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Two's Company: Composition, Structure and Performance of Entrepreneurial Pairs

Alex Coad[1] and Bram Timmermans[2]
[1]SPRU, University of Sussex, UK;
IKE/EOB Aalborg University, Denmark;
RATIO Institute, Stockholm, Sweden
[2]IKE/EOB Aalborg University, Denmark;
Danish Center for Entrepreneurship Research;
Agder Research, Norway

We explore the effects of diverse team composition on the survival and growth of new ventures using the Danish Linked Employer-Employee database. To get cleaner measures of diverse team composition, we focus on entrepreneurial dyads, and also investigate the asymmetric hierarchical effects of team composition by distinguishing between the 'primary' and the 'secondary' member. We complement existing work by showing that heterogeneity in team composition is moderated by the asymmetric hierarchical structure within the team, and that a unidimensional diversity indicator (which is usually applied) fails to capture a number of performance effects of heterogeneous team composition. Pairs of younger individuals have lower survival chances but higher employment growth. Pairs led by a male tend toward 'jobless growth' in the sense that they have higher growth of profits and sales but not employment. Family firms have lower employment growth, especially when formed with one's mother.

Keywords: diversity; structure; new venture teams; survival; growth; team composition

Introduction

From the late 1980s onwards, we have observed a gradual shift from treating entrepreneurship as an act of one lone individual toward entrepreneurship as a collective activity (Cooney, 2005; Harper, 2008).[1] Consequently, researchers within the field of entrepreneurship started to investigate the composition of these teams (e.g., Ruef *et al*., 2003). In close relation to identifying this composition, there is also an interest in investigating whether composition affects the performance of these teams, which varies from member entry and exit to growth and survival, and, if so, the nature of this relationship. Studies have focused on various compositional measures of teams; for example, industry experience (Delmar and Shane, 2006), entrepreneurial experience (Ucbasaran *et al*., 2003; Delmar and Shane, 2006), and prior affiliations of team members (Beckman *et al*., 2007). Inspired by the upper echelon theories on diversity in top management teams (Hambrick and Mason, 1984), there has been an increased focus on diversity in entrepreneurial teams arguing that the heterogeneity of these teams affects how they work together, which ultimately will affect their performance (Gartner, 1985; Roure and Maidique, 1986; Ensley *et al*., 1998). Indeed, Ensley *et al*. (2002: 381) argue that 'the richest and most interesting studies of TMTs are likely to involve new ventures'.

Not surprisingly, and in accordance with studies on top management teams, the impact of diversity is inconclusive as existing research has not provided clear answers whether, how and why team diversity positively or negatively affects the performance of start-ups (Klotz *et al*., 2014). This can be attributed to: (i) the assumption that the same level of diversity might have a different impact on various performance indicators, namely, diversity might be good for firm growth but bad for firm survival; (ii) the empirical strategy of studies to investigate teams of different sizes, thereby introducing another level of complexity, making it even more difficult to estimate the impact of diversity on performance; (iii) the standard approach which investigates team composition using an overall (scalar) diversity measure may be too reductionist and thus miss out certain features relating diversity to performance; and (iv) hierarchical

Correspondence: Alex Coad, SPRU, University of Sussex, Jubilee Building 379, Brighton, UK. Email: A.Coad@sussex.ac.uk

[1]Decades earlier, researchers already started to promote the notion of entrepreneurial teams but the work of Kamm *et al*. (1990) and Gartner *et al*. (1994) called for a more systemic approach in studying the performance of entrepreneurial teams (Ruef, 2010).

asymmetries may moderate the effect of diverse resources on new venture team (NVT) performance. However, we argue that even though two teams have a similar demographic and human capital composition, the structure of the team, that is, the distinction regarding which individual has which type of characteristic, will have a moderating effect on the team's performance. For example, we regard a scenario where an engineer invites a person with a business administration background to differ from a scenario where an individual with a business administration background invites an engineer. This distinction is not captured by existing diversity measures, so we believe it to be a worthwhile avenue of investigation.

This paper will address these above-mentioned points by focusing on a subset of entrepreneurial teams – dyads. This approach will provide us with cleaner measures of heterogeneous team composition and structure, and a focus on dyads is a theoretically meaningful way of analyzing these teams (Harper, 2008). In addition, it is one of the most common forms of entrepreneurial team size (Ruef *et al*., 2003). Many studies on entrepreneurial teams report average sizes between two and three members (Eisenhardt and Schoonhoven, 1990; Ucbasaran *et al*., 2003; Chowdhury, 2005; Clarysse *et al*., 2007) indicating the bulk of the distribution is represented by two-person teams.

For the empirical analyses, we use the Danish Integrated Database for Labor Market Research (IDA) to identify these dyads. This database provides detailed information on the demographic characteristics of individuals, for example, age, gender, education, and the dynamics of organizations, birth, growth and exit of firms, which allows us to analyze the relations that exist between the demographic characteristic of the entrepreneurial team and new venture performance. The structure, which indicates the hierarchy and the order of the various human capital and demographic characteristics, is determined by the position of the individuals in the firm where a higher ranked individual, based on ownership and occupation code, is considered to be the *primus motor* of the start-up. We select a sample of 3,777 entrepreneurial dyads in the Danish private sector in the period 1999–2003 and follow these start-ups for a period of five years after founding.

We contribute to the literature in a number of ways. We investigate the effect of diversity on performance using a rich dataset that contains details on a number of variables including educational background and family ties. While much previous work on diversity and performance has focused on small samples,[2] we provide, as suggested by Vanaelst *et al*. (2006), representative large-sample evidence using detailed administrative data. We investigate the performance of new businesses in terms of both survival and employment growth. While previous work has grouped together ventures of different ages, we observe new ventures from their first year of business (as indicated by their date of official registration). In response to calls for diversity research to focus more on dynamic effects (Horwitz and Horwitz, 2007), we exploit our longitudinal data to consider lagged effects of diversity (that is, the effects of heterogeneous combinations of start-up and pre-start-up characteristics on five-year performance). We apply a novel empirical methodology – using dummy variables as coordinates in a two-dimensional Euclidean disparity space – to explore some of the suspected shortcomings of standard parametric indicators of diversity. Furthermore, we contribute to the literature by moving on from assuming that hierarchical relations are symmetric between team members – we distinguish between the primary and secondary new venture team member, and investigate which characteristics matter for each of the two members. Finally, we want to create more awareness that the existing summary measures on diversity may not be appropriate in all situations, and that team structure (in particular, hierarchical asymmetries) might be an important moderating factor.

The analysis indicates that, when focusing on entrepreneurial pairs, asymmetries in our results provide support for the moderating role of hierarchical structure on how composition affects performance. Consequently, we can argue that there is indeed a difference in performance depending on the hierarchical structure of this diversity. With regards to education, the best performing firms are not composed of similar individuals. Ventures with a science technology, engineering and mathematics (STEM)-educated primary member, that is, a member with a science, technology, engineering or math degree, and a business-educated secondary member enjoy relatively high employment growth, while interestingly enough the opposite combination (business first, STEM second) has low employment growth. Pairs of younger individuals have lower survival chances but higher employment growth. Performance of mixed-race ventures depends upon the identity of the primary member. Family firms have equal survival chances but lower employment growth – consistent with suggestions that they persist for an unnecessarily long period of time.

The remainder of the paper is structured as follows. We review the related literature in following section and formulate some propositions. Our methodology is

[2]A recent review by (Klotz *et al*., 2014, Table 1) on 42 new venture team studies, which included a very diverse set of (mainly high tech) industries in several countries with venture teams of different sizes and ages, include 45 different samples with an average sample size of 158, median sample size of 120, and 90th percentile sample size of 410. By these standards, our sample is unusually large.

described in the third section. We present our data in the fourth section. The fifth section contains our analysis, where we begin with non-parametric representations of team composition and performance before moving on to parametric regressions. The sixth section contains a synthetic discussion of our findings and revisits our propositions. The seventh section concludes.

Background

Related literature

Issues on team diversity are not a new phenomenon; on the contrary, a survey of the literature indicates that there exists a long tradition in linking the diverse composition of teams with their performance (see, e.g., Williams and O'Reilly, 1998; Horwitz, 2005 for a literature review). However, a closer inspection of these studies reveals that the interest is traditionally based on teams in larger organizational settings, for example, top management and product development teams (Bantel and Jackson, 1989; Murray, 1989; Ancona and Caldwell, 1992; Pelled, 1996; Dahlin *et al*., 2005). More recently, studies that investigate the diverse composition of entrepreneurial teams have emerged and an increase in the number of such studies is visible. This steady increase runs parallel with the increased focus on entrepreneurial teams in general (Cooney, 2005; Harper, 2008).

Studies that investigate the composition of entrepreneurial teams (e.g., Baron *et al*., 1999; Ruef *et al*., 2003; Steffens *et al*., 2011; Kaiser and Müller, 2012) show that entrepreneurial teams are mainly characterized by homophily, at least regarding gender, ethnicity and occupation (more visible characteristics), while we can observe more heterogeneity in terms of functionality and status.[3] The homophily in these teams can be explained by the social selection mechanism behind recruitment that is often driven by interpersonal attraction (Forbes *et al*., 2006); not only because these teams rely on social networks (Aldrich and Langton, 1998; Aldrich and Ruef, 2006), which are homogeneous (McPherson *et al*., 2001), but also based on the other recruitment channels. The underlying rationale is that interpersonal attraction based on the demographic attributes will cause less (personal) trouble in start-ups (Beckman *et al*., 2007); consequently, the limited resources will be used to deal with the liability issues that start-ups face.

In contrast to these perspectives on the importance of homophily, there are studies that stress the positive impact of diversity on performance as a result of the unique set of skills, abilities and knowledge that are brought into the team (Cox and Blake, 1991; Hambrick *et al*., 1996; Williams and O'Reilly, 1998; Horwitz, 2005). This line of argument is similar to other approaches within management theory, in particular the resource-based view of the firm, which argues that a heterogeneous resource composition, including human resources, determines a firm's competitive advantage (Barney, 1991). Within the upper echelon studies on top management teams, which have their origin in Hambrick and Mason (1984), it is widely accepted that it is important that these teams collectively possess the skills that are necessary to run a successful business (Beckman *et al*., 2007). Many studies on entrepreneurial teams share this perspective, as the superior performance of these teams compared to solo entrepreneurs is believed to be driven by the access to various forms of human capital and the presence of different perspectives (Kamm *et al*., 1990; Eisenhardt and Schoonhoven, 1990; Watson *et al*., 1995).

