Ethnic diversity and team performance: a randomized field experiment*

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Abstract

One of the most salient and relevant dimensions of team heterogeneity is ethnicity. We measure the causal effect of ethnic diversity on the performance of business (start-up) teams using a randomized field experiment. We follow 550 students who set up 45 real companies as part of their curriculum in an international business program in the Netherlands. We exploit the fact that companies are set up in realistic though similar circumstances and that the population consists of 55% students with a non-Dutch ethnicity from 53 different countries of origin. As outside researchers, we were allowed to exogenously vary the ethnic composition of otherwise randomly composed teams. We find that ethnically diverse teams perform better in terms of their business outcomes (sales, profits and profits per share). In line with theoretical predictions, our data suggest that ethnic heterogeneous teams accomodate a more diverse pool of relevant knowledge facilitating (mutual) learning. This could partially explain their better business performance.

JEL-codes: J15, L25, L26, M13, C93, D83

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1 Introduction

> It is impossible to pick up a business publication these days without reading about the wonders of teamwork. [...] Once teamwork is accepted as a basic business principle, it is not much of a stretch to think about teams that are comprised of diverse individuals, coming from different countries and cultures. (Lazear, 1999, p. 15)

We measure the causal effect of ethnic diversity on the performance of business (start-up) teams using a randomized field experiment. Teams have become increasingly important as decision making bodies. This is the case in many sorts of organizations, varying from judges in collegial courts or academic researchers to business start-ups (Hamilton et al., 2003). Consequently, the effective composition or diversity of teams has become an interesting topic of research (Prat, 2002; Hoogendoorn et al., 2011).

One of the most salient dimensions of team heterogeneity is ethnicity (Alesina and La Ferrara, 2005). It is commonly measured based on country of birth, of the individual or of his/her parents. Ethnic diversity implies heterogeneity in (mother) languages, religions, races and cultures (Alesina and La Ferrara, 2005). It also coincides with a variety of norms, information sets, knowledge and ability levels (Lazear, 1999; Morgan and Vardy, 2009). This variety affects the formation and performance of teams. Ethnic diversity would benefit team performance due to a more diverse pool of skills and knowledge that leads to complementaries and mutual learning. For example, due to complementarities and learning opportunities, ethnically diverse teams are associated with more creativity and innovation (Alesina and La Ferrara, 2005; Lee and Nathan, 2011; Ozgen et al., 2011b). On the other hand, the costs associated with more ethnic diversity would be related to more difficult communication and coordination (Lazear, 1999; Morgan and Vardy, 2009).[1] All in all, ethnic diversity is a major source of heterogeneity.

Ethnic diversity is highly relevant in an increasingly globalized world. Multinational firms often staff teams internationally and local populations -especially in big cities- become more mixed and multicultural. Ethnic diversity is a current fact of life and the share of ethnic minorities in Western populations is increasing sharply (Lazear, 1999; Alesina and La Ferrara, 2005; Ozgen et al., 2011b). In the United States, for instance, the share of minorities is expected to rise from about one-third to roughly the majority in 2042 (Bernstein and Edwards, 2008). As a consequence, it is likely that any team in the workplace will become more and more diverse in terms of ethnicity, even if the optimal team formation would indicate otherwise.

The relevance and potential impact of ethnic diversity in teams motivate our choice for the topic of this study. Our approach of a randomized field experiment among business teams that start up in identical circumstances is motivated based on the literature. Team

[1] Ethnic diversity may also affect group formation and performance through its influence on the group culture (Earley and Mosakowski, 2000; Richard et al., 2004) and the strategic behavior of individual team members (Alesina and La Ferrara, 2005).

formation is obviously driven by prospective productive consequences. If the situation carries a higher likelihood that an ethnically diverse team is beneficial, the team composition will be more mixed (Boisjoly et al., 2006). Hence, the measured effects of diversity on performance in real-world teams are likely to be biased due to endogeneous team composition. Examples of studies conducted on teams in real organizations include Hamilton et al. (2004), Leonard and Levine (2006), Carter et al. (2010) and Parrotta et al. (2010). They offer an ambiguous picture (Alesina and La Ferrara, 2005).[2]

Laboratory experiments do not suffer from endogenous team composition. Experiments in the lab have established results that are largely consistent with the theory proposed by Lazear (1999). An optimal degree of heterogeneity results from the trade-off between the benefits of more diversity and the associated increased communication costs (Alesina and La Ferrara, 2005). The downside of laboratory studies is that their resemblance to real-world situations may be limited. Moreover, they typically measure short-term effects, whereas the consequences of a team's diversity in terms of, for example, coordination, communication, complementarities and learning are not likely to become evident instantaneously (Boisjoly et al., 2006). It is thus useful to study the effects of team composition in the longer run and preferably in more realistic circumstances.

Indeed, some studies measuring the effect of ethnic diversity have tried to combine the advantages of studies in real organizations with experimental studies by carrying out field or 'quasi' experiments. Hansen et al. (2006) resemble the design of a field experiment. They measure the impact of demographic diversity (age, gender and ethnicity) in student groups of four to five students on the team's academic performance and find no effect.[3] Boisjoly et al. (2006) find that attitudes and behaviors change when people of different races are randomly assigned to live together at the start of their first year of college. White students assigned to African-American roommates show to be significantly more empathetic to these groups.

We conclude that measurements of the causal effect of a team's ethnic diversity on its performance in the longer run are scarce. This kind of measurement is the objective of our study. To this end, we conducted a randomized field experiment in the context of a compulsory entrepreneurship program for undergraduate students in international business at the Amsterdam University of Applied Sciences. We follow 550 students who set up and manage 45 real companies as part of their curriculum in the academic year 2008-2009. We exploit the fact that the -otherwise homogeneous- population consists of 55% students with a non-Dutch ethnicity from 53 different countries of origin. As outside researchers, we

[2]Other studies examine the effects of ethnic diversity on productivity at the country (Montalvo and Reynal-Querol, 2005), region (Ozgen et al., 2011a) or city level (Ottaviano and Peri, 2006; Lee and Nathan, 2011). Related are also studies measuring the impact of ethnic composition of schools or neighborhoods on educational outcomes (e.g., Hoxby, 2000; Angrist and Lang, 2004; Card and Rothstein, 2007; Hanushek et al., 2009; Aslund et al., 2011).

[3]Group composition is random and no exogenous variation is imposed. Teams are required to select one of three contract forms that determine the authority of grading. The drawback of this design, when interested in the bare effect of ethnic diversity on team performance, is that the effect of interest may be confounded by the contract choice (that may be related to ethnic diversity).

were allowed to exogenously vary the ethnic composition of otherwise randomly composed teams. The resulting percentage of students with a non-Dutch ethnicity per team varies from 20% to 90%. We use a rather common definition of ethnicity, i.e., parents' country of birth.

