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Tournament in Workplace and Entrepreneurial Entry: The Interplay between Selection and Treatment Effects

Virgilio Failla
Munich School of Management
ISTO
v.failla@lmu.de

Francesca Melillo
KU LEUVEN
Managerial Economics, Strategy and Innovation (MSI)
francesca.melillo@kuleuven.be

Toke Reichstein
Copenhagen Business School
Innovation and Organizational Economics
tr.ino@cbs.dk

Abstract

This paper examines how the extent of tournament in workplaces affects employees? likelihood of transitioning to entrepreneurship. In line with prior research, we use wage dispersion as proxy for tournament in the parent firm. We argue that the effect of tournament on employees? propensity to engage in entrepreneurship depends on parent firms? size. Using a unique matched employer?employee longitudinal dataset from Denmark, we find that when tournament is high, employees in small firms are less inclined to become entrepreneurs while the opposite is observed for employees in large firms. We ascribe this finding to an interaction between a selection effect ? entrepreneurial minded individuals self-select in small firms ? and a treatment effect ?workplaces with high tournament discourage these particular individuals from becoming entrepreneurs, revealing an unobserved preference for competition. The findings document the importance of labor market sorting processes for our understanding of the relationship between tournament and entrepreneurship and have implications for firms aiming at retaining entrepreneurial minded employees.

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INTRODUCTION

Established firms are hotbeds of entrepreneurs (Freeman, 1983; Sorensen, 2007). Thus, it is not surprising that entrepreneurship scholars have substantially investigated the reasons behind employees' decision to become entrepreneurs (e.g. Lazear, 2005; Blanchflower and Oswald, 1998; Benz and Frey, 2008). The entrepreneurial choice has been modeled as a trade-off between expected utility from entrepreneurship – pecuniary and non-pecuniary benefits – and opportunity costs of leaving current job (Hamilton, 2000; Amit et al., 1995).

While prior literature has actively focused on the incentives that the entrepreneurial setting inherently offers, such as task variety (Astebro and Thompson, 2011), autonomy (Benz and Frey, 2008), and possibility to exploit unutilized knowledge (Hellmann and Perotti, 2011; Klepper and Thompson, 2010), little attention has been given to the other side of the entry coin – parent firm incentives. Conceptualizing firms as sources of incentives or opportunities that shapes the entrepreneurial choice represents a promising research direction (Sorensen and Fassiotto, 2011).

This article takes a step in filling this gap by empirically examining the association between extent of tournament in workplaces and employees' likelihood of becoming entrepreneurs. Tournament is a reward system based on rank-ordered performance rather than absolute performance (Lazear and Rosen, 1981; Connelly et al., 2014, for a review). Competition created by tournament is the force providing work incentives (Nalebuff and Stiglitz, 1983:21). Therefore, understanding the role of tournament on entrepreneurship is important because (1) it incorporates work incentives in the entrepreneurial choice, and (2) it may reveal an entrepreneurial unobserved preference, i.e. the attitude towards competition. Ultimately, it has practical implications for managerial strategies aiming at retaining entrepreneurial mindsets employees, i.e. those who are supposed to be the fuel of innovation within organizations.

In line with prior empirical studies on tournament theory, this article uses pay dispersion as proxy for the extent of tournament (Becker and Huselid, 1992; Messersmith et al., 2011). Building on recent evidence suggesting that wage dispersion is correlated with entrepreneurial transitions (Sorensen and Sharkey, 2014), we argue that the entrepreneurial response to tournament depends on labor market sorting processes of individuals into firms. Individuals self-select in firms whose organizational features match their preferences and abilities (Baron, 1984) and this, in turn, may influence their incentives to become entrepreneurs (Ozcan and Reichstein, 2010). Firm size is the main observable organizational dimension along which this sorting process does occur (Sorensen, 2007). Precisely, it is well documented that entrepreneurs are more likely to come from small firms (Parker, 2009) and empirical tests suggest that labor market sorting is a key underlying explanation (Elfenbein et al, 2010; Tåg, Åstebro and Thompson, 2013). Therefore, we use firm size as proxy for this selection effect.

Drawing on tournament-based arguments, we conjecture that newly hired employees of small firms are less likely to transition to entrepreneurship if the extent of tournament in the parent firm is high, because entrepreneurial individuals' taste for challenges may be well satisfied in such competitive settings. Vice versa, employees who select in larger parent firms are more likely to become entrepreneurs if the extent of tournament is high, because these individuals may be less inclined to engage in competition. Entrepreneurship, in this case, may represent an attractive working context where competition for promotion is absent. Moreover, in larger firms the link pay-performance is more loosely coupled compared to smaller firms due to higher monitoring costs (Zenger, 1992). As a result, introducing reward system based on high tournament in larger firms may lead to inequitable perceptions and may exacerbate social comparisons (Larkin et al.,

2012). Under these circumstances, incentives to entrepreneurship increase as this option ensures the tightest link between individuals' productivity and reward (entrepreneurial earnings).

Using a unique matched employer-employee dataset from Danish register data we test our theoretical arguments on a sample of 92,099 newly hired employees in 2003. We perform discrete time duration models and consider employees' episodes of turnover in the years 2004 to 2008. In contrast to prior studies, we focus on newly hired employees (i.e. movers) to make sure that all employees are at the same onset of risk of leaving current job. Time in the firm reveals information about the quality of employer-employee match (Jovanovic, 1979) which influences employees' perceptions about the probability of winning the tournament and, in turn, the probability of leaving. Hence, a focus on new hires mitigates the possibility that this effect counfound our estimates.

The results confirm that incorporating labor market sorting processes based on firm size is central to our understanding of the dynamics connecting tournament with entrepreneurship. In particular, we found that when tournament is high, employees in small firms are less inclined to become entrepreneurs while the opposite is observed for employees in large firms. We ascribe this finding to an interaction between a selection effect – entrepreneurial minded individuals exhibit a preference for working in small firms – and a treatment effect –workplaces with high tournament well match the competitive preference of these individuals. In sum, the empirical analysis reveals an unobserved preference for competition of entrepreneurial minded individuals and suggests that providing the right incentives discourage small firms employees from becoming entrepreneurs.

The remainder of the paper proceeds as follows: Section 2 develops the theoretical framework, Section 3 describes the data and method, Section 4 presents the results and a supplementary analysis, and Section 6 concludes.

