Abstract

In addition to individual-level characteristics there are a range of contextual factors that influence transition into entrepreneurship. One of these factors is the size of the parent company of the founder(s). Several empirical and recent studies establish a negative relationship between the size of the established firm an individual is employed in and the probability of entrepreneurship. However, a close reading of the literature (and the expected mechanisms at work related to bureaucracy) makes it obvious that it is not size per se that determines transition into entrepreneurship but rather the type of work organization that is associated with a particular size. This study contributes to the literature by investigating the effects of work organization on different measures of transition to entrepreneurship with a sample of large established organizations. In addition, the analysis combines survey data on work organization in large firms (derived through principle component analysis) with longitudinal matched employer-employee register data and investigates the different types of entrepreneurial transition for individuals forced with an occupational choice due to mass layoff. We find that work organization has a significant effect on several measures of transition with possible implications for the entrepreneurial eco-system.
Work Organization and Entrepreneurship

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In addition to individual-level characteristics there are a range of contextual factors that influence transition into entrepreneurship. One of these factors is the size of the parent company of the founder(s). Several empirical and recent studies establish a negative relationship between the size of the established firm an individual is employed in and the probability of entrepreneurship. However, a close reading of the literature (and the expected mechanisms at work related to bureaucracy) makes it obvious that it is not size per se that determines transition into entrepreneurship but rather the type of work organization that is associated with a particular size. This study contributes to the literature by investigating the effects of work organization on different measures of transition to entrepreneurship with a sample of large established organizations. In addition, the analysis combines survey data on work organization in large firms (derived through principle component analysis) with longitudinal matched employer-employee register data and investigates the different types of entrepreneurial transition for individuals forced with an occupational choice due to mass layoff. We find that work organization has a significant effect on several measures of transition with possible implications for the entrepreneurial eco-system.

1. Introduction
Within entrepreneurship research, there is a long-standing interest to understand which factors cause an individual to pursue a career as an entrepreneur. In addition to individual level characteristics, the previous work context, and in particular how work is structured, is argued to play a significant role both for transition into entrepreneurship as well as subsequent success of the new venture. The main argument is that some forms of work organization (e.g. with higher levels of autonomy and higher discretion of decision-making) enable an individual to run a new venture while others do not (e.g. more bureaucratic structures). Some recent studies have set themselves the task to investigate how the level of bureaucracy influences the probability that employees become entrepreneurs (e.g. Parker, 2009; Sørensen, 2007; Eriksson and Kuhn, 2006; Sorgner and Fritsch, 2017).
This literature argues that higher levels of bureaucracy is associated with lower levels of entrepreneurship as follows. First, employment in a more bureaucratic work environment results in higher specialization and low autonomy for the employees. This discourages new firm formation by: (i) decreasing work values in favor of entrepreneurship (Özcan and Reichstein, 2009; Sørensen and Fasiotto, 2011); (ii) limiting workers’ potential for acquiring the skills and abilities that are regarded as important for entrepreneurship (Sørensen and Fasiotto, 2011; Dobrev and Barnett, 2009); (iii) lowering the number of significant individuals for entrepreneurship in the social and professional network (Sørensen and Fasiotto, 2011; Parker, 2009); and (iv) creating an incentive structure that discourages transition into entrepreneurship (Özcan and Reichstein, 2009; Parker, 2009) and the ability to attract resources for setting up a new venture (Sørensen and Fasiotto, 2011; Sørensen and Philips, 2011). Following these arguments, empirical studies tend to find support for the negative relation between levels of bureaucracy and transition into entrepreneurship. For example, Sørensen (2004) and Özcan and Reichstein (2009) find that workers employed in large organizations and public institutions are less likely to enter into entrepreneurship. Parker (2009) finds support that workers in smaller, and arguably less bureaucratic organizations, are more likely to enter entrepreneurship. Despite finding support for their claims concerning bureaucracy, these studies tend to proxy the level of bureaucracy through size and industry.

However, even among these organizations, in particular large organizations, there is expected to be a high level of variation in how work is structured. Furthermore, assessing the causal effects of work organization on the transition into entrepreneurship comes with its fair share of selection issues as individuals with a given predisposition for entrepreneurship select into organizations with a particular type of work organization as well as the decision to remain employed contrary to transitioning into entrepreneurship. The research question we would like to address is then as follows: above and beyond size, how does the level of bureaucracy in an organization affect transition into entrepreneurship among employees? Thus, this study contributes to existing studies by exploring the effects of bureaucracy in a bounded sample of large firms with different types of work organization and worker autonomy. The analysis combines survey data with measures of work organization from 2006, with longitudinal matched employer-employee register data from Statistics Denmark. Our main sample consists of 17,239 individuals who have been part of mass layoffs and,
therefore, are exposed to a shock and forced with an occupational choice. Moreover, we restrict
the sample to individuals who have been employed for a minimum of three years (and therefore
also exposed to the given work environment in this time period) where survey data on work
organization is also available. One main indicator for work organization is created through principle
component analysis based on seven survey questions.

