

CFC Exam and Accounting Education: An analysis of HEI characteristics and approval indexes

Deivson Vinicius Barroso

<https://orcid.org/0000-0001-6412-0165> | E-mail: deivson.vinicius07@gmail.com

Sheizi Calheira de Freitas

<https://orcid.org/0000-0002-1148-4296> | E-mail: shecal@ufba.br

José Sérgio Casé de Oliveira

<https://orcid.org/0000-0003-3031-4943> | E-mail: js_cdo@hotmail.com

Abstract

Objective: to verify which characteristics of Higher Education Institutions (HEI) are related to the approval of students in the CFC certification exam.

Method: The institutional characteristics of 741 HEI taking the Exam's two editions of 2017 were analyzed. Inflated Beta Regression analysis was used to treat data.

Results: the institutional characteristics that were positively correlated with higher approval indexes in the CFC exam include: ENADE score; IGC score; belonging to a public university; being located in a Brazilian capital; being well ranked in the Folha University Ranking; and offering graduate programs in Accounting. The variables negatively correlated were: Professors' work regime, Academic organization, and location in the Midwest, Northeast or North.

Contributions: The expansion of Accounting Sciences in Brazil may not be associated with the obtaining of knowledge that is necessary for professional practice, as the exploratory variable RUF suggests. These results enable HEI managers to identify the institutional attributes that contribute to students' good performance in the Exam, supporting the management of factors that can be changed, resulting in improved training in accounting.

Keywords: Education, Higher; Higher Education Institutions; Accounting Programs; CFC Exam.

1. Introduction

The performance of Accounting students in certification exams has been studied in international academic research. Fogarty, Zimmerman, and Richardson (2016) studied this relationship and verified that the results of professional exams are taken into account by universities' faculty when assessing the quality of Accounting programs in the United States.

In the same line, Morgan, Bergin, and Sallee (2012) concluded that students from Accounting programs highly rated by an American association of accreditation and quality assurance achieved significantly higher approval rates in the CPA certification exam. This positive relationship between CPA approval rates and quality accreditation levels of Higher Education Institutions had also been reported by Morgan, Bergin, and Sallee (2008).

In Brazil, the Exame de Suficiência do Conselho Federal de Contabilidade (CFC) [Sufficiency Examination of the Federal Accounting Council (CFC)] is the means to obtain professional certification that is necessary for professional practice in accounting. Results of professional exams concerning recently graduated students reveal increasingly lower approval rates.

The Brazilian Federal Council of Accounting (CFC) presented a statistical report showing that only 35.87% of the graduated students who took the exam between 2011 and 2017 were approved. The most recent edition – 1st edition of 2019 – reports a quite disheartening result: 65.07% of the candidates failed in the exam (CFC, 2019).

As a result of programs intended to expand the number of universities and undergraduate programs adopted by the Brazilian government, Accounting Sciences became popular. It was the most demanded program among private higher education institutions. In 2006, there were 57,257 students in Brazilian Accounting programs (INEP, 2007); while in 2018 this number corresponded to 359,840 students enrolled in brick-and-mortar and distance learning Accounting Sciences programs (INEP, 2019).

Based on these findings and understanding that the CFC Exam represents an important step in the career of former Accounting students and a concern for current undergraduate students, we believe it is important to identify which elements may be associated with good performance in the exam. In the international context, the institutions and Accounting programs, the former students of which obtained a satisfactory performance in professional exams are likely to be better acknowledged in the job market (Fogarty, Zimmerman & Richardson, 2016).

There is, however, no evidence in Brazil about the existence of a relationship between the performance of candidates in the certification exam and receptivity in the job market, something we intend to verify using an exploratory variable, to contribute with the Brazilian literature in the field of accounting education.

In 2017, the Federal Council of Accounting provided statistical data concerning the performance of Accounting students in the exam per HEI, so that it is possible to verify which institutional characteristics are related to the approval of candidates in the accounting certification exam. Given the preceding discussion, we present the following research problem: What are the institutional factors associated with the approval of Accounting graduates in the CFC exam?

There are very few studies in the accounting field addressing the CFC exam, especially because, up to 2017, the responsible agency did not disseminate results per HEI regularly. This is contrary to what happened with ENADE data, which has been reported yearly since 2004. For this reason, the Brazilian literature addressing accounting education reports various institutional characteristics positively or negatively related to the performance of accounting students in the ENADE. This national exam of student performance is intended to assess the quality of Brazilian higher education institutions, however, the same does not occur with the Accounting certification exam.

Therefore, this study is expected to contribute to the literature in the field of education and accounting research. It grants knowledge on institutional factors, associated with approval rates in the CFC exam. Furthermore, it permits comparisons with the results of previous Brazilian and international studies addressing student performance and training in accounting. Additionally, we will also verify the factors that more significantly contribute to approval or failure in the CFC exam.

Finally, this study's results are expected to support HEI managers in the identification of institutional attributes that contribute to the good performance of students in the Brazilian accounting certification exam. Thus, they can work to maximize approval rates by managing factors that can be changed.