The above-mentioned theoretical approaches provide sound but contradictory arguments on the potential effect of team diversity on team performance. It is therefore not surprising that empirical studies have found both positive, negative and non-significant effects of diversity in entrepreneurial teams. This inconsistency is illustrated by the selection of studies on diversity in entrepreneurial teams and the impact on various performance indicators in Table 1. The conflicting results found in previous work on small samples motivates our interest in a large-scale analysis. Another, rather unexplored perspective on why there is so much ambiguity of diversity in entrepreneurial teams might be because of the reductionist indicators of diversity usually used in studies of team diversity. In the remainder of this paper we will address this issue empirically by investigating how a diverse composition in a particular subset of entrepreneurial teams – dyads – affects new venture performance.

In doing so, we also address another issue that is under-investigated in studies on diversity in entrepreneurial teams, which is the moderating role of hierarchical asymmetries on the effects of diversity on performance. The discussion on the impact of hierarchy in (top management) teams on the performance of venture, e.g. the power of the CEO and strategic decision-making, emerged simultaneously with the interest in diversity of teams (see, e.g. Hambrick, 1981; Finkelstein, 1992; Greve and Mitsuhashi, 2007). The discussion on structure in entrepreneurial teams is scarce, and when it is discussed it is often on power structures in teams and the departure of members and entrepreneurial team members (e.g., Boeker and Karichalil, 2002; Forbes *et al*., 2006). Admittedly, entrepreneurial teams, due to their small size, are characterized as having a flat organizational structure with no

[3]The same also holds for other organizational units that rely on voluntary participation (McPherson *et al*., 2001).

Table 1 Studies on entrepreneurial teams and diversity

Study	*Dependent Variable*	*Teams*	*Age*	*Gender*	*Education*	*Experience*	*Functional Background*	*Skill Composition*
Amason *et al*. (2006)	Sales growth (LN/HN)†	174	ns (–/+)		ns (ns/–)		ns (ns/–)	
	Profitability (LN/HN)†		ns (ns/–)		ns (ns/–)		ns (ns/–)	
	Market Performance (LN/HN)†		ns (ns/–)		ns (ns/–)		ns (ns/–)	
Beckman (2006)	Exploration strategy	170						+
	Exploitation strategy							ns
	Speed to market							ns
	Firm growth							+
Beckman *et al*. (2007)	Ability to attract VC	161						+
	Succeed an IPO							+
Chandler *et al*. (2004)	Entry of team members	124		ns	+	+	+	
	Exit of team members			ns	ns	+	ns	
Chowdhury (2005)	Team effectiveness	79	ns	ns			ns	
Clarysse *et al*. (2007)	Team member addition	140					ns	
Eisenhardt and Schoonhoven (1990)	Organizational growth	92				+		
Ensley *et al*. (1998)	Sales growth	88						–
	Profitability							ns
	Revenues							–
Foo *et al*. (2005)	External evaluation of ideas	154	–	ns	+			
Steffens *et al*. (2011)	Short term performance	202	ns	ns				
	Long run performance		+	ns				
Ucbasaran *et al*. (2003)	Entry of team members	92					ns	
	Exit of team members						ns	
Vanaelst *et al*. (2006)	Team development‡	10			(.)			(.)
Watson *et al*. (2003)	Profit	175			ns	ns		
	Growth				ns	ns		

We only report the most common demographic and human capital dependent variables. Other measures used but not included in the table are diversity in religious and political background, and various constructs, e.g.: conflict, task related diversity, non-task related diversity etc.
†LN = low novelty, HN = high novelty.
‡case study.

formalized hierarchy. However, this does not mean that hierarchical structure is not present. Despite the difficulties of measuring hierarchical relations, we believe it may well play a moderating role, and is therefore worth pursuing. This is supported in the works of Timmons and Spinelli (1994) and Ensley *et al*. (2000) who mention that 'teams almost always have lead entrepreneurs who clarify the firm's vision and craft the dream and strategy for the rest of the team to follow' (Ensley *et al*., 2000: 60). As mentioned by Ensley *et al*. (2006), this individual is regarded as a source of inspiration and the driving force behind NVT performance (Baum *et al*., 1998), promoting opportunity thinking (MacGrath, 2000), and goal setting amongst other members (MacGrath, 2000). By considering structure, we also follow a recently-proposed NVT input-mediators-outcome framework (Klotz *et al*., 2014), where the outcome of a compositional construct is mediated by the hierarchical structure of the team.

Development of propositions

The previous literature has generally formulated hypotheses in terms of how diversity in one particular dimension (e.g., age, education, prior professional affiliations) affects the performance of the firm. Of central interest to our study, human-capital-related diversity attempts to capture diversity of knowledge, expertise, skills and abilities. Previous studies have linked human capital diversity with effective team performance, as these different perspectives lead to a broader relevant knowledge base and superior problem-solving capabilities (Webber and Donahue, 2001; Østergaard *et al*., 2011). In our analysis, we focus primarily on a number of human capital variables – that is, age, education (level and type), and prior industry experience, although we also include non-task-based variables as controls (gender, nationality, and marital status).

Diversity in age can have advantages if energetic youth can be combined with the wisdom that accompanies age. Diversity in age may lead to problems of communication and understanding, although small differences in age may lead partners to specialize in youth and wisdom, respectively. However, considering that previous work into firm growth has found that young firms grow faster (Coad, 2009), we suspect that teams of relatively young and energetic members will enjoy faster growth (although their lack of experience may lower

their survival chances). Diversity measures of functional education and experience are regarded as valid measurement of skills, expertise and abilities according to the literature on task-related diversity (Pelled, 1996; Pelled *et al*., 1999; Webber and Donahue, 2001). Diversity in education type can lead to a broader set of available skills and benefits of specialization, which research considers as important due to the various complex tasks that need to be solved (Hmieleski and Ensley, 2007). Based on Foo *et al*. (2005), we are inclined to argue in favor of diversity in education level, as level might also be regarded as a difference in type of skills, that is, higher skills focus on conceptual skills and the lower levels are more practical; however, we are also inclined to follow the belief that higher education levels increase new venture performance (e.g., Cooper *et al*., 1994). Eisenhardt and Schoonhoven (1990) already argued that diversity in prior industry experience might have a positive impact; however, we do not look to diversity in prior industry experience as such, but focus more on whether the industry experience is related or similar to the industry in which the new venture is active. We follow the findings of existing literature on entrepreneurial spin-offs and argue that having similar or related industry experience will have a positive effect on new venture performance (see, e.g., Dahlstrand, 1997; Sapienza *et al*., 2004; Agarwal *et al*., 2004; Klepper and Sleeper, 2005; Dahl and Reichstein, 2006). However, it may be that it is sufficient if one of the partners has prior industry experience (Dahl and Reichstein, 2007). We also control for diverse combinations in terms of gender, nationality, and marital status, although we do not hypothesize any particular advantages for these variables because we focus primarily on human capital characteristics.

Our main theoretical focus is on developing some 'propositions' to loosely guide our empirical investigations. The literature has suggested that diversity has complex effects on team performance, such that we could formulate many different contradicting hypotheses on the relation that exists between diversity and performance. However, since compelling arguments can be provided for almost any effect (positive or negative) depending on whether there is 'too little' or 'too much' diversity, we will abstain from undertaking such an exercise. Rather, similar to Dahl *et al*. (2012), we will implement a more explorative and inductive empirical approach relying on robust large sample evidence of entrepreneurial pairs with the attempt to investigate regularities associated with team composition. Such a research strategy is in line with the arguments put forward by Helfat (2007: 188) who stated that, particularly in the field of empirical management research, "empirical research need not test theory" and that researchers should be free to "get out of the theory-testing straightjacket" (Helfat, 2007: 191) in order to undertake exploratory analyses of large-sample datasets in order to uncover new empirical regularities.[4]

To begin with, we deliberately distinguish between the 'primary' and 'secondary' new venture team members in our analysis, and suggest that the effect of diversity on performance is not invariant to which individual has which characteristics. For example, research that investigates the impact of age diversity often argues that age diversity has an impact on the performance of a team due to intergenerational differences (Williams and O'Reilly, 1998; Foo *et al*., 2005; Østergaard *et al*., 2011); however, the outcome might vary depending on the informal hierarchical structure, as it may be that entrepreneurial pairs need one brash, energetic young individual to take the leading role, with an older and wiser individual acting as a 'guiding hand', while the opposite might have the reverse impact. The same might be true for educational background where the primary member needs to have sound technical knowledge of the product, while benefitting from commercial advice from a supporting partner. Asymmetries in ownership stakes in the venture may lead to agency problems, whereby the individual with the higher ownership stake needs to monitor the secondary member and keep moral hazard problems in check. More generally, we argue that the skills and traits of an NVT's lead entrepreneur may impact performance differently if they were instead possessed by an individual whose role on the NVT was more peripheral. This approach seems supported by recent calls to investigate the role of moderating influences that affect how inputs are mapped onto NVT performance (c.f. the NVT inputs-mediators-outcomes framework discussed in Klotz *et al*., 2014).

Closely connected to the choice of a primary and secondary new venture team member is, as mentioned in the previous section, the idea of the presence of a lead entrepreneur. Ensley *et al*. (2000) investigate the presence of lead entrepreneurs in entrepreneurial teams, although they observe no clear link with new venture performance. While previous work has ignored this, we believe it deserves investigation. In any case, in practical terms, we must assign individuals to either the horizontal or vertical axes of our non-parametric figures, and prefer to do this in a non-random, theoretically meaningful way.

Proposition 1: Structures of power and authority within teams are not symmetric, and the 'direction' of

[4]In the words of Helfat (2007, p. 188), we prefer not to "waste a lot of ink on what may be premature hypotheses. To put it bluntly, the current state of affairs where researchers feel they have to come up with hypotheses in order to justify empirical work is counterproductive. It would make a lot more sense to simply identify a study as an investigation of a potential empirical regularity and then explain the motivation behind the investigation."

hierarchical asymmetries moderates the effect of team composition on performance.

