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# The Impact of Diversity on Group and Individual Performance

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# The Impact of Diversity on Group and Individual Performance

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**Abstract**

Using data on a student group project in which groups are exogenously formed, we examine the potential productivity gains from employing work-teams which are diverse in terms of gender, nationality and ability. We find no significant effect of diversity on overall team performance, except when the team members are from different socio-cultural backgrounds. More importantly, we find that students who have worked in more diverse teams experience a subsequent improvement in individual productivity. These individual productivity gains hold for both domestic and foreign students, and for students of different levels of ability. Our results suggest a mechanism by which diversity enhances individual and collective performance.

JEL Classification: D7, J5, L2, M1

Keywords: Group composition; diversity; performance.

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# 1 Introduction

This paper is about the performance of groups with a diverse composition. Almost all economic activity is performed in groups; rare is the true sole-proprietor. As has been known since at least Adam Smith (1776), there are gains from the division of labour. Even if members of a group are ex ante identical to each other in terms of their abilities, Smith shows that a group of workers will be able to increase their total output through specialisation. If in addition, workers in the group have diverse abilities, then specialisation according to each worker's comparative advantage would maximise the group's total output. On the other hand, Becker and Murphy (1992) develop a model in which the presence of coordination costs acts as a constraint on the extent of the division of labour. A more diverse group may be more difficult to coordinate than a less diverse one. The potential gains and costs of diversity is an important economic issue as the labour force becomes more diverse due to the increase in female participation and the increase in international migration. At the micro-level, for a firm to be willing to bear the coordination costs associated with a diverse workforce, the gains from having diverse work teams must outweigh the coordination costs.

The literature on the impact of team diversity on performance is inconclusive. Lazear (1999a) argues that if a team has diverse range of cultures, it benefits from greater collective knowledge and skills. Papps et al (2010) show that there is an optimal degree of variation in worker ability in professional baseball, while Kahane et al (2013) find that teams in the National Hockey League gain from employing culturally diverse work teams. Lee (2013), Nathan (2013, 2014), and Nathan and Lee (2013) present a range of evidence on the impact of ethnic and gender diversity on performance and innovation in UK firms and cities. Similarly, other research has shown that there is either no impact of gender diversity in the boardroom on firm performance (Gregory-Smith et al. 2014), or a negative impact (Adams and Ferreira, 2009). However, many of the papers in this area of research suffer from the problem of endogenous team formation. For instance, Becker (1973) shows theoretically that output-maximising partnerships involve positive assortative matching when traits are complements. To circumvent this problem of self-selection, Katz, et al. (2001), Sacerdote (2001) and Falk and Ichino (2006) use experimental-type settings

to randomly assign individuals to different peer groups. These papers all find clean evidence of peer effects, in very different institutional settings.

In this paper we make use of data from a course at Lancaster University which has a compulsory group project to analyse the effect of team composition on both team performance and subsequent individual performance. This has advantages relative to both conventional and experimental settings. Relative to the conventional approach, we adopt a randomised trial approach to avoid the problem of assortative selection into groups. That is, the groups are exogenously formed by the course director on the basis of an alphabetical rule. The group work requires both quantitative and language skills, and the projects are not supervised. The final group mark is affected by the behaviour of each member of the group. We consider three types of group diversity: gender, nationality, and ability of individual group members. Groups composed entirely of male British students are our reference group. The comparison of marks of diverse teams to that of the homogeneous reference group allows us to study the effect of group diversity on group performance. Further, unlike the experimental approach such as Falk and Ichino (2006), our analysis is based on an actual, assessed, non-experimental task which is spread over several weeks and is not restricted to a few laboratory sessions. Moreover, because the group project is part of the course design, we have data for several cohorts of students who are engaged in the same tasks.

We have two main results. First, there is no evidence that a more diverse group leads to higher levels of group output, controlling for overall group ability. This suggests, in light of what has been discussed above, that the possible gains from diverse skill sets are counter-balanced by higher costs of coordination in a more diverse group. Our second, and perhaps more interesting, result is that individual students who have worked in a group which is more diverse in terms of nationality, experience a significant gain in subsequent individual productivity. We investigate whether or not this gain exhibits systematic patterns across different groups of students. Our results suggest that there is no differential gain in productivity by nationality or ability. This is in contrast with Bandiera et al (2010) who show that workers who work with others who are more productive, become more productive themselves and vice-versa. Therefore, there seems to be a performance spill over from diversity for all members of a diverse work team. Even though

diverse groups may not collectively perform any better than homogeneous groups, the exposure to diverse work groups enhances subsequent individual performance of team members.

This latter result is important because modern day firms are organised around teams which are increasingly diverse. Our results complement the existing empirical literature by presenting a transmission mechanism through which diversity affects firm performance. Because workers in firms participate in repeated team interactions, the gains in individual productivity from working in a diverse team will enhance the performance of future work teams, leading to long-run gains for the firm.