2. Literature Review

2.1 Historical Perspective

Vocational Accounting teaching in Brazil was first established with the arrival of the Portuguese Court at the beginning of the 19th century. The first trade courses arose in Brazil in 1809. The actions of the Crown, such as opening the ports to “friendly nations” and the diversity of goods and commerce modalities on Brazilian soil, introduced the use of basic accounting techniques. These included the double-entry bookkeeping system and consequently, the use of accounting books for commercial bookkeeping (Oliveira, 2010).

As highlighted by Nossa (1999), the teaching of accounting in Brazil at the beginning of the 20th Century, in 1901, was marked by the establishment of the Escola Prática de Comércio de São Paulo [Commerce Practical School of São Paulo], later called Escola de Comércio Álvares Penteado [Álvares Penteado Commerce School]. The title of Accountant was achieved upon completion of the program. In 1926, Decree No. 17.329 created the undergraduate program in Economic and Commercial Sciences.

Silva (2004, p. 34) explains that, in 1931, Decree No. 20,158 “instituted the Accounting Technical program with a duration of two years to train Bookkeepers, and with a duration of three years to train Accountant Experts”. Silva notes that only in 1945 the Decree-Law No. 7,988 instituted the Actuarial Accounting Sciences program, with the first class graduating in 1949 at the Álvares Penteado Foundation (Silva, 2004).

Saes and Cytrynowicz (2001) report that the creation of the Actuarial and Accounting Sciences program contributed to the establishment of the School of Economics, Business and Accounting (FEA) at University of São Paulo (USP) in 1946, which launched the basis of the first research center in the accounting field in Brazil, with important contributions. Later, this institution implemented the first Brazilian graduate program in Accounting.

The Brazilian Federal Council of Accounting (CFC) was also established in 1946, a government-owned legal entity, which approved the Regulamento Geral dos Conselhos de Contabilidade [Accounting Council General Regulation] in the entire Brazilian territory. Its objective, among others, is to “guide, regulate and supervise the practice of the accounting profession through Regional Accounting Councils” (CFC, 2017). Based on Law No. 12,249, from 2010, the Council is also responsible for regulating Continuing Professional Education Programs for accounting professionals, establishing actions to enable, control and inspect compliance to the Program on the part of the Council's members (CFC, 2016).

According to Nossa (1999), in 1998, there were 384 Brazilian undergraduate programs in Accounting. At the time, “41.4% are hosted by universities, 49% of which in public universities and 51% in private universities. Isolated facilities, federations, and integrated colleges account for 58.6% of the programs, 15% in public institutions and 85% in private ones” (Nossa, 1999, p. 38).

Since the early 21st century, however, the number of universities and undergraduate programs has grown at an accelerated rate in Brazil. This growth is associated with the country's economic development and the consequent emergence of companies and other commercial activities. It is also linked to globalization and access to information as a result of the emergence of new technologies, in addition to the country's greater role in international markets. Additionally, in recent years, public policies for the internalization and expansion of higher education culminated in an increase of slots supply in Brazilian Accounting programs. Currently, 1,489 accounting programs are offered in the entire country, both in the brick-and-mortar and distance modalities (INEP, 2019).

To verify whether students are acquiring the content provided in the programs, Law No. 12,249/2010, later regulated by CFC Resolution No. 1,486/2015, established that the Certification Exam (currently performed twice a year) would be a requirement for obtaining professional accounting certification.

2.2 Previous Studies

Among the few recent efforts, which have set out to study aspects related to the CFC Exam, the following stand out: Rodrigues, Pinho, Bugarim, Craig, and Machado (2018) and Bugarim, Rodrigues, Pinho, and Machado (2014). The first used logistic regression to identify factors associated with approval rates of graduates from accounting programs in the CFC exam performed in 2012 and found that being a male candidate; the region where one attended the program; HEI quality; and age were positively correlated with good performance in the exam.

Bugarim et al. (2014) in turn, based on cluster analysis, analyzed the performance of candidates in the Exam according to the area of accounting knowledge versus Brazilian federative units, which in the results were assigned to two groups: units with the highest percentage of correct answers and units with the lowest percentage of correct answers.

The practice of the accounting profession in the United States is also linked to approval in an internationally renowned certification exam, the CPA. Regarding the performance of undergraduate students in Accounting Sciences in this exam, differently from what happens in the Brazilian context, various studies are found in the literature.

Bline et al. (2015) attempted to identify an association between accounting faculty's characteristics and students' performance in the CPA, concluding that programs with a high percentage of professors with expertise in the fields addressed in the exam, research productivity, and the existence of CPA certified professors, are factors positively correlated with students' performance in the exam.

The study by Bunker and Harris (2014) addressed the relationship between modality of accounting teaching and approval rates in the CPA exam and verified that students coming from predominantly online programs performed significantly worse than students coming from traditional and/or brick-and-mortar modality programs.