THEORETICAL FRAMEWORK

One of the most common tool employers use to create incentives and thus lower monitoring costs is paying and promoting employees on the basis of relative performance rather than marginal productivity. This practice creates competition among employees and the firm becomes the context of a tournament. Therefore, we draw on tournament theory, first developed by Lazear and Rosen (1981) to build up our arguments. This theory models promotion as a relative game, in which grants are the reward for employees whose performance exceeds that of their peers (Lazear and Shaw, 2007). The two fundamental predictions of the theory are: (1) contestants' effort increases when the prize spread between the winner and loser increases, i.e. in our context the wage spread between workers' current position and what they would be earning at the next hierarchical level; (2) what incentivizes contestants is the differences between prizes (wages) rather than the absolute sizes of their winnings (Connelly et al., 2014). Substantial experimental evidence in different contexts supports this theory by showing that this compensation scheme provides strong incentives to outperform (Delfgaauw et al., 2013, Nalbantian and Schotter, 1997, Orrison et al., 2004).

The competition within a firm generated by relative performance pay systems may also have unintended consequences that are costly for the employer (Barron and Gjerde, 1997, Lazear, 1989). For example, feedbacks on performance may induce peers to engage in unethical activities to increase their chances of promotion (Carpenter et al., 2010, Charness et al., 2013). Tournament can also affect employees' turnover. Studies of social comparison processes suggest that individuals respond to perceptions of inequitable pay with the decision to leave the job (Larkin et al., 2012, Zenger, 1992). If turnover triggered by career tournament dynamics includes entrepreneurial workers this becomes of major concern for managers. Such individuals are

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acknowledged to be important drivers of change and innovation within firms (Freeman, 1986). If this is the case, a trade-off between incentives systems and retention policies emerges.

Yet, there are reasons to believe that entrepreneurial-minded workers might be attracted to tournament settings. In order to understand how tournament affects employees' incentives towards entrepreneurship, we consider labor market sorting processes in the parent firm. Individuals select in firms based on the expected match between their preferences and employers' characteristics (Baron, 1984). These predispositions may be correlated with propensity to engage in entrepreneurial activity (Ozcan and Reichstein, 2010). In particular, research has demonstrated that would-be entrepreneurs are more likely to select into small firms (Elfenbein et al., 2010; Sorensen, 2007) because they have a taste for variety (Astebro and Thompson, 2011) and small firms offer more diversified and less routinely job tasks compared to larger firms. Furthermore, small firms create a working context where employees have more freedom to operate and are less likely to be subjected to the decisions of authorities which well matches entrepreneurs' preference for autonomy (Benz and Frey, 2008; Hamilton, 2000). Given self-selection on firm size, tournament might trigger entrepreneurship differently in smaller firms compared to larger ones. Counterintuitively, we propose that when tournament is high, employees in small firms are less inclined to become entrepreneurs while the opposite is observed for employees in large firms.

Small firms are settings where the link pay per performance is tighter (Zenger, 1994) because the monitoring costs as well as the effort to differentially reward performance are lower compared to large firms (Nickerson and Zenger, 2008). Entrepreneurial individuals tend to favor these settings (Elfenbein et al., 2010). Using tournament based incentives in small firms may motivate entrepreneurial individuals to stay since the prize spread produces incentives in line with their taste for challenges, implying a preference for competitive contexts. Moreover, in small firms

wage spread better reflects the actual productivity of workers leading to perceptions of justice and of being even more rewarding then pay for performance. Considering that entrepreneurial individuals have been characterized as exhibiting above average employment turnover tendencies (Astebro and Thompson, 2011), this device may represent a powerful tool for small firms to retain these particular skills and traits. If small firms implement a weak tournament relative with a relatively flat remuneration structure, entrepreneurial individuals might be more likely to transition to entrepreneurship where individual performance may be better rewarded in case of success.

In contrasts, in larger firms wage spread is more loosely coupled to actual employees' performance. Due to the higher monitoring costs, it is difficult to directly assess employees' productivity. In this context, the large wage spread defined by tournament systems may have a demotivating effect on some employees because they perceive the overpaid of peers as unjust, unequal and may exacerbate social comparisons which can ultimately lead to turnover (Bloom and Michel, 2002). Moreover, when tournament is high, less entrepreneurial workers – employees of larger firms – may exhibit a distaste for competition. Indeed, employees in larger firms do not seek a tight link pay-performance (Elfenbein et al., 2010) and respond to increases in tournament with the perception of a lower likelihood of obtaining the promotion. The incentives to move to entrepreneurship relatively increases, compared to smaller firms with high tournament, because in self-employment competition for promotion is inherently absent and the main form of competition – competitors in the market – is moved outside the venture boundaries.

In conclusion, tournament has a differential impact on entrepreneurship depending on the competitive preferences of individuals. These theoretical mechanisms extend a previous recent work by Sorensen and Sharkey (2014) documenting a positive association between pay dispersion and entrepreneurial entry, by incorporating self-selection in the model and by adopting a

tournament perspective. Self-selection at the point of hire is a key neglected issue when inspecting the relation between firm attributes and entrepreneurship (Sorensen and Fassiotto, 2011).

DATA AND METHOD

Data and Sample Construction

We draw on the IDA database ("Integreret Database for Arbejdsmarketforskning") which is a matched employer-employee dataset covering the entire Danish labor market. The dataset is assembled and maintained by Statistics Denmark for the purpose of research and making informed policy recommendations. The dataset is longitudinal since it tracks the movements of individuals yearly across organizations. It has been utilized in numerous prior investigations on labor market dynamics (e.g. Dahl and Reichstein, 2007, Frederiksen, 2008, Kaiser and Malchow-Moller, 2011) and has proven useful for the purpose of investigating entrepreneurial venturing in particular (Dahl and Sorenson, 2012, Nanda and Sørensen, 2010, Sørensen, 2007). With this data, we track individuals' career movements, labor market movements, their characteristics, and the firms with which they are affiliated, and hence the firm-employee relationships over time.

The Danish labor market is characterized by a model of "flexicurity", which means that it is comparable to the US labor market in terms of flexibility (Sørensen, 2007). In addition, it is characterized by a high level of social support, which mitigates concerns about the potential effect of the phenomenon of necessity entrepreneurship on the analyses.

We draw on data from 1998 until 2008. However, we utilize the data from 1998 to 2002 as a foundation for computing working experience variables which represent important controls in the multivariate analysis. Accordingly, we have a window of six years for the duration analysis (2003-2008) to investigate the hazards of transitioning to entrepreneurship given individual and

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contextual (parent-firm) characteristics. The initial sample consists of individuals employed in the year 2002 with information about their past employment history in the years 1998 to 2002. The total number of wage employees in 2003 for which it is possible to track firm-affiliation in the previous five years (1998 to 2002) amounts to 1,342,855, with 18,589 first transitions to entrepreneurship and 831,046 movements to wage employment by 2008.

We couple the IDA data with the official register on newly founded firms, which contains information on all newly registered firms in Denmark and an identifier for the founder. This register provides a link between firm identifiers and founder identifiers that is identical to the identifiers present in the labor market data and business register data. These data are used to identify entrepreneurs.

