Lack of Integrity among Ghanaian Accounting Academics: Upshot on Employers' Operational Costs

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This paper studied how lack of integrity by accounting academics impacts increased-cost-of-operations of universities in Ghana offering accounting degree programmes. Using cross-sectional survey, data collected were analysed via Cronbach's alpha, tests of differences-between-proportions, and one-way ANOVA. Students would not recommend their universities for academics' lack of integrity. Universities' operational costs are increased by reduction-in-enrolment (REN), reduction-in-grants-aids-anddonations (RGD), payment of phony-faculty-claims (PPC), and rapid-impairment-of-assets (RIA). The accounting profession, business schools and other accountancy training institutions and stakeholder organizations must provide activities, policies, practices, programmes and punitive measures that are capable of averting incidents of non-adherence to integrity among academics.

INTRODUCTION

The fundamental principles of the *Code of Ethics for Professional Accountants* are integrity, objectivity, professional competence and due care, confidentiality, and professional behaviour (IFAC, 2010). Integrity as a basic requirement directs the accounting profession (ACCA, 2003; Ebbah, 2003; IFAC, 2005, 2010; AGA, 2003). To have *integrity* is to be straightforward and honest in all professional and business relationships (IFAC, 2010). This fundamental principle requires a professional accountant to not be complicated but truthful in doing his work. Integrity is so crucial in the life of both the accountant and the profession that its absence will undo their very existence. The introduction to the CIMA Code reads: "CIMA expects its members and students to uphold the highest standards of ethical behaviour. These contribute to promoting the integrity of the CIMA qualification and supporting CIMA's purpose – to enhance the employability of CIMA members" (CIMA, 2007).

A quantitative analysis of academics' responses by Kleiner and Maury (1997) looked at a long list of ideals and principles that they hoped business school staff could agree upon in this respect. Through to these, the list was narrowed down to ten key relevant ideals: respect for the human person; integrity; fairness; concern; total quality; professionalism; allegiance; confidentiality; service to the institution; and responsible citizenship (Brinkmann & Peattie, 2005). Interestingly, integrity and these ideals and

principles are in one way or the other captured in the fundamental principles of the *Code of Ethics for Professional Accountants. The Global Code of Ethics for Accounting Educators* issued by The International Association for Accounting Education and Research (IAAER) is another commendable attempt to promote these ideals.

The pertinence of integrity is underscored by the fact that nearly all professions and institutions require it in no small measure from its employees. As a case in point, University of Michigan, like other universities, requires all faculty and staff members to act with honesty, integrity, and in the best interest of the University when performing their duties, and to abide by the highest standards of research, educational, professional and fiscal conduct (University of Michigan, n. d.). The reason is not far-fetched. Compliance by the accountant on professional ethics of integrity among others will improve the quality of financial reports and the performance of any organization (Ogbonna & Ebinobowei, 2011). Indeed, the cornerstone of sound accounting and reporting practices is the integrity of an accountant (Kamat & Kamat, 2012), and "any perception of a lack of integrity is a competitive disadvantage" (aat-ethics.org.uk, 2013).

Unfortunately, "integrity is almost a disappeared concept in the world" (A. Nahkola, personal communication, June 17, 2015) and the world has witnessed more than enough ugly consequences as a result. Overlooking integrity, for example, makes accounting academics, at the expense of their employers, misreport expenses on travels, hotels, meals, etc. (Smith, 2013), misrepresent professional/ academic qualifications, misappropriate institutional funds (Wile, 2013), and engage in academic dishonesty (Joy, 2013). Other resulting undesirable behaviours are: falsifying research data, falsifying documentation for research grants, falsification of activity reports that are used in evaluations of faculty, giving lower grades to students who strongly oppose their views, failure to acknowledge significant student participation in research or publication, relaxing rules (for example, late papers, attendance) so students will like them, etc. which have the potential to reduce enrolment and grants or aids or donations that may have come to the university. Payment of phony faculty claims and rapid impairment of university assets could also result from lack of integrity. Again, it is alleged that some accounting academics do not care about the enforcement of ethical behaviour amongst students and/or ignore unethical behaviours of students entirely (Amlie, 2010). These corroborate the findings of Meyer and McMahon (2004), Robie and Kidwell (2003), Tabachnick, Keith-Spiegel and Pope (1991), and Engel and Smith (1990).

Accounting academics' poor treatment of unethical behaviours of students has an impact on the ethical development of students. For instance, it is contended that lack of punishment for students' unethical actions encourages students to slip back to "stage 1" moral development; or, if we assume instead that the stages of ethical development are cumulative, then the lack of penalty stalls stage 1 moral reasoning, thereby making any successive growth not easy. Indeed, how academics handle academic dishonesty, for example, in the lecture room, is a sure way in which a very unambiguous and an explicit message can be transmitted to students on the subject of "right and wrong" (Amlie, 2010). Research has shown that how accounting academics respond to ethical violations by their students also affects their products' ethical behaviour with far-reaching ramifications.

From a sample of 224 CPAs, Swindle, Phelps and Broussard (1987) found out from accounting professionals that present day CPAs seem to have personally-oriented values and ethics rather than socially-oriented values thereby lacking the utmost ethics and integrity of a professional accountant. Appropriately, Wakefield (2008) posits that promulgation of ethical standards should sustain a high level of integrity in a profession characterized by idealism. Again, Smith (2003) rightly advises that the accounting profession must restore its most priceless assets: its reputation, honour and integrity. He continues that the future of the accounting profession depends on ethical leadership by accounting professionals and accounting educators. This is crucial because, Smith argues, new laws will not restore confidence but will be restored only by ethical leadership from the accounting profession, business community and government. For tactics to resist corruption, Beenen and Pinto (2008) prescribe that accountants should exercise integrity by reflecting on and remaining true to their own individual ethical standards.

Consequently, this study presumes that if accounting academics are to provide future accounting graduates and professionals with effective integrity culture and mindset, the academics themselves should also be integrity role models. If they fail in this respect, it is obvious that it will most likely come with substantial costs to their students, institutions, themselves, and all other stakeholders. It is against this backdrop that this research was conducted to scientifically study the integrity of accounting academics in their classroom teaching, assessment, research, relationships with certain stakeholders, and in carrying out other co-curricula activities by juxtaposing their lack of integrity in the workplace and the attendant cost consequences to their employing institutions.

The rest of this paper is made up of the theoretical and conceptual discussions and the methodology that underpinned the study, followed by discussion of the results or empirical evidence, and ends with conclusions and discussions of the policy implications.

THEORETICAL AND CONCEPTUAL ISSUES

Although it appears that a cross-section of accountants disregard personal and corporate integrity, studies' results accentuate its relevance. For instance, Fatt (1995) conducted a study into the perceived views of personal qualities of accountants in Singapore among 380 students, accountants and the general public in which it was found that most of the respondents, especially the general public, viewed integrity and ethical qualities imperative to the accounting profession. Such a view supports the emphasis placed on integrity as an essential personality trait of accountants (Fatt, 1995). After surveying 110 characters in 91 firms involving accountants from 1932 to 2000 in popular cinemas, Felton, Dimnik and Bay (2008) found that the ethical behaviour of accountants is positively associated with intrinsic terminal values but negatively related to competency values.