The next section discusses the background and data. Section 3 discusses the methods and econometric specifications, while Section 4 presents the results and Section 5 concludes.

## 2 Background and data

In this paper we use data from Lancaster University's module Quantitative Methods for Economics (Econ103). Data is available at the individual student level for students taking the module in the 2007/08 to the 2012/13 academic years[3]. Our data is thus a repeated cross-section over six years. Econ103 is a first year, compulsory, full-year module for all students on the single-major BSc in Economics, and is an optional module for joint majors and students on the BSc in Business Economics. Students at Lancaster University study three full-year modules in their first year. All students who study Econ103 are also required to study Econ100 Principles of Economics, which is the core principles course in Economics.

Econ103 is a 25-week course comprising equal parts of basic mathematics and statistics with one week set aside for student presentations. Although the course content has marginally evolved over the time period under study, the assessment structure remained the same. The course starts in October of each year. Throughout the sample period the module was assessed by means of two tests, in Weeks 11 (January) and 21 (April) of term, one group project due in Week 25

[3] In 2011/12 the module title was changed from its previous title Applications of Economic Analysis to Quantitative Methods for Economics, but there was no substantive change in the course content during the period under study.

(May), and a final exam in June. A time line of the assessments is provided in Figure 1. The two in-term tests are each worth 12% of the final mark, the group project 16%, and the final exam 60% of the final mark. A first-class mark is any mark of 70 or above, a 2:1 mark is between 60 and 69, a 2:2 mark is between 50 and 59, a third class mark is between 40 and 49, and any mark below 40 is a fail.

At the beginning of the academic year, students are allocated to seminar groups of approximately 15 students. Project groups are formed from within each seminar group. Each group consists of three or four group members, and the groups are determined by the course lecturer on the basis of an alphabetical list. Therefore, group composition may be treated as exogenously given.

Crucially, despite changes in the course content over the years, the group project has remained the same throughout the study period. The group task is to analyse a dataset provided by the course lecturer; there are several datasets, and once again the choice of dataset is determined by the course lecturer. All the datasets, even though different in context, are similar in design and level of difficulty, and test the same skills. Students write a group report based on their analysis of the dataset, and give a group presentation in their seminar groups. These tasks are performed over April and May. The marks are awarded by two lecturers on the basis of the quality of analysis, the quality of report-writing, and presentation skills. The group is awarded a mark which applies to all members of the group.

### *2.1. Expected Gains from Diversity*

*A priori,* one would expect work groups to gain from diversity because the skill sets of different groups of students may not be completely overlapping. To take the example of national diversity, more emphasis is laid upon Mathematics and quantitative education at school level in some parts of the world compared to Britain. Since the task we use in our analysis has a quantitative component, this might be a source of comparative advantage for international students, *on average*. On the other hand, domestic British students, by dint of having English as their native language, can be thought to have a comparative advantage in language skills, and hence in writing the report, *on average*. Thus a diverse group comprising both native British students and

international students would, on average, have a wider skill set relative to a group comprising only native British students.

However, the gains from diverse skill sets may be offset by higher coordination costs of a diverse group. Apart from possible language barriers, there may also be social and cultural differences across group members. Some cultures are more egalitarian than others and the social norms of students from these countries may be quite different from that of students from more hierarchical cultures. All these put a constraint on the gains from diversity.

We have data on each student's performance on each component of assessment on Econ103. We also have information on the student's gender, ethnic background, nationality, and their entry qualification (data on entry grades are not available on a comparable basis). Table 1 shows the number of students and groups in each year of our sample. Both increase over time, reflecting the increasing intake of students into Economics and related subjects. In each year there are slightly more international students than female students: about one-third as compared with just over one-quarter. However, the percentage of international and female students remains fairly constant throughout the sample period.

# 3 Methods

The main objective of this paper is to estimate the impact of group diversity on group performance on the Econ103 group project. In order to do this, we estimate regressions of the following form, at the group level:

$$g_{it} = \boldsymbol{\beta}\mathbf{X_{it}} + \boldsymbol{\gamma}\mathbf{Z_{it}} + \alpha_t + \epsilon_{it} \quad (1)$$

Where $g_{it}$ is the mark awarded for the group project (which is the same for all members of a given team), $\mathbf{X_{it}}$ is a vector of measures of diversity, $\mathbf{Z_{it}}$ is a vector of other explanatory variables which includes the average ability of the group members, $\alpha_t$ is a set of time dummies which control for unobserved effects that may influence the performance of a cohort of students (for instance, changes in the course structure), and $\epsilon_{it}$ is a random error term.

