Modeling Ethical Decision-Making Behaviors Through Using Information Index

Mohammad Zainal, Basel M. Al-Eideh

College of Business Administration, Kuwait University

College of Business Administration, Kuwait University

zainal@cba.edu.kw, basel@cba.edu.kw

Abstract. This research aims to study the impact of ethical decision-making factors on the College of Business Administration students at Kuwait University. The paper develops an Information Index model to estimate students' future propensity for ethical decision-making in business study. A Probit model is used to measure the impact of their GPA's as well as their gender on the ethical decision-making information index. This study is motivated predominately by the worldwide public's growing attention to various factors affecting business professionals' ethical decision-making. This paper conducts an analysis that cast light on some of the crucial elements of ethical decision-making.

Keywords: Statistical analysis, information index, ethical decision-making, Probit model, business ethics.

1. Introduction

Ethics helps to understand the effect of an individual's actions on others and the reaction of a person in such a way as to realize this effect. Thus, an ethical perspective is one that primarily considers what is best for others.

Ethical decision-making plays a critical role in the business profession. Simultaneously, ethical decision-making in business has focused on many business students and professional auditing guidance in recent years, especially in the wake of the consecutive twenty-first-century accounting scandals (Enron, WorldCom). One of the vital questions that researchers have been interested in studying is the factors influencing business professionals' ethical decision-making. Therefore, researchers have examined numerous variables and their relationship to the ethical decision-making of business professionals.

Numerous researchers have been studying ethical decision-making from different points of view. One such study by Craig Keller et al. (2007) provided a short assessment of contemporary ethical models, including the hermeneutical model, to find differences in specific ethical standards based on college-level (graduate versus undergraduate), gender, religion, and work experience.

Schopenhauer (1965), in his study, provided a difference of the "good" from the "bad" person based on the idea that most likely a good person considers a more negligible difference between others and himself.

Smith (2003) declares that ethics will be consecrated in situations where a choice must be taken, and these situations will definitely occur in everyone's life.

Many theoretical models have developed for explaining ethical behavior over the years. Viewing business from an interpretative or hermeneutical perception, one may gain insights into well-known ethics models such as utilitarian, pragmatism (egoism), religious, and deontological, all of which are provided by Epstein and Spalding (1993).

Many researchers studied different topics in the field of ethical decision-making of many various aspects, such as Clark and Dawson (1996), Bartels (1967), De George (1986), Ferrell and Gresham (1985), Reidenbach and Robin (1988), Hansen (1992), Cunningham (1998), Davis, and Welton (1991), Dawson (1997), etc.

For instance, Clark and Dawson (1996) conceptualized religiousness as an incentive for ethical action as they discovered significant differences among respondents in ethical judgments, which were classified by personal religious motivation. He discussed and supported different suggestions to these differences' sources and their consequences to managers from the literature.

In addition to the proposed framework for social and personal ethics, a particular plan was presented by Bartels (1967) to analyze the variables inherent in the ethics of decision-making in marketing activities. The variables were always ethical, never ethical, or ethical relative to time, location, and circumstances, including what logical bases the marketer can determine whether it is suitable for him to do in domestic and

international business.

De George (1986) addressed the theological task in business ethics since Philosophers have represented business ethics as a field that provides a systematic overview by linking its problems and concepts and supplies the basis for building on achieved results.

Ferrell and Gresham (1985) addressed a substantial gap in the theoretical literature on promoting ethics resulting from the absence of an integrated structure that explains and the multiple variables that clarify how marketers make ethical and unethical decisions. As a starting point, they suggested a contingency framework for developing a theory of ethical and unethical actions in organizational environments.

Several researchers, for example, Reidenbach and Robin (1988) and Hansen (1992), tried to develop techniques to determine and evaluate the ethics of a variety of different groups of people, including students, professionals, and mixed samples of students and professionals.

Reidenbach and Robin (1988) changed this fashion by quantifying different ethical philosophies into a multidimensional business ethics scale. Whereas, Hansen (1992), in his paper, examined the background of the Reidenbach and Robin (1988) by addressing a promising model with four dimensions: an extensive based ethical judgment, a deontological judgment, a teleological judgment, and a social contract.

In general, information indices provide helpful and clear vision decision support tools to decision-makers to measure the degree of awareness businesses have about specific products or services. This will guide the organization to handle the shortages of their marketing events. Al-Hussainan and Gharraph (1999) used information indices for the touristic companies in the country. They studied the statistical properties of the probability distribution of the information index a. On the other hand, Al-Ansari and Al-Eideh (2005), through the Community Service and Continuing Education Center services at Kuwait University, addressed the probability distributions and statistical properties of the indices for the Center.