Headlines repeatedly disclose that integrity breakdowns collectively cause increased costs (Chandler, 2005). Whereas high levels of integrity help to save on transaction costs, its increase is usually accompanied by an economic downturn. "Empirical research suggests that societies in which trust and integrity are strong perform much better on a range of economic . . . indicators than societies where they are weak" (Evans, 2012, p. 1). Indeed, everybody who lacks integrity pays for it and so are the organisations they belong to (Bourque, 2014; Waldman, n. d.). The literature further confirms that the costs of lack of integrity are excessively high and are measurable in injuries, compensation claims of workers, in addition to lost man-hours. Integrity is for a reason; it keeps people safe and prevents costly accidents (Waldman, n. d.). Worker integrity helps save money for one's organisation by reducing operating costs (International Finance Corporation, 2014; Waldman, n. d.).

The lack of adequate moral ethics and integrity among accounting professionals is attributed to varying reasons. One of them is the cheating behaviour of accounting undergraduates (Adeyemi & Adelaja, 2011; Bowers, 1964; McCabe & Trevino, 1997). Bowers (1964), cited in McCabe, Treviño and Butterfield (2001), published the first large-scale study of cheating in institutions of higher learning. Covering more than 5,000 students in a sample of 99 U.S. colleges and universities, they found that 75% of the respondents had engaged in one or more incidents of academic dishonesty. Bowers' (1964) study was replicated by McCabe and Trevino (1997) in some of the schools, which formed the sample frame of Bowers' study, and a modest increase was observed in overall cheating while significant increases were found in tests and examination cheatings.

Adeyemi and Adelaja (2011) also surveyed 600 students from universities and polytechnics in Lagos, Nigeria. They found out that many prospective accounting professionals engage in one form of cheating or the other in going through their tertiary education and training. These could be cited as a cause for the wearing down of professional ethics and integrity among accountants and accounting academics because a person who cheats in one environment is likely to cheat in another environment or workplace (Nonis & Swift, 2001).

Labande and Piette (2000) examined ethical attitudes and perceptions of unethical behaviour among academic economists. Like the present study, they examined behaviours in the areas of teaching, personal conduct, publication practices, and use of university resources. Typical of studies of academic integrity

among students (for example, McCabe et al., 2001), they found that the behaviours believed to be most unacceptable were perceived to be the least frequent. And after investigating into the extent to which perceptions of the authenticity of (a faculty) supervisor's personal integrity and character (ASPIRE) moderate the relationship between their love of money (LOM) and propensity to engage in unethical behaviour (PUB), Tang and Liu (2012) found that a high level of ASPIRE perceptions was related to low unethical behaviour intention (PUB) but high love-of-money orientation, and high self-esteem.

A year 2000 KPMG survey conducted on 2,390 employees on organizational integrity revealed that the percentages of employees who observed unethical conduct and/or illegal conduct on the job were very high from various industries. Whereas lack of integrity and/or illegal acts pooled 76 percent for all industries, lack of integrity alone pooled 49 percent. The survey report summed the following noteworthy conclusions; that (1) "Employees are observing a high level of illegal and unethical conduct on the job, (2) Misconduct observed by employees is of a serious nature, (3) Companies are sending the wrong messages to employees on how to meet business goals, (4) Improving organizational integrity requires comprehensive solutions, and (5) Management's commitment to business integrity enhances its ability to attract and retain good employees" (KPMG, 2000, pp. 1, 2).

A similar survey by the same organisation to examine the risk of fraud and misconduct, tagged *KPMG Forensic Integrity Survey*, sampled 4,056 U.S. employees who spanned all levels of job responsibility, 16 job functions, 11 industry sectors, and 4 thresholds of organizational size. It also examined how the presence of conformity programmes within firms affects the levels of misbehaviour. Interestingly, 74% this time reported that they had detected misconduct in the preceding 12-month period, with 50% of respondents revealing that what they had seen could be grounds for '"a significant loss of public trust if discovered" (p. 1). In effect, as rightly concluded by the report, these results remain the same from respondent observations in the year 2000 (KPMG, 2006).

This apart, Tang and Liu (2012) studied the love of money as an influence of ethics. Their study investigated the extent to which perceptions of the authenticity of a supervisor's personal integrity and character moderate the relationship between people's love of money and propensity to engage in unethical behaviour. It was found out that the main effect of one's love of money on one's propensity to engage on ethical behaviour was not significant but the main effect of authenticity of a supervisor's personal integrity and character on propensity to engage in unethical behaviour was significant.

Integrity is a core aspect of ethics that cannot be overlooked. To underpin the essence of integrity in accounting professionals, Audi and Murphy (2006) in a study outlined two main faces of integrity. One is the wide, integrational sense in which integrity is a certain kind of unity in character and the aretaic sense in which integrity is identified either with specific move, virtue or with move virtue in general. Just as he is not expected to injure his employer, the accountant is to see to it that other people in his enterprise are not allowed to indulge in financial and other malpractices (Amponsah, 2011).

An accountant who is ethically conscious will have the courage of his own personal conviction. Principle rules in his decisions and actions rather than expedience. He is very firm and does not yield to the dictates of others. Again, he is not a hypocrite or praise singer. He is praised for consistency (Adams, 2001). The accountant should not be someone who behaves ethically (rightly) just because he wants to shun some punishment and or to obtain some reward. He must be fair, true to his work, and ethical at all levels no matter the circumstances. Competence and integrity should be cornerstones of his accounting decisions and judgements. He must live high above what is in the business code of ethics. He should possess a great deal of intelligence and sincerity.

METHODOLOGY

The study amalgamated a cross-sectional, qualitative and quantitative research designs—descriptive, survey, correlational, and case study research designs—that combined faculty, students and practitioners. The population consisted of 3,675 accountants (estimated 140 accounting academics—4 per institution, 3500 Level 400 accounting students, and 35 university finance officers) in universities and university colleges in Ghana accredited by the National Accreditation Board by December 2012 that ran bachelor

degrees in Accounting. The sample was 1,225 persons (140 academics, 1,050 students, and 35 finance officers). The respective response rates were 57 percent, 74 percent, and 72 percent for faculty, students, and finance officers.

Generally, the questionnaires (3 sets) were built on the unethical behaviours of academics as established by the empirical works of Engle and Smith (1990), Robie and Kidwell, Jr. (2003), and Saat, Jamal and Othman (2004). The behaviours were either retained fully or slightly modified to suit the current study and to enhance better understanding considering the culture and backgrounds of the respondents. The cost consequence variables used in the questionnaire were gleaned from various sources as in the literature (Smith, 2013; Addai, 2013; Dalhat & Barnabas, 2003; Jennings, 1995; Li, 2008).