We introduce several measures of entrepreneurial behavior after layoff as dependent variables in
regression analyses to explore direct and indirect effects of work organization, where the former is
the establishment of a firm with a minimum amount of economic activity (determined by Statistics
Denmark) and the latter includes a preference for entrepreneurship revealed through occupational
choice, i.e. employment: (i) as top manager, (ii) in a new firm, (iii) in a small firm, and (iv) in an
industry with a high startup rate.

We find that individuals laid off from large established firms with more worker autonomy and
interdisciplinary work (i.e. less bureaucratic) are not only more likely to establish a new venture
following the mass employee turnover, they also are more likely to become a manager and continue
their employment in a smaller firms. Thus, less bureaucratic work processes in established firms
prepare workers for roles that can be considered as more entrepreneurial. Promoting such type of
work organization thus not only influence the performance of these firms, but also has positive
externalities by contributing to entrepreneurship and overall firm dynamics through increased
competition thereby having a positive effect on innovation, productivity and job creation. Future
qualitative research could pursue the magnitude of the four different mechanisms expected to drive
the findings, which are related to work values, skills and abilities, personal networks and incentive
structures.

2. Literature review on bureaucracy and entrepreneurship
In addition to individual level characteristics like traits, preferences, human capital and social capital,
a range of economic, political and socio-cultural environmental contexts (Nielsen, 2012; Sarasvathy,
2004; Shane, 2003) influence entrepreneurial transition according to the literature. One of these
contexts is the organization or firm where a given person is employed. Recent empirical studies have
mainly focused on how the size, age and the sector of a firm influence transition into entrepreneurship among employees.

2.1 Previous firm size/age and entrepreneurship
Parker (2009) and Eriksson and Kuhn (2006) both find a negative and significant relationship between firm size and transition into entrepreneurship for the employees based on register data from the UK and Denmark. Also based on Danish register data, Sørensen (2007) finds a negative relation between both firm size and age on the transition into entrepreneurship. Dobrev and Barnett (2005) further explores this relationship by allowing for different effects of organizational size and age on founders of an organization and members of the organization, respectively. They find that the transition into entrepreneurship increases and decreases with organization size and age for founders and members, respectively. While numerous empirical studies support a negative relationship between firm size and transition into entrepreneurship – see Eriksson and Kuhn (2006) and Sorgner and Fritsch (2017) for an overview of existing studies – only few explores how the size of the previous work place affects new venture performance and the success as an entrepreneur for those founding a firm. An exception is Sørensen and Philips (2011) who find that entrepreneurs from small firms have higher earnings and persist longer in the start-up.

2.2 Previous sector/industry and entrepreneurship
Özcan and Reichstein (2009) investigate how working in the public compared to the private sector influence the probability of transition into entrepreneurship in the future. They find that public sector employment initially increases the probability of pursuing an entrepreneurial career but the opposite is true for individuals with long tenure in the public sector. Sorgner and Fritsch (2017) also investigate the influence of the work environment on the transition into entrepreneurship and find that work in occupations with high unemployment risk, high earnings risk and high self-employment rates, respectively, are more likely to result in entrepreneurship. Numerous empirical studies focus on the importance of previous industry experience on new venture performance and, especially, how previous work experience as an employee in a given industry influence performance as an entrepreneur in that industry (i.e. industry spin-offs). Industry experience allows the worker to transfer knowledge from the parent firm (e.g. regarding work organization and routines (Feldman et al., 2009)), and use the prior industry knowledge in relation to opportunity recognition and
obtaining resources from professional network ties (Dahl and Sorenson, 2013). The vast majority of studies find superior performance of spin-off entrepreneurs (Dahl and Sorenson, 2013).

3. Work organization and transition into entrepreneurship
Larger and older firms – as well as firms in the public sector – are in the literature often portrayed as bureaucratic with a high degree of work specialization and centralization of decision making (Özcan and Reichstein, 2009; Sørensen, 2007; Dobrev and Barnett, 2005). This bureaucracy affects the transition to entrepreneurship through several mechanisms, which we divide into four main categories: (i) work values, (ii) skills and abilities, (iii) social and professional networks, and (iv) incentive structures. We elaborate on the four potential mechanisms below. The main problem, however, when assessing the causal effects of bureaucracy on the transition into entrepreneurship is the selection of certain individuals – with a given predisposition for entrepreneurship – into certain environments. Therefore, potential selection effects are also included below.

