1 **Link between gender inequality and disabled inclusivity in accounting**
2 **higher education and accounting profession during financial crisis**
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6 **Abstract**
7 In this paper, we find that during financial crises, the wage gap between female and male

8 accounting professionals reduces and affects gender inequality in higher education. In

9 addition, less support and lower wages for disabled accounting professionals demotivate

10 disabled students in accounting higher education. Because of budget cuts during financial

11 crisis, universities limit their support to women and the disabled. We consider 104

12 universities from the UK Higher Education Statistic Agency (HESA) database for 2005–

13 2011. The theoretical and empirical findings of this paper establish the positive growth in

14 female students and the negative growth in disabled accounting students during the recent

15 financial crisis. The established link between higher education and the accounting

16 profession enriches the existing accounting literature and assists policymakers in

17 identifying a better strategy to enhance equality and inclusion of disabled students in

18 accounting higher education to address inequality and non-inclusivity in the accounting

19 profession, especially during financial crisis.

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1. Introduction

Gender has a structuring effect on society (Dambrin and Lambert, 2012; Flynn et al., 2015) that has led to extensive empirical and theoretical works on this issue during the last few decades. It is also a substantive issue in accounting (Broadbent and Kirkham, 2008) and remains a concern for the accounting academic community. Most of the existing studies provide various theories and methodologies to explain gender inequality in accounting profession (e.g., Loft, 1992; Kirkham and Loft, 1993; Lupu, 2012). These studies use either a pseudo-neutral perspective (criteria inherent to women) (Loft, 1992) or a comprehensive perspective (impact of external factors) (Kirkham and Loft, 1993) to explain gender inequality in the accounting profession (Lupu, 2012). However, these findings are inconclusive (Dambrin and Lambert, 2012). Moreover, other studies on accounting highlight factors affecting the differences in the academic performance of women and men at different levels of education, including accounting programs (see Keys, 1985; Carpenter et al., 1993; Jacobs, 1996; Fogarty, 1997; Gammie et al. 2003; Keller et al. 2007; Kornberger et al. 2010). Interestingly, Strier (2010) shows that women succeed more than men in their job performance if they develop certain academic abilities. However, better academic performance by female students is not rewarded with better job wages compared to men (Walby, 2011), and there still exists gender inequality in accounting practice. Therefore, is there any link between gender inequality in accounting higher education and in the accounting profession?

Duff and Ferguson (2007; 2011) and Duff et al. (2007) document the rarity of disabled persons in the accounting profession. Almost all universities encourage disabled students to pursue higher education. However, for obvious reasons, a lower number of

57 disabled accounting professionals indicates that there are fewer disabled accounting

58 students in higher education. Literature in a similar area also shows that disabled

59 accounting professionals get disparate treatment compared to accounting professionals

60 without disabilities (Duff and Ferguson, 2011). Are students with disabilities less

61 attracted to accounting higher education because of exclusivity in the profession?

62   What do we mean by the term 'inequality'? Accounting has always been referred

63 to as a masculine professional field (Keys, 1985; Maupin, 1990), and so it is possible that

64 male students dominate accounting programs at the university level education in the UK

65 (henceforth higher education). This motivates us to test the 'gendering' of accounting

66 higher education by comparing the number of female and male students in accounting

67 programs at the university level. The financial crisis of 2008 destabilized all sectors in the

68 economy. Thus, the question arises, was accounting higher education in the UK affected

69 by the global financial crisis? We consider the differential wage rates in accounting

70 profession to explain the inequality for female compared to male accounting

71 professionals during the recent global financial crisis. During the financial crisis, salary

72 increases reduced and minimum national wages substantially decreased (Ball et al. 2011).

73 Wage rates for accounting professionals are largely affected by the ethics of this

74 profession (Sikka et al., 2007). Recently, Seguino (2010) and Stavropoulou and Jones

75 (2013), among others, showed that during the global financial crisis, the ethical behavior

76 of accounting professionals was questioned by critics and ex ante wage rates de-trended.

77 Moreover, because of the financial crisis, a small change in wages may lead to large-scale

78 changes in taxable income (Saez et al., 2012). As a result, the educational level of these

79 professionals affects the ethical decision-making process, which reduces wage rates

80   during the financial crisis (Keller et al., 2007). Studies on gender indicate that companies

81   and academia employ women, as their wage rates are lower than those of men for the

82   same work, because this discriminatory strategy lowers labor costs and increases profits

83   for the organization (Kim, 2004; Haynes, 2008; OECD, 2012). Ability of corporations

84   and academia to pay lower wages to women for the same work as men worldwide

85   explains women's entry and increased hiring in certain industries and professions

86   (Whittington, 2011). This is a common practice in the accounting profession and has

87   been well documented in the accounting literature (e.g., Kornberger et al., 2010). The

88   accounting profession has never received 'feminized' status because of the existence of

89   this wage gap, but the financial crisis reduced the wages for both women and men

90   accounting professionals. Therefore, is it possible that this economic change affects the

91   'masculine' tag attached to the accounting profession and, in turn, the number of male

92   and female students in accounting higher education? It can be argued that reduced

93   minimum national wage rates lead to a greater hiring of people with good academic

94   degrees in this profession, making possible a larger student population seeking

95   accounting degrees. Based on this wage gap, we proxy the gender inequality by the

96   difference in the number of men and women in accounting higher education. According

97   to a recent study by Walby (2011), the economy depends on human and social capital.

98   So, if human or social capital is biased by gender, then there is a high chance that the

99   'gendered' nature of the workplace would also change. From the above argument, we see

100   a clear indication that gender inequality in higher education has a link with gender

101   inequality in the accounting profession.