Still, concerning approval rates in the CPA exam, Briggs and He (2012) analyzed whether different requirements from American states in terms of higher education workload, necessary to enroll in the CPA exam, were related to approval rates. Results were inconclusive given the variability of performance per field of accounting specialization and the fact that some states with less required workload stand out.

Finally, Barilla, Jackson, and Mooney (2008) for instance compared the performance of graduates from higher education institutions accredited to an association of American business schools and graduates from other institutions. They verified that the likelihood of being approved in the first attempt was correlated with the candidates' institutional origin.

3. Method

According to reports disclosed by the Federal Council of Accounting on Overall Results per HEI, of the 1,684 undergraduate programs in Accounting Sciences active in 2017, 1,524 HEI had their students taking the Certification Exam in the first semester of 2017 and 1,581 HEI in the second edition of the same year. All the HEIs with students taking the exam in both editions of 2017 correspond to this study's population.

Two initial filters were used in the sample. First, the HEI with candidates enrolled in both editions of the exam in 2017 were identified. Then, only the programs with at least ten candidates enrolled in each of the editions were included, considering that programs from HEI with fewer students would be potential outliers; we found that 297 HEI with fewer than 10 students taking the exam's 1st edition presented a 0% approval rate. The same filter was used in the 2nd edition and this time, 270 HEI with fewer than 10 students taking the exam obtained a 0% approval rate.

Hence, in this study, we analyzed 741 programs in Accounting Sciences from Higher Education Institutions with at least ten participants in the two editions of the Certification Exam in 2017. This sample represents 44% of the Accounting Sciences programs active in Brazil in December 2017.

The initial phase of data analysis started with the descriptive statistics of the variables. After this analysis, inflated beta regression models were estimated using the HEI institutional data. Zero and Zero One Inflated beta regression are the most appropriate techniques for this study's data because the dependent variable is an indicator that represents approval rate (approval in the CFC exam), with an interval that ranges from 0 and 1, not allowing negative results or results higher than 1 (100%).

As Ferrari and Cribari-Neto (2004) explain, beta regression is indicated when the dependent variable is beta distributed (interval from 0 to 1). Additionally, according to Ospina and Ferrari (2010), when beta presents an interval between 0 and/or 1, an inflated beta regression is needed, which can be inflated at 0, 1, or 0 and 1, in case there are data in the sample that represent 0%, 100%, or both, respectively.

Because there were programs with 0% approval and programs with 100% approval in the 1st edition of 2017, a Zero One Inflated Beta Regression was used. In the 2nd edition, there were institutions with 0% of students approved though none of the institutions achieved 100% of approval; thus, the model was estimated using Zero Inflated Beta Regression. Log and logit link functions, default of *gamlss* package, available at CRAN, were used for the sub-models used in the regression. The proposed statistical tests were performed using R.

Note that a regression analysis with an OLS estimator was performed beforehand and heteroscedasticity was identified in the model. The problem, however, is solved by inflated beta regression because it is robust for heteroscedasticity, as it models the mean and precision.

This study's dependent variable (CFC) is the Approval index, per Higher Education Institution, in the Accounting Certification Exam (editions 2017/1 and 2017/2). The approval indexes per HEI of the 1st and 2nd editions of 2017 in the certification Exam was reported by the Federal Council of Accounting on its website through the spreadsheet "Relação Apuração Resultado Geral por IES" [List of Overall Result per HEI].

A search was performed in the literature to identify the main institutional factors associated with the performance of accounting students reported by previous studies. The objective was to identify the attributes most frequently investigated both in Brazilian and international studies correlating institutional characteristics to performance in exams, to establish the independent variables. The independent variables, as well as the studies in which they were originated, are presented in Table 1.