3.1 Work values
Work values and work characteristics are divided into two main categories in Kalleberg (1977). First, intrinsic work values/characteristics that are related to the specific work tasks (e.g. the work tasks are interesting, augment skills and abilities, entail responsibility and autonomy, and allow for visible results of the work). Second, extrinsic work values/characteristics are not related to the work tasks but cover the following dimensions: finance (e.g. high income, high job security), convenience (e.g. convenient working hours), career (e.g. good stepping-stone for the future career), and co-workers (e.g. good social work environment). Finally, one dimension covers the availability of resources at the work place to perform the work tasks satisfactorily. This dimension is in between the intrinsic and extrinsic dimension. Individuals motivated by intrinsic work values are often argued to be more likely to found a new venture since these individuals value e.g. autonomy and the specific work tasks higher than job security, convenience and co-workers (Özcan and Reichstein, 2009; Sørensen, 2007).

In the short run, Özcan and Reichstein (2009) find that a bureaucratic work environment increases the probability of startup since high specialisation of work tasks and low worker autonomy results in low satisfaction for intrinsically motivated employees based on the framework presented above. In the long run, however, bureaucracy is found to decrease the probability of startup (Özcan and
Reichstein, 2009) as the intrinsically motivated employees adjust their work values to the present work characteristics or change their attitudes and mental dispositions accordingly (Sørensen and Fasiotto, 2011; Sørensen, 2007). In addition, entrepreneurial skills and abilities also deteriorate over time, which is elaborated next.

3.2 Skills and abilities
Entrepreneurial skills also change since opportunity recognition and the ability to perform many different tasks (i.e. being a ‘jack-of-all-trades) are not a significant part of the daily work tasks in large and bureaucratic organizations (Sørensen and Fasiotto, 2011; Sørensen, 2007). The centralization of decision-making in this environment does not allow for individual discretion on how work tasks and problems are solved and thus does not stimulate the skill of opportunity recognition. In addition, specialization makes the worker an expert with few routinized functional roles (Sørensen and Fasiotto, 2011; Dobrev and Barnett, 2005), where the successful entrepreneur is able to perform very different work tasks like managing day-to-day problems related to e.g. sales, customers, suppliers, employees, accounting, finance, production, and service. Hence, individuals in (large) bureaucratic organizations are not exposed to entrepreneurial opportunities (Sørensen, 2007). In addition, bureaucracy and specialization of work tasks affects the personal networks of the individual, which influences the chance of successful entrepreneurship.

Previous research has also found that work organization characterised by a high level of autonomy, learning and interdisciplinarity is associated with increased creation of tacit knowledge, including skills, and an increased incidence of innovation (Arundel et al., 2007; Jensen et al., 2007).

3.3 Social and professional networks
Exposure to former entrepreneurs or entrepreneurial role models at the work place increases the likelihood of transiting into entrepreneurship (Sørensen and Fasiotto, 2011; Sørensen, 2007) but these entrepreneurial peers are less likely to choose a bureaucratic work environment. In addition, this work environment is more likely to isolate the worker from the (team of) founder-managers. Both due to the larger size of the firm and higher level of work specialization. In a small firm, where the workers are closer to entrepreneurial role models, the transmission of pro-entrepreneurial attitudes and skills is more prevalent (Sørensen and Fasiotto, 2011; Parker, 2009). Contact to entrepreneurial peers is important for founding a new venture that survives the critical first three
years due to motivation – through moral and professional support – and access to important resources like information, capital and labour (Aldrich and Zimmer, 1986) since the entrepreneur is often capital constrained (Parker and Praag, 2006; Van Praag et al., 2005).

In addition, ‘jack-of-all-trades’ workers in non-bureaucratic organizations also interact with more individuals in their job to obtain resources to solve daily work tasks. A bureaucratic work environment, however, does not stimulate these networking abilities – both inside and outside the firm – which result in a network of homogenous contacts (Dobrev and Barnett, 2005) and low exposure to external actors (Sørensen and Philips, 2011). The entrepreneurship literature emphasizes the importance of access to (heterogeneous) network ties and stakeholders for opportunity recognition and creation, and for attracting important resources for the new venture (Greve and Salaff, 2003; Sarasvathy, 2008).

3.4 Incentive structures
The incentive for transition into entrepreneurship is also influenced by the level of bureaucracy in an organization. A bureaucratic work place often relies on automatic advancement, fixed career trajectories, high routinization in work tasks and high job security compared to an adhocratic work place. This is emphasized by Özcan and Reichstein (2009) with the public sector as an example: “Individuals exhibiting good performance are rarely rewarded, and those displaying poor performance are rarely punished” (p.606). Hence, the incentive to leave this environment for an uncertain future as the founder of a startup is low, especially, for low performing individuals. Or put in another way, the opportunity cost of transition is high for these individuals (Sørensen and Fasiotto, 2001; Sørensen, 2007). Another way this has been presented in the literature is to argue that high performing workers in small young firms have a higher probability of transition into entrepreneurship due to ‘blocked mobility’ (Parker, 2009). Moreover, it is important to emphasize an alternative explanation that individuals in small firms are more likely to enter into entrepreneurship due to adverse working conditions (Parker, 2009), e.g. low pay and few fringe benefits due to the capital constraints of the entrepreneurs (Parker and Praag, 2006; Van Praag et al., 2005).