Our randomized field experiment implies a level of controlled circumstances comparable to the laboratory. All teams started up companies at the same time and under equal circumstances and all members were selected from a pool of students, minority or Dutch, of the same caliber. The imposed ethnic diversity is realized at the team level (not companywide or only in the management team of the company). The large variation (20-90%) enables us to capture possible non-linearities in the relationship between ethnic diversity and team performance. On the other hand, the entrepreneurship program and the truly joint task with strong incentives to maximize shareholder value of a company in a real market resemble realistic circumstances that are not likely to be mimicable in a laboratory setting. In particular, these circumstances give rise to the formation of a real team in which people have time to establish roles and observations of other team members.

What kind of results might we expect? We combine Lazear's argument (1999) that there is a trade-off between the costs and benefits of an ethnically more diverse team with recent insights from Earley and Mosakowski (2000) and Richard et al. (2004) based on Blau's theory of heterogeneity (1977). These studies refine Lazear's argument by allowing the costs of communication and coordination to be a non-linear function of ethnic diversity. Moderately heterogeneous teams would incur higher costs of communication and coordination than teams that are homogeneous or heterogeneous in terms of ethnicity. In these moderately heterogeneous teams subgrouping along ethnic lines may have negative effects such as distrust, conflicts or stereotyping between distinct subgroups.[4]

The non-linear relationship between communication costs and ethnic diversity could perhaps be illustrated by considering three team compositions: (i) with a low percentage of minorities, (ii) with a substantial subgroup of minorities, and (iii) with a majority group of minorities. In the first situation the communication costs are probably low. The few minorities present will perhaps not participate in the team process and be left aside. This is costly in the sense that their productivity is lost, but communication can be low cost too and based on habits, language and norms of the majority group (i.e., with a single identity). In the second situation the group that may not take part in the productive process of the majority is larger. Segregated subgroups may be formed by the majority and the others with distinct manners of work. Hence, the cost of diversity at this stage is higher. In the third situation, in a truly ethnically diverse team, the costs of communication and coordination have probably become lower due to the absence of subgroups and the

[4] Akerlof and Kranton (2005) show that teams' identity could act as a substitute mechanism for formal incentive schemes. In a series of laboratory experiments, Charness et al. (2007) find that group membership, and identification with this group, influence individual behavior in strategic environments. Moreover, individuals tend to operate significantly more altruistic towards ingroup members than to outgroup individuals (Chen and Li, 2009). In a field experimental setting, Dugar and Shahriar (2010) find that group identity can reduce moral hazard problems.

desirability for every team member to participate in a hybrid team culture with a diverse identity (Earley and Mosakowski, 2000; Richard et al., 2004).

We thus expect that the costs of ethnic diversity rise according to an inverse U-shaped pattern, whereas the benefits of complementarities and mutual learning may be an(y) increasing function of ethnic diversity (Lazear, 1999). However, due to the fact that we do not have any conjectures about the specific forms of the cost and benefit functions relative to each other, the effect of ethnic diversity on (the net benefits of) team performance remains a question that needs to be answered empirically. The answer that we put forth based on empirical analysis of our randomized field experiment is the following. The impact of a team's ethnic diversity on business performance in terms of sales, profits and profits per share is positive, although only starting at a certain turning point at which at least half of the team is ethnically diverse. Before this turning point the relationship is flat or slightly negative. More (mutual) learning could partially explain why ethnic heterogeneous teams achieve better results. Ethnically diverse teams also have a more diverse pool of relevant knowledge facilitating (mutual) learning.

The contribution of our study to the literature is the following. Our method of a randomized field experiment enables us to measure the causal impact of ethnic diversity on team performance in the longer run. Hence, we obtain our results in a rather controlled but realistic setting. This setting is characterized by a sample of teams that start up a real business venture and are followed during their year-long program in entrepreneurship. The small business setting is of wider relevance. The high level of control is defined by the similar circumstances in which these firms are founded and the randomized assignment of team members to teams based on their ethnic background. The large exogeneous variation results in widely varying teams along this dimension that are otherwise comparable. Finally, the extensive questionnaires enable us to measure and assess the validity of various underlying mechanisms of ethnic diversity and team performance.

The remainder is organized as usual. Section 2 provides information on the context and design of the experiment. In section 3 we describe the data and present results from randomization checks. In section 4 we show the empirical findings. Section 5 discusses and concludes.

2 Context and design

2.1 Context

The teams in our experiment take part in the Junior Achievement (JA) Young Enterprise Start Up Program (in the US known as the JA company program). This is the worldwide leading entrepreneurship education program in secondary education (US and Europe) and post-secondary education (only Europe). In 2009, almost 10 million students from 123 countries participated in JA-programs on work readiness, financial literacy and entrepreneurship (JA Worldwide annual report, 2009), including more than 3 million students from 38 European countries (JA Europe annual report, 2009).

The entrepreneurship program is a compulsory part of the curriculum of international business studies at the Amsterdam College of Applied Sciences. It lasts for an entire academic year and covers about one-fifth of students' first-year undergraduate curriculum in all sub-departments.[5] Our experiment was conducted in the academic year 2008-2009.[6] The program requires students to set up and run a business venture with a team of approximately 10 to 12 fellow students. Students issue shares, appoint officers and delegate tasks, produce and market products or services, keep the accounts and organize shareholders' meetings. Students frequently interact, build up relationships, and create routines and processes to achieve their common goal. In addition, each student company is supported by a coach from the business world and an accountant. Throughout the program the teams report regularly to their professor, business coach and accountant. Professors, business coaches and accountants are randomly matched to teams. The companies also pay taxes and social security payments.

Student companies generally operate as follows. They start with appointing an interim CEO. Teams then elect officers and delegate tasks among their members. About half of the team works in non-management positions and the other half holds specific management positions including the CEO and CFO. After half a year the management positions are redistributed among the formerly non-managing part of the team.[7] Right from the beginning teams also start to brainstorm about possible products or services, where promising business ideas are further analyzed by conducting market research. Subsequently, the most viable business idea is selected and developed. Once the corporate plan has been finished, teams start to raise capital and organize a shareholders' meeting. Business operations start as soon as the majority of shareholders approves the corporate plan. Production and marketing of products or services then become the key activities. At the end of the program all companies are liquidated and teams present their annual report for approval at the final shareholders' meeting. Profits are proportionally divided among the shareholders. Team characteristics such as their size, ethnic composition and the product or service they sell are listed in Table A1 in the Appendix. Our sample includes 45 teams with (initially) 550 students in total, i.e., approximately 12 students per team on average.

Ethnicity

Students are defined as native or Dutch if both parents are born in the Netherlands, whereas students are considered immigrant, minority or non-Dutch if at least one parent is not born in the Netherlands (see Hartog, 2011). The share of students in our sample

[5] The department of international business studies is divided into five sub-departments: management, business management, financial management, trade management Asia and business languages.

[6] We also randomized students into teams based on their gender in the academic year 2008-2009 (see Hoogendoorn et al., 2011). Since gender diversity and ethnic diversity are orthogonal this will not contaminate our results in this paper.

[7] The relationship between the ethnic composition of teams and their allocation of roles across ethnicities is discussed in the next subsection.

with a non-Dutch ethnicity is 0.55.[8] We measure ethnic diversity dichotomously. This is consistent with previous empirical studies (Hamilton et al., 2004; Boisjoly et al., 2006; Hansen et al., 2006; Carter et al., 2010) as well as with our assignment of students to teams (see next subsection).[9] Students with a non-Dutch ethnicity are born abroad in 38% of the cases, whereas 82% of the fathers is born abroad and 87% of the mothers. In 69% of the cases both the father and the mother are born abroad.