102   Similarly, because of lower physical mobility or flexibility and the requirement of

103   extra support systems, disabled accounting professionals' wage rates are significantly

104   lower than those of accounting professionals without any disability (Duff and Ferguson,

105   2011). During the financial crisis, as mentioned above, organizations were constrained

106   with a lack of surplus funds to support disabled employees with extra provisions. Thus,

107   the poor wage rate and less convenient working environment affect the number of

108   disabled accounting professionals in the corporate world. This also affects the interest of

109   disabled students in seeking a degree or certificate in accounting higher education.

110   In summary, participation in higher education is closely associated with changes

111   in the economy (Crossick, 2010), and professionalization is mostly driven by economic

112   motives (Willmott, 1986; West, 1996). Therefore, we consider the recent financial crisis

113   in our study, which caused massive changes in the economy In particular, we aim to

114   understand how universities cope with the recent financial crisis and maintain or extend

115   various provisions for female and disabled students in higher education institutes to meet

116   the changing trend of participation of female and disabled accounting students.

117   The impact of the financial crisis is also noticeable in the higher education sector

118   (Education International Report, 2009; European University Association Report, Jan

119   2011). Policy makers at the institutional and national levels are concerned about the

120   impact of the financial crisis and are taking necessary steps to overcome the associated

121   problems. The UK is no exception. Following the government's Comprehensive

122   Spending Review (2010), until 2014–2015, there has been a total cut of up to 40% in the

123   budget for higher education in the UK. Universities' annual funding was reduced by

124   £398M during the time of the crisis (BBC News, October 2013). The data from the

125   Higher Education Statistics Agency (HESA, 2013) indicate that many people pursue

126   higher education even when there is a wage gap or 'job-cut' in other industries. The

127   Universities and Colleges Admissions Service's (2010–2014) data reveal that

128   approximately one-third of UK first-degree entrants are mature students. This supports

129   our argument that people are joining universities at a later age during the global financial

130   crisis. Moreover, many students apply for part-time programs so that they can work and

131   continue their study simultaneously (Study and Work data, HESA, 2013; Universities

132   UK[1] and HESA report, 2013). The universities that belong to Russell group, usually

133   obtain more public funding for research (Russell International Excellence Group,

134   Spending Review Report 2013). This higher level of funding compared with other

135   universities allows them to introduce advanced research-based practical and professional

136   teaching that not only attracts more students but also allows them to generate more

137   income, which they can apply towards better provisions for female and disabled students

138   (The Guardian, 25 October, 2012). Therefore, in our empirical study, we investigated our

139   research question using this group of universities, along with other universities in the UK,

140   to gain a better understanding of the impact of the financial crisis.

141   Interestingly, there is a notion that changes in the number of women in a particular

142   profession would change the direction of the profession (Hammond and Oakes, 1992).

143   Moreover, the ethical values of any profession are associated with the 'gendering' of the

144   profession[2] (Keller et al., 2007). Thus, without considering gender, it is hard to get a

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[1] Universities UK, founded in 1918, is a representative organization for the UK's universities. It provides high-quality leadership and support to its members to promote a successful and diverse higher education sector. For details: www.universitiesuk.ac.uk.

[2] Women accountants make more ethical decisions than their male counterparts (e.g., Radtke, 2000). This can also be a reason explaining why more lower-paid women are recruited by employers during financial crises. However, please note that this is not our main focus in this study.

145   complete understanding of the development of accounting practices and ideologies

146   (Kirkham, 1992; 1997). Exclusion of educated disabled persons from one profession is

147   not at all acceptable in the 21st century. Thus, based on the above arguments, it is clear

148   that gender inequality and inclusivity of disabled students are critical aspects of the

149   accounting profession. There is a clear gap in the literature, as there is no study where we

150   can find how gender inequality and fewer disabled students in accounting higher

151   education leads to inequality and non-inclusivity in the accounting professional world.

152   Thus, we bridge this gap in the literature by empirically analyzing and answering the

153   following question: What is the impact of the recent financial crisis on gender inequality

154   and disabled students' non-inclusivity in accounting higher education?

155   The sample consists of all universities in the UK that are reported by the HESA

156   (Higher Education Statistics Agency) in the Higher Education Information Database for

157   Institutions (HEIDI) database. Our sample period covers the years 2005–2011We find

158   that there is a positive growth of female accounting students and a negative growth of

159   disabled accounting students during the financial crisis. Based on the tokenism concept

160   (Kanter, 1977) and the *Social Exclusion Theory*, we developed a theoretical model that

161   helps us determine the reasons behind the low representation of female and disabled

162   students in accounting higher education in the UK. In addition, the theoretical framework

163   explains the changing relationship between higher education and the professional

164   accounting world in relation to availability and differences of scarce resources (wages)

165   during the financial crisis.

166   This study contributes to the existing literature related to gender inequality and the

167   inclusion of disabled students in accounting higher education. The findings allow policy

168   makers and academia to work together to solve one main reason behind the gender

169   inequality in the accounting profession, which is mostly sourced from the inequality in

170   accounting higher education. The research is intended to draw the wider community's

171   attention to the importance of proper provisions for the disabled in accounting higher

172   education, even during a crisis. Overall, our study offers a guideline to cause gender

173   equality and inclusivity in the accounting profession. Most studies related to accounting

174   education focus on one or a few universities and consider a small sample for a short time

175   span to study gender inequality. Most of the time, the results are inconclusive, as they are

176   the privileged perspectives of a narrow but dominant segment of society (Hammond et

177   al., 2012). We overcome this problem by considering more detailed data of a large

178   sample and by using a rigorous empirical model to test our research question. Thus, this

179   study also contributes to the existing empirical literature in accounting through its

180   advanced methodology.

181   The rest of the paper is structured as follows. In Section 2, we discuss the related

182   literature and the hypotheses that we test in our study. Section 3 explains the

183   methodology. Section 4 reports the results, and in Section 5, we conclude .