In order to attenuate potential left censoring bias, we follow the literature in only capturing first transitions to entrepreneurship and exclude serial entrepreneurs (defined as individuals who started a new firm between 1998 and 2002). Serial entrepreneurs may exhibit significantly different labor market movements than other individuals (Baron and Ensley, 2006, Hyytinen and Ilmakunnas, 2007). Furthermore, in order to discard individuals unlikely to be wage employees but rather business owners as of 2002, two groups of individuals are further excluded from the sample, namely workers whose occupation code supplied by Statistics Denmark corresponds to "self-employed" and workers affiliated to a firm with one employee in 2002. Moreover, industries such as the primary sector (agriculture, extractive industries, and electricity and water services) are excluded, as well as the public sector, because entrepreneurial activities follow particular dynamics in these sectors (see for instance Ozcan and Reichstein, 2009). For these reasons, the sample size drops to 640,511 individuals, with 12,677 transitions to entrepreneurship and 317,160 moves to new wage employment over the observation time window.

Finally, it is important to highlight that in contrast to prior studies on wage dispersion and entrepreneurship, we strictly focus on individuals that were newly hired in 2002 to ensure that individuals are at the same onset of risk and hence are homogeneously followed from the point in time in which they are first at risk of leaving their parent firm. We thereby assume that no individual is at risk of leaving a job before they in fact have started working in the new position. This may be a strong assumption since some individuals may choose to venture into a job only temporarily. However, we believe this to represent the exception rather than the rule and hence only a source of limited bias at worst. The final sample consists of workers newly hired in the year 2002 who exhibit the same onset of risk to transition to self-employment. The final number of individuals amounts to 92,099 (with 59,745 transitions to a new employer and 1,806 transitions to entrepreneurship).

Variables

Dependent Variable

The dependent variable accounts for first-time transitions to self-employment. It takes the value 1 if the first movement out of the parent firm is for an individual identified through the new business register as the founder of a new firm in the years 2003 to 2008. Entrepreneurship is hence defined as the establishment of a new firm. We also acknowledge that wage earners may have other outside options than entrepreneurship. For this reason, we also consider a dependent variable, which takes on four different values: 0 for staying in current wage employment (198,549 individual-years), 1 for moving into entrepreneurship (1,806 individual-years), 2 for moving into new wage employment (59,745 individual-years), and 3 other moves (14,644 individual-years). The last transition (i.e. dependent variable equals 3) captures individuals who are not affiliated with a firm in that specific year. These are predominantly transitions to

unemployment. Overall, alternative wage employment (i.e. dependent variable equal 2) is by far the dominant destination for movers out of an employment setting.

Independent Variables

Extant literature suggests that workers self-select in workplaces (Elfenbein, Hamilton and Zenger, 2010; Ozcan and Reichstein, 2011). Accordingly, individuals working in different contexts have selected their occupation based on unobservable characteristics, such as preference for an entrepreneurial context. In order to operationalize the construct discussed previously, firms are organized in three size groups, following Elfenbein et al. (2010): Small firms, for firms with up to 25 employees, Medium firms, for firms with between 26 and 100 employees, and Large firms, for firms with more than 100 employees. The structure of the Danish economy is mainly based on small and medium businesses, so although the group of Large firms includes a smaller number of firms, it also encompasses higher variation in terms of size compared to the other two groups. The distribution of firms in the three groups is summarized in table 3. Models report only estimations for the Small and Medium firms since Large firms is set as the baseline.

The firm's compensation dispersion relative to competitors is captured by the Relative Gini coefficient. This approach follows Bloom and Michael (2002) and Carnahan et al. (2012) who study the link between pay dispersion and turnover. The Gini coefficient can assume values included in the interval 0 and 1: absolute equality corresponds to a 0, while a Gini coefficient of 1 measures absolute inequality. It is calculated as follows:

$$G = \frac{2\sum_{i=1}^{n} i * Wage_i}{n \sum_{i=1}^{n} Wage_i} - \frac{n+1}{n} \qquad (1)$$

where $wage_i$ is the wage for the ith individual ranked within the firm at position i on the basis of the wage earnings and n is the number of employees in the firm. This Gini coefficient is then divided by the average for firms active in the same industry, defined by the two-digit NACE code. This level of industry definition is optimal since a narrower distinction might result in capturing too few firms or even industries with a single firm. Relative Gini represents therefore the Gini coefficient for each firm relative to its competitors (Carnahan et al., 2012).

Controls

We tracked the job histories of the subjects backwards in time until 1998 and counted their number of different affiliations. Number of firms is hence the count of the various firm affiliations for each individual in the period covering 1998 to 2002. If the focal individual is employed in firm "A" in 1998, and then moves to firm "B" in 2000 and further to firm "C" in 2001, the variable will assume value 3. Therefore, this variable will assume a maximum of 5 (and since all the individuals are new hires in 2002, the minimum number of firms affiliations in the period 1998 to 2002 will be 2).

We control for whether the individual is female by drawing on the IDA data, which contains a gender variable. Prior contributions suggest a substantial gender bias in terms of transition into entrepreneurship (Koellinger et al., 2011, Langowitz and Minniti, 2007).

In addition, the following individual controls have been included in the analysis. Married, which takes value 1 if the civil status classification provided by Statistics Denmark relative to the focal individual is married as of 2002. Children is a dummy taking value 1 for individuals with at least one child in 2002. The education attainment for the subjects in the sample is measured by the dummy Education, which equals 1 for individuals who completed at least a bachelor program in 2002. Furthermore, Wage experience measures the experience in the labor market for each of the

subjects in the final sample. This variable accounts for labor market tenure and covers the whole period in which an individual has been in the labor force until 2002. It enters the estimation at standardized values. Similarly, Wage experience squared is the squared term of the wage experience variable, which accounts for a (potential) non-linear effect of labor market experience on the dependent variable. Wage earnings represents the wage earnings of each individual in 2002 (it is a value expressed in 2002 Danish Kroner). Lastly, unemployment is a dummy that describes whether individuals experience a spell of unemployment. It takes value 1 if the length of the registered unemployed period exceeds half of the year 2002 and 0 otherwise. Moreover, in order to capture industry trends, two-digit NACE codes industry dummies are included in the analysis (a total of 36 dummies), together with year dummies that account for year-specific trends.

Methodology

The analysis of the association between tournament structures and workers' tendency to transition to entrepreneurship poses an empirical challenge. When performing an analysis of the turnover of workers it is particularly important to include workers who present the same hazard of transitioning to a new job. In other words, the sample considered should consist of individuals at the same onset of risk of performing the transition. This condition is however not met if the analysis includes all the workers in a firm in a specific moment: workers' turnover rates are a function of the match that workers experience with their employer, which occurs over time (Jovanovic, 1979, Nagypal, 2007). By focusing on new hires we can eliminate from the results some – if not most – of the confounding effects of turnover, thereby observing what is truly closer to our proposed mechanisms. Although we do not have the benefit of random assignment

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of workers in a firm or a natural experiment in our study, our identification strategy allows us to alleviate concerns of spurious correlation driving our results.