Table 1 shows that the students in our sample are from 53 different countries of origin with an average number of approximately 6 different countries of origin per team (panel A). For the purpose of presentation, the descriptive statistics in Panel B are clustered by continent (see Parrotta et al., 2010). They show that ethnic variation among minority students is substantial. Panel C shows that there are virtually no ethnic clusters at the team level. The vast majority of ethnic minority students has no team members from the same country of origin (70%), whereas not even 20% of the ethnic minority students has only one team member from the same country of origin (the average number of students with a non-Dutch ethnicity per team is approximately 6.8 at the start of the program). Hence, we can safely assume that the share of students with a non-Dutch ethnic background is a true indicator of the team's ethnic diversity, which varies exogenously and substantively.[10]

< Insert Table 1 around here >

2.2 Design

One week before the start of the entrepreneurship program the school administration shared with us the students' names, gender and field of study. Based on students' names we determined their ethnicity, Dutch versus non-Dutch (see Mateos, 2007 for a motivation of this name-based determination). Nearly 90 percent of the name-based classifications matched with students' actual ethnicity that we retrieved through a pretreatment survey one week later. As expected, most of the mismatches in the category of ethnic minority students occured among those with Dutch fathers.

Subsequently, we defined the fractions of ethnic minority students for each team per field of study and assigned students with Dutch and non-Dutch ethnicity randomly to teams according to these fractions. The program coordinators enforced this assignment

[8] The average share of minorities in Dutch higher vocational schools is approximately 0.20, which is close to the population average (Hartog, 2011). The considerably higher share here reflects the international character and student group of this program in the multicultural capital of Amsterdam.

[9] An alternative way of measuring ethnic diversity takes the country of (parental) origin into account and is expressed in terms of Blau's diversity index (1977), $1 - \sum_{i=1}^{N} p_i^2$. Here, p is the share of individuals in a (ethnic) category i and N the number of (ethnic) categories. The downside of Blau's diversity index is that it implicitly assumes that each category is different from another *to the same extent*. The upside, though, may be that it takes into account that diversity is larger when ethnic minority students originate from all distinct countries than when they or their parents are all born in the same foreign country. However, our initial assignment of students to teams and, hence, the exogeneous variation in teams' diversity is based on the dichotomous measure of ethnicity. As a consequence, we can only use that measure convincingly to study the causal effect of ethnic diversity on team performance.

[10] Robustness checks in section 4 indicate that inclusion of the number of different countries of origin (to the share of ethnic minority students in a team) does not change the main results.

successfully (only six students changed teams during the year). Neither professors nor students were informed about the nature of the imposed team assignment. Professors and students only knew that a research project was conducted which required to stick to the imposed team assignment. Based on interviews with students, we are confident about their uninformedness.

Figure 1 shows, based on the actual ethnic status of students (from the pretreatment survey), the frequency distribution of the share of minorities per team at baseline. The share of minorities which is exogenously imposed and unknown to the students ranges from 0.2 to 0.9. This substantial variation in the share of minorities enables us to study the causal impact of teams' ethnic diversity on their business performance. Note that teams with a relatively high share of minorities are actually heterogeneous in terms of ethnicity (due to the limited presence of ethnic clusters within teams).

< Insert Figure 1 around here >

Composition dynamics

During the year 104 students (19%) dropped out.[11] This reduced the average team size from 12 at the start of the program to 10 at the end. Dropouts did not alter the overall share of minorities or contaminate the design of our experiment. First, the ethnic composition of teams is largely unaffected. The correlation between teams' share of minorities at baseline and at the end is 0.86. Second, dropout rates do not vary across teams in relation to their ethnic composition. Regression coefficients of the share of minorities at baseline (and its square) when explaining dropout decisions are insignificant.

Student companies appoint a management team twice, for the first and second half of the program. Tests indicate that the ethnic diversity of the entire team -on which the treatment is based- is a realistic reflection of the management team (possibly the more influential part of the team). Regressing the share of minorities in the management team on the share of minorities in the entire team returns a coefficient of 0.95 for the first half of the program and 0.97 for the second half. These coefficients are similar for median regressions that minimize the effect of possible outliers. F-tests further indicate that none of these coefficients are significantly different from 1.

All in all, we are confident that the realistic dynamics that take place after the initial asssignment of students to teams have not contaminated our design.

Incentives

The program provides various (team and individual) incentives to align students' interests with the business performance of their company. At the indidual level, incentives are

[11] The average dropout rate for first-year students in Dutch higher vocational schools is about 30% including students that switch study and/or school (HBO-raad, 2010). These rates are commonly high in the Netherlands, where selective admission of students on the basis of grades or achievements is not allowed. For international programs, such as the one studied here, dropout rates are much lower since these programs generally attract students that are more motivated.

generated by the threat of dismissal in case of underperformance, which implies exclusion from the program, a loss of credit points and thus a much lower chance of obtaining an undergraduate degree (that requires a minimum number of credit points in the first year). Dismissal requires two-third of the team members' votes plus the approval of their professor. It is a credible threat: half of the teams experiences at least one dismissal and the average number is 0.73 per team.[12]

Students' grades for the program (20% of GPA) are determined by both individual and team performance with unspecified weights. An indicator of the considerable weight of individual performance is that the average difference between the highest and lowest grade within a team is 1.3 (on a scale from 1 to 10). The relevance of team performance for students' grades is indicated by the positive correlations between the average grade in the team and business performance in terms of, for example, sales (0.34) or positive profits (0.18).

Team incentives are further provided by a formal business competition. At the end of the program, six selected teams present their results in a 'business pitch' to a jury of entrepreneurs who select a winner based on business outcomes and presentations. The winning team obtains a cup, often gets some (local) press attention and will represent the college in the national competition. In addition, virtually all students own shares of their company. Other shareholders are usually family members, friends or acquaintances.

Reported effort levels in terms of hours are a quantitative reflection of the effectiveness of these incentives. On average, students spend about 8.1 hours per week (s.d. 3.8) on the program, which covers 20% of the curriculum. This is substantial relative to the 32 hours per week students in Dutch higher vocational schools spend on their education (Allen et al., 2009). The incentives discussed above make it likely that the efforts of students are directed towards the business outcomes we measure.

3 Data

Data about teams and individuals was collected through administrative data, teams' annual reports and three extensive surveys. Students filled out a survey at the first day of the academic year (pretreatment, in September 2008), halfway (in January 2009) and at the end of the program (posttreatment, in May 2009). Response rates are respectively 88%, 86% and 78%. We use the information obtained through the questionnaires for various purposes. Based on this, we check the validity of the name-based assignment of students to ethnicities and the random assignment of students to teams given their ethnic background. Moreover, the questionnaires enable us to relate our findings to and control for individual and team characteristics and processes (regarding complementarities, learning, communication and coordination).