We include measures of diversity for gender, nationality and ability. Because the groups only have three or four members each, the measures of diversity we use are relatively simple. For gender, we calculate the percentage of male and female in a group. The measure of gender diversity used is

$$D(G) = \%\, Male \times \%\, Female. \tag{2}$$

For an all-male or all-female group, the measure of diversity will be zero, whereas it will be maximised at 0.25 when there are equal numbers of male and female members. For nationality, we calculate the percentage of non-native students in the group and the number of different nationalities represented in the group. The measure of diversity of nationality used is

$$D(N) = \%NonNative \times Number\ of\ Nationalities. \tag{3}$$

A group comprised entirely of native students will have$D(N) = 0$, and $D(N)$ would take a maximum value of 4 if all four group members are non-natives of different nationalities. For diversity of ability, we make use of the students' prior performance on Econ103. We use the sum of the marks attained in the two Econ103 tests that precede the group project as a proxy for a student's ability. The standard deviation across group members of this sum is used as our measure of diversity of ability:

$$D(A) = Std\ Dev(Test1 + Test2) \tag{4}$$

A team's average ability is the average of each student's ability score. Tables 2 and 3 provide information on group composition by year, in terms of the percentage of non-UK and female students in each group. As might be expected from Table 1, over half of all groups have no or only one female member, and similarly, over half of all groups have no or only one non-UK member. However, in each year there is a significant percentage of groups which comprise primarily (and even occasionally exclusively) female or non-UK members.

In addition to the impact of group composition on group performance, we also investigate whether, having been exposed to a diverse group, students improve their subsequent performance. This may take the form of weaker students learning from more-able students, or perhaps through individual initiative to work harder when they become aware of other students' abilities. We therefore also estimate equations of the following form:

$$y_{it} = \phi g_{it} + \psi A_{it} + \boldsymbol{\beta}\mathbf{X_{it}} + \boldsymbol{\gamma}\mathbf{Z_{it}} + \alpha_t + \epsilon_{it} \tag{5}$$

Where $y_{it}$ is the performance of a student in the final exam on Econ103, $A_i$ is prior student ability as described above, and the other variables are as previously described. The coefficient of interest here is $\boldsymbol{\beta}$; controlling for the student's prior ability and the group performance, what is the impact of group diversity on the future individual performance of the student? A positive and significant value for $\boldsymbol{\beta}$ would indicate that being a member of a more diverse group enhances subsequent individual performance through some form of positive spill overs.

Table 4 presents the correlation matrix for the key variables used in the analysis. Although some of the correlations are highly significant, it is clear that group and subsequent individual performance are not highly correlated with any of the measures of diversity. Individual performance in the Econ103 final exam is, as would be expected, strongly correlated with ability as measured by previous Econ103 test scores. The three measures of diversity are only weakly correlated with each other. Figure 2 shows the distribution of group marks and subsequent individual marks in the Econ103 final exam; the group marks appear to have a higher mean than the subsequent individual marks, but are also much less dispersed. This is confirmed in Table 5, which shows the descriptive statistics for prior ability, group performance, and subsequent individual performance. Table 5 also shows that the average group size is between 3.1 and 3.2 in each year; this suggests that the majority of groups consist of 3 (as opposed to 4) members.

Figure 3 shows a boxplot of the effect of increasing the number of nationalities on group and subsequent individual performance (final exam marks). Moving from left to right in the figure, increasing the number of nationalities has only a small effect on group performance, but a much larger effect on subsequent individual performance; moving from 1 (all native) to 4 (at least 3 non-native) nationalities in a group increases subsequent median individual performance from 57 to 70, an increase of almost 23 percent. Also, similarly to Figure 2, group marks are much less dispersed than final exam marks.

# 4 Results

The central hypothesis is that diversity in groups enhances group performance. Using the measures of diversity discussed in Section 3, we estimate equation (1) to investigate whether a

more diverse group leads to better group performance. The results are of presented in column (1) of Table 6. All measures of diversity, $D(G)$ (gender diversity), $D(N)$ (nationality diversity) and $D(A)$ (diversity in ability) are statistically insignificant at conventional levels. Therefore, there is no evidence to suggest that group diversity in terms of gender, nationality or ability, affects team performance. This may be explained by the productivity gains from diversity being offset by the increased coordination costs. However, the average ability of team members is positively related to team performance.

Although there does not appear to be any evidence that more diverse groups outperform less diverse ones, it may be that the gains from working in a diverse group can be manifest in individual performance after exposure to a diverse group. We therefore estimate equation (5), and the results are presented in column (2) of Table 6. The dependent variable in column 2 is the individual performance in the Econ103 final exam, which occurs after the group project. As might be expected, individual student performance in the final exam is positively associated with their ability as measured by previous tests. Gender and ability diversity in the group has no significant effect on final exam performance. However, national diversity in the group has a positive and significant effect on final exam performance. This suggests that even though the benefits of diversity are not manifest in the group performance, there is a spill over effect on subsequent individual performance resulting from being a member of a group which is diverse in terms of nationality.

Even though *prima facie* diverse teams do not seem to collectively perform better in our experimental setting than homogeneous groups, the benefits of diversity could be manifest in enhanced subsequent individual performance of the team members. In real-world firms where group interactions are a repeated game, these gains in individual productivity can improve subsequent group performance. These results suggest a mechanism by which group diversity has a positive impact on both individual and collective productivity in the long run.