Another aspect to include when assessing the incentive to transition into entrepreneurship is the
ability to attract the necessary resources for founding a new venture, e.g. capital and labor. That is, how is the ‘reputational capital’ of the worker affected by the bureaucracy of the work place (Sørensen and Fasiotto, 2011; Sørensen and Philips, 2011). In previous sections it has been argued that entrepreneurial skills and abilities – including networking behavior – deteriorate in a bureaucratic work environment, which decreases ‘reputational capital’ in the presence of potential stakeholders of the new venture and make it hard to attract the necessary resources. However, this could be argued to be moderated or offset by the education of the founder (Bublitz et al., 2017) and previous startup experience (Nielsen and Sarasvathy, 2016).

3.5 Selection effects
The final mechanism that is important to account for in the empirical strategy, when assessing the causal effects of work environment on transition, is selection. That is, workers with a predisposition for entrepreneurship select into non-bureaucratic organizations. In the literature this predisposition is argued to be related to risk aversion, work values or even fixed personality traits and genes. Starting with the previously presented work values, Özcan and Reichstein (2009) argue that workers more motivated by job/pay security and convenience (extrinsic values) in contrast to autonomy (intrinsic values) are more likely to select into a bureaucratic work environment and less likely to found a new venture. Parker (2009) and Sørensen (2007) furthermore emphasize that risk averse individuals are more likely to select into a bureaucratic work environment and less likely to become an entrepreneur. Risk aversion is a common measure included in empirical studies investigating individuals factors affecting entrepreneurial behavior but the measure has been treated as: 1) an inborn personality trait (Cromie, 2000), 2) related to genetic factors influencing pleasure from risk-taking (Nicolaou et al., 2008), or 3) a preference (Parker, 2009) that can change over time or be dependent on the specific decision involving risk (e.g. work related or not).

In sum, bureaucracy (through the mechanisms mentioned above) could explain why numerous studies find a negative relationship between firm size/age and entrepreneurial exit. However, the effects of bureaucracy measured by work organization in a bounded sample of large and established organizations has to our knowledge never been explored, although, the expected mechanisms are the same. This is important to explore since: 1) a significant part of the work force are employed in large firms, and 2) there is large variation in the degree of work organization in large organizations.
both within a given country and between countries, 3) studies focusing on work organization in large firms only focus on the effects on the performance of the firms and not entrepreneurial exit. Both effects, however, contribute to the performance of the economy, where new firms are important in the firm dynamics due to increased competition.

We contribute to the literature by exploring the effects of work organization on the occupational choice of workers. In order to avoid the problem where workers from firms with a high degree of work autonomy do not exit for entrepreneurship because their work values are in accordance with their present work characteristics, we specifically focus on those workers who have been part of mass layoffs and, therefore, have been exposed to an involuntary shock. To measure transition into entrepreneurship we use different measures. First, we include a direct measure of entrepreneurial exit, i.e. new firm registration. Second, we explore indirect effects of work organization on the preference and skills for entrepreneurship by looking at whether the worker is subsequently employed: (i) as top manager; (ii) in a new firm; (iii) in a small firm, or (iv) in an industry where the startup rate is high. These choices are expected to increase the likelihood of later startup based on existing empirical studies and the mechanisms just explained.

4. Method

4.1 Data and Sample
To investigate how work organization affects the likelihood of transition into entrepreneurship we take a point of departure in the fourth questionnaire survey on organizations, employees and research and development strategies in Danish firms (DISKO4). This survey has similarities with the well-known community innovation survey but stands out on asking respondent firms on work organization characteristics, which we discuss in greater detail below. This survey was distributed to managers of a stratified sample of 4136 firms in the Danish economy with more than 20 employees in 2006, in this sample all firms with more than 100 employees were included. In total 1,775 firms responded giving us a response rate of 42.9 percent. We refer to these firms as DISKO firms.

An additional strength of DISKO4 is the possibility to link the survey with firm and individual level register data from Statistics Denmark. The universal character of this register data allows us to
identify all employees of our DISKO firms, while the longitudinal character places us in the position to follow their individual career trajectories. Subsequently, we are able to identify the career following their departure from a DISKO firm, including their association with a new established firm or pursuing a career as being self-employed.

In order to link work organization with transition into entrepreneurship we have to make some timing decisions on: 1) when and the duration a worker should be employed for at a DISKO firm; 2) the moment the worker leaves the DISKO firm; and 3) the period the worker should enter into entrepreneurship. Figure 1 illustrates the timing of the events we apply to link the type of work organization to transition into entrepreneurship. For a worker to be shaped by the work organization of the firm we require her to have some tenure in the job. Specifically, we only include workers that had their primary employment at a single DISKO firm for the three consecutive years 2005-2007; these workers are referred to as the DISKO workers. We identify a total of 193,180 DISKO workers distributed over 1,646 DISKO firms.