Table 2 reports descriptive statistics of individual and team characteristics. The pre-

[12]The occurrence and number of dismissals are neither related to a team's business performance nor to its ethnic composition.

treatment survey administers individual characteristics such as age (19.4 years), gender (44% female), mathematics grade (6.39 out of 10), grade point average (6.46 out of 10) and field of study.[13] In addition, all three surveys include self-assessments of the knowledge that students have in seven areas that are relevant for successful entrepreneurship (see Minnitti and Bygrave, 2001; Karlan and Valdivia, 2011). Hence, we can trace the individual development of these knowledge areas during the year as a proxy for learning (reported in Table 2 are knowledge levels at baseline on a scale from 1 to 5). Finally, at the team level, we are most interested in the procedures and routines followed to better understand any differences in performance between teams. The posttreatment questionnaire administers standard sets of questions to measure students' self-assessments of, for example, conflicts and atmosphere in the team.

Business performance metrics are gathered or calculated from the companies' annual reports that we obtained from 43 out of 45 teams (see Table 2). We measure sales, profits and profits per share in euro. We also add a binary indicator of positive profits because students tend to view as the bottom line result whether they are able to satisfy their shareholders. Average sales amount to 841 euro with a standard deviation of 699 euro. Profits are on average negative at -69 euro varying from a loss of 1016 euro to a profit of 477 euro. 22 teams make positive profits, while 21 teams run a loss. Profits per share vary between -15 and +15 euro.[14]

< Insert Table 2 around here >

Randomization

To examine whether students are randomly assigned to teams of different ethnic composition, we regress students' characteristics on the share of minorities in their team and its square, separately for students of Dutch and non-Dutch ethnicity. This is in line with the specifications of the main results in Table 4. The first four columns of Table 3 show that native (Dutch) students who are assigned to teams with many ethnic minority students are not systematically different from native (Dutch) students who are assigned to teams with few ethnic minority students. The same largely holds for ethnic minority students (see the last four columns of Table 3), although ethnic minority students assigned to teams of moderate heterogeneity in ethnicity are somewhat more likely to be male and less likely to study 'trade management Asia'. Note that students of Dutch and non-Dutch ethnicity have roughly similar characteristics since they are relatively young and all study in their first year at the department of international business studies of the Amsterdam College of

[13] Through standard batteries of questions we also obtain (unreported) validated measures of 'softer' individual characteristics that are associated with entrepreneurship: the 'big five' factor model of personality structure (Goldberg, 1990; Zhao and Seibert, 2006), and entrepreneurial skills and traits such as creativity, market awareness, networking, perseverance, need for achievement and risk aversion (see Parker, 2009; Oosterbeek et al., 2010).

[14] Shares have a nominal value of 20 euro. The mean number of shares issued is 52 (s.d. 21.5). The minimum and maximum numbers of shares sold amount to respectively 15 and 100. On average, half of the shares are bought by team members themselves.

Applied Sciences. Nevertheless, based on the analyses in this subsection we will perform various robustness checks in the next section.

< Insert Table 3 around here >

4 Results

4.1 Main finding

Table 4 shows the relationship between the share of minorities in a team and four measures of business performance: (ln)sales, profits, profits per share and the probability of profits being positive. Note that a larger share of minorities tends to go together with a more ethnically diverse team (team members of non-Dutch ethnicity come from different countries of origin).

In panel A performance measures are regressed on the share of minorities in the team and its square. The first three columns report a u-shaped relationship between the share of ethnic minorities in the team and sales. The minimum supported by these regressions lies around a share of 0.55. The coefficients of the linear and quadratic term are significant at the 10%-level only in the case of the commonly used specification in terms of ln(sales). These results indicate that increasing the share of minorities from 0.6 to 0.7 increases sales by about 3%, while an increase from 0.7 to 0.8 increases sales by approximately 13%.

Columns (4) and (5) report results from least squares and median regressions with profits as the dependent variable. In column (4) neither the linear term nor the quadratic term is significantly different from zero, although the coefficients are jointly significant at the 10%-level. The results from the median regression show that these findings are sensitive to outliers. The point estimates are substantially larger and both coefficients are now significant at the 5%-level. The relationship between profits and the share of minorities tends to follow a u-shape with a minimum of 0.56. In column (6) performance is measured as a binary indicator of positive profits. Both coefficients are significant at the 5%-level and the share of minorities that minimizes the probability of profits being positive drops to 0.52. Finally, the last two columns report results from least square and median regressions when the dependent variable is profits per share. None of the coefficients are (jointly) significant.

< Insert Table 4 around here >

We next fit more flexible spline functions that allow for distinct slopes above and below 55% of minorities in the team (Panel B). Spline functions may be particularly informative in our setting since the distribution of share of minorities has asymmetric properties, i.e., teams with a relatively high share of ethnic minority students are actually heterogeneous in terms of ethnicity. The cutoff at 55% is based on the results of the less flexible quadratic specifications that indicated that team performance is minimized at approximately this

share of minorities (which also happens to be the sample average). All coefficients for the share of minorities, given that they are above 0.55, are positive and (with two exceptions) statistically significant. All coefficients for the share of minorities, when lower than or equal to 0.55, are negative and in one case significantly so. The number of teams may limit the precision of these estimates.

The results presented in this subsection show that the relationship between team performance and ethnic diversity is flat or tends to decline down to a certain threshold level and starts increasing beyond this threshold level. The specific level of this threshold varies slightly across performance measures, but is around a share of minorities of 0.55. Only if ethnic diversity is sufficiently substantial the net effect of ethnic diversity on team performance is positive. This finding is consistent with the idea that the costs of coordination and communication offset the benefits of complementarities and (mutual) learning in homogeneous and moderately heterogeneous teams, while the benefits of sharing and exchanging relevant knowledge outweigh these costs in more heterogeneous teams.

4.2 Costs and benefits of ethnic diversity

In this section we test whether there is any suggestive evidence for these underlying mechanisms using the information gathered for this purpose through the questionnaires. For communication and coordination, we expect that moderately heterogeneous teams incur higher costs of communication and coordination than teams that are homogeneous or heterogeneous in terms of ethnicity. Coordination and communication costs are operationalized by standard sets of questions about teams' atmosphere and conflicts (see Earley and Mosakowski, 2000; Richard et al., 2004). Teams' atmosphere is administered by asking students to rate the atmosphere within their team on a 5-points scale in the posttreatment survey. Likewise, conflicts in the team are surveyed by asking students to what extent there was conflict or disagreement between team members about personal matters (that are not task-related). More personal conflicts and a worse team atmosphere are expected to result from worse communication and coordination due to, for instance, subgrouping along ethnic lines, distrust or stereotyping.

We measure whether teams' atmosphere and conflicts are related to ethnic diversity as well as to business performance. Satisfaction of these conditions would suggest that coordination and communication costs might be an underlying mechanism explaining the relationship between a team's ethnic composition and its performance. In line with Alesina and La Ferrara (2005), we find that homogeneous and moderately heterogeneous teams tend to experience less conflicts than heterogeneous teams (not tabulated). However, this relationship is only marginally significant and conflicts also do not translate into lower business outcomes. Moreover, the data indicate that teams' atmosphere and ethnic diversity are not significantly related. In sum, the data do not suggest that communication and coordination cost explain our main finding.