The questionnaires were validated by test-retest and their reliability was verified by Cronbach's alpha reliability coefficient (0.8447) using a sample of 270 of the questionnaire completed by selected accounting academics and some Level 400 students in a pilot test. In order to test the hypothesis and achieve the objective, tests of differences-between-proportions were used to analyse both faculty and students' responses. One-way ANOVA was still employed for confirmation.

The fourth phase of this study's analysis related the percentage of respondents who responded in particular ways to the total respondents and total enrolment figures collected to come out with the proportion of cost consequences that could be suffered by the employing institutions of the accounting academics studied.

The hypothesis for this study was stated as follows:

 H_0 : Increased-cost-of-operations is not significantly impacted by lack of integrity of accounting academics.

The variables were operationalised as below:

$\mathbf{Y} = \mathbf{f}(\mathbf{X})$	(1)

$$\mathbf{Y} = \mathbf{C}\mathbf{C} = \mathbf{y}_1 \tag{2}$$

$$\mathbf{X} = \mathbf{x}_1 \tag{3}$$

where CC = Cost consequences $x_1 = LOI = Lack$ of Integrity, and

 $y_1 = REN, RGD, PPC, and RIA$

where REN = Reduced enrolment RGD = Reduction in grants, aids, and donations RIA = Rapid impairment of assets PPC = Payment of phony faculty claims

$$CC = f(LOI), and$$
 (4)

LOI = f(REN, RGD, PPC, RIA)(5)

Equation (5) is the principal function that characterises the modelled effects of accounting academics' lack of integrity on the cost consequence variables.

RESULTS AND DISCUSSION

The substantive objective of the study was to determine how lack of integrity by accounting academics impacts "increased cost of operations" of their employing institutions. In other words, the aim was to find which of the elements of increased-cost-of-operations can be caused most by the lack of integrity variables. We should recall that increased-cost-of-operations—the dependent variable—is made up of reduced enrolment (REN), reduction in grants, aids and donations (RGD), payment of phony faculty claims (PPC), and rapid impairment of assets (RIA). Data on lack of integrity are presented in Table 1 (A & B) of Appendix I (NOTE: The accompanying percentage table for Table 1 is Table 2, also in Appendix I). Table 1 summarises the responses of both faculty and students on the consequences for lack of integrity by accounting academics. Data collected on each of the sub-variables examined under lack of integrity (the independent variable) are analysed, interpreted and discussed below.

The first factor examined was falsifying of research data. In Table 2, 45 percent of faculty respondents indicated that falsifying of research data can result in reduced enrolment (REN) while 20 percent had the view that it could lead to reduction in grants, aids and donations (RGD). The difference (0.25) in views for these two cost consequences was significant at the 5 percent alpha level as shown by the p-value of .001 in Table 1A. Similarly, the difference in views regarding RGD and payment of phony faculty claims (PPC) was significant (difference = 0.15, *p*-value = .000). The same can be said about RGD-RIA and PPC-RIA. However, the other two differences were not statistically significant. Generally, the faculty responses were tilted towards REN (45%) and then PPC (35%). By way of contrast, in Table 2, 42.7 percent of student respondents said that they will maintain school (MS) if their teachers falsify research data but only 8.9 percent said they will rather shift school (SS) for the same reason. The difference (0.33) between these two consequences was significant (*p*-value = .001) as displayed in Table 1B. Likewise, all the other differences were significant. By and large, the students' responses were tilted towards MS (42.7%) and then I will not recommend school (NR) (30.1%). Obviously, the consequence of REN as a result of falsifying research by faculty is in dissonance with MS but in agreement with NR by students.

Falsifying research data implies being dishonest and inaccurate in conveying expert conclusions, opinions, and research findings, in addition to acknowledging the latent limitations (BPS, 2009). Some of the cost consequences to the employing universities for this behaviour include the institution's reputational damage (Cabral-Cardoso, 2004; WSU, n. d.) which likely affects current and future students' enrolment, payment of huge fines (Solberg, 2012; WSU, n. d.) and potential reduction in government funding (WSU, n. d.) which amounts could have been used to expand infrastructure to increase enrolment. The students' stance on this issue could probably be attributed to their fear of not gaining admission into other almost non-existent institutions with its concomitant inconveniences. Thus, student respondents disapprove falsifying research data by their faculty but since they cannot easily shift school, they will stay in but will reasonably not recommend to others to enrol.

The second factor examined was falsifying of documentation for research grants. In Table 2, 38.3 percent of faculty respondents designated that this behaviour can result in payment of phony faculty claims (PPC) while 19.8 percent indicated that it could lead to reduced enrolment (REN). The difference (-0.18) in views for these two cost consequences, as revealed in Table 1A was significant (*p*-value = .009). Besides the difference in views regarding RGD and PPC (d = 0.04, *p*-value = .600), all the others were statistically significant. Generally, the faculty responses were more of PPC (38.3%) and then RGD (34.6%). On the other hand, in Table 2, 40.6 percent of students stated that they will maintain school (MS) if their teachers falsify documentation for research grants but 10.4 percent said they will rather shift school (SS) for the same reason. The difference between these two consequences was significant (d = 0.30, *p*-value = .001) as in Table 1B. All the other differences were also significant. On the whole, the students' responses were basically MS (40.6%) and then I will not recommend school (NR) (29.6%).

The two predominant faculty responses (PPC and REN) for falsifying of documentation for research grants presuppose that the employing universities will suffer more funds outflows and little inflows in sync. If found of indulging in this behaviour, some of the costs could arise from increased supervision and

remuneration for stand-in human resource to do what would otherwise have been done by the culprit as well as repayment of research grants received (Solberg, 2012) with interest. The eventual effect could be increase in students' fees. Students therefore seemed rational by indicating that though they will not change schools, they will not recommend schools where behaviour of faculty might lead to increase in fees.

Misreporting of expenses—to claim from university was the third factor examined. With respect to Table 2, 70 percent of faculty subscribed that this unethical behaviour can result in payment of phony faculty claims (PPC) while only 3.8 percent indicated that it could lead to reduced enrolment (REN). With respect to Table 1A, the difference (-0.66) in views for these two cost consequences was significant (*p*-value = .001). Apart from the difference in views regarding REN and RIA (d = 0.01, *p*-value = .638), all the others were statistically significant. Generally, the faculty responses were more of PPC (70%) and then RGD (23.8%). Conversely, in Table 2, 41.9 percent of students said that they will maintain school (MS) if their teachers misreport expenses but 9.1 percent said they will shift school (SS) for this. The difference between these two consequences was significant (d = 0.32, *p*-value = .001). All the other differences were significant with *p*-values of .000. In general, the students' responses were mostly MS (41.9%) and then I will not recommend school (NR) (29.1%).

It follows that the universities pay phony faculty claims on padded faculty expenses (Lewellyn, 1996; Rezaee et al., 2001) unless they are detected on time. The cost consequences to the institutions could be far-reaching and myriad as testified by the very high percentage by participant faculty in the present study. It is usual to expect that grants, aids and donations might be curtailed if providers of such funds find out that universities pay phony claims to faculty for misreported expenses. Again, students would continue to stay in such universities but would not want to advise others to join them.