*Figure 1: research design*

![Figure 1: research design](image)

Following the identification of DISKO workers, we have to identify those workers who leave the DISKO firm to pursue another career. However, the decision to leave the workplace is riddled with selection issues, in particular with regards to the decision to become an entrepreneur. First, workplaces that are characterized with high autonomy, challenging and varying tasks, and continuous personal development are attractive workplaces for those who emphasis intrinsic
motivation, such as entrepreneurs. In addition, working at such a workplace is likely to facilitate the development of the diverse skills needed for entrepreneurship. However, since the workplace offers exactly these characteristics these employees are less likely to leave their job. Indeed, in an unreported mobility analysis, we can corroborate that turnover rates in these types of workplaces are lower.

Consequently, we need to identify an event that forces people to change jobs. Mass employee turnovers, which also include the closure of a firm or plant is such an event. We identify such shocks in the data as events at a DISKO firm where at least 30 people and at least 15 percent of the workforce exit their employment in the same calendar month. We look for such shocks among the DISKO firms in a 36-month period, from January 2008 to December 2010. We identify 271 mass employee turnover events across 188 DISKO firms. In total, these mass employee turnovers affect 17,239 of our DISKO workers.

Following the mass employee turnover event, we follow the career trajectory of the DISKO worker for three subsequent calendar years. More specifically, we identify whether a former DISKO worker is registered as self-employed or whether this worker is involved in a startup in any of these years. Identifying involvement in a startup, however, is not that straight-forward.

4.2 Transition into entrepreneurship
As a first step we select all new firm registrations, i.e. those firms with a registration number that does not precede the calendar year. Furthermore, these newly registered firms should not be linked to an establishment that existed in previous years. We also have to be cautious not to falsely include corporate spinoffs, or foreign firms entering the Danish market by acquiring an established firm. We do so by identifying labor mobility flow between firms, and if we observe a large flow of workers move from one firm to the newly registered legal entity, we do not consider this firm as a startup. After we identify these startups, we identify the individuals that are associated with these new ventures. A person is classified as an entrepreneurship when he or she: (i) is an owner or employer working at a startup with personal liability; (ii) holds a management position with a startup registered as limited liability company with three or more employees; or (iii) working at a startup
with limited liability and at most two other employees. The method is similar to that pursued in Nanda and Sørensen (2010), Sørensen (2007) and Nielsen and Sarasvathy (2016), and we consider all these forms as entry into entrepreneurship.

To contrast transition into entrepreneurship with other career trajectories, we also identify DISKO workers who have entered a management position and workers who find employment at a new firm. In both cases we exclude workers categorized as entrepreneurs in the previous step.

4.3 Work organization
When characterizing work organization at the DISKO firms we turn our attention to the DISKO4 survey; more specifically the questions concerning work organization. The original question and the response distribution is given in Table 1.

Table 1: frequency distribution from DISKO4

<table>
<thead>
<tr>
<th>2: Does the firm make use of some of the following ways of organizing the work?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Please, check with an X how many employees are included)</td>
<td>No/none</td>
</tr>
<tr>
<td>1. Planned job rotation</td>
<td>940</td>
</tr>
<tr>
<td>2. Autonomous groups</td>
<td>595</td>
</tr>
<tr>
<td>3. Systems for collecting proposals from employees</td>
<td>592</td>
</tr>
<tr>
<td>4. Quality circles/groups (Formal delegation of quality control)</td>
<td>658</td>
</tr>
<tr>
<td>5. Delegation of responsibility</td>
<td>87</td>
</tr>
<tr>
<td>6. Interdisciplinary workgroups</td>
<td>435</td>
</tr>
<tr>
<td>7. Integration of functions (e.g. sales, production)</td>
<td>490</td>
</tr>
</tbody>
</table>

The responses to the seven questions in Table 1 are highly correlated. We therefore use a principal components analysis to condense the information in the seven variables into a number of factors. Before doing so, we must take into account the missing and “Don’t know” responses. We handle
these with multiple imputation. There is full information for 1,566 DISKO firms, while 77 firms had one of the seven responses missing. Two or three responses are missing for 18 and 13 firms respectively. The remaining 101 firms are removed from the sample as we lack too much information to conduct a trust-worthy imputation.

For the remaining 1,674 firms we perform 25 imputations for the missing responses using an ordered logistic model taking the non-missing variables as predictors along with controls obtained from the registry data: industry, region and total full-time equivalent employment.