Table 1

Independent variables

Variable	Acronym	Measurement	Base studies	Database
Performance in the ENADE program	ENADE	Continuous grade from 0 to 5	Lemose Miranda (2014); Ferreira (2015); Santos (2012); Pandolfi (2017).	Preliminary program's grade (CPC) 2015
Infrastructure	INFR	Standardized grade from 0 to 5	Andriola (2009); Moreira (2010); Lemos and Miranda (2014); Ferreira (2015); Lacerda (2015)	CPC 2015
No. of professors	PROF	No. of professors working in the HEI (from 0 to 163)	Abjaud (2014); Lepchak, Oliveira, Fragalli, and Scarpin (2016). Pandolfi (2017).	CPC 2015
Faculty degrees	DOC	Standardized grade from 0 to 5	Moreira (2010); Santos (2012); Lemos and Miranda (2014); Cruz (2012).	CPC 2015
Professors' work regime	REGIM	Standardized grade from 0 to 5	Santos (2012); Lemos and Miranda (2014); Lacerda (2015).	CPC 2015
Program's workload	HORA	Program's total workload	Exploratory variable	2016 Higher Education Census
No. of students enrolled	MAT	No. of Enrollments in 2016	Andriola (2009); Abjaud (2014); Lepchak, et al. (2016); Pandolfi (2017).	2016 Higher Education Census
Time since the program's implementation	AGE	HEI Program's No. of years functioning	Lepchak et al. (2016).	2016 Higher Education Census
Region	REG	Dummy variable: 0 - Southeast (constant); 1 - Midwest 1 - Northeast; 1 - North; 1 - South	Cruz, Moreira (2010); Cruz (2012); Abjaud (2014).	2016 Higher Education Census
Academic organization	ORG	Dummy variable: 0 - University (constant); 1 - University; 1 - College; 1 - Federal Institute	Moreira (2010); Abjaud (2014).	2016 Higher Education Census
Administrative category	CAT	Dummy variable: 0 - Private; 1 - Public	Moreira (2010); Cruz (2012); Abjaud (2014).	2016 Higher Education Census
Programs located in capitals	IN_CAP	Dummy variable: 0 - HEI is not located in a capital; 1 - HEI is located in a capital.	Exploratory variable	2016 Higher Education Census
HEI with graduate programs	POS	Dummy variable: 0 - HEI does not have a graduate program in Accounting 1 - HEI has a graduate program in Accounting	Exploratory variable	Sucupira Platform
Market opening	RUF	Dummy variable: 0 - HEI is absent in the RUF Employer Ranking 1 - 0 - HEI is present in the RUF Employer Ranking	Exploratory variable	Folha's University Ranking 2018
Halo effect	HALO	IGC continuous - 1 to 5	Fogarty, Zimmerman, Richardson (2016).	IGC 2016

Source: developed by the authors (2018).

4. Results

4.1 Descriptive Statistics Of The Dependent Variable

The variable analyzed, as shown in Table 2, was the study's dependent variable, Approval index in the Accounting Certification Exam (CFC).

Table 2

Descriptive Statistics

N: 741 HEI	Mean	Median	Mode	Variance	Standard Deviation	Minimum	Maximum
1 st edition CFC/2017	27.57%	25.00%	0.00%	325.241	18.034	0.00%	100.00%
2 nd edition CFC/2017	28.42%	25.00%	20.00%	309.484	17.592	0.00%	97.14%

Source: Study's results.

Note that students from HEI included in the sample obtained a mean equal to 27.57% of approval in the exam's first edition. This result is slightly higher than the mean of all the 1,524 programs with students taking the CFC exam's 1st edition in 2017, which was 25.26% and below the general mean of approved candidates since its 1st edition in 2011, 35.87%. The mean approval among the programs included in the analysis increases slightly in the exam's 2nd edition, with 28.41% of approval.

Descriptive statistics of the independent variables were verified in unpublished reports. These variables presented values consistent with those reported in the literature.

4.2 Results of Zero and Zero One Inflated Beta Regression

The results presented below were obtained using an exhaustive comparison procedure of various adjusted models, taking into account different possible combinations of independent variables. The results from models with a better fit, according to AIC and SBC, are analyzed and reported.

No multicollinearity problems were identified among the variables, and differently from models estimated via OLS, because inflated beta regression is a model based on likelihood, it does not require various assumptions to certify its validity, the main hypothesis of which is that the modeled variable follows the distribution assumed for the estimation.

4.2.1 Main Regression

Zero One Inflated Beta Regression was used for the 1st edition of the Certification exam because in this edition there were programs with 0% and 100% approval, while Zero Inflated Beta Regression was used in the exam's 2nd edition because there were programs with 0% of approval but none with 100% of approval.

Table 3 reveals the variables with statistical significance to explain the average performance of HEI in the exam's 1st edition, while Table 4 presents the variables statistically significant in the exam's 2nd edition.

Table 3

Outputs Zero One Inflated Beta – 1st Edition 2017

Variables	Estimate	Standard Error	t-value	Significance
(Intercept)	-193.591	0.15505	-12.486	***
ENADE	0.37220	0.03510	10.605	***
INFR	-0.04717	0.02188	-2.156	*
DOC	0.05891	0.02381	2.474	*
REGIM	-0.08842	0.02017	-4.383	***
HALO	0.12291	0.05602	2.194	*
CAT	0.35309	0.08608	4.102	***
Dummy_ORG_FAC	-0.19094	0.05535	-3.450	***
Dummy_Reg_Midwest	-0.39723	0.07773	-5.111	***
Dummy_Reg_Northeast	-0.29683	0.06362	-4.666	***
Dummy_Reg_North	-0.54872	0.09162	-5.989	***
Dummy_Reg_South	0.11141	0.05913	1.884	.
IN_CAP	0.12801	0.04850	2.640	**
RUF	0.20565	0.05622	3.658	***
POS	0.67587	0.14141	4.779	***

Significance levels: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

AIC (-1029.327); SBC (-918.7346).

Source: Study's results.

As presented in Table 3, 14 variables were statistically significant to explain the Approval Indexes of HEI in the CFC Exam's 1st edition in 2017. With exception of the south (in comparison to the southeast), all the variables present at least 5% of statistical significance (most significant at 0%).