The fourth factor examined was falsification of activity reports that are used in evaluations of faculty. In Table 2, 41.5 percent of faculty respondents indicated that this unethical behaviour can result in PPC while 25.6 percent had the view that it could lead to REN. The difference (-0.15) in views for these two cost consequences, as in Table 1A, was not significant at the 5 percent alpha level as shown by the p-value of .033. Similarly, the differences in views regarding all the other proportions were not significant: REN-RGD (d = -0.49, p-value = .490) and RGD-PPC (d = -0.11, p-value = .140). Generally, the faculty responses were tilted towards PPC (41.5%) and then RGD (30.5%). By way of contrast, in Table 2, 39.8 percent of student respondents said that they will maintain school (MS) if their teachers falsify activity reports that are used in faculty evaluations but 11.4 percent said they will rather shift school (SS) for the same reason. Table 1B shows that the difference (0.28) between these two consequences was significant (p-value = .000). Likewise, all the other differences were significant. By and large, the students' responses were tilted towards MS (39.8%) and then NR (29.8%).

It appears plausible to think that when faculty falsify reports to get promoted their universities would expend more funds on them and that could bring about reduction in grants, aids and donations should the providers find out the means by which they were promoted. Yet again, students take the previous stance possibly for the same reasons.

Giving of lower grades to students who strongly oppose the academic's views was the fifth behaviour examined. The results in Table 2 reveal that 65 percent of faculty responded that this unethical behaviour can result in REN while 20 percent had the view that it could lead to RGD. The difference in views for these two cost consequences was significant at the 5 percent alpha level as shown in Table 1A (d = 0.45, p-value = .000). Similarly, the difference in views regarding all the other proportions were significant except RGD-PPC (d = 0.10, p-value = .077) and PPC-RIA (d = 0.05, p-value = .230). By and large, the faculty responses were mostly REN (65%) and then RGD (20%). On the other hand, 33 percent of students said they will maintain school (MS) but 33.4 percent stated that they will not recommend school (NR) if their teachers give lower grades to students who strongly oppose their (academics') views. The difference between these two consequences was not statistically significant (d = 0.00 approx., p-value = .868). SS-RS was also not significant (d = 0.00, p-value = .917) but the others were. On the whole, the students' responses were NR (33.4%) and then MS (33%). Whereas faculty overwhelmingly thought the behaviour in question can reduce enrolment, students were divided mostly between MS and NR, the only

instance where NR surpassed all other responses. Up to this point, giving of lower grades to students who strongly oppose the academic's views has been the only behaviour which would make more students not to recommend school more than any other response or action.

Kaynak and Sert (2012) found in their study that unethical behaviours of service providers and their representatives affect customer satisfaction negatively. Indeed, giving lower grades to students who strongly oppose the academic's views affects students' satisfaction and subsequent enrolment. This is likely the more reason why faculty rated reduced enrolment very high and two-thirds of students would not recommend schools where this unethical behaviour rears its ugly head.

The sixth factor examined was failure to acknowledge significant student participation in research or publication. Here, 57.5 percent of faculty indicated that this behaviour can result in REN while 25 percent indicated that it can result in RGD. The difference of 0.32 in views for these two cost consequences was significant with *p*-value of .000 as presented in Table 1. Only the difference in views between PPC and RIA was not significant (d = 0.08, *p*-value = .093); all the others were statistically significant. In the main, the faculty responses were more of REN (57.5%) and then RGD (25%). Alternatively, 39.1 percent of student respondents stated that they will maintain school (MS) if their teachers fail to acknowledge significant student participation in research or publication but 11.6 percent said they will instead shift school (SS). The difference between these two consequences was significant (d = 0.27, *p*-value = .000). All the other differences were also significant. On the whole, the students' responses were basically MS (39.1%) and then NR (31.4%). The closeness of the two seemingly opposite students' responses makes the REN by faculty appear very strong at this point.

Failure to acknowledge significant student participation in research or publication (Engle & Smith, 1990; Kidwell & Kidwell, 2008) casts suspicion over the integrity that parents and students rely on to judge the fitness of faculty in universities where their wards and they themselves school (McRoberts, 2002). Such deliberate neglect of ethical responsibility to human subjects has far-reaching ramifications on enrolment. The 2012 iThenticate report details that this misconduct brings about university brand damage which negatively affects reputation, enrolment and ability to increase overall funding from governmental agencies (Turnitin, 2012, p. 4). The report also stated that "because an individual researcher is an employee and as such a representative of an organization, a very public case of misconduct involving that researcher has the potential to significantly harm the institution's brand," so most of the universities "keep such information private, given the embarrassing and sensitive nature of misconduct" with its most damaging long-term costs (p. 5).

Relaxing rules (for example, late papers, attendance) so students will like the academic was the seventh factor that was considered. The results showed that 58.5 percent of faculty subscribed that this unethical behaviour can result in REN while 23.2 percent indicated that it could lead to RGD. The difference (0.35) in views for these two cost consequences was significant (*p*-value = .001) with respect to Table 1A. Excepting the differences in views regarding RGD-PPC and PPC-RIA (d = 0.10, *p*-value = .099; d = 0.08, *p*-value = .350 respectively), all the others were statistically significant. Generally, the faculty responses were more of REN (58.5%) and then RGD (23.2%). Students (44.1%) said on the other hand that they will maintain school (MS) if their teachers relax rules so students will like them but 9 percent said they will shift school (SS). The difference between these two consequences was significant (d = 0.35, *p*-value = .000). All the other differences were significant. In general, the students' responses were mostly MS (44.1%) and then NR (25.9%). One would have expected a very high response percentage for MS since relaxing rules "benefits" students; an appreciable number of them have registered their disapproval if their teachers desire to achieve cheap favour.

Relaxing rules (for example, late papers, attendance) so students will like the academic (Engel & Smith, 1990; Labande & Piette, 2000; Robie & Kidwell, 2003; McCabe et al., 2001; Tabachnick et al., 1991) was regarded highly by faculty as being capable of causing reduction in enrolment probably as a result of faculty assuming that certain well-bred students would not like to experience such a behaviour. It is likely the reason why a respectable percentage of students would not want to recommend universities where this behaviour thrives. After all, if the rules would be relaxed, why were they made in the first place?

The last lack of integrity factor examined was misrepresentation of academic and/or professional qualifications. The results revealed that 51.2 percent of faculty responded that this unethical behaviour can result in REN while 19.5 percent were of the view that it could lead to RGD. The difference in views for these two cost consequences was significant at the 5 percent alpha level as shown in Table 1A (d = 0.31, p-value = .000). Similarly, two other differences in views were significant: REN-PPC (d = 0.35, p-value = .001) and REN-RIA (d = 0.37, p-value = .001). The others were not significant. By and large, the faculty responses were mostly REN (51.2%) and then RGD (19.5%). On the other hand, 36.7 percent of students held that they will maintain school (MS) but 15 percent assured that they will shift school (SS) if their teachers misrepresent the latter's academic and/or professional qualifications. The difference between these two consequences was statistically significant (d = 0.21 approx., p-value = .000). All the others were significant too. On the whole, the students' responses were MS (36.7%) and then NR (29.1%). Whereas majority of faculty believed that misrepresenting their academic and/or professional qualifications will reduce enrolment, only about a third of students would want to maintain school, implying that both groups appreciate the seriousness of the problem. Obviously, most of the students would not want imposters and the incompetent to teach them.