### *4.1 Are there differential impacts of diversity on performance?*

The results presented in Table 6 indicate the average effects of group diversity on both group and individual performance. One possible question is whether the effects are different across different groups of students. In particular, the gains from diversity may only be limited to students with higher abilities. To investigate this possibility, we augment the specifications in Table 6 with an indicator *Native* for British students and an indicator *HighAbility* for students will high prior attainment. *HighAbility* is equal to one for students in the top decile of the ability score as defined in Section 3 above. We interact both *Native* and *HighAbility* with the three measures of diversity. The coefficients of these interactions will identify any differential impact of group diversity on different groups of students. The results are presented in Table 7, where the dependent variables in columns (1) and (2) are the team performance and subsequent individual performance respectively.

In specification (1), the coefficients on both *HighAbility* and *Native* are statistically significant. The presence of workers with high ability raises the performance of teams, by 11.4 percentage points, while having natives in the group reduces group performance, by 3.7 percent on average. However, native students perform better in gender-diverse groups, as is evident from the significant coefficient on *Native*D(G)*. All other interactions are statistically insignificant at conventional levels. In specification (2), we once again find evidence that native students perform less well than non-native students in the subsequent individual exam, by 5.5 percentage points. Similarly to Table 6, greater national diversity in the group is positively associated with subsequent individual performance, while greater gender diversity in the group is now negatively associated with subsequent individual performance. As with specification (1), the only interaction which is statistically significant is *Native*D(G)*, suggesting that native students gain more in individual productivity from having worked in a gender-diverse group. Hence overall it appears that the gains in individual productivity from working in nationally diverse groups do not vary systematically across different groups of students.

### *4.2 Additional Results*

In the main results, we have constructed a measure of nationality diversity, *D(N)*, using the nationality of each team member. However, it may be argued that at least some of the diversity

manifest in individuals has a socio-cultural origin, and as a result some countries can exhibit similar personality traits. For example, it may be argued that a group comprising a French, a Swiss and a Belgian student is less diverse than a group comprising a French, a Chinese and a Ghanaian student. We therefore check the robustness of our measure of national diversity by amalgamating nations into supra-national groups following Huntington's (1996) classification of different civilizations. Since not all countries are represented in our sample, we use the following groups: Asian, African, Islamic, Orthodox and Western. A complete list of nationalities and their supra-national groups are presented in Appendix 1.

Using this classification, we calculate a measure of supra-national diversity:

$$D(SN) = \%\, Non - Western \times Number\ of\ SupraNational\ Groups \quad (6)$$

So a group comprised of all European students have a value of 0 on this measure and a diverse group with no European students will have a higher score on the scale. The results using the supra-national groupings as measures of diversity in place of national diversity are provided in Table 8.

In column (1) of Table 8, we find that groups which are supra-nationally diverse perform better than homogeneous groups. This is different from our baseline results in Tables 6 and 7, which suggest that national diversity has no statistically significant impact on group performance. This suggests that what is important in terms of the impact of diversity on group performance is not merely that the group members are from different countries, but that they are from different socio-cultural backgrounds. Similarly, we find in column (2) of Table 8 that the gain in subsequent individual performance from supra-national group diversity is larger than from national diversity in Tables 6 and 7. Thus, having been exposed to a work group comprised of people from different socio-cultural backgrounds, individual workers gain more in subsequent individual productivity. All other variables retain their previous sign and significance. Taken together, these results suggest that diverse work teams, particularly those composed of workers from different socio-economic cultures, could gain in both collective and individual productivity.

# 5 Conclusions

We make use of a randomised trial to examine the effect of group diversity on the performance of students in a group task and in subsequent individual tasks. Our results suggest that there is no significant difference in performance between diverse and homogeneous groups. Instead, the benefits of group diversity are manifest in *ex-post* individual performance of the members of a diverse group. Whereas the benefits of diversity may be counterbalanced by the coordination costs in a group setting, any assimilated skills may be transferred to future individual tasks where the coordination constraint is no longer active. Also, the benefits of diversity are more pronounced when the individual workers are drawn from different socio-cultural backgrounds. Moreover, we find no evidence that different groups of students experience differential gains from group diversity.

Our results are novel in suggesting a possible mechanism by which diversity may impact upon group performance. Gains in the individual productivity of group members resulting from working in diverse groups may translate into enhanced performance in future group tasks. Therefore, firms can benefit in terms of higher overall labour productivity in the long run from employing diverse work teams.