For the analysis, we use a duration specification to investigate the effect of career competition on entrepreneurial tendencies. We thereby predict the individuals' tendency to transition to entrepreneurship given the contextual setting. Given that such transitions might happen at any point in time during the year, and because the data capture this event on a yearly interval only, we adopt discrete time hazard models in order to be able to account for this feature of the data. One way to implement such discrete time hazard models would be through logistic regression. However, this model would present a notable drawback since it would make it impossible to distinguish between transition to entrepreneurship from the 2002 employment and subsequent transitions to entrepreneurship from other parent firms. In other words, it would be impossible to distinguish between the following two cases: 1) a transition to entrepreneurship directly out of the wage employment as of 2002; and 2) a transition to entrepreneurship subsequent to a move to different wage employment compared to 2002. This would make it problematic to capture the effect of the contextual effects since these indicate the setting to which the subject was affiliated in 2002. Instead, we use a multinomial logistic regression specification, which enables us to distinguish the first transitions from the parent firm at the beginning of the sample. The careful coding of the dependent variable makes a multinomial logistic model apt to account for the first of the transitions out of wage work in 2002: either to entrepreneurship (outcome 1) or to new wage employment (outcome 2), whereas the baseline model is stability in the same occupation. Accordingly, the estimations presented in the tables are the result of multinomial logistic models.

Since we are using a duration specification for the analysis, we also include year dummies. These capture the average variation in transition tendencies across years. They can be considered time fixed effects since all observed subjects are at risk at the same time – namely, 2002.

RESULTS

Descriptive Statistics

Table 1 presents the summary statistics and the correlation matrix. Individuals in the sample have on average been in 2.64 different firms in the years 1998 to 2002. About 37% of the sample consists of females. Moreover, individuals in the sample have an average age of 38.3 years and have been in the labor market for about 16 years.[1] Table 2 shows the same summary statistics by splitting the sample between individuals working in 2002 in the three groups of firms: small, medium and large.

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                Insert Table 1, 2, and 3 about here
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It can be noted that the proportion of entrepreneurs in the group of workers in small firms is higher compared to larger organizations; this fact aligns with the stylized fact that small firms spawn a larger number of entrepreneurs as shown in previous studies as a by-product of selection based on preferences and ability (e.g. Elfenbein et al., 2010). Moreover, a job history of high mobility occurs more frequently for individuals working in small firms, who are on average affiliated with 2.68 firms in the pre-sampling period (1998-2002). This number decreases for

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[1] Age is not present in the models and in the correlation table since it is highly collinear with wage experience (pairwise correlation coefficient of around 0.8). Summary statistics report the standardized value of wage experience.

employees in medium firms, who have 2.64 firm affiliations on average, and declines even more for employees in larger firms: 2.55. T-tests confirm that these differences are statistically significant at the 5% level. Another interesting comparison regards the average wage earnings of workers in small firms compared to those of larger firms. Individuals in medium and large firms have a higher salary on average relative to workers in small firms (unreported t-tests also suggest that these differences are statistically significant at 5%).

Multivariate Analysis

Table 4 reports the estimates of discrete time event history models estimated using multinomial logistic regression. Two model specifications are presented: the first in columns 1 to 3 and the second, including the interaction terms, in columns 3 to 6. The columns represent each of the predicted outcomes, derived from the structure of the dependent variable: transition to entrepreneurship (columns 1 and 4), transition to wage employment (columns 2 and 5), and other transitions (columns 3 and 6). For the two models the baseline outcome (which is omitted) is the persistence of individuals in the firm, i.e. no transition taking place. All the specifications include industry controls defined by two-digit NACE codes (which consist of 36 industry dummies), providing a fine-grained control for the various industry trends. The table also displays robust standard errors.

Insert Table 4 about here

Column 1 of table 4 contains the estimates for the main term, Relative Gini, on the first outcome, i.e. transition to entrepreneurship. The effect of Relative Gini does not seem to contribute to explaining the transition to entrepreneurship for new hires. The coefficient of -0.032 is not significant, with a standard error of 0.059. The effect of Relative Gini, however, contributes to the turnover of individuals to other wage employment (the coefficient is positive and significant at the

5% level in column 2). This result is in line with Tag, Astebro, and Thompson (2013) and in contrast with Sorensen and Sharkey (2014) who do not specifically focus on new hires.

Columns 3, 4, and 5 in table 4 include interaction terms between Relative Gini and the two other dummies Small firm and Medium firm. The coefficients for the interaction term between Relative Gini and the Small firm dummy are negative and statistically significant at 5%. This provides evidence suggesting that career tournament is associated with a lower hazard of transition to entrepreneurship. In other words, for the group of small firm workers, the higher the tournament taking place in the firm, the lower the likelihood of a transition to entrepreneurship: this evidence supports the notion that in highly entrepreneurial environments i.e. in small firms, higher tournament is desired by workers who have a preference for entrepreneurship, and the hazard of leaving such firms with higher Relative Gini to start a new venture is lower. This result supports the notion proposed that higher turnover decreases the hazard of transition to self-employment for individuals working in small firms.

This negative effect on the transition to entrepreneurship is, however, not observed in medium-sized firms, as the interaction between Relative Gini and the Medium firm dummy is positive and statistically significant at 5%. For larger firms, the result confirms previous studies that found a positive association between Relative Gini and the transition to entrepreneurship (Sørensen and Sharkey, 2014). Higher tournament in medium-sized and large firms has the effect of pushing individuals towards entrepreneurship, while for workers in small firms, an increased Relative Gini does not trigger transitions to entrepreneurship.

In general, the coefficient for Small Firms (negative, with p-value <0.001) gives support for the notion highlighted in previous studies that large parent firms are home to a lower number of entrepreneurial individuals, and that entrepreneurial rates in smaller firms are higher (Elfenbein,

Hamilton and Zenger, 2010). The coefficient of Medium firm supports the idea that the difference for transitions to wage employment relative to the baseline category Large firm is not dramatic (the coefficient in column 2 has a p-value larger than 0.05). Moreover, there does not seem to be a difference when considering transitions to entrepreneurship as shown in column 4 (the p-value is larger than 0.1 which speaks against a systematic difference between medium and large firms). The coefficient for Female is negative for the outcome 1, transition to entrepreneurship, and for outcome 2, transition to other wage employment (and remains so in all columns of table 4 except for the "other" turnover episodes). This result is aligned to prior studies that document how entrepreneurial activities are more frequent among males compared to females (Frederiksen, 2008, Koellinger, Minniti and Schade, 2011, Langowitz and Minniti, 2007).