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185
2. Theoretical Framework and Hypothesis Development
187

188   *2.1 Theoretical background*

189   Existing literature provides evidence of the importance of women's participation in the

190   professional world and of the discrimination between women and men in the workplace

191   (Loft, 1992; Maupin and Lehman, 1994; Broadbent and Kirkham, 2008; Kmec and

192   Gorman, 2010; Lehman, 2012). The corporate world and academia usually apply a

193   discriminatory strategy (paying lower wages to women compared to men for the same

194   work) to minimize labor costs and increase their profits (Hausmann et al., 2010; OECD,

195   2012). The wage gap has been prominent in the accounting profession for decades

196   (Broadbent and Kirkham, 2008). One major factor responsible for the structured

197   inequality in accounting is its male dominance (Hooks and Cheramy, 1988; Pillsbury et

198   al., 1989; Ciancanelli et al., 1990; Lehman, 1992; Street et al., 1993; Spruill and

199   Wootton, 1995; Fogarty, 1997; Lowe et al., 2001; Anderson-Gough et al., 2005).

200   However, these studies fail to capture the gender inequality at the higher education level,

201   which is to a great extent responsible for the gender inequality in practice. Statistics

202   published by OECD (2012) show that as women approach higher levels in their

203   professional career, they earn 21% less than their male counterparts. Therefore, is

204   academic performance responsible for the gender inequality in the accounting profession?

205   The answer is not really, but rather it is the lower wage rate that diverts student interest

206   away from accounting in higher education.

207   However, a number of studies highlight the massive exclusion and

208   marginalization of the disabled in any profession (Thornton and Lunt, 1977; Berthoud et

209   al., 1993; Barnes et al., 1999; European Commission, 2001; Smith and Twomey, 2002;

210   Grewal et al., 2003; Shaw, 2004). A similar picture is also observed in the accounting

211   profession (Duff et al., 2007). As there are limited provisions for disabled students at

212   higher education institutes, we find fewer disabled graduates. However, still, accounting

213   professionals or academics in practice fail to employ disabled accounting graduates. The

214   wage gap between the disabled and the non-disabled is one of the major reasons for the

215 non-inclusion of disabled accounting professionals (Duff and Ferguson, 2011). Therefore,

216 disabled students find less interest in accounting programs in higher education.

217   Theoretically, how do we explain the above-mentioned issue? Let us consider

218 Kanter's (1977) 'tokenism' and 'social exclusion' theories. According to Kanter, a token

219 condition is a situation in which a socially distinct group (e.g., women and disabled

220 persons in our study) constitutes only 15% or less of a corporation's membership, and the

221 token individuals often lack power. This concept is widely used to explain the difficulties

222 that women or any underrepresented group (in our study disabled students) face in any

223 profession. Therefore, the tokenism concept can explain this social issue where men and

224 people without disabilities dominate the accounting profession. By employing a larger

225 number of women and disabled in an organization, tokenism can be controlled to some

226 extent. However, the 'token' bears a cost in spite of their better performance in the

227 organization, which usually affects the others in the same category. Some critics argue

228 that such a gender-neutral theory cannot explain the gender inequality or non-inclusivity

229 in dynamic corporations and ignores the complexity of gender integration in the

230 workplace (e.g., Zimmer, 1988; Yoder, 1991; Turco, 2010). Thus, we introduce the social

231 exclusion[3] theory in addition to tokenism to strengthen the theoretical background of our

232 study. One major cost associated with tokens is lower wages for the same work compared

233 to counterparts and fewer career prospects (Silver, 1994). These costs allow tokens to feel

234 socially excluded. This continuous social exclusion in the accounting profession is widely

235 discussed in accounting literature (Loft, 1992; OECD, 2012). As social exclusion is a

236 multidimensional process (e.g., education, health care, and legal assistance), we can see

237 its impact on education. Following the theory, we argue that women and the disabled are

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[3] For measurement of several aspects of social exclusion, see Levitas (2006: p135).

238 less interested in accounting higher education because of the social exclusion of tokens

239 (women and disabled) in the accounting profession. In fact, Daly (2005) argues that

240 unless women or any underrepresented group (e.g., students with disabilities) reaches a

241 critical mass, they have little impact on the culture of higher education. Although

242 universities are encouraging women and disabled students to participate in higher

243 education (with either a limited or wide capacity), the social exclusion explain their less

244 participation in accounting higher education, and the culture of the universities remains

245 the same.

246

247   Based on the social exclusion theory, Collins (1979) provides an insight about the

248 changing relationship between education and occupational stratification. The study

249 highlights the need to understand the above relationship on the basis of scarce resources

250 (e.g., income and occupational status). During the recent global financial crisis, these

251 scarce resources were affected in the UK as in other countries. Seguino (2010) reports

252 that the financial crisis also affected the wage rates of accounting professionals, as critics

253 raise questions concerning the ethical training of these professionals. The wage gap

254 between men and women with similar job profiles is reduced during the crisis, first

255 because of the lower average wage rates in the market and second because companies

256 prefer to recruit only people (men or women) with specific expertise and higher academic

257 performance.

258   Despite the fact that women perform better than men in higher education and obtain

259 the same job as men at a lower wage, the proportion of women accounting professionals

260 remains low. Similarly, the wage rates of the disabled students are also badly affected, as

261 companies find it hard to spend money for extra provisions for disabled persons.

262 Moreover, budget cuts at the university level restricts universities from providing enough

263 support for the disabled and female students participating in higher education. Thus,

264 theoretically it is important to test how the change in wage rates affects the number of

265 women and disabled students in accounting higher education. Thus, the social exclusion

266 theory allows us to understand this changing relationship between education and

267 occupational stratification in the recent crisis period.

268

269 *Hypotheses development*

270   In the next section, we discuss the existing literature related to gender inequality and

271 the exclusion of disabled students in accounting programs in higher education. From this

272 literature review, we highlight the major gaps in the existing literature and later develop

273 the related hypotheses to be tested.