For the benefits, we expect a positive relationship between ethnic diversity and busi-

ness performance due to more complementarities and learning in ethnically diverse teams. We measure learning in terms of the development in seven knowledge areas that are relevant for successful entrepreneurship: business, management, entrepreneurship, strategy, organization, administration and leadership (see Minnitti and Bygrave, 2001; Karlan and Valdivia, 2011). For each of these knowledge areas, the indicator of individual learning is the difference between the self-assessed level in the posttreatment and pretreatment questionnaire.

Table 5 reports results from least squares regressions (panel A) and spline functions (panel B) of learning in different knowledge areas on the share of minorities. The results show a U-shaped relationship between ethnic diversity and team-average learning, especially for the development of knowledge in business, entrepreneurship and leadership. Spline functions in panel B (cutoff again at a share of minorities of 0.55) indicate that the relationship between learning and share of minorities is flat or declines down to a threshold level of 0.55 and starts increasing beyond this threshold level. Hence, on average, members of ethnic heterogeneous teams learn more than members of homogeneous and moderately heterogeneous teams. Additional regressions at the individual level, that we run separately for students of Dutch and non-Dutch ethnicity, show that the learning benefits of more ethnic diversity accrue to similar extents to both groups. Moreover, and probably as an explanatory factor of the higher learning levels in more diverse teams, the data tell us that ethnically diverse teams enter the entrepreneurship program at the start with a more diverse pool of relevant knowledge than less heterogeneous teams (see Lazear, 1999). Table 6 shows that complementarities between team members and the coefficients of variation of business, entrepreneurship and leadership knowledge at baseline are larger in ethnically diverse teams.[15]

< Insert Table 5 around here >

The higher average learning in more ethnically diverse teams could only explain better performance if learning and performance are positively related. This is indeed the case. The coefficients of regressing the various business outcomes on team-average learning in business, entrepreneurship and leadership are respectively: 0.16 (s.e. 0.21), 0.56 (s.e. 0.27) and 0.14 (s.e. 0.23) for (ln)sales; 0.13 (s.e. 0.15), 0.32 (s.e. 0.17) and 0.14 (s.e. 0.19) for positive profits; 0.41 (s.e. 1.05), 3.41 (s.e. 2.06) and 2.33 (s.e. 2.19) for profits per share. All in all, the results support the idea that ethnic diversity benefits team learning possibly leading to better business performance. However, when adding the metrics for learning to the regression equations in Table 4 the main effects remain of comparable size and significant. Hence, the benefits from (mutual) learning in ethnic heterogeneous teams may only partially explain why these teams perform better.

Our findings in this subsection are partly consistent with the theoretical ideas formulated in section 1. More (mutual) learning could partially explain why ethnic heterogeneous

[15]The note of Table 6 defines how we measure complementarities and heterogeneity in the relevant knowledge dimensions.

teams achieve better results. Ethnic heterogeneous teams also have a more diverse pool of relevant knowledge at the start of the entrepreneurship program facilitating (mutual) learning. On the other hand, we do not find support for the idea that moderately heterogeneous teams incur higher coordination and communication costs.

4.3 Robustness

We conduct robustness checks by including controls or excluding observations from the regression analyses presented in Table 4. We restrict the analyses to specifications with (ln)sales, the binary indicator of positive profits and profits per share, i.e., specifications (3), (6) and (7) in Table 4.

Since there are relatively few teams in our sample that have an extremely homogeneous or heterogeneous ethnic composition, we check whether trimming the tails from the distribution alters the main results. Table A2 in the Appendix shows that excluding teams with share of minorities $\leqslant 0.35$ (4 teams) or share of minorities $\geqslant 0.75$ (5 teams) does not change the overall picture, where the initial distribution ranged from 0.20 to a share of minorities of 0.90 (see Figure 1). If anything, the effects tend to become more pronounced relative to the estimates in Table 4.

As a second robustness check, we include all possible control variables discussed in section 3. Control variables are not included altogether due to the limited number of observations. Table A3 in the Appendix indicates that, separately for quadratic specifications and spline functions, none of the previous results was affected systematically by groupwise inclusion of team-average background characteristics of students, fields of study or team characteristics such as size and the number of different countries of origin.

5 Discussion and conclusion

This paper shows evidence of a positive impact of ethnic diversity on team performance, although only starting at a certain turning point at which at least half of the team is ethnically diverse. Before this turning point the relationship is flat or slightly negative. Hence, only if ethnic diversity is sufficiently substantial the net effect of ethnic diversity on team performance is positive. In line with theoretical predictions (Lazear, 1999), our data suggest that ethnic heterogeneous teams accommodate a more diverse pool of relevant knowledge facilitating (mutual) learning. This could partially explain why these teams perform better.

Our study is motivated by the fact that many decisions in organizations are nowadays assigned to teams (Hamilton et al., 2003), the increasing share of minorities in Western populations (e.g., Ozgen et al., 2011b) and that one of the most salient and relevant dimensions of team heterogeneity is ethnicity (Alesina and La Ferrara, 2005). However, measurements of the causal effect of ethnic diversity on team performance in the longer run are scarce. To this end, we conducted a randomized field experiment among student teams that start up a real company as part of their curriculum in an international business

program in the Netherlands. We exploit the fact that companies are founded in identical circumstances and that the population consists of 55% students with a non-Dutch ethnicity from 53 different countries of origin. As outside researchers, we exogenously varied the ethnic composition of otherwise randomly composed teams.

There are discrepancies between the business teams in our study and teams in the workplace. Individuals in our teams are relatively young, lack serious labor market experience and some of the teams have unprecedented high degrees of ethnic diversity. These characteristics might, to some extent, limit the external validity of our study. Moreover, although advantageous for the internal validity of our study, the random composition of teams is probably not entirely representative of common practice in business. Finally, our experimental design does not allow for a causal interpretation of mechanisms such as learning that lead to higher performance of ethnic heterogeneous teams.

Nevertheless, students' truly joint task with strong incentives to maximize shareholder value of a real company in which team members have time to establish roles and observations of other members closely resembles the functioning of teams in the workplace. Given the upcoming increase of the share of minorities in the labor force it is likely that any team in the workplace will become more and more diverse in terms of ethnicity. Our study provides a realistic preview of the impact of many distinct ethnic backgrounds in teams.