Similarly to what is already suggested from the summary statistics in tables 1 and 2, column 1 of table 4 also confirms that a higher number of firm affiliations is associated with higher probability of becoming an entrepreneur (the coefficient for Number of firms is positive, with p-value <0.001). This result supports the idea that frequent job-hopping is associated with higher chances of starting up a new firm, as previously found in similar studies (Astebro and Thompson, 2011, Silva, 2007, Wagner, 2006). Furthermore, the relationship between transition to entrepreneurship and work tenure is negative (the coefficient of Wage experience is negative and significant at the 99% level), which confirms the notion that individuals with longer work experience have a lower propensity to switch jobs (as for instance reported by Frederiksen, 2008).

As discussed in the method section, the analysis of table 4 is restricted to the individuals newly hired in 2002, in order to consider the group of individuals at the same onset of risk of leaving their current employment. Focusing on newly hired individuals makes it easier to isolate the incentives to entrepreneurship more precisely than in the case of extending the analysis to the

whole workforce. In the Appendix, Table 1 reports the results obtained by not restricting the analysis to new hires and instead considering all the workers. It is important to note that the main effect of Relative Gini becomes positive and significant, a finding in line with Sorensen and Sharkey (2014) using the same data. This evidence suggests that tenure in the firm reveal information regarding the perceived probability of winning the promotion. When the odds are low, entrepreneurship becomes a relative more attractive career option[2]. Failing to control for this effect overestimates the probability of transitioning to entrepreneurship.

Supplementary Analysis

In order to further investigate the associations between the variables presented, we have plotted the marginal effect of the coefficient for the probability of a transition to entrepreneurship at the various levels of Relative Gini, for the three groups of firm size.

Insert Figure 1 about here

Figure 1 displays the marginal effect of Relative Gini on the probability of transition to entrepreneurship for the various levels of Relative Gini. The solid line corresponds to Small firm, the dashed line to Medium firm, and the dotted line represents Large firm. The effect of an increase in Relative Gini on the probability of transition to entrepreneurship is positive for Medium firm and increases with higher levels of Relative Gini.

What is observed for small firms is however in net contrast. The transitions from small firms towards entrepreneurship decrease as Relative Gini increases. This supports the proposed

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[2] Note that while our argument builds on tournament theory, based on probability of winning the tournament and on the notion that when approaching the top of the hierarchy the competitive incentives decreases, Sorensen and Sharkey (2014) build up on job matching theory to explain why tenured employees, conditional on moving, are more likely to opt for entrepreneurship.

mechanism taking place in small firms, where more entrepreneurially oriented individuals will be less likely to find an entrepreneurial career alternative outside a small firm that operates the tournament. For the category Large firm, there does not seem to be a sizeable effect of Relative Gini on the probability of transitioning to entrepreneurship. The dotted line appears to be flat, supporting the idea that in large firms workers do not show a strong interest in and preference for entrepreneurship (as for instance shown by Ozcan and Reichstein, 2009, Sørensen, 2007). For workers in large firms (those a priori less likely to transition to entrepreneurship), it seems that the tournament dynamics within the organization measured by Relative Gini are not able to trigger entrepreneurship as much as in Medium firms, where the effect is the largest.

Insert Figure 2 about here

Figure 2 instead displays the marginal effect of Relative Gini on the probability of transition to wage employment. It shows that along this dimension, individuals working in large firms differ substantially from those in the other two groups, Medium firm and Small firm. Individuals in small and medium firms present a stable and similar pattern of transition to wage employment for the various levels of Relative Gini. For large firms, a low level of Relative Gini corresponds to a negative likelihood of transition to wage employment, supporting the idea that employees in this kind of organization do not have a preference for high wage dispersion and tournament within the organization. For higher values of Relative Gini, however, the transition rate from large firms increases and is substantially higher than in smaller firms.

Insert Figure 3 about here

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Figure 3 reports the contrasted margin of two categories at a time, relative to the third one, which is omitted as the baseline. In the first panel of figure 3 the categories reported are Small firm (represented by the solid line) and Medium firm (represented by the dashed line), relative to Large firm (the third category, which is omitted). The first panel shows that for lower levels of Relative Gini workers in small firms have a higher probability of moving to entrepreneurship, and that this effect is different from medium firms' employees. For larger values of Relative Gini the transition to entrepreneurship declines while on the contrary, the share of transitions to entrepreneurship rises for workers in medium firms. Furthermore, panel 1 of figure 1 shows that small firms do not seem noticeably different from the other categories in terms of transitions to entrepreneurship for high values of Relative Gini. In contrast, medium firms present an opposite pattern, very similar to that of large firms for low values of Relative Gini (the confidence interval for the dashed line includes the zero, meaning that the difference with the omitted category is zero), while the confidence interval does not include zero for higher values of Relative Gini. Panels 2 and 3 report the marginal effects of Relative Gini on the probability of a transition to entrepreneurship, taking as the baseline medium firms (panel 2) and small firms (panel 3), respectively. From panel 2 it can be noted that the effect of Relative Gini is different for small and large firms compared to medium firms, but does not appear to be substantially different for the higher values of Relative Gini. Lastly, panel 3 of figure 1 shows how both for large and medium firms there seems to be a similar effect of Relative Gini on the transition to entrepreneurship (relative to small firms) but at higher values of Relative Gini the effect for employees of medium firms is substantially positive relative to small firms and at the same time different than for large firms.

Insert Figure 4 about here

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Finally, figure 4 displays the effect of Relative Gini on the transition to other wage employment. Similarly to figure 2, the three panels have a different baseline: Large firm for panel 1, Medium firm for panel 2, and Small firm for panel 3. The graphs show that the effect of Relative Gini on the transition to other wage employment is essentially the same for small firms and medium firms. For the category Large firm, a low value of Relative Gini corresponds to a negative likelihood of movement to wage employment, but gradually the likelihood of transition to new wage employment increases with Relative Gini.

DISCUSSION AND CONCLUSIONS

The results of this study provide support for our main claim that an association between tournament structures and employees' likelihood of becoming entrepreneurs can be ascribed to the interaction between individual characteristics (selection effect on firm size) and employer characteristics (treatment effect of tournament). The selection effect concerns the evidence that small firms attract individuals that exhibit preferences in line with entrepreneurship. The treatment effect concerns our evidence that tournament represents a device that allows small firms to retain their entrepreneurial individuals. Vice versa, implementing tournament-based compensation systems in medium-sized firms will increase employee's probability of transitioning to entrepreneurship. Last, transitions to entrepreneurship out of large firms do not appear to be very sensitive to changes in the degree of tournament, an effect which can be ascribed to the low propensity of these workers to choose a priori an entrepreneurial setting (Ozcan and Reichstein, 2009; Sorensen, 2007). In sum, when wage dispersion increases workers of small firms will be less likely to leave for entrepreneurship, while workers in medium firms will respond to such a change with an increased propensity to start their own firm.