Misrepresentation of academic and/or professional qualifications (Wile, 2013), like unaccredited colleges and universities, "bogus degrees," and résumé fraud, is ubiquitous in recent times (Barr, 2004; Lee, 2006) that it is required that applicant background checks be conducted to help colleges and universities to be more self-assured about the integrity of the persons they hire. Lee contends further that academic institutions function, in various respects, on the foundation of trust; though they cannot guarantee that that trust is earned, verifying an applicant's background information helps ensure that academic and/or professional qualifications are not misrepresented. There is no gainsaying that betrayal of this trust, if disclosed, has serious consequences on the enrolment and financial strengths of a university as affirmed by the present findings.

In the end, the results show that each of the lack of integrity variables, according to the respondents' views, at least causes some level of cost consequences in each of the dependent variables. The most outstanding cost consequences suffered by the universities were reduced enrolment and payment of phony faculty members' claims. Figure 1 depicts the results.

In Figure 1, five lack of integrity variables point to the cost consequence (CC) they can cause to the employing university—reduced enrolment (REN)—in the outer circle which represent CC. On the darker side of the circle are the three that can cause payment of phony claims (PPC).

Results from the difference-between-proportions' tests on faculty responses revealed that, the five lack of integrity variables that can cause the cost consequence of reduced enrolment were: falsifying of research data, giving lower grades to students who strongly oppose his/her views, failure to acknowledge significant student participation in research or publication, relaxing rules (for example, late papers, attendance) so students will like him/her, and misrepresentation of academic and/or professional qualifications. In other words, according to the results, these pretentious behaviours can increase the cost of operations to the universities through reduced enrolment. The three remaining factors-falsifying of documentation for research grants, misreporting of expenses to claim from university, and falsification of activity reports that are used in evaluations of faculty-were regarded as having the potential to impact the universities through payment of phony faculty claims. These spurious reportage behaviours as well as their pretentious counterparts above appeared to have been upheld by student respondents who largely indicated that they will maintain school but will not recommend to others. Probably they would maintain school because of their fear of not getting admission into other universities. Besides, why should they go through the inconveniences of shifting school for lack of integrity of their teachers? So the faculty belief that their own disingenuousness can cause reduced enrolment and payment of phony faculty claims seemed to be in line with the students' views. Therefore, the study's purpose to determine which increased cost of operation elements could impact the employing universities revealed REN and PPC.

FIGURE 1 COST CONSEQUENCES OF LACK OF INTEGRITY



TESTING OF SIGNIFICANCE IMPACT OF LACK OF INTEGRITY ON INCREASED-COST-OF-OPERATIONS USING ONE-WAY ANOVA

 H_0 : Increased-cost-of-operations is not significantly impacted by lack of integrity of accounting academics.

TABLE 5							
HYPOTHESIS TESTING ON LACK OF INTEGRITY WITH ANOVA							

Increased cost of operations	F	Probability	Significance level: > or .05	Decision
REN	19.654	.171	>	Do not reject
RGD	2.579	.444	>	Do not reject
PPC	160.117	.060	>	Do not reject

Source: Extraction from Appendix II

The critical value of F (df1 = 1; df2 = 6; $\alpha = .05$) = 5.9874 as in Appendix III. Since the computed values of F in Table 5 above are much greater than the critical value, this means that the impact of lack of integrity on increased cost of operations is not significantly different among the elements of the latter. Indeed, the corresponding probabilities p(.171; .444; .060) also confirm the insignificance of the impact among the elements. Therefore, the null hypothesis is retained.

The results in Table 5 showed an acceptance of the null hypothesis which states that increased-costof-operations is not significantly impacted by lack of integrity of Accounting academics. That is, the collective impact of the lack of integrity variables examined on the cost consequence variables is not statistically significant. This result appears to somewhat disagree with the literature because the latter seem to generally indicate that the costs of lack of integrity is too high.

In sum, the findings of the hypothesis indicate that there is no serious impact of lack of integrity on increased-cost-of-operations in the universities. This is a confirmation of the difference-between-proportions' results in which the impact of lack of integrity on increased cost of operations in most cases were insignificant. This result implies that although lack of integrity has made certain universities lose a lot of money, the situation is not that serious in the area of study.

COSTS FROM REDUCED ENROLMENT (REN) FOR LACK OF INTEGRITY (LOI)

In this last section, we attempted to determine the potential costs of REN as a consequence of lack of integrity with the help of the cross-tabulation percentages and our assumptions. Although REN is only one out of the four consequence variables, we believe that computations and discussion on it will suffice. The data are presented in Table 6. Columns a, b and c form a unit and should be interpreted as such. Columns a, d and e is another unit. Column a lists the unethical behaviours that were examined under lack of integrity. In column b is shown the percentages of students who indicated that they will leave their universities if they found their accounting teachers indulging in the unethical behaviours in column a. The revenues that could be lost on a present enrolment of 757 students (total student respondents) are computed in column c. Column d displays the percentages of students who will not recommend their school should their teachers be found indulging in the unethical behaviours in column a. A future potential revenue loss on assumed 200 students who would not be introduced by the present 757 students for enrolment is also computed in column e.

The computations were done as follows: *Column c*: It was assumed that each of the 757 student respondents pays average total fees of \$2,000 per semester. That is, $757 \times 2000 = \$1,514,000$. The result was multiplied by the percentages in column *b*. *Column e*: It has been observed that a certain proportion of new students into a university is recommended by continuing students. Based on the 4.51 percent growth rate of Accounting students into the universities in the area of study, it was further assumed that a quarter of new enrolments—200 of the new students who would be enrolled in a session—would come from the recommendations of the 757 continuing students. (One university's admission records indicate that about a fourth of all new enrolments come from continuing students' recommendations of their university to others). So the percentages in column *d* (those who will not recommend their school because of their teachers' unethical behaviours) were multiplied by 200 x \$2,000; that is, if the fees (\$2,000) remained unchanged.