274

275 *2.2 Inequality in higher education of accounting*

276 The accounting sector is mainly dominated by male professionals (Czarniawska, 2008;

277 Kornberger et al., 2010). The available statistics indicate that in accounting firms

278 (Czarniawska, 2008) and accounting teaching positions (HEIDI database), women are

279 less visible than their male counterparts. Studies on gender and accounting argue that

280 cultural and social barriers are the most common reasons behind the lower number of

281 women in accounting (Kirkham and Loft, 2001; Johanson et al. 2008; Komori, 2008).

282 Individuals need to acquire higher degrees in accounting provided mainly by higher

283 educational institutes to be employed as accounting professionals. Thus, there is a

284   possibility that fewer female accounting students at the university level is to some extent

285   responsible for lower female representation in the accounting profession. In existing

286   studies, we find evidence of gender inequality in some aspects of higher education

287   (Jacobs, 1996). Although the female-to-male student ratio has increased over decades in

288   higher education, there exists a pronounced inequality in accounting higher education

289   (Hausmann et al., 2010; Lehman 2012). We argue that the consistent wage gap in the

290   accounting profession still adversely affects the interest of female students in accounting

291   higher education.

292

293   The recent financial crisis has had a great impact on the world economy. Several

294   corporations in the UK and other countries are under scrutiny, mainly for their

295   accountants' unethical behavior. Kohlberg's model of cognitive moral development

296   (Kohlberg, 1969) is used extensively in research to explain the behavior of professionals

297   (see Ponemon, 1990). This model can also be used to define the cognitive behavior of

298   accounting professionals during the financial crisis. According to this model,

299   professionals at the conventional level of moral reasoning adhere to rigid rules and

300   conventions, which are seldom questioned. During a financial crisis, accounting

301   professionals are at stage four of Kohlberg's model and are thus beyond the need of

302   individual approval for their own activities. They follow the societal practices of others

303   and maintain the social function determined by outside forces. Because of such mass

304   moral degradation in the accounting profession coupled with the financial crisis, the

305   male-dominated accounting profession is affected, and male employees start losing their

306   jobs. Companies also drastically minimize the pay packages for their existing employees.

307 From a social point of view, this badly affects families, which are dependent on the

308 earnings of male family members. Consequently, female graduates start looking for jobs

309 to support their families. Women are always interested in pursuing programs in higher

310 education that guarantee a job in the future (Vaitilingam, 2010), even for lower wages

311 compared to men (Hausmann et al. 2010). In the accounting profession, there is always a

312 wage gap between men and women. During the financial crisis, the accounting academia

313 experienced gender inequality (Poullaos, 2004). The changes in economy and social

314 norms adversely affect the number of students participating in higher education

315 (Crossick, 2010). Although the number of female accounting professionals has increased

316 over the years (Ciancanelli et al., 1990), female students have developed a lack of interest

317 in accounting higher education because of the above-mentioned wage gap. From this

318 discussion, we see that the financial crisis immensely changes the environment of the

319 accounting profession, which leads us to assume there is a change in gender inequality in

320 accounting higher education. Based on the Spending Review Report (Russell

321 International Excellence Group, 2013), the universities belonging to the Russell group

322 consistently receive more public funding. Therefore, they intensively implement

323 research-led teaching. Such activities at these universities attract more students, which

324 also helps them to plough back their profits in times of need. Thus, during a financial

325 crisis, these universities may maintain extra support for female students compared to

326 other universities.

327 Based on the above discussion, we tested the following hypothesis:

328 **Hypothesis 1**: There is a positive growth of female accounting students during the

329 financial crisis.

330

2.3 Non-inclusion of the disabled in higher education of accounting

Non-inclusivity of the disabled is always a big concern in the accounting discipline.

Studies in accounting focus on either male dominance in accounting (e.g., Ciancanelli et

al., 1990; Fogarty, 1997; Spruill and Wootton, 1995), color of accountancy (Annisette,

2003) factors that influence the ethical decision-making of accountants (Keller et al.,

2007) or social class and accounting (Jacobs, 2003; Holvino, 2010). The learning

experience of disabled accounting professionals is often overlooked in the related

literature, even though disability rights legislation has been in place in the UK since

1944. This is a very important but overlooked limitation of the accounting literature.

Interestingly, Duff and Ferguson (2007) find that companies in the UK have either no or

minimal understanding of disability. In their study, they discuss many barriers that cause

the small number of disabled professionals in accounting. One major reason is the wage

difference among disabled and non-disabled accounting professionals. Based on this

argument, we assume that the wage gap negatively affects the interest of disabled

students in accounting higher education.

With the introduction of the Further and Higher Education Act (1992) in the UK,

more adult participation from disadvantaged socio-economic backgrounds is expected

(Bachan, 2013). More participation in higher education may lead to a scarcity of funding

(Barr and Crawford, 1998), especially during a financial crisis. However, the higher

education literature shows that debt constraints do not affect the choice of subject

(Callender and Jackson, 2008). Thus, we argue that less financial support cannot be

responsible for the lower participation of disabled students in accounting higher

353   education. In fact, it supports our previous argument that the wage gap is the main reason

354   for the lower number of disabled accounting students. Moreover, liquidity constraints

355   prevent firms from spending money to arrange support for disabled employees. The

356   marginalizing behavior of employers toward the disabled is more prominent in times of

357   financial crisis (Duff and Ferguson, 2011). This employer behavior is factored into the

358   accounting professionals' ethical behavior, which altogether decreases the wage rates of

359   the disabled and in turn affects the token's (disabled student) interest in accounting

360   higher education. On the other side, budget cuts at universities restrict universities from

361   providing sufficient support for different types of disabled students during a crisis period.