These findings are based on a sample of employees at the same onset of risk of transitioning to a new job, by restricting the analysis to all new hires. It is important to consider individuals who – at least theoretically – present the same risk of transitioning to a new job or to entrepreneurship because it minimizes the possibility that revealed information on the probability of being promoted introduces a confounding effect.

Our findings have some limitations. First, because we do not have a way to allocate individuals to firms randomly or a natural experiment that might provide the necessary exogenous variation, we cannot completely rule out the possibility that our results are biased due to potential omitted variables. This can be the case if there are unobservable firm characteristics that drive both entrepreneurship and tournament in the firm. Nevertheless, it is worth mentioning that the tournament measure here employed is relative to parent firms' direct competitors in the industry.

Second, we rely on the observed selection in contextual settings as proxied by firm size rather than the true unobserved working context preferences. This measure is imperfect as there are numerous reasons why people may select into contexts that are different from the one that they in fact would prefer. Moreover, other observable organizational dimensions might be relevant too. We do, however, believe that firm size is a rather easily observable characteristic and a relatively valid signal of the type of working context an individual should expect at the point of hire. Also, it is the only dimension where entrepreneurship scholars have provided empirical evidence of labor market sorting. For this reason, we believe the measure is suitable despite its intrinsic limitations.

Our study is closely related to recent research on entrepreneurship. Although individuals may certainly have predispositions, the episodic nature of entrepreneurship makes stable attributes an unlikely explanation for people's decision to become entrepreneurs (Carroll and Mosakowski, 1987). By providing insights into how tournament can be regarded as a treatment that influences

employees' choice to become entrepreneurs, we contribute to the call by Sorensen and Fassiotto (2011) for conceptualizing parent firms as a source of incentives and opportunities. Moreover, our study adds to the literature that attempts at characterizing the entrepreneurial preferences (Astebro and Thompson, 2011; Benz and Frey, 2008), by suggesting that entrepreneurial minded individuals exhibit a preference for competition (Gneezy and Rustichini, 2004). In addition, our evidence that small firms exhibit lower levels of wage dispersion may suggest that the small firm effect might also be explained by lack of tournament-based incentives. Last, we incorporate individuals' labor market sorting processes at the point of hire by using firm size. This is an important contribution to prior empirical literature in line with Sorensen and Fassiotto (2011: 1330)'s claim that ignoring selection at the point of hire may lead to spurious correlations.

Our paper also contributes to the tournament literature, in particular to the stream on the unintended consequences of tournament as incentive device, such as turnover (Bloom and Michel, 2002) and sabotage (Carpenter, Matthews and Schirm, 2010, Charness, Masclet and Villeval, 2013). We add to this literature by documenting the consequence of tournament for turnover to entrepreneurship. This is a critical issue considering the role that entrepreneurial minded employees play in a firm's innovation activity. Hence, our study ultimately direct managers' attention towards designing optimal retention policies for these individuals by explicitly incorporating employer size.

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Table 1. Correlation Matrix and Summary Statistics

		Mean	S.D.	Min	Max	(1)	(2)	(3)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Entrepreneur	0.008	0.089	0	1	1										
(2)	Relative Gini	0.982	0.421	0	3.791	-0.013	1									
(3)	Number of Firms	2.612	0.784	2	5	0.022	0.025	1	1							
(4)	Female	0.371	0.483	0	1	-0.031	0.102	-0.044	-0.044	1						
(5)	Married	0.521	0.5	0	1	-0.002	-0.046	-0.157	-0.157	0.008	1					
(6)	Children	0.88	0.325	0	1	0.011	-0.03	-0.034	-0.034	-0.02	0.222	1				
(7)	Education	0.02	0.14	0	1	-0.002	0.064	0.052	0.052	0.052	-0.066	-0.034	1			
(8)	Wage Experience	-0.236	0.899	-1.835	2.128	-0.022	-0.083	-0.261	-0.261	-0.115	0.354	0.077	-0.149	1		
(9)	Wage Experience, sq.	0.864	0.859	0	4.527	-0.01	0.078	0.101	0.101	-0.002	-0.143	-0.121	0.165	-0.063	1	
(10)	Wage Earnings	2.85E+05	1.69E+05	0	1.19E+07	0.032	-0.036	-0.104	-0.104	-0.253	0.149	0.067	-0.047	0.211	-0.123	1
(11)	Unemployed	0.015	0.122	0	1	0	0.04	0.029	0.029	0.032	-0.018	-0.016	-0.008	-0.025	0.013	-0.146

Note. Number of observations: 247,744. Correlations higher than 0.008 in absolute value are significant at 5% level

Table 2. Summary statistics for size firm, with differences among the three groups.

	Small Firms	Medium Firms	Large Firms	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)
	(1)	(2)	(3)	(4)	(5)	(6)
Entrepreneur	0.012	0.008	0.005	***	***	***
Relative Gini	0.831	0.980	1.069	***	***	***
Number of Firms	2.685	2.64	2.557	***	***	***
Female	0.334	0.345	0.404	***	***	***
Married	0.511	0.530	0.522	***	***	***
Children	0.888	0.887	0.872	-	***	***
Education	0.018	0.018	0.022	-	***	***
Wage Experience	-0.267	-0.216	-0.227	***	***	-
Wage Experience, sq.	0.849	0.843	0.882	-	***	***
Wage Earnings	2.67E+05	2.90E+05	2.94E+05	***	***	***
Unemployed	0.022	0.014	0.012	***	***	***

Note. Columns 4 to 6 report significance for t-tests and chi2 tests for the differences between the groups. *** denotes significance at 0.001%.