It is worth noting that, the deciphering of the data in Tables 6 must be done in light of the above assumptions (All percentage figures, from cross tabulations, are found in Table 2). The computed costs, their interpretations, as well as their implications are presented below:

In Table 6, the potential costs of reduced enrolment as a consequence of lack of integrity behaviours among accounting academics have been computed and displayed. In it, the cost of 8.9 percent of the 757 students who will leave the university because their faculty falsify research data will be \$134,746. That of falsifying documentation for research grants (10.4%) will be \$157,456. It continues in that order till a total of \$1,397,422 is attained for all the eight (8) lack of integrity factors. On the other hand, the cost of losing 30.1 percent of new students for lack of recommendation by the 757 continuing students for falsifying research data by accounting faculty would be \$120,400. For falsifying documentation for research grants, the university would lose \$118,400. The total would be \$953,600. These connote that, for falsifying research data alone, the hypothetical university may lose a whopping \$255,146 in a semester. Other results in this respect show no better picture.

a	b	С	d	e
Lack of integrity factors	Percentage of Students Who Will Shift School	Revenue Loss on Present Enrolment of 757 Students \$	% of Students Who Will Not Recommend School	Future Revenue Loss on 200 Students to be enrolled \$
Falsifying of research data	8.9	134,746	30.1	120,400
Falsifying of documentation for research grants	10.4	157,456	29.6	118,400
Misreporting of expenses – to claim from university	9.1	137,774	29.1	116,400
Falsification of activity reports that are used in evaluations of faculty	11.4	172,596	29.8	119,200
Giving lower grades to students who strongly oppose his/her views	16.9	255,866	33.4	133,600
Failure to acknowledge significant student participation in research or publication	11.6	175,624	31.4	125,600
Relaxing rules so students will like him/her	9.0	136,260	25.9	103,600
Misrepresentation of academic and/or professional qualifications	15.0	227,100	29.1	116,400
TOTALS		1,397,422		953,600

 TABLE 6

 POTENTIAL REDUCED ENROLMENT COST AS A RESULT OF LACK OF INTEGRITY

Source: Researchers' computations.

Usually, every student who is enrolled into a university pays fees. Such payments are revenues to the university. To some universities, students' tuition and other fees are their main sources of revenue. Even in public universities, the size of government grants and other funding are dictated by the enrolment. Consequently, the amount of money paid by each student or provided by the government based on student enrolment is crucial to the running of a university. Therefore, any unit reduction in enrolment (REN) costs the university some revenue.

Besides fees paid by students, many universities receive grants, aids and donations from one source or the other. Such funds undoubtedly go a long way to complement the fees paid by students. Should providers of such funds perceive that faculty members falsify documents to attract research grants, for example, the providers would most likely curtail such funds. That is, if there is reduction in grants, aids and donations (RGD), it would mean that the university shall have to look for funds from elsewhere to make up the lost funds.

Every expense paid by a university is cost to the institution. Any amount paid will no longer be available for the payment of another expense, and each expense paid makes the university worse off. However, payments should bring benefits to the university. But if a university pays faculty claims that have been padded (PPC), such payments will not bring any such benefits to the university. It is money gone down the drain, cost suffered for having employed faculty members who lack integrity.

University assets, like assets of every organization, have life-spans. All things being equal, such assets live up to their estimated useful lives because such estimations are done with experience and expert advice and with the assumption that the assets would be used solely for the organization's purposes. However, if some faculty members use the assets for personal gains, such a practice will likely impair the assets prematurely (RIA). That will mean that the university will incur the cost of replacing the precipitately impaired assets with money that could have been used to do other things.

CONCLUSIONS AND POLICY IMPLICATIONS

It could be gathered from the empirical evidence that few accounting academics in the area of study do not adhere to integrity. In the face of non-exhibition of integrity by some of their faculty, accounting students generally would still maintain their schools but will not recommend them to others. Moreover, while most of the cost consequences of non-adherence to integrity are never suffered by universities, they occasionally do. Reduction in enrolment and payment of phony faculty claims are an outgrowth of lack of integrity among accounting academics. Finally, reduction in enrolment (REN), reduction in grants, aids and donations (RGD), payment of phony faculty claims (PPC), and rapid impairment of assets (RIA) increase the costs of operations of the universities.

Having revealed that accounting academics' lack of integrity produces harsh cost consequences, universities must provide rules and regulations in their faculty handbooks where they are lacking to prevent the occurrence of such unethical behaviours rather than covering up and shielding the culprits. The study results also imply that there is the urgent need for the accounting profession, business schools and other accountancy training institutions and organizations to provide activities, policies, practices and programmes that are capable of averting incidents of non-adherence to integrity.

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APPENDIX I

	REN	-RGD	REN-PPC		REN-RIA		RGD-PPC		RGD-RIA		PPC-RIA	
	d	p-v	d	p-v	d	p-v	d	p-v	d	p-v	d	p-v
Falsifying of research data	.25	.001	.10	.197	.45	.450	15	.000	.02	.000	.35	.000
Falsifying of documentation for research grants	14	.035	18	.009	.12	.022	04	.600	.27	.000	.31	.000
Misreporting of expenses – to claim from university	20	.000	66	.000	.01	.638	45	.000	.21	.000	.68	.000
Falsification of activity reports that are used in evaluations of faculty	49	.490	15	.033	.23	.000	11	.140	.28	.000	.39	.000
Giving lower grades to students who strongly oppose his/her views	.45	.000	.55	.000	.60	.000	.10	.077	.15	004	.05	.230
Failure to acknowledge significant student participation in research or publication	.32	.000	.45	.000	.52	.000	.13	.043	.20	.000	.08	.093
Relaxing rules so students will like him/her	.35	.000	.45	.000	.53	.000	.10	.099	.18	.000	.08	.350
Misrepresentation of academic and / or professional qualifications	.31	.000	.35	.000	.37	.000	.04	.551	.61	.298	.03	.665

TABLE 1A DIFFERENCES BETWEEN PROPORTIONS AMONG COST CONSEQUENCES FOR LACK OF INTEGRITY—FACULTY

d = Difference in percentage p-v = p-value

REN = Reduced enrolment

PPC = Payment of phony faculty claims

RGD = Reduction in grants, aids and donations RIA = Rapid impairment of assets

TABLE 1BDIFFERENCES BETWEEN PROPORTIONS AMONG COST CONSEQUENCES FOR
LACK OF INTEGRITY—STUDENTS

	MS	-SS	MS-RS		MS	-NR	SS	RS	SS-	NR	RS-NR	
	d	p-v	d	p-v	d	p-v	d	p-v	d	p-v	d	<i>p-v</i>
Falsifying of research data	.33	.000	.24	.000	.12	.000	09	.000	21	.000	11	.000
Falsifying of documentation for research grants	.30	.000	.21	.000	.11	.000	09	.000	19	.000	10	.000
Misreporting of expenses – to claim from university	.32	.000	.22	.000	.12	.000	10	.000	20	.000	09	.000
Falsification of activity reports that are used in evaluations of faculty	.28	.000	.20	.000	.10	.000	07	.000	18	.000	10	.000
Giving lower grades to students who strongly oppose his/her views	.16	.000	.16	.000	.00	.868	.00	.917	16	.000	16	.000
Failure to acknowledge significant student participation in research or publication	.27	.000	.21	.000	.07	.001	06	.000	19	.000	13	.000
Relaxing rules so students will like him/her	.35	.000	.23	.000	.18	.000	12	.000	16	.000	04	.024
Misrepresentation of academic and/or professional qualifications	.21	.000	.17	.000	.07	.001	04	.033	14	.000	01	.000