We also take a non-standard approach to measuring heterogeneity of team composition, because we suspect that the standard practice of reducing heterogeneity to a single summary scalar index of diversity leads to a loss of information on team composition. Consider the variable age: first of all, we suspect that age has a non-linear effect on performance (from the liability of youth to the 'golden age' to senescence). A second drawback is that it is likely that 10 years difference in age matters more when the two new venture team members are on average 25 years old than when they are both on average 60 years old. By posing this proposition, we want to increase awareness of other research in the field that the summary measures that are presently dominating studies on diversity might not be appropriate in all situations. Therefore we posit:

Proposition 2: Many interesting effects may remain hidden if team composition is reduced to a single summary scalar index of diversity.

Another feature of our paper is that we have two performance indicators: survival and employment growth. While each of these indicators is associated with firm performance, they shed light on different facets of performance (Miller *et al*., 2013). For example, the survival of a new venture could be a signal of prolonged commercial success, although it could also signal a lack of outside options for those involved in the venture (Gimeno *et al*., 1997). Employment growth of a venture is often taken as an indicator of new venture success, although it could occur to the detriment of profitability. We therefore acknowledge that there are differences between alternative performance indicators, and that team composition may have different effects on different performance indicators. In our robustness analysis we also take growth of sales and profits as alternative performance indicators.

Proposition 3: Heterogeneity of team composition has different effects for survival and growth.

Method

In the majority of studies on team diversity, diversity is defined as a function of differences among team members with respect to a common attribute. Consequently, diversity is often regarded as a unit-level compositional construct (Harrison and Klein, 2007). To study this diversity, we consider the same type of team characteristics proposed in the existing literature on team diversity. The majority of these studies have used the techniques of organizational demography. This means that the level of diversity is measured based on observable demographic characteristics, where demography is defined as: "the composition, in terms of basic attributes such as age, sex, educational level, length of service, race and so forth of the social unit under study" (Pfeffer, 1983: 303).

In the following subsections, we will discuss several methodological challenges affecting investigations of the impact of diversity on team performance.

Focus on pairs only

When investigating the impact of team diversity on performance, the challenge is to find a concise representation of the high dimensionality involved (because the number of possible combinations of individuals increases rapidly with the number of NVT members). To keep the dimensionality manageable, we focus on entrepreneurial pairs. Focusing on these dyads is a theoretically meaningful way of simplifying the analysis of entrepreneurial teams (Harper, 2008). With pairs, there is only one possible relationship in which heterogeneity can be measured – that is, the relationship of *A* to *B*. With triads, one may look at the heterogeneity between *A* and *B*, or *A* and *C*, or *B* and *C*; and the analysis of heterogeneity becomes even more complex with four or more members.

Another main reason why we focus on pairs is that, contrary to other studies that investigate entrepreneurial team performance, we consider that entrepreneurial teams of different sizes are qualitatively different. In pairs, for example, there is always the tension of a head-on conflict, and disputes are resolved essentially through the mechanism of 'my word against yours.' Regarding triads, an entrepreneurial team of three members may have more stability as the dynamics of majority rule is more flexible, with each individual taking turns as the swing voter and arbiter, and being able to move from side to side to form new majority coalitions with one of the two others (otherwise the perpetually oppressed minority would leave the team).[5] With teams of four individuals, there may be a tendency to split into rival groups (of pairs) within the team, for individuals to seek strong pair-bonds within the team, or for minority views to acquiesce relatively easily. In short, there may be nonlinearities between number of team members and the nature of diversity within the team, because integers can be seen as being qualitatively different (Schimmel, 1994). Teams of different sizes have fundamentally different opportunities for specialization, that do not scale up with team size in a linear way. To keep our observations as comparable as possible, we focus only on the most numerous team size, which is the team of two individuals.

[5]A speculator might see a parallel here with geometric patterns – that is, the stability of triangular structures.

The final reason we focus only on entrepreneurial dyads is that this size is probably the most common team size in the literature. Many existing studies report average sizes between two and three members (Eisenhardt and Schoonhoven, 1990; Ucbasaran *et al*., 2003; Chowdhury, 2005; Beckman, 2006; Beckman *et al*., 2007; Clarysse *et al*., 2007; Steffens *et al*., 2011). Despite the existence of larger teams, particularly in more high-tech areas, the bulk of the size distribution corresponds to two-person teams.

Quantifying diversity

The most common indicators of diversity used in the literature are the coefficient of variation, $cv = \frac{\sigma}{\mu}$, for continuous variables, as well as the Herfindahl-Hirschman index (HHI), $H = \sum_{i=1}^{I} (P_i)^2$, Blau's heterogeneity index, $H = 1 - \sum_{i=1}^{I} (P_i)^2$, and Shannon index (also known as Teachman's index), $H = -\sum_{i=1}^{I} P_i (ln P_i)$ for categorical variables (for details, see Pelled *et al*., 1999; Foo *et al*., 2005; Beckman *et al*., 2007). We seek to increase awareness of potential drawbacks of these measures of diversity. First of all, the numerical value of such an index may have no immediately intuitive interpretation (e.g., comparing an HHI of 0.3 with an HHI of 0.6). Second, we may be interested in asymmetric roles (due to power structures in a hierarchy) for individuals *i* and *j*, instead of assuming the two to be interchangeable. Third, the benefits of diversity may vary across the distribution of *x* (for example, as we highlighted in the previous section, being ten years younger may be more important if your partner is 30 than if your partner is 60). This will be difficult to quantify without making the results difficult to interpret. Therefore, instead of trying to quantify diversity, we instead aim to complement the existing literature by presenting information on diverse team compositions in a more accessible way.

In our view, the standard scalar indicators of diversity may be vulnerable to problems related to reductionist simplification. For example, a team of two men and one woman is treated as having an identical gender composition as a team of two women and one man, or even a team of four women and two men (because firm size is seldom interacted with the diversity indices). The maximum possible amount of diversity also depends on the group size (e.g., the maximum score for gender diversity in a team of three is not the same as the maximum score for a team of four).[6] With regards to information on educational background, standard diversity measures provide information on the number of different backgrounds, but they remain mute on which backgrounds are represented. For example, when looking at the diversity of educational backgrounds, a team where everyone has a STEM background is indistinguishable (to the econometrician) from a team where everyone has a business background (both teams would have zero diversity). Another issue, that we do not explore here, is how the level of diversity depends on team size in contexts where the number of available categories exceeds the number of team members.

To raise awareness of these issues, we develop a less parametric approach to investigating diversity and performance, by representing heterogeneity in terms of coordinates in an n-dimensional Euclidean disparity space (Stirling, 2007).

Data

To investigate whether the direction of the employment diversity affects the performance of the new venture, we make use of the information gathered from Danish government registers. This database, which is maintained by Statistics Denmark, is known under the name Danish Integrated Database for Labor Market Research (hereafter referred to by its Danish acronym IDA). IDA is suitable for the analysis in this paper as it holds detailed information on demographic characteristics such as gender, age, country of origin, type and level of education, which university the individuals attended, occupation and work experience. Since these individuals can be matched to a firm at any given year, it is possible to observe the team composition of the start-up, thereby addressing individual level processes that can help us understand the founding of new businesses as proposed by Shane and Khurana (2003). In addition, its longitudinal nature allows us to follow individuals, establishments and firms over time. As a result, we are able to investigate how these individual level processes affect the growth and survival of these new ventures.[7]

Start-ups, entrepreneurial pairs, and hierarchical asymmetries

To conduct the various analyses, we created a sample of start-ups in the period 1999 to 2003 where we exclude start-ups in the primary, public and energy sector.[8] The

[6]The maximum gender diversity in a team of three corresponds to a gender ratio of 2:1, the maximum score for a team of four is a gender ratio of 1:1, and the maximum for a team of five corresponds to a gender ratio of 3:2, and so on. These differences translate into different maxima in terms of diversity indicators such as the Herfindahl-Hirschman index.

[7]See Timmermans (2010) for a detailed description of the database.

[8]Start-ups that are not between the 15 and 75 two-digit level NACE rev 1.1 codes are excluded. Between these two two-digit codes there is one classification, 40 and 41 (energy), that is a mix of both public and private firms, which also will be omitted.

motivation for selecting the time period is twofold. First, we want to follow the start-up for a number of years after founding to identify whether they survive and to establish their growth rates. Second, we want to use the growth in sales as a measure of growth in our robustness analysis; due to a break in the data between 1998 and 1999 it is problematic to include start-ups founded prior to 1999. The current dataset is censored to 2008, which allows us to follow each start-up for up to at least five years after founding.

To select our sample of start-ups it is important to identify the founding year. To do so, we use information on the firm's founding date from the company register in combination with the plant and firm identification number. We identify a start-up as a one-plant firm with no prior firm and plant identification number, which is in line with Dahl and Reichstein (2007). Furthermore, to select genuinely new firms, we exclude all start-ups that are the result of a separation or merger of previously existing plants. Based on the above-mentioned selection criteria we identify 12,861 start-ups in the period 1999–2003.[9]

To identify the disparity we need to identify the persons that are involved in the start-up in the year of founding. These persons are identified by merging two datasets: namely, (i) the entrepreneurship database, which provides detailed information on who is the owner of the start-up; and (ii) the employee dataset that provides information on a person's primary workplace. We add all these individuals to identify the size of the start-up in the year of founding. Due to the nature of linked employer-employee databases we are limited to only identify individuals that have a formal attachment to the new venture, that is, registered to be part of the organizations through governmental registers. For that reason, our concept of entrepreneurial pair varies from definitions of entrepreneurial teams that exist in the literature. Nevertheless, this approach of identifying entrepreneurs in small new ventures in IDA is similar to Nanda and Sørensen (2010) who use these entrepreneurs to investigate peer effects of entrepreneurship. Furthermore, the motivation for identifying all the individuals in the first year as crucial stakeholders is: (i) the observation that most firms start small and hardly change in size during their lifetime (Aldrich and Ruef, 2006); (ii) the initial resource profile can be used to predict start-up performance, including failure (Cooper *et al*., 1994); and (iii) member characteristics (Boeker, 1989), (iv) early hiring decisions (Baron *et al*., 1999), and (v) strategies at start-up (Romanelli and Tushman, 1994) have lasting consequences for new organizations. The operational definition of an entrepreneurial pair in this paper are thus two individuals ('members') that have a formal affiliation to the new venture in the year of founding and invest effort in the form of work, that is, 'sweat equity', in the new venture (Cooney, 2005). In the remainder of this paper, we refer to both individuals as members, namely, primary and secondary members, despite the fact that the second 'member' might have joined the start-up later during the year.