Table 3. Distribution of firms and observations by firm size

	Small Firms	Medium Firms	Large Firms	Total
	70.36%	21.84%	7.81%	100%
N. of Firms	17,394	5,399	1,930	24,723
	28.56%	21.66%	49.78%	100%
N. of Observations	26,302	19,950	45,847	92,099

Table 4. Multinomial Logit on Transition to new occupational state

Variables	Transition to entrepreneurship (1)	Transition to Wage employment (2)	Other Transitions (3)	Transition to entrepreneurship (4)	Transition to Wage employment (5)	Other Transitions (6)
Relative Gini	-0.032	0.196***	0.180***	0.545**	0.720***	0.536***
	(0.059)	(0.012)	(0.022)	(0.176)	(0.029)	(0.054)
Small Firm	0.804***	0.071***	0.147***	1.540***	0.722***	0.589***
	(0.064)	(0.013)	(0.024)	(0.195)	(0.035)	(0.066)
Medium Firm	0.171*	-0.012	0.037	0.149	0.611***	0.430***
	(0.076)	(0.014)	(0.025)	(0.239)	(0.044)	(0.080)
Relative Gini *Small Firm				-0.777***	-0.649***	-0.441***
				(0.188)	(0.033)	(0.060)
Relative Gini *Medium Firm				0.041	-0.603***	-0.380***
				(0.222)	(0.041)	(0.073)
Female	-0.782***	-0.124***	0.059**	-0.796***	-0.128***	0.057**
	(0.066)	(0.011)	(0.021)	(0.065)	(0.011)	(0.021)
Number of Firms	0.219***	0.248***	0.179***	0.216***	0.246***	0.178***
	(0.031)	(0.007)	(0.012)	(0.031)	(0.007)	(0.012)
Parent firm Size	-0.000+	-0.000***	-0.000*	-0.000*	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.130*	-0.107***	-0.058**	0.132*	-0.105***	-0.057**
	(0.053)	(0.011)	(0.020)	(0.053)	(0.011)	(0.020)
Children	0.403***	0.059***	-0.125***	0.404***	0.059***	-0.126***
	(0.093)	(0.015)	(0.026)	(0.093)	(0.015)	(0.026)
Education	-0.362	0.052	0.022	-0.393+	0.028	0.008
	(0.225)	(0.037)	(0.060)	(0.225)	(0.037)	(0.060)
Wage Experience	-0.473***	-0.196***	0.104***	-0.464***	-0.191***	0.107***
	(0.036)	(0.006)	(0.011)	(0.036)	(0.006)	(0.011)
Wage Experience, sq.	-0.187***	-0.010+	0.289***	-0.195***	-0.013*	0.287***
	(0.037)	(0.006)	(0.010)	(0.037)	(0.006)	(0.010)
Wage Earnings	0.000***	-0.000***	-0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployed	0.328	0.191***	0.621***	0.317	0.195***	0.626***
	(0.228)	(0.046)	(0.058)	(0.228)	(0.046)	(0.058)
Constant	-6.219***	-1.792***	-2.056***	-6.731***	-2.278***	-2.393***
	(0.223)	(0.041)	(0.087)	(0.273)	(0.048)	(0.101)
Industry Dummies		Yes			Yes	
Year Dummies		Yes			Yes	
Observations		274,738			274,738	
Pseudo R2		0.049			0.050	
Chi2		25822.977			25694.733	
Prob> Chi2		0.000			0.000	
Log likelihood		-197473.605			-197244.167	

Note. Unreported tests show that the coefficients of Relative Gini and its interaction with Small Firm in column 4 are different. Robust standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

FIGURES

Figure 1. Effects of Relative Gini on Transition to Entrepreneurship

Predictive Margins of size with 95% CIs

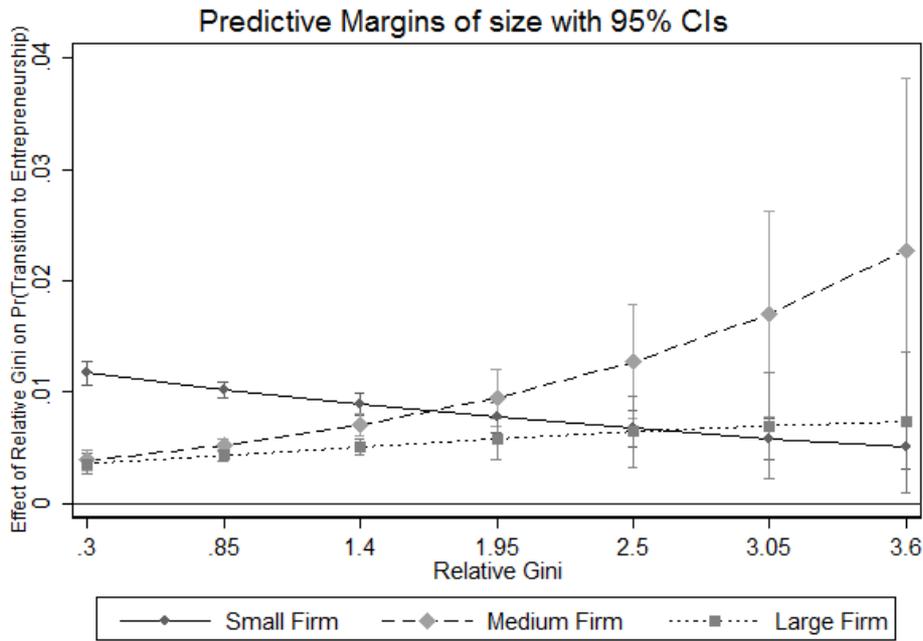**Figure 2. Effects of Relative Gini on Transition to Wage Employment**
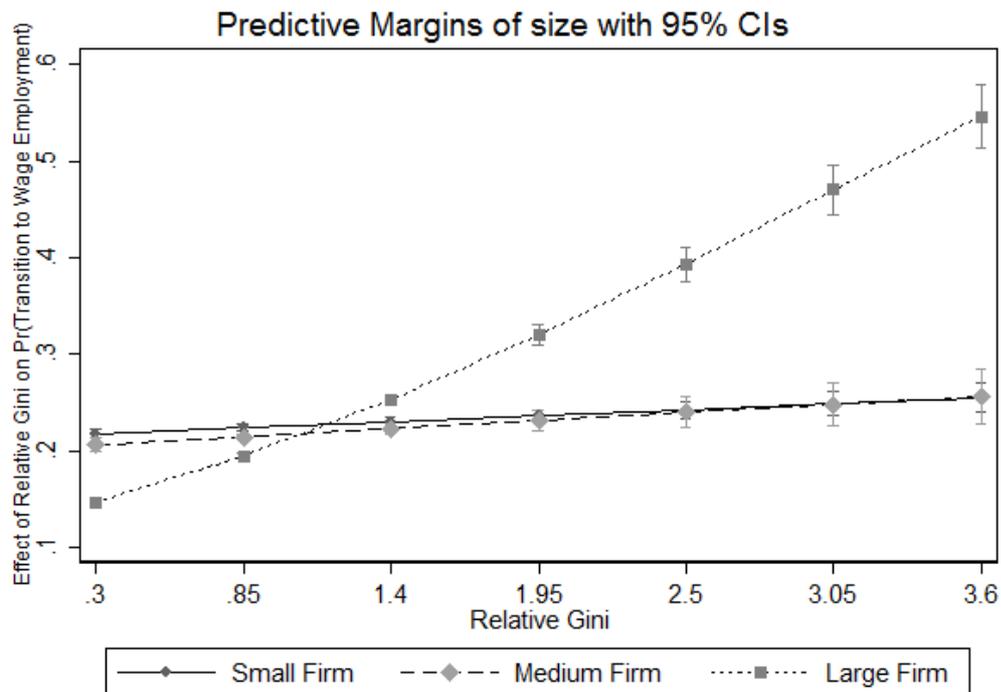