Analyzing the estimation of coefficient (estimates), the variables with higher coefficients are more relevant to explain the mean performance of HEI in the CFC exam. The first variable that stands out is POS. With the highest coefficient estimate with a high level of statistical significance, this result indicates that, on average, HEIs with graduate programs in Accounting obtain the highest rates of approval in the CFC Exam. This result is very representative because only 3.2% of the HEI offers these programs.

This result suggests that factors as being regularly assessed by MEC (for accreditation to maintain graduate programs), faculty greater qualification (who usually teach in both undergraduate and graduate programs), and research experience may lead to a superior quality of teaching, which would directly reflect on the students' learning and, consequently, in the HEI success in tests, assessments, and exams, as is the case of the CFC.

The second most relevant variable to explain the mean performance of HEI in the CFC exam was the North region variable. This variable was significant with a negative coefficient estimate, indicating that if a program belongs to an HEI located in the North, it is less likely to obtain high approval rates in the CFC exam.

Likewise, the Midwest and Northeast present significant negative estimates compared to the performance of HEI located in the southeast, also indicating students from HEI located in these regions are less likely to be approved in the exam. The only region with a statistically significant positive coefficient estimate is the south, indicating students from HEI located in this region are more likely to be approved in the exam, with statistical significance at 10% in the exam's 1st edition in 2017.

This finding is in line with studies analyzing other educational exams. Miranda (2011) for instance, analyzed determinant factors of an HEI's score in the ENADE for Accounting Sciences and found results indicating the north presented the lowest scores in the 2009 Exam, while the south and southeast presented the best performances.

ENADE is the next variable with the most relevant and positive statistically significant coefficient estimate. This variable shows that the better one's performance in the HEI program verified in the ENADE exam, the higher one's likelihood to be approved in the CFC exam, with statistical significance at 0%. Thus, if the programs in this sample score well in the ENADE, its students will be more likely to succeed in the CFC exam.

The Academic category is the 5th most relevant variable to explain the performance of students in the CFC's exam. The results suggest that a student from a public institution, included in this sample, is more likely to be approved in the CFC exam. Descriptive statistics had already revealed a higher mean of approval in the CFC exam among public HEI, which are positively correlated to performance in the programs analyzed in this exam. This result is coherent with that reported by Ferreira (2015), who verified that private HEIs tend to perform worse public HEI in educational exams.

The RUF variable revealed that accounting programs of HEI that are preferred by employers are those with the highest number of alumni approved in the CFC exam, given its positive correlation significant at 0%. Therefore, alumni from institutions with more positive results in the CFC exam are more likely to belong to programs highly rated by employers, according to this sample data. This finding is aligned with those reported by Fogarty, Zimmerman, and Richardson (2016), which highlights the importance of Accounting programs keeping a positive relationship with the companies composing the job market.

The only item from the variable "Academic Organization" that was significant in the Exam's 1st edition was College. With a negative coefficient estimate, this variable shows that programs from HEI classified as "Colleges" present worse performance in the CFC exam than those classified as Universities (constant in the model). This result may be related to the process in which HEI are created and "College" is the first stage of an HEI, hence, it tends to present less robust characteristics than a "University" or "University Center", which may result in differences in terms of teaching. In this same line, Abjaud (2014), based on the Higher Education Census, reports that the average performance of Colleges in institutional assessments is poor.

The results related to the variable "IN_CAP" revealed a significant positive correlation, among the HEIs included in the sample, between being a student of a program located in a Brazilian capital and performance in the CFC exam. This may be explained by the level of urbanization and economic development that primarily takes place in the capitals before moving on to cities in the interior of states.

The next variable analyzed was "HALO". This variable is intended to verify whether HEIs rated as having high quality overall correspond to those HEI with programs that score the highest in the CFC exam. In other words, whether an HEI considered having high-quality programs in general, also has an Accounting program with the highest rates of approval in the CFC exam.

This variable was operationalized using IGC, which represents an overall assessment of HEI, as described in Table 1. Table 3 shows that the variable presented a significant positive estimate in the exam's 1st edition, suggesting that HEI considered to have greater quality in its overall assessment are those that also obtain good results in the CFC exam for the programs analyzed.

With statistical significance, but with a negative coefficient estimate (albeit low), the variable Professors' work regime shows that the higher the proportion of professors working part-time or full-time, the lower an HEI approval index in the CFC exam. This result seems to contradict previous studies that identified a positive correlation between the greater workload of professors and the better performance of students in institutional assessments (Santos, 2012; Lacerda, 2015).

The result, however, is coherent with that reported by Wilson (2002), when addressing exogenous determinants of students in financial exams. The author reports that this is a "surprising" finding and rejected the paper's initial hypothesis, as a contrary effect was expected. Not controlling variables at the students' level probably contributed to this correlation.

