis. *PloS one* 8(1), e51333.

- Nunley, J. M., A. Pugh, N. Romero, and R. A. Seals (2017, May). The Effects of Unemployment and Underemployment on Employment Opportunities. *ILR Review* 70(3), 642–669.
- Oberholzer-Gee, F. (2008). Nonemployment Stigma as Rational Herding: A Field Experiment. *Journal of Economic Behavior & Organization* 65(1), 30–40.
- Paserman, M. D. (2008). Job Search and Hyperbolic Discounting: Structural Estimation and Policy Evaluation. *Economic Journal* 118(531), 1418–1452.
- Phillips, D. C. (2016). Do Comparisons of Fictional Applicants Measure Discrimination When Search Externalities Are Present? Evidence from Existing Experiments. Working paper, Hope College.
- Riach, P. A. (2015). A Field Experiment investigating Age Discrimination in four European Labour Markets. *International Review of Applied Economics* 29(5), 608–619.
- Riach, P. A. and J. Rich (2004). Deceptive Field Experiments of Discrimination: Are they Ethical? *Kyklos* 57(3), 457–470.
- Sullivan, D. and T. von Wachter (2009). Average Earnings and Long-Term Mortality: Evidence from Administrative Data. *American Economic Review* 99(2), 133–38.
- van den Berg, G. J. and J. C. van Ours (1996). Unemployment Dynamics and Duration Dependence. *Journal of Labor Economics* 14(1), 100–125.
- Van Horn, C. E. (2014). *Working scared (or not at all): The lost decade, great recession, and restoring the shattered American dream*. Rowman & Littlefield.
- Vishwanath, T. (1989). Job Search, Stigma Effect, and Escape Rate from Unemployment. *Journal of Labor Economics* 7(4), 487–502.
- vom Berge, P., I. Klingert, S. Becker, J. Lenhart, S. Trenkle, and M. Umkehrer (2016). Mindestlohnbegleitforschung-Überprüfung der Ausnahmeregelung für Langzeitarbeitslose. Forschungsauftrag des Bundesministeriums für Arbeit und Soziales (BMAS). IAB-Forschungsbericht.

Resume

Daniel Hoffmann

***** Munich

Phone: *****

E-Mail: *****

Personal Data

Birth: ***** in Nuremberg

Marital Status: Single

Professional Career

03/2012 to 05/2016

***** GmbH Munich

Callcenteragent

08/2010 to 08/2011

***** GmbH Kiel

Callcenteragent

Education

08/2007 to 07/2010

***** GmbH Kiel

Vocational training as a Commercial Agent in
Dialog Marketing

to 2007

***** Secondary School, Nuremberg
Graduation: Middle Maturity

Further Qualifications

Computer Skills:

Microsoft Office (Word, Excel, Power Point)
SAP

Language Skills:

German (Mother Tongue)
English (Fluently Spoken and Written)

Driving License:

Class B

Hobbies:

Jogging, Schwimming

Munich, **.08.2016

Daniel Hoffmann

Figure A5: Sample résumé - Callcenter Agent

Table A1: Alternative Specification 1 of Duration Dependence (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Employed	-0.0607 (0.0370)	-0.0673* (0.0372)	-0.0648* (0.0372)	-0.0651* (0.0371)	-0.0703* (0.0370)	-0.0495 (0.0364)	-0.0139 (0.0315)	-0.0672 (0.0414)	-0.0527 (0.0335)	-0.0583 (0.0373)
Months Unemployed	-0.0044** (0.0019)	-0.0044** (0.0019)	-0.0046** (0.0019)	-0.0045** (0.0019)	-0.0045** (0.0019)	-0.0045** (0.0019)	-0.0033** (0.0016)	-0.0046** (0.0021)	-0.0040** (0.0017)	-0.0041** (0.0019)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269	0.264	0.209	0.356	0.269	0.269
N	3124	3124	3124	3124	3124	3038	3124	3124	3124	3124
(pseudo) R^2	0.112	0.130	0.130	0.142	0.169	0.144	0.143	0.110	0.163	0.143
Callbacks 2	X	X	X	X	X	X			X	X
Probit	X	X	X	X	X	X	X	X		
Baseline Controls	X	X	X	X	X	X	X	X	X	X
Distance	X	X	X	X	X	X	X	X	X	X
Company Infos		X	X	X	X	X	X	X	X	X
Vacancy Infos				X	X	X	X	X	X	X
Contract Infos				X	X	X	X	X	X	X
Regional FE										
Exclude TEA						X				
Callbacks 1							X			
Callbacks 3								X		
OLS									X	
Logit										X