362   However, as argued before, not all universities are affected by a financial crisis to the

363   same extent. In fact, a number of universities use their scarce financial resources

364   efficiently to support their disabled human capital. However, most of the studies on

365   disabled student participation in higher education are based on survey data or a small

366   sample, which is inconclusive. These findings, based on a small sample, use HESA

367   statistics, which are again dependent on the varying methodologies adopted by

368   universities (Richardson and Wydell, 2003). We applied an advanced methodology

369   consistent with similar literature on large samples to test the following hypothesis:

370

371   **Hypothesis 2**: There is a negative growth of accounting students with disability during

372   the financial crisis.

373

374   **3. Methodology**

375   *3.1 Sample and data description*

16

376   Our initial sample consists of all 202 universities reported in the HEIDI database. We

377   exclude universities with no information for any of the variables required for our model.

378   The final sample includes 104 universities with information from the period 2005 to

379   2011. Following the finance literature, the period from 2008 onwards is defined as the

380   crisis period in our model (e.g., Campello, 2011). To maintain a balance in the data, we

381   consider the period three years before and three years after 2008. The difference between

382   the number of female accounting students in the years 2011 and 2008 is the dependent

383   variable in our first model. In the second model, we use a similar measure for another

384   dependent variable for disabled students (both male and female). To determine the impact

385   of the crisis, we divided the universities in two groups. In our final sample, there are 19

386   universities that belong to the Russell Group (the control group of universities believed to

387   be unaffected or least affected during the financial crisis), and the remaining 85

388   universities are the treatment group in our difference-in-differences model.

389   From the existing documents, we find that universities in the Russell group have

390   more research funding (Russell International Excellence Group, Spending Review Report

391   2013). Thus, they provide advanced research-based practical and professional teaching

392   and establish a transfer link with the business and public sector. Such features and their

393   timely courses put those universities a step ahead of others in the industry. They generate

394   more income compared with others, which they use for better provisions for female and

395   disabled students, especially during a crisis. Based on this well-known fact, we assume

396   that there will be a smaller or ignorable effect of the crisis on the universities in the

397   Russell group. Thus, our main independent variable is 'affected universities,' which

398   refers to those universities that are likely to be affected by the financial crisis.

399   In our models, we control for other variables (data from HEIDI) that can have an

400 impact on the findings. For example, we control for the age of the students, the mode of

401 study (number of undergraduate and part-time students), ethnic background (number of

402 black students), domicile of the students (number of the UK, EU-excluding UK and non-

403 EU students), and number of alums (i.e., graduates) working full- time or part-time after

404 graduating in accounting. We include these control variables (covariates) by calculating

405 the average of each factor each year from 2005 to 2011 and include these variables step-

406 wise in our models.

407

408 *3.2 Econometric approach*

409 To analyze the data and test the above-mentioned hypotheses, we use two methods. First,

410 we employ propensity score matching, and second, we use difference-in-differences

411 methods.

412

413 *3.2.1 Propensity score matching*

414 To evaluate a policy, it is important to determine the effectiveness of the particular

415 intervention. This study has many policy implications. The findings can allow policy

416 makers to evaluate the existing policies related to gender inequality and inclusivity of

417 disabled accounting students in the UK and their link with the accounting profession. It is

418 not possible to perform analysis on experimental data where subjects are randomly

419 assigned to the treatment and control groups. The main concern in our data is the

420 differences between the treated and non-treated groups in one dimension that has

421 similarities as well as differences. Our sample universities have many similarities, so it is

422   hard to balance similarity along each of the dimensions. To overcome this matching

423   problem, we use a propensity score matching method that reduces the problem to a single

424   dimension—the propensity score. Here, the score is the probability that a unit in the full

425   sample receives the treatment, given a set of observed variables. The main advantage of

426   this method is that individual units can be compared on the basis of their propensity score

427   instead of being matched based on all values of the variables. Moreover, this method does

428   not require a correctly specified functional form. Below we discuss our model.

429   Suppose we use the ordinary least square (OLS) regression method for the model

430   below

431                          $Y = \beta_0 + \beta_0 X + \beta_0 Treat + \varepsilon$ ...... (1)

432   where Y is the difference between the numbers of female students studying accounting in

433   the years 2011 and 2008. X is the vector of independent variables, and *Treat* is the

434   treatment group, which equals 1 if the university is not in Russell group, and 0 otherwise.

435   In other words, the universities in the Russell group are in the control group, and all other

436   universities are in the treatment group. In the above Equation (1), it is plausible to assume

437   that the effect of treatment (financial crisis) is constant across all universities. However,

438   in reality this may not be true. Using propensity score matching, we can avoid this

439   assumption and consider that the financial crisis may affect universities to different

440   extents. However, the counterfactual question is what would have occurred to the

441   universities in the treatment group had these universities not been affected by the

442   financial crisis? Because of the fundamental problem of causal inference, it is not only

443   difficult but impossible to observe the outcome of the same unit when treatment and

444   control universities are exposed to the same financial crisis at the same time period. To

445   understand these complicated features, we follow the methods described below.

446

447   Consider that the impact of the financial crisis on university i (denoted by Φ_i) is

448   the difference between potential outcomes with and without financial crisis, so that the

449   following condition is satisfied: $\Phi_i = Y_{1i} - Y_{0i}$, where 1 and 0 refer to with and without

450   financial crisis, respectively.