The seven work organization variables are then used in a principle components analysis, which is undertaken on the pooled dataset of 25 imputations. The original seven variables are coded 1 to 4 where 1 is “no/none” - the first response in table 1 - and 4 is “over 50%”. The eigenvalues of the first four factors are 2.87, 1.01, 0.77 and 0.75 respectively. Thus, the rule of thumb of retaining factors with eigenvalue greater than 1.0 entails retaining two factors. However, all seven original variables load positively on the first factor which thus captures the common positive relationship between all seven.

Using a rotated version of the two-factor solution does not result in an interpretable outcome. It would have been interesting to have separate factors for autonomy (variables 2, 3, 4 and 5 in Table 1) and interdisciplinarity (1, 6 and 7 in Table 1) but the data do not support this. We thus retain only the first factor and simply refer to it as “work organization”. Higher values of “work organization” entails that the worker experience more autonomy and interdisciplinary work when she was employed at the DISKO firm. Table 2 shows the correlations between “work organization” and the seven original variables. All correlations are significant at p<0.001 percent. The table also shows the distribution of the work organization variable. The skewness and kurtosis show that the distribution is not quite normal.

<table>
<thead>
<tr>
<th>Table 2: Factor loadings for work organization</th>
<th>Work organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Planned job rotation</td>
<td>0.404</td>
</tr>
<tr>
<td>2. Autonomous groups</td>
<td>0.601</td>
</tr>
</tbody>
</table>
3. Systems for collecting proposals from employees  0.626
4. Quality circles/groups (Formal delegation of quality control)  0.677
5. Delegation of responsibility  0.668
6. Interdisciplinary workgroups  0.752
7. Integration of functions (e.g. sales, production)  0.691

Mean  0.00
Standard deviation  1.00
Skewness  -0.09
Kurtosis  -0.70

4.4 Dependent variables
We use five dependent variables. The first three are the binary variables already described: “Entrepreneur” is 1 if the worker becomes an entrepreneur at any time in the three years following the layoff, cf. figure 1, and 0 otherwise. “Manager” is 1 if the worker becomes a manager (but not an entrepreneur) and “Job at new firm” is 1 if the worker finds a job at a new firm (but does not become an entrepreneur or manager). A worker is classified as a “manager” if she has an occupation code for manager or high-level wage earner. These models are all estimated using logistic regression.

The remaining two dependent variables are continuous. One is the size of the firm at which the worker finds her first job after leaving the DISKO firm, and the other is the industry startup rate of the firm at which the worker finds her first job after leaving the DISKO firm. The industry startup rate is the share of firms classified as new in the relevant year, cf. earlier. The two models are estimated using ordinary least squares.

In all five models we cluster errors at the level of the DISKO firm. Each regression is performed independently on the 25 imputed datasets and the combined result is presented.

4.5 Independent variables
In all five regressions we use the same set of explanatory variables. In addition to the variable for work organization at the DISKO firm the explanatory variables control for age, gender, ethnicity, education, industry and region. They all refer to the final year of employment at the DISKO firm.
Age is the age of the worker in years, and it enters both in linear and squared form. Male is 1 if the worker is registered as a male and 0 if the worker is registered as a woman. Danish is 1 if the worker is not registered as an immigrant or the descendent of an immigrant. The variable for the industry of the DISKO firm has three categories: (i) Manufacturing, (ii) Retail, wholesale, transportation, hotels and restaurants, and (iii) Other services. The variable for the education of the worker also has three categories: (i) at most secondary education, (ii) Vocational training, and (iii) Tertiary education. The variable for region of residence distinguishes between the five administrative regions of Denmark, which corresponds to the NUTS2 level. Finally, we add fixed effects for the year of the layoff from the DISKO firm. Table 3 shows the frequencies for the categorical dependent and independent variables while Table 4 shows the mean and standard deviation for the continuous dependent and independent variables.

**Table 3: Descriptive Statistics**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>68.81</td>
</tr>
<tr>
<td>Danish</td>
<td>90.87</td>
</tr>
<tr>
<td>Industry 1</td>
<td>54.22</td>
</tr>
<tr>
<td>Industry 2</td>
<td>16.62</td>
</tr>
<tr>
<td>Education 1</td>
<td>33.64</td>
</tr>
<tr>
<td>Education 2</td>
<td>48.17</td>
</tr>
<tr>
<td>Region 1</td>
<td>15.30</td>
</tr>
<tr>
<td>Region 2</td>
<td>20.99</td>
</tr>
<tr>
<td>Region 3</td>
<td>22.18</td>
</tr>
<tr>
<td>Region 4</td>
<td>26.08</td>
</tr>
<tr>
<td>Layoff year 2008</td>
<td>40.47</td>
</tr>
<tr>
<td>Layoff year 2009</td>
<td>20.25</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>1.11</td>
</tr>
<tr>
<td>Manager</td>
<td>22.14</td>
</tr>
<tr>
<td>Job at new firm</td>
<td>1.16</td>
</tr>
</tbody>
</table>
Table 3 shows that most workers in the sample are male and Danish. Almost half have vocational training (education2) and more than half worked in manufacturing (industry1) when they were employed at a DISKO firm. They are more or less evenly distributed regionally and the largest share were laid off in 2008, possibly related to the financial distress because of the financial crisis.