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Appendix A

< insert tables A1-A3 around here >

Figures and tables

Table 1. Descriptive statistics of ethnicity

A: Ethnicity (team level)	Mean	SD	Min	Max
Share of minorities	0.554	0.161	0.200	0.900
Number of different countries of origin	6.044	1.821	3.000	12.000

B: Ethnicity (≈ continent)	Fraction
Netherlands (native)	0.45
North America / Oceania	0.01
Central and South America	0.15
Formerly Communist Countries	0.02
Muslim Countries	0.17
East Asia	0.06
Asia	0.04
Africa	0.03
Other European Countries	0.07

C: Ethnic minority students with number of team members from the same country of origin*	Fraction
0	0.70
1	0.19
2	0.05
3	0.01

Note: Based on information from 550 students and 45 teams. Ethnic minority students are from the following countries of origin: *North America / Oceania*, Australia, Canada, United States; *Central and South America*, Antilles, Argentina, Barbados, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Guyana, Honduras, Jamaica, Peru, Surinam; *Formerly Communist Countries*, Russia and other East European countries; *Muslim Countries*, Afghanistan, Algeria, Egypt, Eritrea, Guinea, Indonesia, Iran, Iraq, Malaysia, Morocco, Nigeria, Pakistan, Palestine, Somalia, Tunisia, Turkey; *East Asia*, China, Hong Kong, Japan; *Asia*, other Asian countries not included in categories of East Asia and Muslim Countries (India, Laos, Philippines, Singapore, Vietnam); *Africa*, other African countries not included in category of Muslim Countries (Angola, Cameroon, Cape Verde, Gabon, Ghana, Kenya, South Africa); *Other European Countries*, other European countries not included in category of Formerly Communist Countries (Germany, Israel and other West European countries). *Ethnic minority students in 2 teams have respectively 4 and 6 team members from the same country of origin. Excluding these teams from the sample does not change the main results.

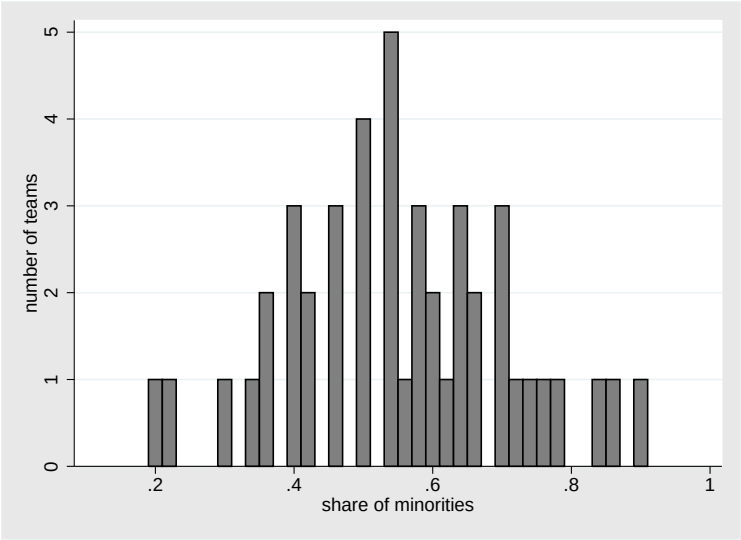

Figure 1. Frequency of share of minorities per team

Table 2. Descriptive statistics of individual and team characteristics

A: Individual level		Mean	SD	Min	Max
Background characteristics	Age	19.39	1.99	15.98	30.92
	Gender	0.44	0.50	0.00	1.00
	Mathematics grade	6.39	0.87	4.00	9.00
	Grade point average	6.46	0.84	3.00	8.50
Field of study	Business Management	0.44	0.50	0.00	1.00
	Management	0.11	0.31	0.00	1.00
	Trade Management Asia	0.19	0.39	0.00	1.00
	Business Languages	0.21	0.41	0.00	1.00
	Financial Management	0.05	0.22	0.00	1.00
Entrepreneurial knowledge	Business	2.66	0.88	1.00	5.00
	Management	2.91	0.93	1.00	5.00
	Entrepreneurship	2.71	0.98	1.00	5.00
	Strategy	2.71	0.97	1.00	5.00
	Organization	2.71	0.98	1.00	5.00
	Administration	2.62	0.99	1.00	5.00
	Leadership	3.14	0.98	1.00	5.00
B: Team level		Mean	SD	Min	Max
Characteristics and processes	Size (at baseline)	12.22	2.09	8.00	16.00
	Conflicts	2.23	0.59	1.00	3.67
	Atmosphere	3.52	0.55	2.33	4.83
	Effort (hours/week)	8.05	3.76	3.00	20.25
Business performance	Sales (euro)	841.25	699.00	0.00	4209.49
	Profit (euro)	-69.17	317.57	-1016.36	477.15
	Pr(Profit)>0	0.51	0.51	0.00	1.00
	Profit/share (euro)	-0.51	6.42	-15.48	15.64

Note: Based on information from 550 students and 45 teams.

Table 3. Random assignment of native (Dutch) and ethnic minority students at the individual level

		Native (Dutch) students				Ethnic minority students			
		share of minorities		share of minorities squared		share of minorities		share of minorities squared	
Background characteristics	Age	1.990	(4.054)	-0.720	(3.838)	2.021	(4.140)	-3.347	(3.374)
	Gender	0.117	(0.655)	-0.594	(0.618)	-2.859**	(1.196)	2.359**	(0.966)
	Mathematics grade	-2.655	(1.864)	2.094	(1.759)	-1.145	(2.067)	0.549	(1.805)
	Grade point average	0.170	(1.039)	-0.150	(1.047)	0.198	(0.975)	-0.413	(0.879)
Field of study	Business Management	1.736	(2.830)	-1.907	(2.452)	1.922	(2.387)	-2.160	(1.925)
	Management	0.249	(1.361)	-0.353	(1.036)	1.103	(1.645)	-1.107	(1.282)
	Trade Management Asia	-1.144	(1.262)	1.743	(1.330)	-3.232*	(1.712)	3.549**	(1.511)
	Business Languages	-1.149	(2.254)	0.657	(1.911)	-0.752	(1.822)	0.404	(1.445)
	Financial Management	0.308	(0.517)	-0.141	(0.493)	0.958	(0.774)	-0.687	(0.635)
Entrepreneurial knowledge	Business	4.173**	(1.986)	-3.621*	(2.007)	-1.195	(1.613)	1.003	(1.380)
	Management	-1.011	(2.468)	1.459	(2.372)	-3.655	(2.581)	2.905	(2.149)
	Entrepreneurship	1.386	(1.864)	-1.154	(1.908)	-1.355	(2.077)	0.858	(1.784)
	Strategy	-0.474	(2.175)	1.400	(2.332)	-1.178	(1.937)	0.632	(1.590)
	Organization	-4.110	(2.880)	4.735	(2.976)	1.453	(2.072)	-1.245	(1.705)
	Administration	2.685	(1.953)	-2.438	(1.800)	1.763	(2.204)	-1.784	(1.723)
	Leadership	2.447	(2.533)	-2.530	(2.594)	-2.851	(2.676)	2.001	(2.209)

Note: Based on information from 550 students. Each coefficient comes from a regression at the individual level of the row variable on the column variables, separately for native (Dutch) and ethnic minority students. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table 4. Ethnic diversity and team performance