As explained in previous section we will focus only on two-person start-ups.[10] Similarly to the studies reported in the previous section, entrepreneurial pairs are the most common team size. This selection criterion will decrease the sample to 4,002 new ventures. Since we investigate the 'directed' hierarchical asymmetries, we need to assign a *primus motor* (individual *i*) for each two-person start-up. To do so, we conduct several steps to find this individual, which is a combination of ownership, occupation code and the length of the attachment to the workplace. In assigning the primus motor, or lead entrepreneur, we consider the rank and tenure of the two individuals. Rank is indicated by whether the person is identified as employer, director, high-level employee, skilled worker, or unskilled worker, and tenure is measured using a variable that indicates the number of days the person has been working for the new venture in the previous year.[11] The majority of our primary individuals are identified as the owner of the new venture, namely, 2,418. In 172 pairs the primary individual is identified as a director of the business, and in 1,187 cases both are registered as an employee but then the highest employee rank in combination with the number of days of employment enables us to identify a primary individual. For 225 cases it is not possible to identify a direction and these cases are excluded from our sample; consequently, we end up with a sample of 3,777 entrepreneurial pairs. Afterwards, we identify the disparity of this pair in terms of age, education (both degree and discipline) and industry experience, as well as other common diversity indicators (gender, nationality, and civil status). More descriptive statistics on the overall sample, including the

[9]This number is substantially lower than the total of newly registered firms in any given year; however, registering a firm does not necessarily mean that there is activity in the firm. Consequently, for a large share of newly registered firms there is no information available on financial information, geographical location of the business. Furthermore, to identify genuinely new business it is necessary to know the plant identification number and for many newly registered firm this information is missing. This plant identification number is also necessary to identify the second individual associated with the business.

[10]We only restrict our sample where two individuals have a primary attachment to the new venture in the founding year. Other individuals might be connected to this new venture but this venture is not their primary employment. Note also that it is possible that a team of two members takes their first employee within the first year.

[11]We can identify the number of days a person has worked at the firm, which is based on a formal attachment to the workplace, consequently, we are able to identify how many days have passed between founding and formal attachment.

performance indicators and demographic variables are presented in Table A1 in the Appendix.

Survival and growth

As mentioned above, we investigate the impact of composition on firm performance. The first performance measure is firm survival – due to the unique identification number associated to firms and plants we can follow the status of these organizational units in all years up to a change in this identification number.[12] A change in this identification number is always connected to a variable that indicates the status; when this status is identified as being a closure we consider it to be a non-survivor. In reality, firms might re-enter into the same or in different industries; however, for analytical purposes we will not consider this as a new entry and these firms do not re-appear in the sample. In addition to the closure of a business, a firm might continue in another form, for example, as a result of a merger or acquisition. These observations will be censored due to the structural change of these firms. This is the case for 114 firms in the sample. In total, 1,256 firms (that is, 33.33%) survive up to the fifth year.

We also investigate the impact of team composition on employment growth. We measure growth in terms of number of employees,[13] and track the employment growth of the firm after five years. It is straightforward for us to measure the employment growth of our firms, because they all start with two individuals – we need only consider the number of employees in year 5.[14] Indeed, a meaningful indicator of the growth of new ventures is their size at the end of the period of observation (Eisenhardt and Schoonhoven, 1990; Storey, 1994; Colombo and Grilli, 2005). Although final size confounds the effects of initial size and post-entry growth, nonetheless all the firms in our sample have the same initial size of two employees, and so in this context we can identify growth by focusing on final size only. In our non-parametric analysis, employment growth is measured in terms of number of employees after five years, an advantage of which is ease of interpretation. In our regression analyses, we proxy employment growth by the natural logarithm of final size (employees after five years), which is equivalent to taking the employment growth rate in our context using regressions that focus on variation across firms.[15]

Analysis

We begin with some non-parametric illustrative statistics of the performance of pairs to give the reader an intuitive grasp of the composition of teams and their performance outcomes. We start with the impact of age, followed by education (both the level and the type of education), and industry experience. We plot the two members on two axes and report the outcome in the resulting two-dimensional disparity space, using cross-tabulations and a contour plot. For each team, we are forced to put one member on the x-axis, and one on the y-axis (Figure 1). Instead of doing this randomly, we refer to the concept of hierarchical structure.

We then complement our 'raw' non-parametric results with parametric regressions, that have the advantage of allowing us to include control variables. In our parametric regressions, we include a dummy variable for each category of combinations of partners. This presents the challenge of having to include a large number of dummy variables for each pair-wise combination of characteristics. To deal with this latter issue, we adopt a 'stepwise' regression approach, whereby we repeat our regressions in iterative progression, at each step removing the least significant variable, and proceed until all of the remaining explanatory variables are above a minimum threshold level of significance.

Non-parametric analysis

Age. We start with presenting some non-parametric analysis on the age of the new venture team members.

[12]Timmermans (2010) discusses in more detail when firms and plants change identifier. In short, IDA follows a person-oriented approach towards change. Consequently, an establishments identification number remains the same from one year to the other whenever one of the following criteria is fulfilled: (i) a plant has the same owner and is active in the same industry; (ii) a plant has the same owner and the same labor force; or (iii) a plant has the same labor force and is located on the same address or is active in the same industry.

[13]Measured in terms of an employee headcount that takes place on a date in November of each year, as chosen by the government administration.

[14]Although we also have data on sales, value-added and profits, in this paper we focus on growth measured in terms of employees. This is easier to count, it is a relatively transparent indicator, it makes for meaningful comparisons across sectors and years, and furthermore it makes it easy for us to calculate growth because all firms have the same initial size (i.e., 2 members). We repeated our analysis by looking at growth of sales, value-added and profits, and got similar results, but for the sake of space they are not reported here.

[15]In our case, we have initial size = 2 for all firms, and final size = x. The standard way of calculating growth rates in the literature is to take log-differences (c.f. Coad, 2009, p. 10): Growth rate = ln(final size) – ln(initial size) = ln(x) – ln(2) = ln(x) – 0.693147. Regressions with growth rates as dependent variable are interested in variation in growth rates, with any constant effect being controlled for and removed through the usual practice of including a constant term in the regression specification. Regressions with ln(final size) as dependent variable are therefore equivalent to regressions with the growth rate as dependent variable in our context. Finally, another advantage of looking at final size is that it is a more intuitive way of understanding the growth performance of these firms.

		j		
		≤ 30	31-44	45+
i	≤ 30	0.283	0.265	0.293
	31-44	0.333	0.364	0.402
	45+	0.300	0.351	0.406

		j		
		≤ 30	31-44	45+
i	≤ 30	6.098	5.959	3.767
	31-44	4.918	4.572	3.446
	45+	4.044	3.574	3.000

Figure 1 Performance after five years, by age group, for individuals *i* (primary member) and *j*. Cells with above-median values are highlighted. Left: survival after five years; right: means of numbers of employees after five years conditional on survival

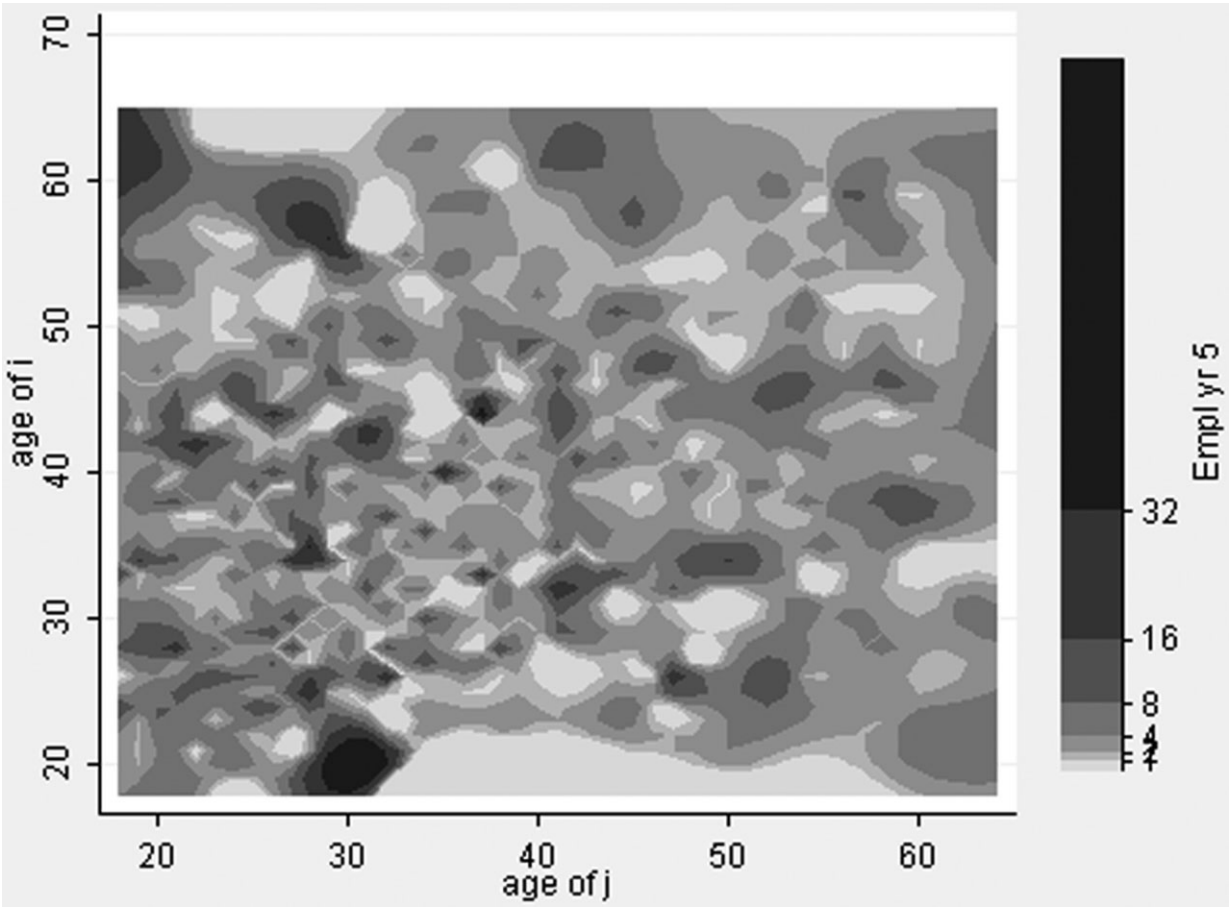

Figure 2 Contour plot of the outcomes associated with entrepreneurial pairs of the primary member i and secondary member j. z-axis: employment after five years, measured in terms of number of employees at the date of annual compulsory registration, in November of each year, Contour plot produced using thin-plate-spline interpolation

As presented in Table A1 in the Appendix, the average age of the individuals in the sample is around 35 years. Figure 1 shows the survival and employment growth outcomes associated with different age combinations where we recoded the age categories by dividing age in three separate, approximately equipopulated classes, that is, less or equal to 30; age 31–44 years; and 45 years and over.