Only 1 percent of the workers become entrepreneurs, but another 22 percent become managers. An additional 1 percent find other jobs at new firms. Because the number of workers per DISKO firm varies the distribution of the work organization variable at the worker level differs from the distribution presented in table 2. In the data used in the regressions the mean is slightly negative and the standard deviation is slightly less than 1. The average worker is 45 years old when leaving the DISKO firm and finds a new job in a firm with, on average, 7 employees and in an industry where 6.62 percent of firms have been established within the same year.

Table 4: Descriptive Statistics

<table>
<thead>
<tr>
<th>Work organization</th>
<th>Age</th>
<th>Firm size</th>
<th>Industry startup rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-0.029</td>
<td>45.3</td>
<td>6.92</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>0.691</td>
<td>10.6</td>
<td>2.01</td>
</tr>
</tbody>
</table>

5. Results
Table 5 presents the regression results with five different dependent variables covering entrepreneurship or a preference for entrepreneurship through occupational choice. The dependent variable in Model 1 is realized startup after mass layoff. The factor coefficient for work organization is positive and highly significant (at 1% level) revealing that individuals laid off from firms with greater worker autonomy and interdisciplinary work (i.e. scoring high on “work organization”) are more likely to found a new venture in the immediate years after layoff compared to individuals from the opposite, more bureaucratic, types of firms. Turning to indirect effects of work organization on entrepreneurship, Model 2 complements this result by showing that individuals from firms scoring high on work organization also are more likely to be employed as managers in established firms (in contrast to lower-level wage earners) compared to individuals...
from firms scoring low on work organization. Again, the result is significant on 1 percent level. Surprisingly, the factor coefficient in Model 3 is negative and significant on 5 percent level, which indicates that individuals from firms with high worker autonomy and interdisciplinary work are less likely to be hired in startups compared to individuals from more bureaucratic firms. Model 4, however, does show that individuals from less bureaucratic firms (i.e. scoring high on the factor for work organization) are employed in significantly smaller firms (significant on 5 percent level) compared to individuals laid off from more bureaucratic firms. Finally, the factor coefficient in Model 5 is insignificant indicating that work organization does not influence the choice of industry based on the industry startup rate measure as the population of new firms divided by the total population of firms. That is, individuals from firms with high worker autonomy and interdisciplinary work are not more likely to select into ‘entrepreneurial’ industries after being laid off.

All regressions include control variables for individual characteristics (i.e. gender, age, foreign origin and education as well as environmental factors (i.e. industry, region and year of layoff dummies). In general, the control variables are highly significant, but the sign and magnitude of the coefficients are also highly dependent on the specific measure used as dependent variable (i.e. the different measures of entrepreneurship or preference for entrepreneurship).

Table 5: Regression results from logistic regression (Model 1-3) and OLS regression (Model 4-5).

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logit:</td>
<td>Logit:</td>
<td>Logit:</td>
<td>OLS:</td>
<td>OLS:</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>Manager</td>
<td>Job at new</td>
<td>First job:</td>
<td>First job:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>firm</td>
<td>Firm size</td>
<td>Ind. start-up rate</td>
</tr>
<tr>
<td>Work Organization</td>
<td>0.876***</td>
<td>0.315***</td>
<td>-0.241**</td>
<td>-0.335***</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.166</td>
<td>0.090</td>
<td>0.112</td>
<td>0.065</td>
</tr>
<tr>
<td>Age^2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.022</td>
<td>0.168***</td>
<td>-0.011</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>0.052</td>
<td>0.018</td>
<td>0.044</td>
<td>0.009</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.001</td>
<td>-0.002***</td>
<td>-0.001</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td>0.001</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>0.021</td>
<td>0.849***</td>
<td>0.236</td>
<td>0.181***</td>
</tr>
<tr>
<td></td>
<td>0.165</td>
<td>0.055</td>
<td>0.167</td>
<td>0.034</td>
</tr>
<tr>
<td>Region</td>
<td>Estimate</td>
<td>Std. Error</td>
<td>t value</td>
<td>p value</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Region1</td>
<td>-1.162***</td>
<td>-0.392***</td>
<td>0.060</td>
<td>-0.239***</td>
</tr>
<tr>
<td>Region2</td>
<td>-0.987***</td>
<td>0.079</td>
<td>0.374</td>
<td>-0.173***</td>
</tr>
<tr>
<td>Region3</td>
<td>-0.264</td>
<td>-0.429***</td>
<td>0.226</td>
<td>-0.051</td>
</tr>
<tr>
<td>Region4</td>
<td>-1.023***</td>
<td>0.476***</td>
<td>0.358</td>
<td>-0.142***</td>
</tr>
<tr>
<td>Region5</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N per imputation | 16135 | 16135 | 16135 | 14934 | 15002 |
Imputations | 25 | 25 | 25 | 25 | 25 |
Additional controls | Year of shock | Year of shock | Year of shock | Year of shock | Year of shock |