Notes: Dependent variable is the probability of receiving an invitation for a job interview; The table reports marginal effects for the probability of a callback; The baseline controls are those listed in Table 2; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Alternative Specification 2 of Duration Dependence (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Employed	-0.0482 (0.0344)	-0.0547 (0.0347)	-0.0515 (0.0346)	-0.0519 (0.0346)	-0.0567* (0.0344)	-0.0351 (0.0337)	-0.0037 (0.0292)	-0.0521 (0.0384)	-0.0413 (0.0308)	-0.0468 (0.0349)
Stigma	-0.0573*** (0.0168)	-0.0569*** (0.0168)	-0.0587*** (0.0168)	-0.0585*** (0.0168)	-0.0570*** (0.0167)	-0.0539*** (0.0169)	-0.0410*** (0.0148)	-0.0544*** (0.0187)	-0.0513*** (0.0152)	-0.0542*** (0.0166)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269	0.264	0.209	0.356	0.269	0.269
N	3124	3124	3124	3124	3124	3038	3124	3124	3124	3124
(pseudo) R^2	0.114	0.132	0.144	0.144	0.170	0.145	0.144	0.111	0.163	0.145
Callbacks 2	X	X	X	X	X	X			X	X
Probit	X	X	X	X	X	X	X	X		
Baseline Controls	X	X	X	X	X	X	X	X	X	X
Distance	X	X	X	X	X	X	X	X	X	X
Company Infos		X	X	X	X	X	X	X	X	X
Vacancy Infos			X	X	X	X	X	X	X	X
Contract Infos				X	X	X	X	X	X	X
Regional FE										
Exclude TEA						X				
Callbacks 1							X			
Callbacks 3								X	X	
OLS										
Logit										X

Notes: Dependent variable is the probability of receiving an invitation for a job interview; The table reports marginal effects for the probability of a callback; The baseline controls are those listed in Table 2; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Alternative Specification 3 of Duration Dependence (Robustness)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Employed	-0.0227 (0.0398)	-0.0298 (0.0400)	-0.0263 (0.0399)	-0.0264 (0.0399)	-0.0332 (0.0397)	-0.0159 (0.0392)	0.0120 (0.0339)	-0.0346 (0.0445)	-0.0178 (0.0363)	-0.0221 (0.0400)
Months Unemployed	0.0050 (0.0040)	0.0049 (0.0040)	0.0050 (0.0040)	0.0050 (0.0040)	0.0046 (0.0040)	0.0038 (0.0040)	0.0031 (0.0035)	0.0034 (0.0045)	0.0046 (0.0038)	0.0049 (0.0039)
Months Unemployed \times Stigma	-0.0074*** (0.0028)	-0.0074*** (0.0028)	-0.0076*** (0.0028)	-0.0076*** (0.0028)	-0.0072*** (0.0028)	-0.0066** (0.0028)	-0.0051** (0.0024)	-0.0063*** (0.0031)	-0.0067** (0.0026)	-0.0071*** (0.0027)
Average Callback Rate	0.269	0.269	0.269	0.269	0.269	0.264	0.209	0.356	0.269	0.269
N	3124	3124	3124	3124	3124	3038	3124	3124	3124	3124
(pseudo) R^2	0.1142	0.1322	0.1441	0.1443	0.1705	0.1451	0.1444	0.1111	0.1628	0.1449
Callbacks 2	X	X	X	X	X	X			X	X
Probit	X	X	X	X	X	X	X	X		
Baseline Controls	X	X	X	X	X	X	X	X	X	X
Distance	X	X	X	X	X	X	X	X	X	X
Company Infos		X	X	X	X	X	X	X	X	X
Vacancy Infos			X	X	X	X	X	X	X	X
Contract Infos				X	X	X	X	X	X	X
Regional FE				X	X	X	X	X	X	X
Exclude TEA						X				
Callbacks 1							X			
Callbacks 3								X	X	
OLS										
Logit										X

Notes: Dependent variable is the probability of receiving an invitation for a job interview; The table reports marginal effects for the probability of a callback; The baseline controls are those listed in Table 2; Standard errors in parentheses; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Determinants Cross-Correlation Table

Variables	Immediate Need	Temporary Contract	Collective Agreement	Firms > 50 Employees	Firms 6 to 50 Employees	Firms < 6 Employees	Unemp. Tightness	V/U Ratio Tightness
Immediate Need	1.000							
Temporary Contract	0.039	.000						
Collective Agreement	-0.012	0.057	1.000					
Firms > 50 Employees	-0.046	0.139	0.189	1.000				
Firms 6 to 50 Employees	0.042	-0.072	-0.109	-0.764	1.000			
Firms < 6 Employees	0.003	-0.092	-0.108	-0.293	-0.393	1.000		
Unemp. Tightness	0.103	-0.006	0.015	0.012	-0.009	-0.004	1.000	
V/U Ratio Tightness	0.036	-0.029	0.019	0.026	-0.035	0.015	0.548	1.000