451   Therefore, to determine the impact of financial crisis on the female and disabled

452   accounting students admitted to universities in the UK, we calculate the average

453   treatment effect on the treated observation (ATT) by using the following equation:

454    $$ATT = E(Y_1 - Y_0 | treat=1)\ldots\ldots (2)$$

455   where *treat*=1 refers to the financial crisis. We can rewrite Equation (2) as

456    $$ATT = E(Y_1 | treat=1) - E(Y_0 | treat=1)\ldots\ldots (3)$$

457   In Equation (3), $E(Y_0 | treat=1)$ refers to the average outcome of the treated universities

458   had they not experienced the effects of the financial crisis. Clearly, we cannot observe

459   this term, but we can observe a corresponding term for the untreated, and we can

460   calculate the following:

461    $$ATT_{other} = E(Y_1 | treat=1) - E(Y_0 | treat=1)\ldots\ldots (4)$$

462   Therefore, the difference between *ATT* and *ATT_{other}* can be expressed as

463   *ATT_{other} = ATT + Selection Bias*. The selection bias is the difference between the above-

464   mentioned counterfactual for treated universities and the observed outcomes for untreated

465   universities. The selection bias should be zero for the validity of *ATT_{other}*.

466   In this matching method, we have two important assumptions. These are

467   $(Y_1, Y_0) \perp treat|X$, i.e., potential outcomes are independent of treatment status (after

468   controlling for the X variables), and for each value of X, there exists a positive

469   probability of being both treated and untreated, which is known as common support.

470   We used a probit model to estimate the propensity score. We employed four types of

471   matching algorithms - nearest neighbor, radius, kernel, and stratified matching.

472

473   *3.2.2 Difference-in-differences (diff-in-diff) methods:*

474   To determine the impact of the financial crisis on the number of female and disabled

475   accounting students in higher education in the UK, we use Equation (1).

476   Here, Y_i indicates the difference between the numbers of female accounting students in

477   the years 2011 and 2008 and the difference between the numbers of disabled accounting

478   students in the years 2011 and 2008. The *Treat* variable is a dummy variable equal to 1

479   for the treatment group and 0 otherwise. Note that as mentioned above, the treatment

480   group is associated with universities not in the Russell group. In the control group, all the

481   universities that belong to the Russell group are considered. X is the vector of

482   independent or control variables explained in Section 3.1. ε is the usual error term. The β_0

483   and β_1 identify the causal effects of financial crisis on the trend of female accounting

484   students and disabled students, i.e., the change in Y before and after the treatment for the

485   treated with respect to controls.

486

487   **4. Results**

488   In this section, we provide a summary of the major variables used in our study and our

489   empirical findings. The detailed summary statistics are depicted in Table 1.

490   Insert Table 1 about here

491   In Table 1, we report the summary statistics of the treatment group, control group, and

492   the full sample. The full sample includes 104 universities in the UK. The treatment group

493   consists of 85 universities, and the control group consists of 19 universities. Here, the

494   variable Female-Difference is the difference in the number of female accounting students

495   for the year 2011 and year 2008. The mean of the Female-Difference for the treatment

496   group is -51.84, whereas it is -31.35 for the control group.

497

498   *4.1 Empirical Findings*

499   *4.1.1a Propensity score matching*

500   We first estimate a propensity score-matching model. We consider the treatment variable

501   (a dummy whether the university received the treatment—in our case it is financial

502   crisis), and all the independent variables are considered in the diff-in-diff model. We

503   retrieve all propensity scores, which we will match in later steps. We only compare

504   observations that have similar propensity scores in the same range.

505   The propensity score-matching model uses a probit model as shown below:

506    $$Pr\ (Y_R = 1/X) = f\ (\beta_0 + \beta_1 X)\ldots\ldots\ldots(5)$$

507   where f(.) is a function such that $F:X \longmapsto \{0,1\}, \forall X \in R$. The function f(.) determines the

508   structure of the probit model.

509   In particular, the model can be written as:

510    $$Y_R = \beta_0 + \beta_1 Undergrad + \beta_2 StudyMode + \beta_3 Age + \beta_4 Domicile + \beta_5 Ethnicity +$$
511    $$\beta_6 Employment + \varepsilon \ldots\ldots\ldots\ldots\ldots(6)$$
512

513   where Y_R is the treatment variable that takes on a value of 1 if a university does not

514   belong to the Russell group and 0 otherwise.

515   From the results (not reported), we find that students from the UK, non-EU countries,

516   and full-time students are less likely to receive the treatment. Therefore, we correct these

517   variables by winsorizing the outliers. We find that the region of common support

518   (discussed in the methodology section) is between 0.11 and 1 (with mean 0.89 and

519   standard deviation 0.23) when the dependent variable is the difference in female

520   accounting students between 2011 and 2008. A similar result is also obtained for

521   differences in disabled students between 2011 and 2008. For example, for the University

522   of Exeter, we get the propensity score of 0.29, which means the likelihood that the

523   University of Exeter will receive the treatment (shock of financial crisis) is 0.29. We also

524   calculate the optimal blocks, where each block consists of similar characteristics of

525   independent variables. In other words, these numbers indicate that the mean propensity

526   score is not different for the treated and the control in each block. We find that the

527   optimal number of blocks is 7 for models with both differences in female students and

528   differences in disabled students between 2011 and 2008. This algorithm suggests that the

529   balancing property is satisfied; in each of the blocks, we have not only similar propensity

530   scores but also similar characteristics of the independent variables, which we are trying to

531   match.

532

533   *4.1.1b Matching of propensity scores by different methods*

534   We used four types of matching: nearest neighbor, radius, kernel, and stratified.

535   Table 2 reports the average treatment on the treated effect (ATT). We take the number of

536   treated observations and find the number of control observations that are the nearest

537   neighbor. The difference between the outcomes of treated and control observations after

538   matching is reported in Table 2.

539   Insert Table 2 about here

540

541   In the nearest neighbor method, the ATTs for female accounting students and disabled

542   accounting students are 37.41 and -6.18, respectively. According to the radius matching

543   method, we find that the ATT for female accounting students is 16.6, and the ATT for

544   disabled accounting students is -3.99. The findings of the kernel and stratification

545   methods are similar to the radius matching method; the respective ATTs for female

546   accounting students are 17.98 and 15.78, respectively, and those for disabled accounting

547   student are -6.17 and -6.44, respectively. The reported bootstrapped standard errors are

548   obtained by 500 replications. The results indicate sufficient support for both hypotheses.