 $d = \text{Difference in percentage} \qquad p$

p - v = p-value

MS = I will maintain school RS = I will recommend school

SS = I will shift school

NR = I will not recommend school

	REN	RGD	PPC	RIA	MS	SS	RS	NR
Falsifying of research data	45.0	20.0	35.0	0.0	42.7	8.9	18.3	30.1
Falsifying of documentation for research grants	19.8	34.6	38.3	7.4	40.6	10.4	19.4	29.6
Misreporting of expenses – to claim from university	3.8	23.8	70.0	2.5	41.9	9.1	19.9	29.1
Falsification of activity reports that are used in evaluations of faculty	25.6	30.5	41.5	2.4	39.8	11.4	19.0	29.8
Giving lower grades to students who strongly oppose his/her views	65.0	20.0	10.0	5.0	33.0	16.9	16.7	33.4
Failure to acknowledge significant student participation in research or publication	57.5	25.0	12.5	5.0	39.1	11.6	17.8	31.4
Relaxing rules (e.g., late papers, attendance) so students will like him/her	58.5	23.2	13.4	4.9	44.1	9.0	21.0	25.9
Misrepresentation of academic and/or professional qualifications	51.2	19.5	15.9	13.4	36.7	15.0	19.1	29.1

TABLE 2 ACCOMPANYING PERCENTAGE TABLE FOR TABLE 1 (A & B) FROM CROSS-TABULATIONS

REN to RIA are for faculty; MS to NR for students

APPENDIX II

TABLE 3ANOVA RESULTS

	-	Sum of Squares	df	Mean Square	F	Sig.
REN	Between Groups	3316.535	6	552.756	19.654	.171
	Within Groups	28.125	1	28.125		
	Total	3344.660	7			
RGD	Between Groups	193.395	6	32.233	2.579	.444
	Within Groups	12.500	1	12.500		
	Total	205.895	7			
PPC	Between Groups	3002.190	6	500.365	160.117	.060
	Within Groups	3.125	1	3.125		
	Total	3005.315	7			