	Sales			Profits		Positive profits	Profits per share	
	Mean	Median	ln(sales)	Mean	Median	Mean	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A: Polynomial								
Share of minorities	-3953.2	-3308.3	-5.185*	-1850.0	-3129.8**	-4.808**	-28.865	-38.135
	(3587.5)	(4089.7)	(3.052)	(1558.1)	(1314.4)	(2.395)	(26.935)	(32.998)
Share of minorities squared	3163.6	3237.2	4.598*	1837.2	2799.4**	4.627**	29.883	32.388
	(3059.6)	(3545.8)	(2.598)	(1254.2)	(1170.6)	(1.967)	(22.506)	(30.197)
Minimum	*0.62*	*0.51*	*0.56*	*0.50*	*0.56*	*0.52*	*0.48*	*0.59*
R^2	*0.03*	*0.04*	*0.05*	*0.05*	*0.06*	*0.10*	*0.04*	*0.05*
B: Spline								
Share of minorities $\leqslant 0.55$	-1168.1	n/a	-1.315	-563.9	n/a	-1.793*	-9.369	n/a
	(1327.0)		(1.260)	(704.4)		(0.972)	(11.968)	
Share of minorities > 0.55	224.4		1.062	894.8**		2.321***	17.152*	
	(1042.1)		(0.997)	(414.2)		(0.660)	(8.560)	
R^2	*0.02*		*0.03*	*0.06*		*0.17*	*0.05*	

Note: Based on information from 43 teams. The linear effect of share of minorities on business performance turned out insignificant in all specifications. We also tested higher order specifications and these turned out being insignificant too. Similar results are obtained if we run M-estimator regressions, use bootstrapped standard errors or apply a dummy variable approach (with teams of low, moderate and high ethnic diversity). Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table 5. Learning and ethnic diversity

	Development in the knowledge of						
	Business	Management	E'ship	Strategy	Organization	Admin.	Leadership
A: Polynomial							
Share of minorities	-2.604*	-0.477	-3.443***	1.055	-1.246	-1.264	-3.359**
	(1.332)	(1.429)	(1.184)	(1.410)	(1.622)	(1.383)	(1.347)
Share of minorities squared	2.640**	0.769	3.159***	-0.741	1.691	1.923	3.089**
	(1.118)	(1.282)	(1.040)	(1.226)	(1.489)	(1.256)	(1.247)
Minimum	*0.49*	*0.31*	*0.54*	*0.71*	*0.37*	*0.33*	*0.54*
R^2	*0.35*	*0.43*	*0.38*	*0.32*	*0.50*	*0.50*	*0.30*
B: Spline							
Share of minorities $\leqslant 0.55$	-0.719	-0.163	-1.151**	0.369	-0.288	0.006	-1.239**
	(0.546)	(0.548)	(0.521)	(0.591)	(0.599)	(0.501)	(0.514)
Share of minorities > 0.55	1.299**	0.888	1.218***	0.104	1.495**	1.691***	1.329**
	(0.534)	(0.609)	(0.450)	(0.585)	(0.719)	(0.570)	(0.544)
R^2	*0.36*	*0.44*	*0.39*	*0.31*	*0.52*	*0.51*	*0.33*

Note: Based on information from 45 teams. Learning is based on the development of self-assessed knowledge that students have in seven areas that are relevant for successful entrepreneurship (measured at baseline and at the end of the program). All regressions control for team size and teams' average knowledge levels at baseline. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table 6. Complementarities and diversity in relevant knowledge

	Complementarities in relevant knowledge	Diversity in knowledge of Business	E'ship	Leadership
A: Polynomial				
Share of minorities	-4.454**	-0.320	-0.697	-0.589*
	(2.042)	(0.386)	(0.439)	(0.295)
Share of minorities squared	4.107**	0.305	0.712*	0.495*
	(1.702)	(0.333)	(0.377)	(0.253)
Minimum	*0.54*	*0.52*	*0.49*	*0.59*
R^2	*0.35*	*0.35*	*0.21*	*0.28*
B: Spline				
Share of minorities $\leqslant 0.55$	-1.211	-0.107	-0.175	-0.185
	(0.813)	(0.146)	(0.150)	(0.116)
Share of minorities > 0.55	1.338**	0.136	0.350**	0.100
	(0.650)	(0.136)	(0.146)	(0.102)
R^2	*0.34*	*0.35*	*0.22*	*0.27*

Note: Based on information from 45 teams. A diverse pool of relevant knowledge at the start of the entrepreneurship program is operationalized by: (i) complementarities between the self-assessed knowledge that team members have in business, entrepreneurship and leadership, and (ii) the coefficients of variation of business, entrepreneurship and leadership knowledge in teams at baseline. Complementarities are constructed by first standardizing all three knowledge dimensions, subsequently computing the teams' maximum for each knowledge dimension, and then determining the teams' minimum of the maximums of all three knowledge dimensions. All regressions control for team size and teams' average knowledge of business, entrepreneurship and leadership at baseline. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table A1: Team characteristics

#	Name	Team size	Share of minorities	Sales (euro)	Profits (euro)	Profits per share	Description of product/service
1	A-Card	16	0.50	1236.15	-848.05	-11.78	Discount card for Amsterdam nightlife
2	A'dam Gadgets	12	0.45	534.12	-41.40	-0.47	USB hot plate for coffee, tea, etc.
3	Appie	11	0.40	454.75	149.86	3.00	Apple-shaped box to preserve apples
4	Aqua de Coctail	12	0.58	1130.47	-305.94	-3.12	Comprehensive cocktail shaker set
5	ArtEco Bags	11	0.60	912.00	-401.69	-7.44	Durable give-away bag for clothes stores
6	BubbleMania	11	0.70	503.00	-61.79	-1.34	Multifunctional protective key chain
7	D'Wine	9	0.63	740.00	-55.00	-1.62	Bottles of wine
8	Eastern Green	14	0.69	513.00	105.51	2.93	Engravable text bean that grows a plant
9	Escapade Inc	9	0.22	592.55	-111.30	-3.09	Tube clip for sealing food, toiletry, etc.
10	eyeBMA	16	0.50	557.50	124.66	3.90	Package with easy-to-use eye shadow
11	Firefly	12	0.20	2225.65	293.62	3.67	Ascending fire lantern for celebrations
12	Fl!pthat	13	0.64	455.00	214.88	9.77	Redecorating already existing websites
13	Ginger	12	0.58	976.50	-106.81	-2.14	Multifunctional solar energy charger
14	Himitsu	10	0.86	775.00	36.00	0.86	n/a
15	I-Care	15	0.54	1204.45	477.15	11.36	Beauty products with Dead Sea minerals
16	iJoy	14	0.64	1952.85	93.56	1.44	Wristband with USB storage capacity
17	I-Juice	13	0.54	1255.38	-38.54	-0.42	Pocket-size lightweight mobile charger
18	IMSC	11	0.55	625.00	-390.00	-7.41	n/a
19	iShield	11	0.50	4209.49	129.76	2.20	Invisible protective shield for iPhones
20	KISBag	9	0.57	205.48	-117.02	-3.90	Tiny foldable bag to replace plastic bags
21	Laservibes	11	0.40	130.00	-228.90	-4.32	Organizing lasershows for companies
22	Mengelmoes	10	0.71	941.50	63.14	1.24	Easy-to-wear telephone charger device
23	My-Buddy	12	0.45	297.00	-58.33	-2.65	USB doll for kids that reflects emoticons
24	Nine2Five	12	0.60	235.45	-1016.36	-12.87	USB hot plate for coffee, tea, etc.
25	Picture Perfect	15	0.54	260.09	-50.87	-1.45	Customized t-shirts for men and women
26	Pietje Plu	12	0.40	n/a	n/a	n/a	Trendy umbrellas
27	Pocket Memory	16	0.73	978.94	103.46	1.20	Business cards with USB storage capacity
28	Pro'Lux	14	0.54	378.25	-394.90	-9.18	Promotional gifts with USB storage capacity
29	Qwinlok	13	0.42	340.00	34.61	0.91	Boxer shorts for female adolescents
30	Reflection	11	0.36	889.51	45.43	0.84	Cosmetics mirror including mascara clip
31	SAME	11	0.36	1618.35	152.37	2.15	Comfortable unisex earwarmer
32	Sappho	8	0.50	980.00	n/a	n/a	n/a
33	Sharity	12	0.67	265.00	-241.12	-8.04	Necklace with peace sign for teenagers
34	ShoeTattoo	13	0.77	270.00	88.32	1.21	Shoe customization by graphic artists
35	Student Promotion	13	0.42	571.32	234.54	15.64	Promotional activities for companies
36	StuPill	14	0.31	731.33	-1011.33	-15.48	Comfortable Indonesian anti-RSI pillow
37	Test-a-Holic	11	0.45	728.45	219.77	4.88	Alcohol breath tester for nightlife
38	We-Do Solutions	10	0.56	604.00	-266.82	-6.06	Multifunctional trendy key chain
39	We 'R U	13	0.33	1041.11	49.77	0.89	Compact wallet in several colors
40	XNG	12	0.90	1087.50	258.31	7.60	T-shirts of "Chicks on Kicks" community
41	YEN Empowered	13	0.83	1266.67	33.33	0.71	n/a
42	YET's Wear	16	0.79	789.08	-246.81	-2.47	Customized t-shirts of own YET-brand
43	YOU	12	0.64	0.00	-242.41	-6.55	Hotel door hanger to store keys, money, etc.
44	Young Legends	9	0.67	400.00	59.00	0.84	n/a
45	YUVA	16	0.70	1153.00	294.11	12.79	Engravable grain of rice in a glass covering