Our non-parametric analysis of age can be taken further still, because both age and employment growth are continuous variables. In Figure 2 we present a contour plot, which shows in more detail the employment growth associated with different combinations of ages.[16] Darker shades correspond to higher employment growth. A first observation is that the best performing ventures, in terms of employment growth, are those where the primary member has an age of around 20, while the secondary partner has an age of around 30. This suggests that both partners should be relatively young, to cope energetically with the workload of

[16]Note however that applying contour plots to non-continuous variables is problematic, so we do not present a contour plot for the survival outcomes associated with age combinations.

starting a new venture, although the secondary new venture team member should be noticeably older than the first. Hence, some diversity in age can be valuable. Other regions associated with high employment creation are also visible, such as when $age_i = 45$ and $age_j = 37$, or when $age_i = 55$ and $age_j = 30$. A second observation is that job creation generally seems to decrease with age of both the primary and the secondary partner, although the relationship is not smooth or linear. To the extent that the best outcomes are not on the 45° line (the 'diagonal'), Figure 2 provides early evidence that diversity in age can be beneficial. Furthermore, the contour plot is not symmetric with respect to the 45° line, which suggests that hierarchical structure is an important moderator of how member characteristics are converted into venture performance.

Education. In our analysis of the impact of new venture team member heterogeneity in education, we investigate both the level of education and the type of education. The structure of the education variable in IDA allows us to identify the level of education (based on the first two-digits of an eight-digit code) and the discipline being taught (digit three and four of the eight-digit education code). We begin by considering education level before moving on to education type.

Education level. In preparing the sample for the non-parametric analysis on education, we have merged the different education codes in five education level dummies: all individuals up to (and including) high-school (HS); vocational training (VT); vocational short cycle education (VSC); bachelor (Bach), which includes professional and academic bachelor; and post-graduate (Grad), which includes Master and PhD graduates.

In Figure 3 we present our performance indicators of the start-ups based on the combination of education levels of the members. We observe that those with the least education (i.e., public/primary school) generally seem to have the lowest survival rates. Paradoxically, pairs where one individual belongs to the highest education category also have, in a number of cases, lower survival rates, presumably because highly-educated entrepreneurs have attractive outside options that may lure them away (Gimeno *et al*., 1997). We also observe that diversity in education level is not necessarily an encumbrance, because high survival rates are also observed away from the diagonal, which might indicate some support on the argument of Foo *et al*. (2005) on the benefits of diversity in education level.

Table 3 (right) shows the number of employees after five years by education level. It would appear that post-entry growth is low when $Educ_i = 1$ or $Educ_j = 1$ (that is up to and including high school) and relatively high when $Educ_i$ or $Educ_j$ are equal to 3 (vocational short cycle education) or 5 (post graduate education).

Education type. In addition to education level, we investigate whether the type of education matters for survival and growth. The education types are divided in four categories. One type is all the programmes in vocational training and below (≤Voc Tr) and three where the educational programmes above this level have been divided in: degrees within science technology, engineering and mathematics (STEM); business related degrees (Business); and other degrees (Other). The reason for making this distinction beyond vocational training is that the types of education in these lower levels of education are prohibitively difficult to place in our STEM, Business and Other categories. Figure 4 contains a number of interesting results, among which some evidence that the direction matters regarding which individual has which educational background. The best performing teams (in terms of survival and growth) occur when $EducType_i$ = STEM. {$EducType_i$ = STEM, $EducType_j$ = Business} has a high survival rate (0.571) while {$EducType_i$ = Business, $EducType_j$ = STEM} has a low survival rate (0.222) – due to a low number of observations, however, this difference is not statistically significant at the usual 5% level. This pattern is also

		j				
		HS	VT	VSC	Bach	Grad
i	HS	0.241	0.327	0.353	0.286	0.227
	VT	0.319	0.441	0.457	0.385	0.350
	VSC	0.373	0.520	0.409	0.235	0.125
	Bach	0.341	0.448	0.444	0.565	0.353
	Grad	0.241	0.333	0.273	0.154	0.625

		j				
		HS	VT	VSC	Bach	Grad
i	HS	3.909	4.677	4.111	3.833	5.000
	VT	4.411	4.224	4.952	4.500	7.714
	VSC	4.760	5.654	5.111	9.750	2.000
	Bach	4.696	3.821	6.875	4.269	5.333
	Grad	3.846	4.923	7.000	6.250	10.080

Figure 3 Performance after five years, by education level, for individuals *i* (primary member) and *j*. Cells with above-median values are highlighted. Left: survival after five years; right: means of numbers of employees after five years conditional on survival

		j			
		≤ Voc Tr	STEM	Bus	Other
i	≤ Voc Tr	0.318	0.408	0.488	0.263
	STEM	0.465	0.556	0.571	0.542
	Bus	0.397	0.222	0.412	0.231
	Other	0.311	0.000	0.500	0.345

		j			
		≤ Voc Tr	STEM	Bus	Other
i	≤ Voc Tr	4.263	4.897	5.400	4.371
	STEM	5.414	6.600	17.500	4.231
	Bus	6.074	12.500	4.857	14.667
	Other	3.842	.	3.750	6.684

Figure 4 Performance after five years, by education type, for individuals *i* (primary member) and *j*. Cells with above-median values are highlighted. Left: survival after five years; right: means of numbers of employees after five years conditional on survival

		j		
		None	2-digit	4-digit
i	None	0.265	0.311	.
	2-digit	0.331	0.428	.
	4-digit	0.412	.	0.429

		j		
		None	2-digit	4-digit
i	None	4.798	4.197	.
	2-digit	5.652	4.618	.
	4-digit	4.395	.	4.149

Figure 5 Performance after five years, by industry experience, for individuals *i* (primary member) and *j*. Note that the three industry experience categories are mutually exclusive by construction (see text). Cells with above-median values are highlighted. Left: survival after five years; right: means of numbers of employees after five years conditional on survival

visible in the right panel of Figure 4, which pertains to growth. The highest employment growth (mean of 17.5 employees after five years) is associated with $\{EducType_i = \text{STEM}, EducType_j = \text{Business}\}$; while the employment growth associated with $\{EducType_i = \text{Business}, EducType_j = \text{STEM}\}$ is lower (but the difference is not significant). This offers weak support to the idea that STEM and business education backgrounds complement each other in complex ways, with hierarchical asymmetry moderating the relationship, in line with our propositions.

Industry experience. Results for prior industry experience are shown in Figure 5. Industry experience is calculated with respect to the individual's work experience in the previous five years. Individuals can either have no prior experience, industry experience at the 2-digit NACE rev1.1 industry class but not at the same 4-digit level, or industry experience at the 4-digit level (following Dahl and Sorenson, 2009, 2012). The categories are mutually exclusive by construction. The 4-digit category represents individuals who have experience in the same 4-digit industry class as the industry class assigned to the start-up. The 2-digit category indicates that the individual has experience in related industries, namely, the same 2-digit industry but not the same 4-digit industry class, and 'none' indicates that the individual does not have experience in related industries.

A first observation is that not all combinations of industry experience are observed. The worst outcome for survival is when neither *i* nor *j* have any (related) industry experience – pairwise *t*-tests and tests of equality of proportions with respect to the baseline case of $\{indexp_i = indexp_j = 0\}$ show that the differences are all highly significant. The performance outcomes associated with industry experience for *i* at the 2-digit level are not considerably lower than those obtained for experience at the 4-digit level, which suggests that related experience may be sufficient, which is in line with studies investigating the impact of similar industry experience on survival (see, e.g., Agarwal *et al*., 2004; Klepper and Sleeper, 2005; Dahl and Reichstein, 2006).[17] Interestingly, it is sufficient that only one member has experience in the same 4-digit industry class, or that both members have experience in a related industry. There is no additional impact of both members having experience in the same 4-digit industry. The explanation might be that related skills improve firm performance,[18] although it is not necessary that the members display symmetry in terms of the skills that they bring to the venture. For growth, high employment growth can occur even if *j* has no prior industry experience. Thus it is not necessary for both new venture team members to have prior industry experience in

[17] *t*-tests and tests of equality of proportions reveal that there are no significant differences between the outcomes for *i* when industry experience is measured at the 2-digit or 4-digit level, with the exception of survival when $indexpj = 0$ (that is, the mean values 0.412 and 0.331 are significantly different at the 5% level).

[18] See for example Timmermans and Boschma (2013).

order to grow. This finding nuances previous studies on entrepreneurial spin-offs, that is, entrepreneurs that start in the same industry as their parent firm (Dahlstrand, 1997; Sapienza *et al*., 2004), although these studies mainly focused on high-tech ventures.