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Figure 1: Timeline of the Experimental Set Up

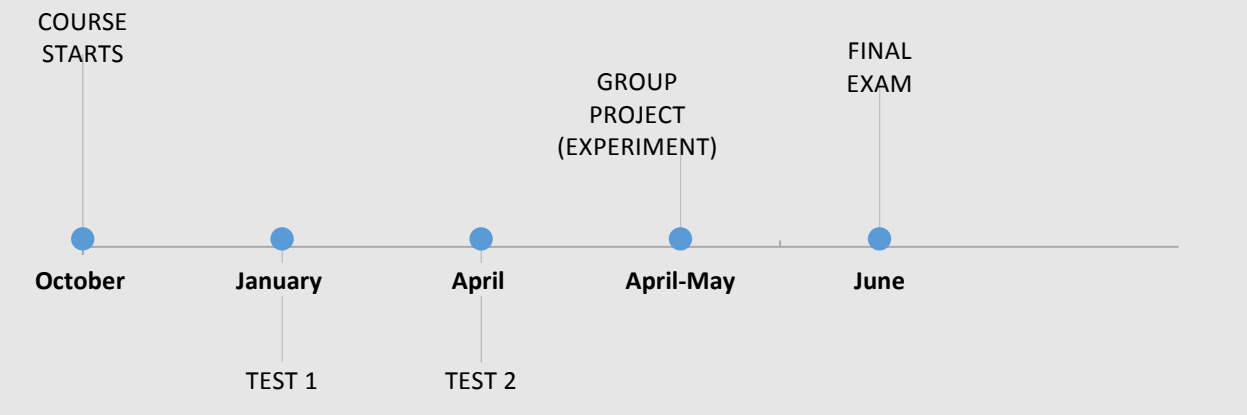


Figure 2: Kernel Density Plot of Group Marks and Examination Marks

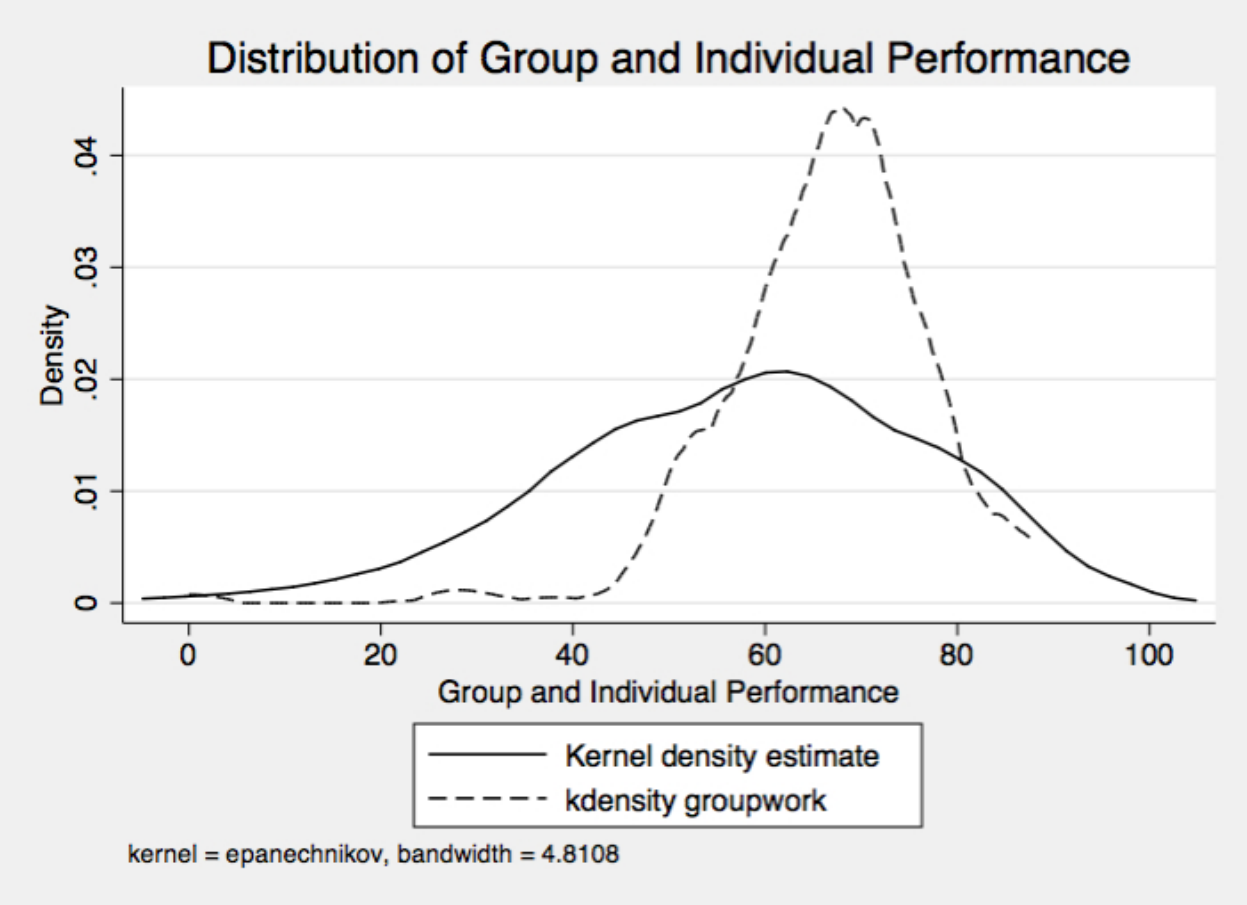

Figure 3: Variation of Group Performance with Diversity

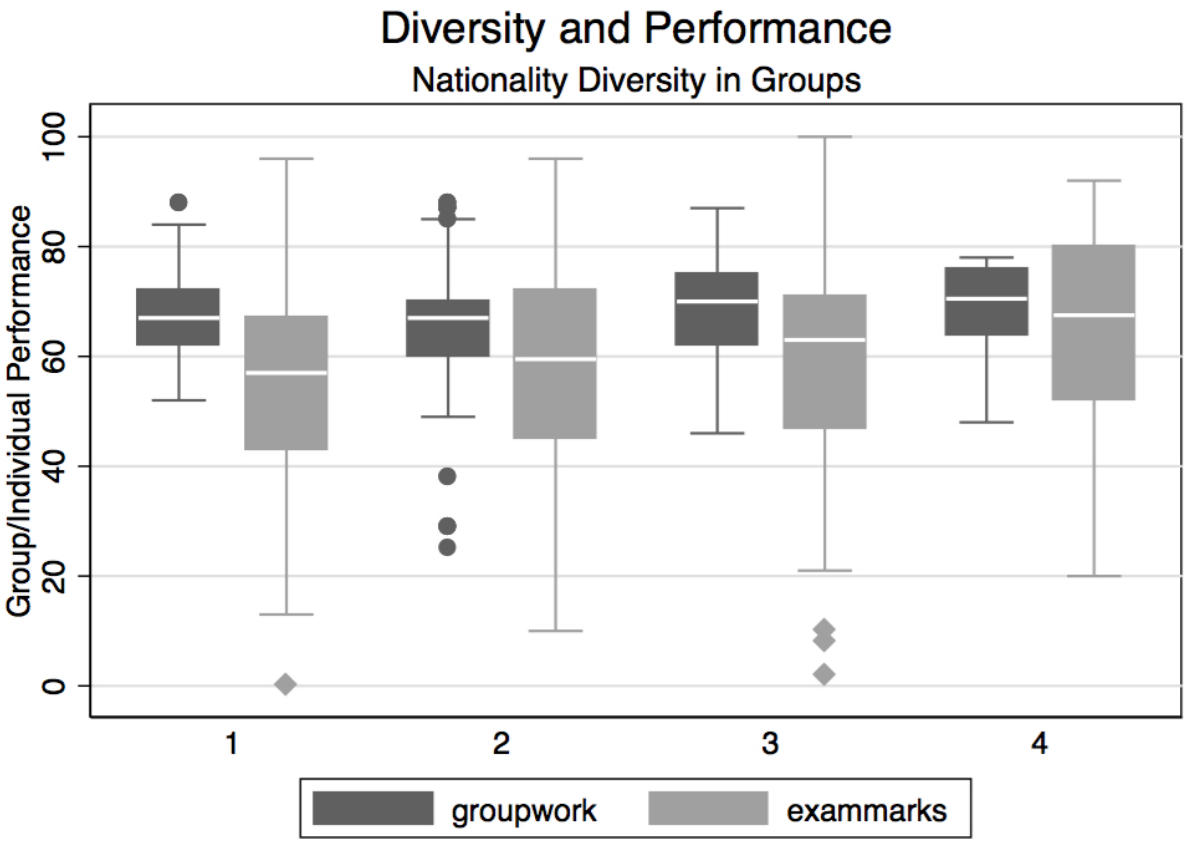

Table 1: Descriptive Statistics on Sample Diversity

| Year | No. of groups | No. of students | % International Students | % Female Students |
|---|---|---|---|---|
| 2008 | 15 | 51 | 37.25 | 29.41 |
| 2009 | 17 | 54 | 31.48 | 24.07 |
| 2010 | 28 | 96 | 28.12 | 27.08 |
| 2011 | 34 | 105 | 30.48 | 22.86 |
| 2012 | 32 | 107 | 42.45 | 30.18 |
| 2013 | 37 | 117 | 34.18 | 31.62 |

Table 2 Percentage of Female students in Work Teams over the sample period

| Percentage of Female students in groups | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| | % Students | | | | | |
| 0 | 35.29 | 29.63 | 34.38 | 42.86 | 20.56 | 43.59 |
| 25 | 15.69 | 42.59 | 16.67 | 7.62 | 26.17 | 6.84 |
| 33 | 17.65 | 11.11 | 18.75 | 40.00 | 22.43 | 14.53 |
| 50 | 19.61 | 11.11 | 20.83 | 3.81 | 7.48 | 6.84 |
| 67 | 5.88 | 5.56 | 9.38 | 5.71 | 19.63 | 20.51 |
| 75 | 0.00 | 0.00 | 0.00 | 0.00 | 3.74 | 3.42 |
| 100 | 5.88 | 0.00 | 0.00 | 0.00 | 0.00 | 4.27 |

Notes: A group may consist of 3 members, in which case the percentage of females can take values equal to 0, 33, 67 or 100 percent, or 4 members, in which case the percentage of females can take values equal to 0, 25, 50, 75 or 100 percent.