The variable related to the professors' degrees (DOC) presented a significant positive coefficient to explain the behavior of the dependent variable. This result suggests that alumni from programs with a faculty composed of professors with the highest degrees are more likely to be approved in the CFC exam. This finding is in agreement with those reported by Brito (2015), Ferreira (2015), Lemos and Miranda (2014), when addressing the determinant factors of ENADE results. Miranda (2011) reveals that the regions with fewer masters and doctors are those with the lowest indexes in the ENADE, especially the North.

Finally, the Infrastructure variable presented statistical significance in the exam's 1st edition with a negative coefficient estimate, indicating that the better an HEI's infrastructure is rated, the worse its approval indexes are for the sample under study. This result may indicate that some institutions primarily invest in their physical facilities as a strategy to attract students, but do not necessarily present higher levels of teaching quality. Another aspect worth noting is the fact that public HEIs are often unsatisfactorily rated in terms of infrastructure due to a lack of investment on the part of governments.

Following the analysis of the results of the main regression, Table 4 presents the variables and their relationships with the approval indexes of students from HEI included in the sample in the CFC 2nd edition of 2017.

Table 4

Outputs Zero Inflated Beta Regression – 2nd Edition 2017

Variables	Estimate	Standard Error	t-value	Significance
(Intercept)	-2.161.858	0.152897	-14.139	***
ENADE	0.301095	0.032995	9.125	***
PROF	0.003841	0.001369	2.806	**
REGIM	-0.041893	0.018860	-2.221	*
HALO	0.180746	0.052325	3.454	***
CAT	0.482748	0.085164	5.668	***
Dummy_ORG_FAC	-0.102523	0.053942	-1.901	.
Dummy_Reg_Midwest	-0.359453	0.071232	-5.046	***
Dummy_Reg_Northeast	-0.281750	0.056652	-4.973	***
Dummy_Reg_North	-0.589614	0.085879	-6.866	***
IN_CAP	0.076950	0.045651	1.686	.
RUF	0.253609	0.053534	4.737	***
POS	0.445294	0.147487	3.019	**

Levels of significance: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
 AIC(-1086.345); SBC (-989.5771)

Source: Study's results.

Statistical significance in 12 independent variables of the initial model was found in the exam's 2nd edition of 2017. Similar to the 1st edition, most variables are statistically significant at 5% at least, except IN_CAP and Academic Organization: College variables, which are statistically significant at 10%, which reasonably explains the behavior of the dependent variable.

The first significant variable to be highlighted in the exam's 2nd edition presents a negative coefficient estimate, which is the North. This result is similar to that found in the exam's 1st edition, and likewise, Midwest and Northeast follow presenting significant negative coefficients in comparison to the performance of HEI located in the southeast, considering previous analyzes.

Academic Category is, in the CFC exam's 2nd issue, the second most relevant variable explaining the performance of students in the exam. Similar to the 1st issue, the coefficient estimate is positive, reinforcing the conclusion that a student from a public institution, included in this sample, is more likely to succeed in the certification exam.

The POS variable also presents positive significance in the exam's 2nd issue, being the third variable with the greatest ability to explain the performance of students in the exam. It is worth noting its representativeness because, even though few HEI in the sample offer graduate programs in accounting, this variable remains significant and positive in both of the CFC exam's issues.

The next variable with a significant positive estimated coefficient in the exam's 2nd issue of 2017 is the variable ENADE. The result is coherent with that found in the exam's 1st issue and reinforces the relationship between performance obtained in both exams.

The RUF variable, as well as the CFC exam's 1st issue, presented a significant and positive coefficient conferring robustness to the analysis that HEI included in this study with a reputation of training better professionals from the perspective of employers are those with the highest approval indexes in the certification exam.

The variable HALO in the exam's 2nd edition also presented a significant positive coefficient estimate, reinforcing the fact that HEIs well rated by IGC have a larger number of approved candidates in the CFC, among the institutions under study. Concerning the "Academic Organization" variable, similar to the 1st edition, the only significant configuration was College, when compared to University. The coefficient estimate remains negative, suggesting that alumni of the Universities in the sample present higher approval indexes.

The variable "IN_CAP" also presented a result similar to the 1st edition, suggesting that the fact students are from programs located in Brazilian capitals is correlated with improved performance in the CFC exam. As previously discussed, similar to Table 3, the variable Professors' work regime presents a significant negative coefficient estimate.

Finally, the last variable with statistical significance to explain the performance of HEI in this study sample in the exam's 2nd edition was No. of professors in the Institution. The variable presents a positive coefficient, indicating that the higher the number of professors in the program, the greater the likelihood of students succeeding in the CFC exam for the HEI analyzed here. Greater diversity of professors and experts may be a potential explanatory factor for this relationship, suggesting that such diversity would expand learning possibilities and consequently the quality of teaching. Brito (2015) also found a positive relationship between the number of professors and students' performance in educational exams.

4.2.2 Complementary Results

Zero and/or Zero One Inflated Beta Regression, in addition to the main model, for the mean, presents additional results concerning data that complement the analysis of influence between the variables studied in the exam's two editions. Table 5 presents the estimates of the sub-model for precision, denoted by σ , which, opposed to the variance, indicate the precision of the relationship among the programs analyzed.