549

550   Insert Table 3 about here

551

552   *4.1.2 Difference-in-differences models*

553   In Table 3, we show the estimates of the model by diff-in-diff to determine the effect of

554   the financial crisis on the trend of female accounting students in the UK. In Model 1, we

555   estimate the two-sample t-test, where the differences between the means of the treatment

556   group and the control group are shown. The adjusted R^2 in the first model is very small,

557   and the coefficient is not significantly different from zero. Therefore, in the other four

558 models, we control for all the relevant variables related to domicile, ethnicity, and

559 employment opportunity. The result shows that the number of female students in

560 accounting is positively correlated with the affected universities and significant at the 1%

561 level. The result implies that the number of female accounting students increased during

562 the financial crisis, and this finding supports the first hypothesis of this study.

563   Insert Table 4 about here

564

565 In Table 4, we also estimate the models by diff-in-diff to determine the effect of the

566 financial crisis on the number of disabled accounting students in the UK. In Model 1, we

567 estimate the two-sample t test, and we find similar results, as discussed above. The result

568 shows that in Model 2, Model 3, and Model 4, the number of disabled students in

569 accounting is significantly and negatively associated with the affected universities. The

570 result implies that the number of disabled accounting students decreased during the

571 financial crisis, which supports the second hypothesis of this study.

572

573 *4.2 Robustness Tests*

574 We test the robustness of our findings with alternative model specifications.

575 First, we take the differences between the years 2011 and 2005 (please note that in our

576 previous model, we take the difference between number of female or disabled students in

577 the years 2011 and 2008) to check the validity of the findings. The results (not reported)

578 remain qualitatively the same.

579   Second, along with the number of female accounting students, we consider the

580 differences in the number of male accounting students and re-run the estimation. This

581 comparative analysis also supports our previous findings for female students in

582 accounting higher education.

583

584 **5. Conclusion**

585 Women and disabled persons are two important constituents of human capital. The

586 existing literature notes a surprising behavior of our society towards them. A similar

587 concern exists for accounting professionals (Loft, 1992; Duff et al., 2007, etc.). Studies

588 show lower wages for women and the disabled compared to men and persons without

589 disability in the accounting profession, respectively (Kirkham and Loft, 1993; Duff and

590 Ferguson, 2011). Changes in social structure and many other factors have been identified

591 for such differences. After careful investigation of the existing literature, which is mainly

592 based on the oral history method (Kim, 2008), we use the differences in wage rates in the

593 accounting profession to identify the differences in the numbers of men and women in the

594 profession and use them as a proxy for gender inequality. Differential wage rates in

595 accounting profession are also applied for the marginalization of disabled accounting

596 professionals (Duff and Ferguson, 2011). As professionalization can be affected by

597 changes in the economy, theoretically and empirically we show how the changes in wage

598 rates in accounting profession for women and the disabled during the financial crisis

599 affect the young generation's educational aspiration toward this profession.

600   As the accounting profession is dominated by men and professionals without

601 disability, with the application of Kanter's tokenism, we highlight the prominent barriers

602 for tokens (women and disabled). In line with the literature, we accept that the cost

603 associated with the tokens' better performance mostly keeps those tokens on the lower

604 step of the career ladder. The impact of social exclusion is widespread. Thus, by

605   complementing the tokenism theory with social exclusion theory, we argue that the

606   token's interest in higher education could also change, especially when the associated

607   cost is changed.

608   To become accounting professionals, most of them need to pursue university

609   accounting degrees (Bryne and Flood, 2005). Therefore, we consider 104 universities in

610   the UK for the years 2005–2011 to empirically test our research question. We argue that

611   the wage gap in the accounting profession has reduced during the crisis. Massive 'job

612   cuts' in the accounting profession for unethical behavior curtail male dominance,

613   especially during the financial crisis. Existing studies report that female students prefer to

614   undertake programs that give them more job opportunities, in spite of lower wages

615   compared to male counterparts (OECD, 2010). Therefore, we expected that more female

616   students would pursue accounting higher education than male students. Our empirical

617   findings support this argument. This finding is also consistent with the report of the

618   World Bank education database and the UNESCO world atlas (Accessed on 12 August

619   2013), which states that the number of female students has increased in higher education

620   over the years.

621   The wages of disabled accounting professionals are always lower than those of the

622   non-disabled (Duff and Ferguson, 2011). In addition, during a crisis, the scarcity of funds

623   restricts employers from accommodating disabled graduates. This hinders disabled

624   students from pursuing accounting degrees. Therefore, we find negative growth of

625   disabled students in accounting higher education. We also consider the impact of a crisis

626   on a university budget with regards to supporting female and disabled students in

627   accounting degree programs at a university. To our knowledge, this is the first study in

628   accounting higher education related literature where this unique database is used to

629   examine one of the important issues related to accounting and analyzed in detail by

630   advanced econometrical tools.

631   The findings of this study contribute to the existing literature related to inequality and

632   inclusion of the disabled in the accounting profession and establish a link with accounting

633   higher education. This newly developed link between accounting higher education and its

634   profession can assist policy makers in their future strategies. This study gives a clear

635   indication that differential wage rates are the main source of gender inequality and the

636   reason behind the non-inclusivity of the disabled in the accounting profession and in

637   accounting higher education. The outcomes of this study suggest that, especially during

638   financial crises, decision makers should consider the differential wage rates to regulate

639   the spread of inequality and non-inclusivity in the accounting profession.

640   Similar to other studies, our paper has limitations. We consider the accounting

641   students in general and do not make a distinction between domestic and foreign students.

642   Because of lack of data availability, we cannot distinguish between the female and male

643   disabled students. Moreover, we cannot find enough information about the precise

644   number of accounting students entering university and the number of students becoming

645   accounting professionals. Such detailed categorization will be considered in our future

646   study.