Table 3 Percentage of non-UK students in Work Teams over the sample period

| Percentage of Non-UK students in groups | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| | | | % Students | | | |
| 0 | 25.49 | 37.04 | 30.21 | 40.00 | 22.43 | 35.90 |
| 25 | 15.69 | 20.37 | 20.83 | 3.81 | 14.95 | 9.40 |
| 33 | 23.53 | 11.11 | 21.88 | 25.71 | 14.02 | 23.08 |
| 50 | 15.69 | 0.00 | 20.83 | 9.52 | 14.95 | 6.84 |
| 67 | 5.88 | 16.67 | 3.12 | 11.43 | 19.63 | 11.97 |
| 75 | 7.84 | 14.81 | 0.00 | 3.81 | 11.21 | 0.00 |
| 100 | 5.88 | 0.00 | 3.12 | 5.71 | 2.80 | 12.82 |

Notes: A group may consist of 3 members, in which case the percentage of non-UK students can take values equal to 0, 33, 67 or 100 percent, or 4 members, in which case the percentage of non-UK students can take values equal to 0, 25, 50, 75 or 100 percent.

Table 4: Correlation Matrix

| | D(G) | D(N) | D(A) | Ability | Group Mark | Individual Mark |
|---|---|---|---|---|---|---|
| D(G) | 1.000 | | | | | |
| D(N) | 0.2752* | 1.000 | | | | |
| D(A) | 0.0722 | -0.0623 | 1.000 | | | |
| Ability | -0.0184 | 0.0932* | -0.1612* | 1.000 | | |
| Group Mark | 0.0253 | -0.0053 | 0.0633 | 0.1171* | 1.000 | |
| Individual Mark | -0.0277 | 0.1367 | -0.0814 | 0.7635* | 0.1055 | 1.000 |

D(A) refers to diversity in ability; D(G) refers to gender diversity; D(N) refers to diversity in nationality. * refers to significance at 1% level.

Table 5: Descriptive Statistics (N=531, Groups=163)

| Year | Group Size | Prior Ability-Before Team Work | | Group Performance | | Subsequent Individual Performance | |
|---|---|---|---|---|---|---|---|
| | Mean | Mean | SD | Mean | SD | Mean | SD |
| 2008 | 3.19 | 107.78 | 40.22 | 60.70 | 14.22 | 58.50 | 20.39 |
| 2009 | 3.08 | 126.61 | 38.12 | 63.12 | 8.14 | 64.26 | 20.14 |
| 2010 | 3.23 | 120.85 | 37.83 | 66.74 | 9.74 | 58.02 | 14.89 |
| 2011 | 3.18 | 123.75 | 34.62 | 67.02 | 8.41 | 54.87 | 17.09 |
| 2012 | 3.24 | 126.72 | 39.59 | 68.20 | 8.15 | 56.02 | 18.86 |
| 2013 | 3.14 | 111.53 | 46.55 | 69.82 | 9.67 | 59.24 | 19.84 |

Notes: Prior ability is measured on a scale from 0 to 200, while group performance and subsequent individual performance are measured on a scale from 0 to 100.

Table 6: Effects of Team Diversity on Collective and Individual Performance

| Dependent Variable | Group Performance (1) | Subsequent Individual Performance (2) |
|---|---|---|
| Ability | 0.0341** | 0.3527*** |
| | (0.0124) | (0.0131) |
| D(A) | 0.0404 | 0.0001 |
| | (0.0473) | (0.0337) |
| D(G) | 0.00029 | -0.0001 |
| | (0.00078) | (-0.0005) |
| D(N) | -0.00152 | 0.0179** |
| | (0.00851) | (0.0057) |
| Group Performance | | 0.0654 |
| | | (0.0633) |
| $R^2$ | 0.2034 | 0.6202 |
| Year Dummies | Yes | Yes |
| Observations/Clusters | 163 | 530 |

***p<0.01. **p<0.05. *p<0.1. Robust standard errors in parentheses. D(A) refers to diversity in ability; D(G) refers to gender diversity; D(N) refers to diversity in nationality. In column (1) each observation is a group, while in column (2) each observation is an individual.