Table 5
Outputs σ - 1st CFC Edition

Variables	Estimate	Standard Error	t-value	Significance
(Intercept)	-1,54E+03	1,02E+02	-15.087	***
ENADE	2,26E+02	4,13E+01	5.471	***
MAT	-5,45E-01	9,35E-02	-5.836	***
RUF	1,44E+02	7,09E+01	2.028	*

Levels of significance: 0 '***' 0.001 '**' 0.01 '*'

Source: Study's results.

Table 5 reveals that three independent variables explain the heterogeneity in the performance of the programs from the HEI analyzed in the exam's 1st edition. The number of enrollments per program presents a negative significant coefficient estimate, that is, there is greater variation in the programs' results. This finding is somewhat expected considering that the higher the number of students in a program, the more likely results concerning approval and failure will differ, that is, there is a greater potential for variation.

The ENADE variable was also significant, however with a positive coefficient estimate, indicating that the higher the score obtained in the ENADE, the more homogeneous the results will be in the CFC exam among the HEI included in the sample. This interpretation is also valid for the RUF variable, which also presented a significant positive coefficient estimate. This reveals that being highly rated by employers also leads to more similar results in the CFC exam.

In the exam's 2nd edition, however, (Table 6), the variables that were statistically significant for the precision of results among the HEIs analyzed were ENADE, Administrative Category, and the number of individuals enrolled in the program. The ENADE variable, differently from the relationship found in the CFC exam's 1st edition, presented a negative estimate, indicating that the better the performance in the ENADE, the most dispersed the results in the exam are. A potential explanation for this variation in the results may be related to aspects linked to the profile of the students who took the exam in both 1st and 2nd editions.

Because it was not possible to control data concerning the students given a lack of access to microdata, we could not identify the students' characteristics that would help to explain this difference. Variation in terms of access to higher education programs may influence student performance though. Students who obtain the best scores in the entrance exam enter the undergraduate program in the first school semester and consequently, tend to apply for the certification exam the year immediately following the program's conclusion. On the other hand, students entering college in the second semester need to attend another semester before completing the curricular requirements. Only then are they able to take the certification exam.

As shown in Table 6, the variable Academic Category was also significant and with a negative coefficient estimate, indicating the fact that being from a private HEI increase dispersion in the performance of students in the CFC Exam, among the programs in the sample. The MAT variable, in turn, even though presented statistical significance in the exam's 2nd edition, presented a positive coefficient estimate very close to zero, which reveals its lower relevance in the precision of the 2nd edition results.

Table 6
Outputs σ – 2nd CFC Edition

Variables	Estimate	Standard Error	t-value	Significance
(Intercept)	32.997.442	0.1609124	20.506	***
ENADE	-0.3072978	0.0662832	-4.636	***
CAT	-0.5530677	0.1618758	-3.417	***
MAT	0.0008370	0.0002422	3.455	***

Levels of significance: 0 '***'

Source: Study's results.

Table 7 presents the coefficients of the sub-model for the mixing parameter ν , that is, the variables related to a 0% likelihood of approval in the CFC exam.

Table 7
Outputs ν – 1st CFC Edition

Variables	Estimate	Std. Error	t-value	Significance
ENADE	-110.920	0.33709	-3.291	**
INFR	0.48405	0.19346	2.502	*
PROF	-0.15199	0.03697	-4.112	***
IN_CAP	-140.150	0.64755	-2.164	*

Levels of significance: 0 '***' 0.001 '**' 0.01 '*'

Source: Study's results.

The coefficient estimate with the greatest representativeness is the IN_CAP variable and because it is negative, it reveals that in this sample the fact that a program belongs to an HEI located in a Brazilian capital is less likely to have students approved in the CFC exam's 1st edition. Likewise, the variables ENADE and PROF present a very high negative coefficient estimate. This result shows that the better the performance of students in the ENADE, the less likely students are to be approved in the exam. The variable PROF, in turn, reveals that the higher the number of professors, the less likely that an HEI will obtain a 0% approval index in the Exam.

The Infrastructure variable presented a significant positive coefficient, showing that the better an HEI's infrastructure, from the students' perception, the more likely of a 0% approval in the Exam.

Despite a 100% approval in the CFC 1st edition, the sub-model for the mixing parameter τ revealed that none of the variables are relevant to explain the chance of all students being approved in the exam.

Zero Inflated Beta Regression was performed in the CFC exam's 2nd edition. Table 8 presents the coefficients of the sub-model for the mixing parameter ν , showing the variables that were significant to explain the HEI's 0% approval in the CFC exam.

Table 8
Outputs v – CFC 2nd Edition 2017

Variables	Estimate	Standard Error	t-value	Significance
REGIM	0.473732	0.222125	2.133	*
HALO	-1.151.640	0.343107	-3.357	***
IN_CAP	-1.422.848	0.771691	-1.844	.
MAT	-0.011766	0.004032	-2.918	**

Levels of significance: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'

Source: Study's results.