647

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Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
		Full sample				Treatment Group				Control Group		
Female-Difference	-35.10	176.17	-1680	185	-51.84	89.96	-265	180	-31.35	190.38	-1680	185
Undergraduates	294.84	238.91	0	1224.29	252.44	134.59	0	502.14	304.31	256.14	0	1224.29
Part-time	77.75	155.58	0	1153.57	6.28	10.12	0	45.71	93.73	168.06	0	1153.57
Age (20-29 years)	188.19	152.63	0	755.71	179.02	114.07	0.71	465.71	190.24	160.48	0	755.71
Age (30 and more)	46.89	90.47	0	635.00	5.94	6.81	0	22.14	56.04	97.79	0	635
British Students	241.02	223.12	0	1152.86	166.65	108.17	0	355.71	257.64	238.76	1.43	1152.86
EU (excl. UK)	13.64	17.95	0	112.86	19.51	25.41	0	112.86	12.33	15.72	0	99.29
Non-EU students	58.95	61.16	0	322.86	98.57	79.72	0.71	322.86	50.09	52.83	0	257.86
Black students	92.36	132.45	0	697.86	42.29	39.70	0	146.43	103.55	143.10	0	697.86
Full time-leavers	16.79	13.39	0	61.43	20.08	15.95	0	61.43	16.05	12.74	0	57.86
Part time-leavers	3.01	3.37	0	17.86	1.47	1.69	0	5	3.35	3.56	0	17.86

Notes: Full sample includes 104 universities of the UK. The treatment group consists of 85 universities and the control group consists of 19 universities. The universities in treatment group refer to non-Russell group universities and the universities in control group belong to the Russell group. The data covers the year between 2005 and 2011.

Table 2: Propensity Score matching

Matching Methods	Number of Treated Observation	Number of Control Observation	ATT Female	ATT Disability
Nearest neighbor	85	6	37.41	-6.18
			(3.41)	(-2.90)
Radius	19	10	16.6	-3.99
			(2.75)	(-2.05)
Kernel	85	10	17.98	-6.17
			(2.49)	(-2.17)
Stratification	9	86	15.78	-6.44
			(2.63)	(-3.04)

Notes: ATT is the average treatment on the treated effect. Bootstrapped standard errors, shown in parentheses, are obtained by 500 replications.

Table 3: Effect of financial crisis on number of female accounting students

Dependent Variable	Female Students in Accounting				
	Model 1	Model 2	Model 3	Model 4	Model 5
Affected Universities	20.49	105.40**	43.37***	39.25*	49.39**
	(-0.46)	(-3.18)	(-2.22)	(-2.11)	(-3.38)
Undergraduate		-0.58*	-0.77*	-0.78*	-0.60
		(-2.45)	(-2.19)	(-2.22)	(-1.51)
Part time		-1.07***	-1.60***	-1.40***	-1.81***
		(-3.67)	(-5.26)	(-4.09)	(-3.83)
Age >19 years & <30 years		1.33***	2.59***	2.14**	2.68***
		(-4.29)	(-4.39)	(-3.10)	(-3.53)
Age >29 years		0.48	1.32*	0.94	1.53*
		(-0.96)	(-2.39)	(-1.51)	(-2.14)
Domicile					
UK			-0.34	-0.18	-0.49
			(-0.64)	(-0.34)	(-0.71)
European Union (excl. UK)			0.26	0.59	0.08
			(-0.22)	(-0.50)	(-0.06)
Non-European Union			-1.96**	-1.64*	-2.27**
			(-2.73)	(-2.16)	(-2.64)
Ethnicity					
Black				0.24	0.27
				(-1.27)	(-1.26)
Employment Opportunity					
Full time					0.55
					(-0.23)
Part time					-13.45
					(-1.69)
Intercept	-51.84	-140.00***	-74.91*	-64.17	-76.48
	(-1.28)	(-4.00)	(-1.99)	(-1.67)	(-1.96)
Observation	104	104	104	104	104
Adj. R^2	-0.008	0.49	0.55	0.55	0.56

Notes: t-statistics in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Table 4: Effect of financial crisis on number of disabled accounting students

Dependent variable	Disabled Students in Accounting				
	Model 1	Model 2	Model 3	Model 4	Model 5
Affected University	-4.947	-10.28*	-3.04*	-2.46**	-3.14
	(-0.69)	(-2.21)	(-2.61)	(-1.48)	(-0.61)
Undergraduate		-0.08*	-0.10*	-0.11*	-0.11
		(-2.33)	(-2.05)	(-2.08)	(-1.77)
Part time		-0.18***	-0.25***	-0.22***	-0.27***
		(-4.43)	(-5.57)	(-4.37)	(-3.88)
Age >19 years & <30 years		0.19***	0.34***	0.27**	0.32**
		(-4.23)	(-3.96)	(-2.76)	(-2.91)
Age >29 years		0.05	0.15	0.10	0.15
		(-0.76)	(-1.89)	(-1.08)	(-1.45)
Domicile					
UK			-0.04	-0.016	-0.02
			(-0.49)	(-0.20)	(-0.13)
European Union (excl. UK)			-0.02	0.03	0.01
			(-0.12)	(-0.15)	(-0.06)
Non-European Union			-0.22*	-0.17	-0.22
			(-2.14)	(-1.62)	(-1.73)
Ethnicity					
Black				0.03	0.03
				(-1.23)	(-0.90)
Employment Opportunity					
Full time					-0.13
					(-0.37)
Part time					-1.11
					(-0.95)
Intercept	-1.05	-13.72**	-6.13	-4.63	-5.56
	(-0.16)	(-2.79)	(-1.13)	(-0.84)	(-0.98)
Observation	104	104	104	104	104
Adj. R^2	-0.005	0.608	0.638	0.64	0.637

Notes: t-statistics in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.