TABLE 4 ANOVA F-DISTRIBUTION TABLE AND HYPOTHESIS RESULTS

CH2 Li 2 3 4 5 6 7 8 9 1 161.45 199.50 215.71 224.58 230.16 233.99 236.77 238.88 240.54 2 18.513 19.000 19.164 19.276 9.296 19.330 19.353 19.371 19.385 3 10.128 9.5521 9.2766 9.1172 90135 8.9406 8.8867 8.8452 8.812 5 6.6079 5.7861 5.4095 5.1922 5.0503 4.9503 4.8759 4.8183 4.772 6 5.9874 5.1433 4.7571 4.5337 4.3874 4.2839 4.2067 4.1468 4.099 7 5.5914 4.7374 4.3468 4.1203 3.9715 3.8606 3.5005 3.4381 3.3381 3.3481 3.3329 3.0671 3.2927 3.2296 3.178 9 5.1174 4.2565 3.6331 3.4817 3.3733 2.8321 <th></th> <th>^{1t}∕ql¹</th> <th></th> <th></th> <th>N</th> <th>lumerator</th> <th>Degrees</th> <th>of Freedo</th> <th>m</th> <th></th> <th></th>		^{1t} ∕ql¹			N	lumerator	Degrees	of Freedo	m		
1 161.45 199.50 215.71 224.58 230.16 233.99 236.77 238.88 240.54 2 18.513 19.000 19.164 19.247 19.296 19.330 19.353 19.371 19.385 3 10.128 9.5521 9.2766 9.1172 9.0135 8.9406 8.8867 8.8452 8.812 5 6.6079 5.7861 5.4095 5.1922 5.0503 4.9503 4.8759 4.8183 4.772 6 5.9874 5.144 3.714 4.5464 4.103 3.9715 3.8660 3.7870 3.7257 3.676 8 5.3177 4.4590 4.0662 3.8379 3.6875 3.5806 3.5005 3.4381 3.388 9 5.1174 4.2565 3.8625 3.6331 3.4470 3.3258 3.2172 3.1355 3.0717 3.020 10 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717	<	# <u>₂∖arı</u>	1	2						8	9
2 18.513 19.000 19.164 19.247 19.296 19.330 19.353 19.371 19.385 3 10.128 9.5521 9.2766 9.1172 9.0135 8.9406 8.8867 8.8452 8.812 5 6.6079 5.7861 5.4095 5.1922 5.0503 4.9503 4.8759 4.8183 4.772 6 5.9874 5.1433 4.7571 4.5337 4.3874 4.2839 4.2067 4.1468 4.0999 7 5.5914 4.7374 4.3468 4.1203 3.9715 3.8660 3.7870 3.7227 3.676 8 5.3177 4.4590 4.0662 3.8379 3.6875 3.5806 3.5005 3.4381 3.388 9 5.1174 4.2565 3.8625 3.6331 3.4780 3.3258 3.2172 3.1355 3.0717 3.020 9 5.1174 4.2667 3.8056 3.4105 3.1791 3.0224 2.9134 2.8486 2.7966			161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
3 10.128 9.5521 9.2766 9.1172 9.0135 8.9406 8.8867 8.8452 8.812 5 6.6079 5.7861 5.4095 5.1922 5.0503 4.9503 4.8759 4.8183 4.772 6 5.9874 5.1433 4.7571 4.5337 4.3874 4.2839 4.2067 4.1468 4.0999 7 5.5914 4.7374 4.3468 4.1203 3.9715 3.8660 3.7870 3.7257 3.676 8 5.3177 4.4590 4.0662 3.8379 3.6817 3.3738 3.2927 3.2296 3.178 9 5.1174 4.2565 3.8625 3.6311 3.4817 3.3738 3.2927 3.2296 3.178 10 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717 3.020 11 4.8443 3.9823 3.5874 3.0556 2.0952 2.9961 2.9134 2.8486 2.7969		2				19.247	19.296	19.330	19.353	19.371	19.385
5 6.6079 5.7861 5.4095 5.1922 5.0503 4.9503 4.8759 4.8183 4.7722 6 5.9874 5.1433 4.7571 4.5337 4.3874 4.2839 4.2067 4.1468 4.099 7 5.5914 4.7374 4.3468 4.1203 3.9715 3.8660 3.7870 3.7257 3.676 8 5.3177 4.4590 4.0662 3.8379 3.8875 3.5806 3.5005 3.4381 3.388 9 5.1174 4.2565 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 10 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717 3.029 11 4.8443 3.9823 3.5874 3.3567 3.2039 3.0123 2.9480 2.886 12 4.7472 3.8853 3.4003 3.2592 3.1023 2.8486 2.7964 13 4.6672 3.8056 <t< th=""><th></th><th></th><th>10.128</th><th>9.5521</th><th>9.2766</th><th>9.1172</th><th>9.0135</th><th>8.9406</th><th>8.8867</th><th>8.8452</th><th>8.8123</th></t<>			10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123
6 5.9874 5.1433 4.7571 4.5337 4.3874 4.2839 4.2067 4.1468 4.099 7 5.5914 4.7374 4.3648 4.1203 3.9715 3.8660 3.7870 3.7257 3.576 8 5.3177 4.4590 4.0662 3.8379 3.6875 3.5806 3.7870 3.7257 3.767 9 5.1174 4.2555 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 9 5.1174 4.2555 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 10 4.9646 4.1028 3.7083 3.4780 3.2557 3.2039 3.0946 3.0123 2.9480 2.8967 12 4.7472 3.8853 3.4903 3.2557 3.2039 3.0946 3.0123 2.9480 2.8967 14 4.6001 3.7389 3.3439 3.1122 2.9582 2.8477 2.7642 2.6987 2.6453		4	7.7086	9.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	6.9988
7 5.5914 4.7374 4.3468 4.1203 3.9715 3.8660 3.7870 3.7257 3.676 8 5.3177 4.4590 4.0662 3.8379 3.6875 3.5806 3.5005 3.4381 3.388 9 5.1174 4.2565 3.6625 3.6331 3.4817 3.3778 3.2927 3.2296 3.178 9 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717 3.020 9 11 4.8443 3.9823 3.5874 3.3567 3.2039 3.0123 2.9486 2.7966 12 4.7472 3.8853 3.4903 3.2592 3.1059 2.9961 2.9134 2.8486 2.7969 13 4.6601 3.7389 3.3439 3.1122 2.9522 2.8477 2.7642 2.6987 2.6445 14 4.6001 3.7389 3.0069 2.8524 2.7413 2.6572 2.5911 2.537 16 4		5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
8 5.3177 4.4590 4.0662 3.8379 3.6875 3.5806 3.5005 3.4381 3.388 9 5.1174 4.2565 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 9 5.1174 4.2565 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 9 5.1174 4.2565 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.178 11 4.8443 3.9823 3.5874 3.3557 3.0393 3.0946 3.0123 2.9486 2.896 12 4.7472 3.8853 3.4903 3.1122 2.9582 2.8477 2.7664 2.6497 2.6453 15 4.4513 3.5915 3.1968 2.9647 2.8100 2.6987 2.6113 2.5480 2.4944 18 4.4139 3.5516 3.1799 2.9277 2.7101 2.6283 2.5435 2.4468 2.4421		6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990
9 5.1174 4.2565 3.8625 3.6331 3.4817 3.3738 3.2927 3.2296 3.1789 9 10 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717 3.020 11 4.8443 3.9823 3.5874 3.3567 3.2039 3.0946 3.0123 2.9480 2.8966 12 4.7472 3.8853 3.4903 3.2592 3.0554 2.9134 2.8486 2.7966 14 4.6001 3.7389 3.3439 3.1122 2.9582 2.8477 2.7642 2.6987 2.6450 15 4.5431 3.6823 3.2874 3.0556 2.9013 2.7905 2.7066 2.6408 2.5877 16 4.4940 3.6337 3.2389 3.0069 2.8524 2.7413 2.6572 2.5112 2.436 18 4.4139 3.5546 3.1599 2.9277 2.7729 2.6613 2.5767 2.5102 2.456		7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
Op 10 4.9646 4.1028 3.7083 3.4780 3.3258 3.2172 3.1355 3.0717 3.020 11 4.8443 3.9823 3.5874 3.3567 3.2039 3.0946 3.0123 2.9480 2.8966 12 4.7472 3.8853 3.4903 3.2592 3.1059 2.9961 2.9134 2.8486 2.7969 13 4.6672 3.8056 3.4105 3.1791 3.0254 2.9153 2.8321 2.7669 2.7144 4.6001 3.7389 3.3439 3.1122 2.9582 2.8477 2.7642 2.6987 2.6455 15 4.5431 3.6823 3.2874 3.0556 2.9013 2.7905 2.7066 2.6408 2.5877 16 4.4940 3.6337 3.2389 3.0069 2.8524 2.7413 2.6572 2.5911 2.537 17 4.4513 3.5915 3.1968 2.9647 2.8100 2.6987 2.6143 2.5480 2.4949 <t< th=""><th></th><th>8</th><th>5.3177</th><th>4.4590</th><th>4.0662</th><th>3.8379</th><th>3.6875</th><th>3.5806</th><th>3.5005</th><th></th><th>3.3881</th></t<>		8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005		3.3881
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	ε	9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	응	10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	ĕ	11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	1.5	12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	L T	13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	Š	14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	8	15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	5	16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	e e		4.4513	3.5915	3.1968	2.9647					2.4943
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	12		4.4139	3.5546	3.1599						2.4563
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	Ē	19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	2		4.3512	3.4928	3.0984	2.8661	2.7109		2.5140		2.3928
24 4.2337 3.4028 3.6008 2.4765 2.6007 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	<u> </u>		4.3248	3.4668	3.0725						2.3660
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	2		4.3009	3.4434							2.3419
24 4.2337 3.4023 3.4003 2.4763 2.5207 2.6002 2.4027 2.3371 2.282 25 4.2417 3.3852 2.9912 2.7587 2.6030 2.4904 2.4047 2.3371 2.282 26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124	l e										
26 4.2252 3.3690 2.9752 2.7426 2.5868 2.4741 2.3883 2.3205 2.265 27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124 60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.0400 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
27 4.2100 3.3541 2.9604 2.7278 2.5719 2.4591 2.3732 2.3053 2.250 28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124 60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.0400 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904			2.2821
28 4.1960 3.3404 2.9467 2.7141 2.5581 2.4453 2.3593 2.2913 2.236 29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124 60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.0400 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		26	4.2252	3.3690	2.9752	2.7426	2.5868				2.2655
29 4.1830 3.3277 2.9340 2.7014 2.5454 2.4324 2.3463 2.2783 2.222 30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124 60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.0400 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		27	4.2100	3.3541	2.9604	2.7278					2.2501
30 4.1709 3.3158 2.9223 2.6896 2.5336 2.4205 2.3343 2.2662 2.210 40 4.0847 3.2317 2.8387 2.6060 2.4495 2.3359 2.2490 2.1802 2.124 60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.040 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958			4.1960	3.3404	2.9467						2.2360
40 4,0847 3,2317 2.8387 2,6060 2,4495 2.3359 2,2490 2,1802 2,124 60 4,0012 3,1504 2.7581 2.5252 2,3683 2.2541 2.1665 2,0970 2.040 120 3,9201 3,0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229
60 4.0012 3.1504 2.7581 2.5252 2.3683 2.2541 2.1665 2.0970 2.040 120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		30	4.1709	3.3158	2.9223	2.6896	2.5336				2.2107
120 3.9201 3.0718 2.6802 2.4472 2.2899 2.1750 2.0868 2.0164 1.958		40	4.0847	3.2317	2.8387	2.6060	2.4495				2.1240
		60	4.0012	3.1504	2.7581	2.5252					2.0401
		120	3.9201	3.0718	2.6802						1.9588
∞ <u>3.8415</u> 2.9957 2.6049 2.3719 2.2141 2.0986 2.0096 1.9384 1.879		00	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799

F - Distribution ($lpha$ = 0.05 in the Right Tail)	
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