The results show that variables with greater relevance are HALO and IN_CAP. The HALO variable, which presented a negative coefficient estimate, reveals that the better an HEI's overall assessment, the less likely it is to obtain 0% approval in the CFC exam

The IN_CAP variable, which also presented a negative coefficient estimate, indicates that an HEI's location in a state capital decreases the likelihood of obtaining a 0% approval in the Exam, among those included in this sample. In turn, the MAT variable also presented a statistically significant negative coefficient estimate, revealing that the higher the number of students enrolled, the less likely that an HEI will obtain 0% approval in the Exam.

Finally, the variable REGIM suggests that the higher the number of professors working full-time and part-time, the higher the likelihood of an HEI in this sample presenting 0% of approval. As mentioned in the discussion regarding the main regression, this result contradicts previous studies that identified a positive correlation between greater faculty workload and better performance among students in educational exams.

It is important to note that the study design comprised variables that represent institutional characteristics, rather than variables related to the students. The fact that the latter were not controlled in this study given a lack of data may have influenced the results reported here.

The literature also shows that the characteristics of students strongly influence performance in exams, however, these characteristics are less subject to the control and management on the part of the institutions. Therefore, identifying institutional factors that can influence the success of students in the Accounting certificate exam may support the program managers' decision making.

5. Final Considerations

Assessment of educational programs should be a continuous process intended to improve the identification of the positive and negative aspects that concern the object under study. The objective is to enable institutions to identify the factors that support the good performance of students, reinforcing such factors and correcting those that can be changed and do not contribute or contribute very little to the training of students.

This study's methodological design added some exploratory variables to the independent variables usually adopted in the revised studies, to verify whether they influence the performance of students in the CFC exam.

The POS variable stood out in terms of its relevance for the performance of students as few HEIs enable students to given continuity to their studies in Accounting by offering Master's and Doctoral programs in Brazil. But despite this small number, this variable was positively significant in this study sample.

Generally, HEIs offering graduate programs in the Accounting field are older institutions, with a more qualified faculty, regularly assessed by MEC. These aspects reinforce the idea that graduate programs not only enable the development of Accounting in Brazil due to research but also benefit the training of undergraduate students attending undergraduate Accounting programs.

The RUF variable, also an exploratory variable, requires attention because it shows that employers may be attentive to the performance of students from various HEI in the CFC exam. In this sample, this becomes apparent at the time of hiring accounting professionals, that is, employers prefer HEI with the best performances in the CFC exam. Therefore, the more renowned a program is in the job market, the more likely it is to present the best approval indexes in the exam.

Finally, the IN_CAP variable, which revealed that among the programs in the sample, those located in Brazilian capitals are more likely to obtain higher approval indexes, is brought back to the discussion. This variable is related to the fact that economic development generally takes place in primarily metropolitan areas. Hence, it attracts a greater demand for higher educational training, which leads to greater competition in the selection process, more heavily demanding for good professionals given the large contingent of candidates per slots.

This study was only possible after 2017 when the Federal Council of Accounting started disclosing the results of the exam per HEI. Therefore, this study's results are the first efforts toward a better understanding of aspects related to the success of graduates in Accounting Sciences in the Brazilian certificate exam.

Through the results generated, this study also supports program managers and coordinators as it presents potential institutional attributes that increase the likelihood of students being successful in the exam. Thus, managers may implement actions intended to maximize the characteristics identified as those that boost greater approval rates in the exam, which is expected to also improve the training of future accounting professionals.

The approval rates of graduates of Accounting Sciences in the CFC exam in recent years have been far below the desirable while, at the same time, a considerable number of Accounting programs (both in the brick-and-mortar and distance modalities) have been accredited in Brazil.

While this expansion is very positive because it increases accessibility and creates opportunities to different social classes and regions in Brazil, it needs to be more judiciously analyzed on the part of regulating agencies and teaching institutions, so that the professionals graduated in these HEI meet the expectations of the job market, training professionals that gather the competencies and skills expected in the accounting practice, which is not occurring considering the results of the last exam's editions.

It is also worth noting that more robust analyses concerning the performance of students in the exam require access to the candidates' microdata, which the CFC has not made available yet. Considering that the regressions present evidence that contradicts the literature, findings could be better understood if students' variables had been also analyzed.

This study's limitations include the fact that only programs from Higher Education Institutions that had students applying for the exam's two editions in 2017 were included in the sample so that not all the Accounting Sciences programs active in Brazil at the time were included. Another limitation is the fact that students who graduated in different times, in which HEI might have presented different characteristics, may have taken the exam's 1st and 2nd editions in 2017 and been "labeled" as having the current attributes of an institution.

Finally, we suggest future studies include a longer time frame and also address the students' characteristics, which may represent different relationships with their performance in the CFC exam. For that, however, the Federal Council of Accounting needs to expand its access policy to the exam data.

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