Regressions

The non-parametric analysis we presented above gives an indication of the role of team composition on new venture performance. To study this effect in more detail, we apply regression techniques to control for other factors that might explain new venture performance. To do so, we estimate the following regression equation:

$$\begin{aligned} Y_k = {} & \beta_0 + \beta_1 \cdot \sum_{I=1\ldots3} \sum_{j=1\ldots3} AgeGroup_{ij} \\ & + \beta_2 \cdot \sum_{I=0,11} \sum_{j=0,11} Education_{ij} \\ & + \beta_3 \cdot \sum_{I=0,2} \sum_{j=0,2} IndustryExp_{ij} + \beta_4 \cdot \sum_{I=0,1} \sum_{j=0,1} Gender_{ij} \\ & + \beta_5 \cdot \sum_{I=0,1} \sum_{j=0,1} Danish_{ij} + \beta_6 \cdot \sum_{I=0,1} \sum_{j=0,1} Married_{ij} \\ & + \beta_7 \cdot ControlVariables_k + \varepsilon_k \end{aligned} \quad (1)$$

The dependent variable is the performance of venture k, and the explanatory variables include a constant term β_0, characteristics of the two members i and j captured by the coefficient matrices $\beta_1 - \beta_6$, as well as some venture-specific controls. Hence, a closer analysis of non-linearities and interdependencies affecting team composition is enabled by mapping the two-dimensional disparity space with a set of dummy variables for each combination of characteristics for individuals i and j.

Equation (1) corresponds to a cross-sectional regression setup, where we explain performance up until time $t + 5$ as a function of characteristics at startup (time t). When the dependent variable is survival, we apply a logit regression model (Jenkins, 1995).[19] When the dependent variable is employment growth, we measure this by taking the (natural logarithm of) number of employees after five years.

For age we created a dummy variable based on the combination of age classes mentioned above. This gave us $3 \times 3 = 9$ possible configurations for i and j which are represented by eight dummy variables (with the omitted base dummy corresponding to a team of young partners). In each case, the omitted dummy variable (corresponding to the base case) is the combination of lowest values for i and j.

We recoded our education variables to take into account the interdependence of education level and education type. Those with the lowest educational qualifications have not had the opportunity to specialize, and therefore the types of education refer only to those above a minimum level of education. To take this into account, we recoded our education variables $Education_{ij}$ such that i and j can take the following values: HS for all up to (and including) high-school; VT for vocational training; VSC_STEM, VSC_Bus and VSC_Oth for vocational oriented shortcycle education programmes that specialize in either STEM, Business or Other (respectively); Bach_STEM, Bach_Bus and Bach_Oth for undergraduate (both academic and professional bachelor degrees), that specializes in either STEM, Business or Other, respectively, and Grad_STEM, Grad Bus and Grad_Oth graduate and PhD education that specializes in either STEM, Business, or Other, respectively.

As mentioned above, industry experience is calculated with respect to the individual's work experience in the previous five years. The new venture team members either have no prior experience, industry experience at the 2-digit NACE rev 1.1 industry class but not at the same 4-digit level, or industry experience at the 4-digit level. As described before, these categories are mutually exclusive by construction.

Although our main interest focuses on the human capital variables mentioned above, we also control for pair combinations according to gender, nationality (Dane vs non-Dane) and marital status, as well as other control variables included in $ControlVariables_k$. First among our control variables are industry controls. In some industries, such as manufacturing, we only have a few firms present. To deal with this, we regroup some sectors together, following the Eurostat industry classification scheme for manufacturing sectors.[20] We also have few firms in two-digit NACE rev 1.1 sectors 65 and 67 (banking, insurance, etc) and so we merge these sectors together with 66 (life insurance, pensions, etc.) to generate a new industry group, which corresponds to the Eurostat definition of 'Knowledge-intensive financial services'.[21]

Second, the entrepreneurial pairs might be based on family relationships. As this relationship can influence the performance of the firms in different ways, we included four dummies making a distinction whether the entrepreneurial pairs are spouses, siblings, father and

[19]An additional advantage of logit regression in our context is that it can be implemented inside our stepwise regression algorithm.

[20]The Eurostat manufacturing industry classification scheme has the following four categories: high tech, medium-high tech, medium tech and low tech. More details can be found at http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an2.pdf.

[21]See http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an2.pdf.

son/daughter, or mother and son/daughter. The inability of previous work to control for spousal relations has in fact been identified as a weakness of previous work (Hellerstedt *et al*., 2007). Family firms account for around 20% of our sample. Third, similar industry experience is an important factor that explains new venture performance, in particular survival (Dahl and Reichstein, 2007). To control for this factor we created eight dummy variables based on the similar and related industry experience of the entrepreneurial pair during the last five years, which has been explained in more detail above. The baseline category is a dummy variable where both individuals have no experience in the similar or related industry class. Fourth, we introduce cohort dummies, which correspond to the year (1999–2003) in which the firm was founded. Fifth, we include a dummy variable that indicates whether the pair has worked at the same firm in the five years before the founding of the new venture ('co-worker'), and a dummy variable for whether the pair has attended the same school ('same school'). Both variables indicate a pre-founding relation between the two individuals in addition to being in the same family and were used in Timmermans (2012). Finally, to control for the regional dimension, we created a set of five region dummies that correspond to the five Danish administrative regions.[22]

Altogether, we have an unusually rich set of variables in our initial regressions – too many to fit in a conventional results table. To maintain clarity, we adopt a stepwise algorithm for iterative removal of the least significant variable, and then repeating the regression until only the most significant variables remain. (We explore the robustness of this stepwise procedure later.) We take the full model in Equation (1) as a starting point before stepwise removal of the least significant explanatory variable. We stop when the least significant explanatory variable is significant at the 15% level. As a result, it can be expected that our stepwise algorithm will give a different set of significant variables for different dependent variables and for different subsamples. This implies that it is not possible for us to report all of our results as adjacent columns in the same regression table – instead each regression of Equation (1) will be reported in a separate results table.

Survival. Table 2 contains the regression results for survival after five years. Compared to the non-parametric analysis, the effect of age groups is less clear, as only the combination of a young primary individual and a mid-aged secondary person appears to have a lower probability of survival compared to the benchmark category of a team of two young individuals. However, some of the age effects may be captured by other variables, for example, same school, or co-worker experience.[23]

Education seems to help survival, because all of the significant education dummies are positive (with respect to the omitted baseline case corresponding to two new venture team members with minimal education). Interestingly enough, many (but not all) of the significant education dummies correspond to symmetric configurations where both members are in the same education category. Industry experience has a positive effect on survival – because all of the significant dummies are positive with respect to the omitted baseline category of no experience for both new venture team members.

Table 2 Stepwise logit regression of Equation (1), where the binary dependent variable is survival after 5 years

	Coefficient	*Robust Std. Error*	*Z-stat*
Age group dummies			
≤30; 31–44	–0.336	0.152	–2.21
Education			
HS; VSC_Bus	0.829	0.547	1.52
VT; VT	0.329	0.097	3.39
VSC_STEM; VT	0.889	0.276	3.22
Bach_STEM; VT	0.644	0.406	1.59
Bach_STEM; Bach_STEM	1.718	0.705	2.44
Bach_Oth; VT	0.497	0.281	1.77
Bach_Oth; Bach_Oth	0.974	0.415	2.35
Bach_Oth; Grad_Bus	2.154	0.950	2.27
Grad_STEM; Grad_STEM	2.254	0.605	3.73
Grad_Oth; Grad_Oth	1.817	1.008	1.80
Industry experience			
indexp_dummy_1_0	0.212	0.144	1.47
indexp_dummy_1_1	0.592	0.165	3.58
indexp_dummy_2_0	0.693	0.106	6.56
indexp_dummy_2_2	0.541	0.116	4.68
co_worker	0.348	0.137	2.55
same_school	–0.310	0.197	–1.57
Non-task characteristics			
dane_dummy_1_1	0.626	0.116	5.37
marr_dummy_0_1	0.241	0.122	1.97
marr_dummy_1_0	0.326	0.097	3.35
marr_dummy_1_1	0.569	0.101	5.66
Industry dummies	yes		
Region dummies	yes		
Year dummies	yes		
β_o: Constant term	–1.97	0.18	–10.96
Obs	3604		
Pseudo-R^2	0.0813		

Age dummies refer to combinations of three age categories: <=30 years (1); 31–44 years (2) and 45+ years (3). Education dummies refer to both level (1–5) and type (STEM, Business or Other; 1–3 respectively), with education types being available only for education levels 3 and above. Industry experience dummies refer to combinations of three categories: no industry experience (0), same 2-digit industry (1); and same 4-digit but not same 2-digit industry (2). For the other variables, we distinguish between Danes between married (1) and non-married (0) individuals.

[22]These regions are: Capital Region of Denmark, Zealand, North Denmark, Southern Denmark, and Central Denmark.

[23]By removing same school and co worker from the analysis, we observe that teams that include old members tend to have higher survival rates compared to the base case of two young members.

Co-worker experience has a positive impact on the likelihood of survival while the impact of same schooling is not significant.

In terms of ethnicity, we observe that teams of two Danes have the highest expected survival. Higher survival is observed for ventures where both the members are in a registered partnership. However, there are no significant differences in the survival of family businesses.

Employment growth. Table 3 contains the regression results for number of employees after five years. A first observation is that we have a larger number of significant variables when employment growth is the dependent variable.[24]

For age, we observe results that slightly contrast to the findings for survival but confirm the results of our non-parametric test – the base case (youngest age category for both members) has the highest expected employment growth, judging by the fact that all of our significant dummies are negative. In fact, teams of two old members have the coefficient with the largest magnitude, which indicates the lowest employment growth. Combining our results for survival and growth, old age partly explains survival but firms composed of young members demonstrate higher growth (conditional on survival). This is reminiscent of the well-known result that younger firms grow faster (i.e., firm age measured as years since start-up; at the business-level rather than at the level of individuals).

With regards to education, we have a mixed bag of results, considering that some education dummies are positive and others are negative. Furthermore, many are not significant at the usual 5% significance level. We observe that $\{i = VSC\_STEM, j = VSC\_Bus\}$ has a large positive effect on employment growth, while the opposite configuration, $\{i = VSC\_Bus, j = VSC\_STEM\}$, has a large negative effect on employment growth. This echoes our earlier findings from Figure 4 (right). Contrary to survival, there we do not observe the same level of symmetry for employment growth. This asymmetry between STEM and Business education is not always observed however; the cases of post-graduate education levels, $\{i = Grad\_STEM, j = Grad\ Bus\}$ and $\{i = Grad\_Bus, j = Grad\_STEM\}$ are the combinations with the highest employment growth. More generally, teams where the primary member has a post-graduate education often have higher employment growth.