Table A2: Ethnic diversity and team performance (excl. teams with share of minorities $\leqslant$ 0.35 or share of minorities $\geqslant$ 0.75)

	(ln)sales	Positive profits	Profits per share
A: Polynomial			
Share of minorities	-0.281	-26.612***	-218.6**
	(12.514)	(5.803)	(92.178)
Share of minorities squared	0.649	24.049***	196.0**
	(11.026)	(5.371)	(83.934)
Minimum	*0.22*	*0.55*	*0.56*
R^2	*0.00*	*0.28*	*0.12*
B: Spline			
Share of minorities $\leqslant$ 0.55	0.729	-4.878***	-43.080**
	(2.649)	(1.170)	(19.056)
Share of minorities $>$ 0.55	0.123	4.398***	35.696*
	(2.067)	(1.377)	(19.994)
R^2	*0.01*	*0.29*	*0.13*

Note: Based on information from 34 teams. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table A3: Robustness to inclusion of control variables (polynomials)

	(ln)sales	Positive profits	Profits per share	(ln)sales	Positive profits	Profits per share	(ln)sales	Positive profits	Profits per share
Share of minorities	-4.899	-3.754	-18.913	-5.815**	-4.160*	-27.811	-5.681*	-4.346*	-32.114
	(3.199)	(2.559)	(28.718)	(2.630)	(2.399)	(22.644)	(3.011)	(2.567)	(23.106)
Share of minorities squared	4.790*	3.875*	23.009	4.963**	4.078*	30.649	5.100**	4.438**	33.446*
	(2.765)	(2.096)	(23.078)	(2.352)	(2.114)	(19.894)	(2.470)	(2.063)	(19.825)
Age	0.085	-0.041	-0.792						
	(0.203)	(0.128)	(1.371)						
Gender	-0.231	0.174	-1.988						
	(0.621)	(0.465)	(5.968)						
Mathematics grade	0.029	0.181	3.952*						
	(0.218)	(0.191)	(2.233)						
Grade point average	0.736*	0.179	1.725						
	(0.425)	(0.321)	(4.037)						
Business Management				-0.173	0.411**	7.970***			
				(0.221)	(0.180)	(2.720)			
Trade Management Asia				-0.140	0.396*	4.725**			
				(0.285)	(0.228)	(2.226)			
Business Languages				-0.650**	0.371*	3.465			
				(0.244)	(0.215)	(2.893)			
Team size							0.042	0.061	0.441
							(0.057)	(0.051)	(0.726)
Effort (hours/week)							-0.065**	-0.031	-0.533**
							(0.025)	(0.026)	(0.247)
Number of different countries of origin							-0.011	-0.052	-0.096
							(0.063)	(0.072)	(0.839)
Minimum	*0.51*	*0.48*	*0.41*	*0.59*	*0.51*	*0.45*	*0.56*	*0.49*	*0.48*
R^2	*0.14*	*0.17*	*0.14*	*0.16*	*0.19*	*0.24*	*0.16*	*0.20*	*0.14*

Note: Based on information from 43 teams. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.

Table A3: Robustness to inclusion of control variables (splines)

	(ln)sales	Positive profits	Profits per share	(ln)sales	Positive profits	Profits per share	(ln)sales	Positive profits	Profits per share
Share of minorities $\leqslant 0.55$	-0.875	-1.332	-3.934	-1.796	-1.592*	-8.213	-1.260	-1.566	-10.365
	(1.438)	(1.072)	(13.086)	(1.174)	(0.892)	(10.627)	(1.349)	(1.145)	(10.426)
Share of minorities > 0.55	1.619	2.288***	16.417*	1.024	2.203**	19.721**	1.257	2.465***	18.637**
	(1.189)	(0.719)	(8.322)	(0.990)	(0.894)	(9.460)	(0.839)	(0.621)	(8.515)
Age	0.074	-0.018	-0.679						
	(0.208)	(0.126)	(1.319)						
Gender	-0.202	0.120	-2.254						
	(0.636)	(0.422)	(5.815)						
Mathematics grade	0.011	0.175	3.909*						
	(0.219)	(0.178)	(2.151)						
Grade point average	0.753*	0.158	1.628						
	(0.425)	(0.310)	(3.942)						
Business Management				-0.177	0.401**	7.899***			
				(0.224)	(0.178)	(2.789)			
Trade Management Asia				-0.114	0.371*	4.562*			
				(0.281)	(0.208)	(2.257)			
Business Languages				-0.659***	0.325	3.137			
				(0.244)	(0.205)	(2.993)			
Team size							0.045	0.054	0.391
							(0.058)	(0.051)	(0.727)
Effort (hours/week)							-0.063**	-0.032	-0.539**
							(0.026)	(0.024)	(0.234)
Number of different countries of origin							-0.024	-0.038	-0.009
							(0.064)	(0.078)	(0.851)
R^2	*0.12*	*0.22*	*0.15*	*0.14*	*0.25*	*0.26*	*0.14*	*0.25*	*0.16*

Note: Based on information from 43 teams. Robust standard errors in parentheses. ***/**/* denotes significance at the 1%/5%/10%-level.