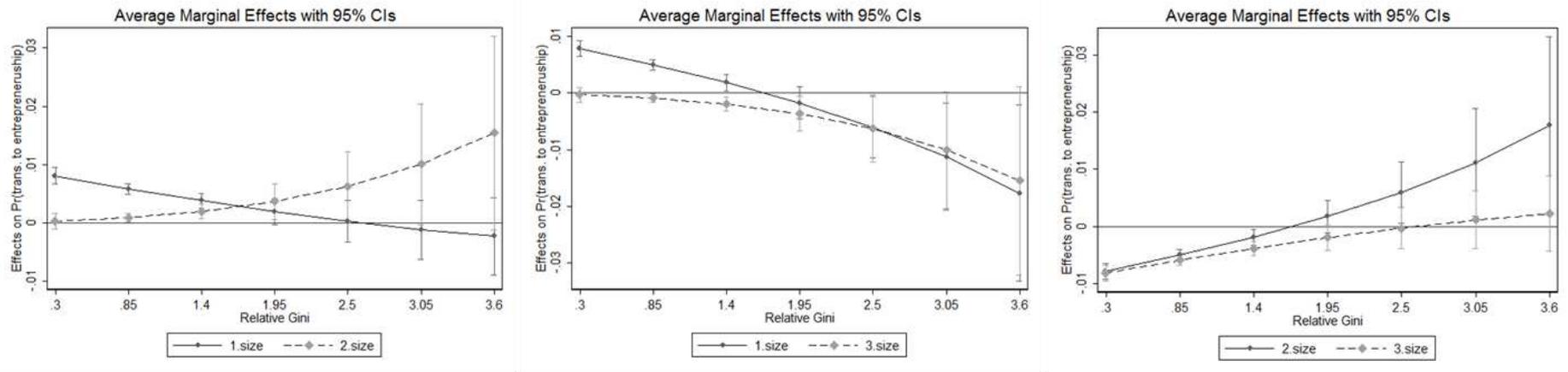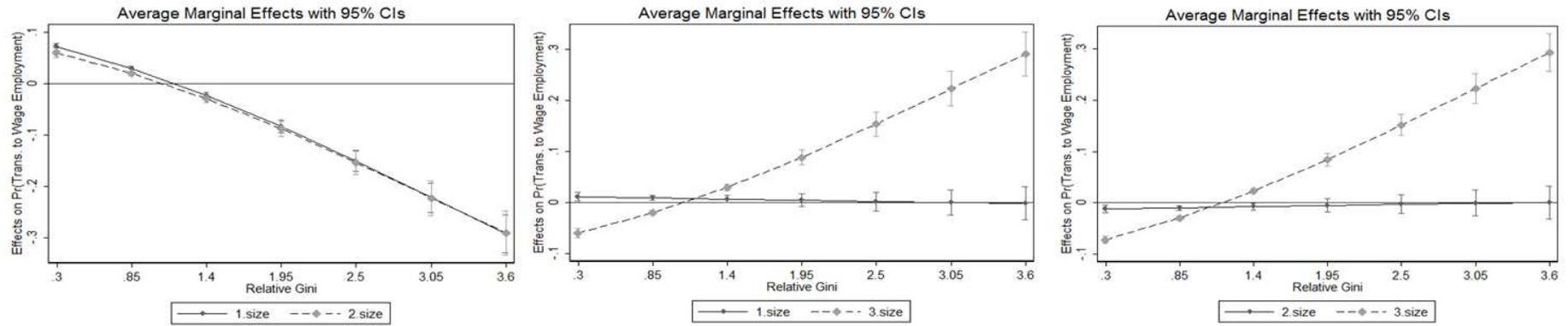Predictive Margins of size with 95% CIs

Figure 3. Marginal Effects on the Probability of Transitioning to Entrepreneurship for the three Size Groups

Note Panel 1: Small vs. Medium firms; Panel 2: Small vs. Large firms; Panel 3: Medium vs. Small firms.

Figure 4. Marginal Effects on the Probability of Transitioning to Wage Employment for the three Size Groups

Note Panel 1: Small vs. Medium firms; Panel 2: Small vs. Large firms; Panel 3: Medium vs. Small firms.

APPENDIX A

Table A1. Multinomial Logit on Transition to New Occupational State for all Employees

Variables	Transition to Entrepreneurship (1)	Transition to Wage Employment (2)	Other Transitions (3)
Relative Gini	0.496***	0.125***	0.189***
	(0.073)	(0.013)	(0.021)
Small Firm	1.368***	-0.075***	0.107***
	(0.082)	(0.015)	(0.025)
Medium Firm	0.637***	-0.029	-0.051
	(0.098)	(0.019)	(0.031)
Relative Gini*Small Firm	-0.449***	0.012	-0.045*
	(0.076)	(0.014)	(0.023)
Relative Gini*Medium Firm	-0.302**	-0.012	0.050+
	(0.093)	(0.018)	(0.030)
Tenure	0.014	-0.082***	-0.000
	(0.011)	(0.002)	(0.004)
Female	-0.840***	-0.106***	0.189***
	(0.025)	(0.005)	(0.008)
Number of Firms	0.007	-0.077***	0.001
	(0.011)	(0.002)	(0.004)
Parent firm Size	-0.838***	-0.106***	0.189***
	(0.025)	(0.005)	(0.008)
Married	0.270***	0.281***	0.178***
	(0.021)	(0.005)	(0.009)
Children	-0.000***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)
Education	0.080***	-0.066***	0.021**
	(0.020)	(0.004)	(0.007)
Wage Experience	0.483***	0.088***	-0.130***
	(0.036)	(0.006)	(0.010)
Wage Experience, sq.	0.012	0.055***	-0.030
	(0.079)	(0.017)	(0.028)
Wage Earnings	-0.382***	-0.198***	0.083***
	(0.012)	(0.003)	(0.004)
Unemployed	-0.124***	0.001	0.421***
	(0.013)	(0.002)	(0.003)
Constant	-7.306***	-2.025***	-2.585***
	(0.129)	(0.024)	(0.044)
Industry Dummies		Yes	
Year Dummies		Yes	
Observations		2,448,992	
Pseudo R2		0.048	
Chi2		131447.525	
Prob> Chi2		0.000	
Log likelihood		-1380087.263	

Note. Unreported tests show that the coefficients of Relative Gini and its interaction with Small Firm are not different.
Robust standard errors in parentheses, *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$