With regards to industry experience, it is puzzling to see that *ceteris paribus* the few significant dummies are all negative. It is not clear why businesses without prior

Table 3 Stepwise OLS regression of Equation (1), where the dependent variable is (log of) the number of employees after 5 years

	Coefficient	*Robust Std. Error*	*Z-stat*
Age group dummies			
≤30; 31–44	–0.236	0.132	–1.79
≤30; 45+	–0.271	0.139	–1.95
31–44; ≤30	–0.239	0.082	–2.90
31–44; 31–44	–0.400	0.081	–4.93
31–44; 45+	–0.492	0.098	–5.01
45+; ≤30	–0.460	0.124	–3.71
45+; 31–44	–0.487	0.109	–4.48
45+; 45+	–0.715	0.099	–7.19
Education			
HS; VSC_Oth	–0.651	0.360	–1.81
VT; Bach_STEM	0.377	0.146	2.57
VSC_STEM; VSC_STEM	0.601	0.106	5.67
VSC_STEM; VSC_Bus	1.364	0.145	9.38
VSC_STEM; VSC_Oth	0.342	0.115	2.97
VSC_STEM; Bach_Oth	–0.856	0.225	–3.81
VSC_STEM; Grad_Oth	–0.807	0.203	–3.98
VSC_Bus; VSC_STEM	–1.200	0.162	–7.42
VSC_Oth; VT	0.634	0.290	2.18
VSC_Oth; VSC_Bus	–0.575	0.171	–3.36
Bach_STEM; HS	0.555	0.271	2.05
Bach_STEM; VSC_Bus	1.443	0.151	9.55
Bach_Oth; VSC_Oth	–1.529	0.102	–14.97
Bach_Oth; Grad_Bus	–0.583	0.195	–2.98
Grad_STEM; VSC_Oth	0.581	0.225	2.58
Grad_STEM; Bach_STEM	–0.540	0.119	–4.53
Grad_STEM; Bach_Oth	0.907	0.114	7.94
Grad_STEM; Grad_STEM	0.455	0.254	1.79
Grad_STEM; Grad_Bus	1.374	0.552	2.49
Grad_Bus; VT	0.653	0.249	2.62
Grad_Bus; VSC_Oth	0.842	0.127	6.61
Grad_Bus; Grad_STEM	2.027	0.103	19.67
Grad_Bus; Grad_Oth	–0.377	0.128	–2.94
Grad_Oth; VSC_Oth	1.024	0.099	10.37
Grad_Oth; Grad_Bus	0.440	0.122	3.61
Industry experience			
indexp_dummy_0_1	–0.108	0.064	–1.68
indexp_dummy_2_2	–0.143	0.063	–2.29
Non-task characteristics			
dane_dummy_1_0	0.283	0.140	2.02
dane_dummy_1_1	0.255	0.099	2.56
marr_dummy_1_0	0.124	0.060	2.06
marr_dummy_1_1	0.115	0.061	1.89
Family-firm dummies			
mom	–0.568	0.107	–5.30
spouse	–0.323	0.082	–3.96
dad	–0.218	0.120	–1.82
Industry dummies	yes		
Region dummies	yes		
Year dummies	yes		
β_0: Constant term	3.01	0.22	13.68
Number of obs	1207		
R^2	0.174		

Robust standard errors obtained from the Huber/White/Sandwich estimator. Age dummies refer to combinations of three age categories: ≤30 years; 31–44 years and 45+ years. Education dummies refer to both level (HS, VT, VSC, Bach and Grad) and type (STEM, Business or Other), with education types being available only for education levels 3 and above. Industry experience dummies refer to combinations of three categories: no industry experience (0), same 2-digit industry (1); and same 4-digit but not same 2-digit industry (2). For the other variables, we distinguish between Danes (1) and non-Danes (0), and between married (1) and non-married (0) individuals.

[24]A practical implication of the difficulty of finding variables that predict survival, but not growth, is that it will not be easy to apply a two-stage Heckman selection model (which requires the existence of variables that predict survival but not growth).

industry experience would outperform those with such knowledge capital. Although we include industry dummies in our linear regression framework, it could be that more complex interactions of industry, experience, and employment growth are driving these findings. Co-worker experience and having attended the same school do not have an impact on the growth of the business.

Regarding ethnicity, the highest-growth ventures are those led by a Dane (although it matters little whether the second member is a Dane or a non-Dane). Family firms consistently have negative coefficients – whether we consider businesses formed with the father, with the spouse, or with the mother. This likely reflects the particularities of the 'business plan' of family firms, which puts more emphasis on guaranteeing a relaxed family lifestyle rather than the pursuit of commercial ambitions. The lowest-growth businesses are formed with one's mother.

Robustness analysis. Although stepwise regression is rarely applied in the management literature, it has been criticized in some disciplines for giving potentially unreliable results (Thompson, 1995; Whittingham *et al.*, 2006). These concerns are muted in our context, because the R^2 statistics remain far from 100%, and we have a relatively large number of observations. Nevertheless, to deal with the risk that our stepwise procedure will remove potentially valuable variables, we compared our stepwise estimates with those of the full model (all variables included) to see if there were any major discrepancies; however no such discrepancies were found. We also repeated our regressions focusing on one dimension of human capital at a time (age, industry experience, education level, or education type), and obtained similar results.[25] We also separated education level and education type and repeated our analysis. We also changed the time period over which performance was measured – instead of focusing on the five years after entry, we also investigated three-year and four-year periods for our two performance indicators (survival and employment growth). This gave similar results.

It has recently been argued that taking survival as a binary variable means that exit is underspecified, because no distinction is made between successful exits and failures (Wennberg *et al.*, 2010). To address concerns that firm exit might correspond to closure of a successful business for retirement reasons, we removed those individuals aged 55 or above (cf. Dahl and Sorenson, 2012; Coad *et al.*, 2013), and repeated the analysis. We also repeated this analysis taking age 60 as the threshold.[26] Our main results remained unchanged.

[25]We are grateful to an anonymous referee for suggesting this robustness analysis.

[26]We are grateful to an anonymous referee for this suggestion.

Firm growth should be considered as a multi-faceted process involving distinct variables such as employment, sales and financial performance (Coad, 2010). Alternative growth indicators were therefore considered – namely, growth of sales and profit (results for these, as well as growth of Value Added which is not discussed here, are available upon request). Age of members has a negative effect on growth of sales (similar to what was found for employment growth), although no negative effects can be detected for profits. Education generally has benefits in terms of growth of sales and profits (in particular, if the primary new venture team member has a STEM-based vocational short-cycle education: $i = VSC\_STEM$), although the benefits of post-graduate education ($i = Grad\_x$ *or* $j = Grad\_x$) are always positive for profits but not always positive for sales. With growth of sales (as for growth of employment), we observe that the ordering of education types matters, because the coefficient on $i = VSC\_STEM,\ j = VSC\_Bus$ is positive while the coefficient on $i = VSC\_Bus,\ j = VSC\_STEM$ is negative. Teams of two males (or where the primary member is male) have higher growth of sales and profits, although no significant effect could be found for employment growth. This 'jobless growth' finding is consistent with the stereotype that men are more oriented toward financial gain and less willing to rely on others for help. Teams where the primary member is married (irrespective of the marital status of the secondary member) have higher growth of profits (and employment), although no benefits were found in terms of sales. Pairs of spouses, however, do not perform well in terms of sales growth (or employment growth). Ventures started with one's mother have lower performance in terms of growth of employment, sales, and profits.

We also took an alternative employment growth indicator. In our baseline analysis, we measured employment taking the number of employees (November headcount). To check the robustness of our measure, however, we also considered employment (growth) measured using the full-time equivalent (FTE) variable (which nonetheless had more missing observations than our main employment variable). All in all, the results are very similar.

To check that our identification of 'primary' and 'secondary' member is valid, we repeated the analysis on a subsample of businesses where we could be more confident that our attribution of members as 'primary' and 'secondary' was meaningful. In this case, we only select those firms where the primary member is registered as an owner and the secondary member as a middle and lower ranked employee. This would amplify the hierarchical asymmetries between the different members. The results from this analysis are not very significant (presumably because of a lower number of observations) but generally are in accord with our main findings.

For comparability with previous work, we also estimated Cox and Heckman regression models. This required reformatting our data into a panel with observations at an annual frequency. Cox regressions gave similar findings for the role of age and industry experience, although our findings for the education dummies were weaker. We also estimated a Heckman selection model for growth (conditional on survival). An advantage of applying a Heckman model in our case is that we have comprehensive coverage of all two-member start-ups (even though some exit before the end of the 5-year period). A drawback of the Heckman model, however, is that the first-stage equation requires the inclusion of variables that affect survival (but not growth). As can be seen from our results in Tables 2 and 3, there are more variables that predict growth than survival. Nonetheless, lagged growth has been shown to be a strong predictor of survival, but weakly related (if at all) to subsequent growth (Coad *et al*., 2013), and so we took lagged growth to explain survival but not growth. The non-selection hazard (that is, the inverse of the Mills Ratio) was significant and negative, but in the Heckman model most of our explanatory variables became insignificant (no doubt because explaining annual growth is more difficult than explaining growth over a five-year period).

Discussion

In this section we will seek to 'digest' our findings by referring to our three propositions. Proposition 1 stated that the effects of diversity on the outcomes of new businesses were moderated by the 'position' or 'status' within the hierarchy. We find considerable support for this proposition, because our results were far from 'symmetric' in a number of cases. This suggests that beneficial characteristics of the primary member are not necessarily those that would best befit the secondary member. With regards to age, growth tends to be higher if the primary member is younger than the second. With regards to type of education, we obtained a mixed set of results, although businesses with a commercially-minded individual playing a secondary role performed better in terms of survival and growth than when a commercially-minded individual was the primary member. More generally, our results for education type were far from symmetric. With some of our other variables, however, symmetry in characteristics space was associated with better outcomes (such as two Danes as members; or where both members are married (positive effects for firm survival); or two members with low education having the worst survival chances). This might indicate that the issue of diversity and performance should be placed within an NVT inputs-mediators-outcomes framework (Klotz *et al*., 2014) as the same diversity construct appears to have different outcomes depending on the structure in which the construct is created.