Table 7: Who gains more from Team Diversity?

| Dependent Variable | Group Performance | Subsequent Individual Performance |
|---|---|---|
| | (1) | (2) |
| Ability | 0.0226* | 0.3567*** |
| | (0.0124) | (0.0228) |
| D(A) | 0.0117 | 0.0246 |
| | (0.0421) | (0.0509) |
| D(G) | -0.0019 | -0.0013* |
| | (0.0069) | (0.0008) |
| D(N) | 0.02823 | 0.0155** |
| | (0.0093) | (0.0073) |
| *HighAbility* | 11.4010* | -6.0305 |
| | (6.1298) | (5.5462) |
| *Native* | -3.6944 | -5.5387* |
| | (2.4752) | (3.0180) |
| *Native*D(A)* | 0.0417 | 0.0514 |
| | (0.0500) | (0.0601) |
| *Native*D(G)* | 0.0024** | 0.00195* |
| | (0.0008) | (0.0010) |
| *Native*D(N)* | 0.0019 | 0.0053 |
| | (0.0122) | (0.0153) |
| *HighAbility*D(A)* | -0.1471 | 0.1255 |
| | (0.1003) | (0.0900) |
| *HighAbility*D(G)* | -0.0002 | 0.0005 |
| | (0.0016) | (0.0015) |
| *HighAbility*D(N)* | 0.0109 | 0.0193 |
| | (0.0159) | (0.0197) |
| Group Performance | | 0.0522 |
| | | (0.0591) |
| $R^2$ | 0.232 | 0.6403 |
| Year Dummies | Yes | Yes |
| Observations/Clusters | 163 | 530 |

***p<0.01. **p<0.05. *p<0.1. Robust standard errors in parentheses. D(A) refers to diversity in ability; D(G) refers to gender diversity; D(N) refers to diversity in nationality. In column (1) each observation is a group, while in column (2) each observation is an individual.

Table 8: Regressions with Supra-National Grouping

| Dependent Variable | Group Performance | Subsequent Individual Performance |
|---|---|---|
| | (1) | (2) |
| Ability | 0.0234 | 0.3491*** |
| | (0.0144) | (0.0136) |
| D(A) | -0.0016 | -0.0466 |
| | (0.0652) | (0.0434) |
| D(G) | -0.0004 | -0.0013 |
| | ((0.0010) | (0.0008) |
| D(SN) | 0.0262* | 0.0192* |
| | (0.0136) | (0.0108) |
| *HighAbility* | 14.2164** | -4.2948 |
| | (5.6679) | (5.2300) |
| *Native* | -4.4155 | -6.4464** |
| | (2.7489) | (2.8481) |
| *Native*D(A)* | 0.0519 | 0.0612 |
| | (0.0654) | (0.0602) |
| *Native*D(G)* | 0.0017* | 0.0018* |
| | (0.0010) | (0.0010) |
| *Native*D(SN)* | -0.0029 | 0.0085 |
| | (0.0191) | (0.0079) |
| *HighAbility*D(A)* | -0.1853* | 0.1045 |
| | (0.0938) | (0.0866) |
| *HighAbility*D(G)* | -0.0000 | 0.0029 |
| | (0.0016) | (0.0017) |
| *HighAbility*D(SN)* | -0.0054 | 0.0233 |
| | (0.0361) | (0.0406) |
| Group Performance | | 0.0433 |
| | | (0.0347) |
| $R^2$ | 0.1495 | 0.6226 |
| Year Dummies | Yes | Yes |
| Observations/Clusters | 163 | 530 |

***p<0.01. **p<0.05. *p<0.1. Robust standard errors in parentheses. D(A) refers to diversity in ability; D(G) refers to gender diversity; D(SN) refers to the measure of supra-national diversity. In column (1) each observation is a group, while in column (2) each observation is an individual.

Appendix 1: Supra-National Groupings:

| Country | Students (All years) | Supra-National Grouping | Country | Students (All years) | Supra-National Grouping |
|---|---|---|---|---|---|
| Tanzania | 01 | African | Lithuania | 16 | Orthodox |
| Ivory Coast | 01 | African | Estonia | 02 | Orthodox |
| Nigeria | 04 | African | Bulgaria | 08 | Orthodox |
| China | 46 | Asian | Ukraine | 01 | Orthodox |
| Malaysia | 05 | Asian | Romania | 01 | Orthodox |
| Mongolia | 02 | Asian | Russia | 02 | Orthodox |
| Hong Kong | 07 | Asian | Poland | 07 | Western |
| India | 05 | Asian | Ireland | 03 | Western |
| Nepal | 01 | Asian | Spain | 05 | Western |
| Vietnam | 03 | Asian | Greece | 08 | Western |
| Pakistan | 04 | Islamic | Czech Republic | 02 | Western |
| Kazakhstan | 05 | Islamic | Cyprus | 07 | Western |
| Indonesia | 01 | Islamic | France | 05 | Western |
| United Arab Emirates | 01 | Islamic | Italy | 02 | Western |
| Bahrain | 02 | Islamic | Finland | 01 | Western |
| Somalia | 01 | Islamic | Norway | 04 | Western |
| Turkmenistan | 01 | Islamic | Denmark | 01 | Western |
| | | | Switzerland | 01 | Western |
| | | | Germany | 08 | Western |
| | | | Latvia | 01 | Western |
| | | | Sweden | 03 | Western |
| | | | United Kingdom | 211 | Western |

Our sample contains students from these countries. Using the definitions in Huntington (1996), we classify these countries into the following socio-cultural groups: African, Asian, Islamic, Orthodox and Western. Some socio-economic groups in Huntington (1996) are not represented here.