SE below estimate. ***: p<0.01, **: p<0.05, *: p<0.1. SE clustered at DISKO firm

6. Discussion

Our study contributes to the literature by complementing the bulk of research using firm size and age as a proxy for bureaucracy and work organization (e.g. Parker, 2009; Eriksson and Kuhn, 2006;
Sørensen, 2007; Dobrev and Barnett (2005)). A significant part of the work force is employed in large firms, and the effects of the specific work organization in these could be a crucial part of the entrepreneurial eco-system, although, these studies are absent in the existing literature. Indeed, we generally find that work organization has a significant impact on entrepreneurship.

Individuals from firms with high work autonomy and interdisciplinary work (i.e. from less bureaucratic firms) are found to be more likely to become entrepreneurs or have a preference for entrepreneurship due to selection into an occupation as manager or employment in a small firm. This can be explained by mechanisms related to how bureaucracy affects entrepreneurial work values (Özcan and Reichstein, 2009; Sørensen and Fasiotto, 2011), entrepreneurial skills and abilities (Sørensen and Fasiotto, 2011; Dobrev and Barnett, 2009), entrepreneurial role models and professional contacts in the social network (Sørensen and Fasiotto, 2011; Parker, 2009), and finally the incentive structure related to the opportunity cost of entrepreneurship (Özcan and Reichstein, 2009; Parker, 2009) and the ability to attract resources necessary for entrepreneurship (Sørensen and Fasiotto, 2011; Sørensen and Philips, 2011). The magnitude of these specific mechanisms could be explored further in more qualitative research.

In addition, the surprising results that laid off individuals from less bureaucratic firms are less likely to become employed in startups - compared to similar individuals from more bureaucratic firms - are worth exploring further. A possible explanation could be that capital constrained entrepreneurs (Parker and Praag, 2006; Van Praag et al., 2005) are forced to hire less attractive workers (Coad et al., 2017; Bhidé, 2000; Bublitz et al., 2017), which in this setting would be individuals from bureaucratic firms due to non-entrepreneurial work values as well as skills and abilities (Sørensen and Fasiotto, 2011).

Turning to the implications of the findings, our results indicate that work organization in large established firms are not only important for the performance of these firms but also for successful creation of new ventures that contributes positively to the economy through competition, which has a positive effect on productivity, innovation and job creation. Even if the laid of workers in our study only become self-employed with no employees and little economic activity, the situation is...
still preferable compared to unemployment. Moreover, self-employed are found to be more satisfied than employees (Hundley, 2001), even though, the average self-employed could earn more by being an employee (Hamilton, 2000). In addition, we also find that workers from organizations with more worker autonomy and interdisciplinary work are more likely to enter firms as managers, who acts as “entrepreneurs” in established firms (i.e. labelled “intrapreneurship” in the literature). These intrapreneurs that recognize new opportunities/initiatives/projects and attract the resources to follow these through are important for the future labor market if simple work tasks are expected to disappear in advanced economies in the future due to outsourcing or substitution of labor with machines.

The main limitation of this study is potential selection issues affecting the interpretation of findings as causal effects. That is, potential selection of specific individuals into specific firms based on (expectations about) work organization. E.g. individuals with a predisposition for entrepreneurship originating from work values (Özcan and Reichstein, 2009), risk-aversion (Parker, 2009), genes (Nicolaou et al., 2008) or other factors choose employment in less bureaucratic firms. Although we introduce individual level control variables in the analysis, the problem needs to be addressed through more appropriate empirical strategies like utilization of a quasi-experiment, statistical matching, or instrumental variable regression for interpretation of the results as causal effects of work organization. However, from the perspective of the entrepreneurial eco-system the selection issue is less severe. Either there is a causal effect where the work organization of local firms creates individuals well suited for entrepreneurship, or the work organization of the local firms attracts such people to the region and retains them. Either way work organization increases the number of potential entrepreneurs in the region.

In addition, robustness tests could be conducted with respect to the independent variables. Most importantly, alternative measures of work organization based on the survey questions and/or inclusion of additional components from the principle component analysis. Moreover, inclusion of more disaggregated control variables for industry, region and education. Finally, other related dependent variables could be included in future studies - like the time period as unemployed after layoff - as well as performance measures of the new firms (e.g. startup size, export in the first year,
survival and growth rates) or the performance as an employee (e.g. earnings trajectory or job promotion). Only few studies - Sørensen and Philips (2011) being an exception - investigates how the performance of new firms are influenced by the bureaucracy and work organization of the founder(s) previous work place.
References