Proposition 2 stated that the effects of diversity were non-linear and complex and could not easily be represented using a linear unidimensional indicator. We observed that the 'optimal' position in characteristics space was not monotonically increasing – for example, low education was associated with low survival, but there was little dependence of survival on education above a certain threshold. We also observed that the 'optimal' position in characteristics space depended on the characteristics of the partner – a powerful illustration of this idea is that, controlling for other factors, a configuration of education types $\{i = VSC\_STEM, j = VSC\_Bus\}$ had high expected employment growth, while the inverse configuration $\{i = VSC\_Bus, j = VSC\_STEM\}$ yielded a negative coefficient (with respect to the base case of minimal education), and furthermore, changing the characteristics of the 'second fiddle' sometimes turned the coefficient from strongly positive to negative (compare e.g., employment growth for $\{i = Grad\ STEM,\ j = Bach\_STEM\}$ with $\{i = Grad\_STEM,\ j = Bach\_Oth\}$). Finally, another problem is that diversity will probably interact with firm size (this was not examined here because all businesses in our sample have the same start-up size of 2 individuals).

Taken together, our support for Propositions 1 and 2 provides justification for our methodology, which has identified effects of team composition on performance that could not have been uncovered using the standard diversity indicators. Consequently, we hope to create more awareness among researchers investigating the impact of diversity on teams about the vulnerability of the standard measures, both in terms of neglecting the hierarchical structure, and also that the existing summary measures are reductionist simplifications that may not be appropriate in all situations.

Proposition 3 predicted that diversity has different effects on survival and employment growth (even though these two could be considered as indicators of firm performance). In the case of family firms, we observe that they generally have an average performance for survival (because we observe no significant coefficients apart from a positive coefficient for spouses), although family firms are associated with slower employment growth. Regarding our employment growth regressions, we observe the largest negative effects for firms founded with mothers, then fathers, then spouses. This is consistent with the notion that family firms are under pressure to keep the family 'tradition' alive (perhaps even in the face of prolonged poor performance), although they do not seek employees either through a mistrust of 'outsiders' or an aversion to the perceived risks or growth. Similarly, firms composed of older members have better survival rates, but lower employment growth. Pairs of young members have the highest employment growth. This could be because pairs of older members do not

want to take risks or over-exert themselves, but would prefer to 'coast along' before retirement. Younger pairs seem to be more willing to 'experiment' in their businesses, having higher exit hazards but often experiencing faster employment growth. In further analysis, we complemented our employment growth results with findings relating to growth of sales and profits. Among our results, we found that ventures led by a male had higher growth of sales and profits, but not of employment, suggesting that ventures led by males have different priorities and seem to prefer jobless growth.

We anticipate that our findings will be of interest to the following parties: academic scholars interested in the effects of team composition and diversity on venture performance; angel investors interested in the outcomes associated with observed entrepreneurial partnerships; university entrepreneurship promotion schemes interested in complementarities between educational subjects;[27] policy makers interested in offering assistance to potentially high-impact new ventures; and entrepreneurs who are interested in choosing a partner for their new business idea, from a pre-selected list of possible candidates.[28]

Limitations

A number of caveats of our analysis can be mentioned. One open question is how valid our findings are for different institutional contexts in other countries. Denmark has a fluid labor market that has been described as being about as fluid as that of the US (Bingley and Westergaard-Nielsen, 2003), although there are generous state unemployment benefits for those who do lose their jobs. It is not clear, therefore, how easily our findings regarding employment growth can be generalized to countries with tighter job protection laws.

As with many other studies on entrepreneurial teams, this paper suffers from endogeneity. Studies such as ours that deal with voluntary participation in teams do not observe exactly what makes the individuals form teams. Therefore, our results are not intended for guiding how individuals should be 'fused' together as teams. Self-selection matters in establishing a team. We cannot identify the underlying mechanisms on why teams are formed, but given that entrepreneurial teams rely on voluntary participation there is likely to be a subjective motivation on the formation of the team, which is probably influenced by factors that remain unobserved to the econometrician. Our results do not purport to prescribe 'arranged marriages' in the sense that our results are not sufficient to say how one individual should be 'fused' to another individual they don't know, in order to make the 'ideal' entrepreneurial team. Instead, we merely observe start-ups that have formed themselves at time t, and observe regularities concerning the outcomes associated with these start-ups at time $t + 5$. We have no information on the business opportunity being exploited, or the quality of the business idea. It may, of course, be the case that higher-quality opportunities make it easier to team up with higher-skilled individuals.

Another issue that needs to be addressed is the member selection and identification. Since we rely on official tax records, we can only identify individuals that have a formal attachment to the start-up, an identification that is made only once a year. In addition, it might be that the secondary individual only later in the year joined the business; however, as mentioned before, early hiring decisions affect new venture performance (Baron *et al*., 1999; Weber and Zulehner, 2010). Furthermore, the distinction between primary and secondary partner is crucial. Some teams may be symmetric (some of these cases ($n = 225$) have been identified and dropped); however it is possible that power relations in a new venture go counter to the legalistic foundations of their relationship, in the same way that (according to the caricature) a CEO may be subservient to his secretary. Further work on this topic would be needed. In particular, our work would benefit from being complemented by detailed case studies and qualitative research to shed further insights on these themes, perhaps exploring informal power relations as opposed to the financial and legalistic hierarchical asymmetries in our data on which our analysis has focused.

Conclusion

This exploratory study on 3,777 entrepreneurial pairs, and the amount of detail that is provided by the Danish register data on these pairs, provide interesting insights into how team composition affects performance. In particular it places question marks on the way diversity is treated in the various studies that exist on the topic. First, we provided evidence that the effects of diversity are moderated by the hierarchical asymmetries that exist in new ventures. The hierarchical landscape is not flat, and hierarchical asymmetries between new venture team members moderate the mapping of inputs onto outputs. Second, aspects of diversity are not always well represented by a linear and unidimensional indicator. Third, diversity has a different impact on different performance measures.

[27]For example, our finding that pairs of educational profiles consisting of STEM and business do well (but are sensitive to the ordering), may have implications for encouraging collaboration between e.g. engineering departments and business schools.

[28]However, it should be clear that our results provide large-sample regularities rather than deterministic causal effects. Furthermore, the explanatory power of our regressions was not higher than about 20%. Entrepreneurs have richer information about their set of potential partners, and have detailed knowledge about the specificities of their business opportunities, personalities, strengths/weaknesses, technical challenges, etc.

Our results offer insights concerning the stereotype (to be found in venture capital circles or the university spinout literature) that startups have good technical ideas but poor business/commercial skills (and hence need venture capitalist (VC) business guidance to succeed). For example, Wennberg *et al*. (2011: 1138) write about the 'important imperative to assist USOs in building viable teams that have the requisite commercial experience to succeed'. We observed that it is better, in terms of employment growth, to be configured with STEM first and Business second, than to have a Business-educated member first and STEM second. This hints that there may be problems if the focus is on commercial aspects, with the technical side taking a back seat. Our analysis provides tentative evidence that while commercial skills are important, they should not dominate the technical aspects. Commercial viability should, perhaps, be seen as a constraint to be satisfied, rather than the primary aim of the new venture.

Our results show that family firms generally have lower growth performance, and policy-makers seeking to have a more efficient entrepreneurship policy should perhaps rethink the specific benefits these firms get. For example, it is not clear why, in the UK, family firms get implicit subsidies (such as relief from inheritance tax) even though they are observed to have a relatively poor performance (Bloom and Van Reenen, 2010).

Finally, we would like to provide some suggestions for further work. First, we consider that there is still plenty of opportunity for finding richer quantitative tools for analyzing diverse entrepreneurial teams. It seems slightly ironic to us that it is frequently acknowledged that diversity is a 'double-edged sword' and often yields mixed results, and yet researchers generally compress the numerous dimensions of diversity into a single indicator and then calculate the 'average effect' through standard regressions. We would like to see more 'diversity' in quantitative research into the role of diversity in teams. For example, future work could try to decompose the two edges of the 'sword' to investigate which factors affect conflict more than creativity (that is, distinguishing between the 'gross' and the 'net' costs and benefits of diversity). Second, it would be interesting to see if the degree of diversity in an entrepreneurial team affects the likelihood that the member will stay with the firm in later years. Although there does exist literature on team member exit (Ucbasaran *et al*., 2003; Chandler *et al*., 2004; Hellerstedt *et al*., 2007), the time span of these studies are limited.

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Appendix

Table A1 Summary statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
age *i*	3777	36.967	10.263	15	91
age *j*	3777	33.615	11.941	15	79
male *i*	3777	0.700	0.458	0	1
male *j*	3777	0.617	0.486	0	1
dane *i*	3777	0.881	0.324	0	1
dane *j*	3777	0.867	0.340	0	1
educ_level (*i*)	3678	1.997	1.097	1	5
educ_level (*j*)	3639	1.722	0.977	1	5
educ_type (*i*)	3777	0.387	0.900	0	3
educ_type (*j*)	3777	0.260	0.770	0	3
survival	3777	0.333	0.471	0	1
empl (t = 5), November headcount	1259	4.563	5.310	0	88
empl (t = 5), FTE	1259	3.223	3.919	0	60
turnover (100k DKK) (t = 5)	892	50.597	114.642	0.960	2007.530
family firm: brother	3777	0.032	0.175	0	1
family firm: spouse	3777	0.073	0.261	0	1
family firm: mother	3777	0.030	0.170	0	1
family firm: father	3777	0.049	0.216	0	1
family firm	3777	0.184	0.387	0	1
2-digit industry experience (*i*)	3777	0.443	0.497	0	1
2-digit industry experience (*j*)	3777	0.387	0.487	0	1
4-digit industry experience (*i*)	3777	0.317	0.465	0	1
4-digit industry experience (*j*)	3777	0.262	0.440	0	1
co_worker	3777	0.081	0.272	0	1
same_school	3777	0.045	0.207	0	1
Copenhagen	3777	0.449	0.497	0	1