In this paper, an ethical information index (EII) is used to model the college of business students' ethical decision-making at Kuwait university. An autoregressive integrated moving average (ARIMA) model is used to fit the EII and the binary Probit model to measure the impact of some study variables on the EII. A one-way ANOVA test is used to test that there are no differences among the EISS based on these models.

2. Methodology

2.1. Ethical Decision-making Information Index (EII)

Ethical decision-making Information Index (EII) of students' intention is developed to measure the personal intention rates of ethical decision-making through their factors. Therefore, EII is defined as the average of all respondent indices of information on ethical decision-making regarding the ethical decision-making factors.

The EII index measures the average of the personal intention rates to all items

offered by the Sample Survey. This gives the propensity quantitatively a respondent is loyal to the ethical decision-making factors EDMF (C.f. Al-Hussainan and Gharraph (1999) and Al-Ansari and Al-Eideh (2005)).

Let Y_i be the individual information index for a person i, $i = 1,2,...,n$, then

$$Y_i = \frac{1}{p}\sum_{j=1}^{p} I_{ij} \text{ , } i = 1,2,...,n. \tag{1}$$

Where I_{ij} is defined as the respondent response such that if I_{ij} is 0, it means the respondent has no intention of ethical decision-making factors EDMF of students' intension with probability 1. If the response (I_{ij}) is 1, it means the respondent has an intention of ethical decision-making factors EDMF with probability 1.

$$I_{ij} = \begin{cases} 0; & \text{no intention to EDMF} \\ 1; & \text{has an intention to EDMF} \end{cases} \text{ ; } i = 1,2,...,n \text{ ; } j = 1,2,...,p \tag{2}$$

Where p is the number of categorical variables (twelve factors) related to the model under study. Thus, the EII index will be given by

$$EII = \frac{1}{n}\sum_{i=1}^{n} Y_i \tag{3}$$

Note that $0 \le EII \le 1$ for the above case. If EII found to have a value of 0.6, it indicates, on average, respondents have a 60% propensity of the intention of the ethical decision-making factors EDMF. Also, EII value increases as more respondents state their intention to the ethical decision-making factors EDMF.

2.2. Probit Regression Model

The Probit regression model was used to study the impact of gender, general GPA, and major GPA on the Ethical Decision-making Information Index (EII) of students' intention developed in subsection 2.1 above.

Assume the response variable Y is a count with explanatory variables, $X = (X_1, X_2, ..., X_n)$, can be continuous or a combination of continuous and categorical variables. Then, the Probit regression model is given by:

$$EII = E(Y) = \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X_3 + \cdots + \beta_k X_k) \tag{4}$$

Where $\Phi(\cdot)$ is the cumulative distribution function of a $N(0,1)$ distribution.
The fitted model or the predicted Probit model will be given by:

$$\text{Pr\_} EII = \Phi(\hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_3 + \cdots + \hat{\beta}_k X_k) \tag{5}$$

3. Empirical Setting

3.1. Study Sample and Procedures
The study population is the students of the Faculty of Business Administration at

Kuwait University. In contrast, the study sample consisted of a simple random sample of 543 students from the Faculty of Business Administration at Kuwait University. The questionnaire was distributed at (600) business students of the study population, where (543) of them are valid, and the other (58) are excluded due to the lack of validity, making the response rate up to 90.3%, which is a high response rate.

As the study tool, a questionnaire consisted of two parts; where the first part included a set of questions that dealt with the personal information of gender, general GPA, and major GPA. Whereas the second part of the study group questions related directly and indirectly to the ethical decision-making factors of intentions among students of the Faculty of Business Administration at the University of Kuwait (see Appendix).

To ensure the study tool's validity, the questionnaire is initially distributed to five faculty members and asked them to express an opinion on the tool's suitability, the safety of the appropriate language, and the usefulness of study questions. The tool was then amended according to the faculty members' remarks and notes, where some of those remarks are positive, and some are negative ones.

The amended questionnaire is distributed to 50 students as a pilot sample to ensure clarity and extent to respond to it to ascertain the tool's external validity. Some have made remarks on the lack of transparency of some questions, and then the tool is amended again.

To ensure the tool's stability, the reliability coefficient (Cronbach Alpha) was calculated and found to close to 0.89, which is high stability and refers to a remarkable degree of question consistency. A group of students, who have been trained, were asked to randomly distribute the questionnaire to students of the College of Business Administration at Kuwait University.

3.2. Respondents Characteristics

The SPSS statistical package was used in the statistical analysis to calculate the appropriate statistics such as the percentage and ratios through the frequency tables, which used to calculate the rates of personal information and the study variables.

The relative frequency distributions were used to determine the personal information percentages of gender and the descriptive statistics for total EII and according to the gender, general GPA, and major GPA for members of the sample, where Table 1 and 2 below show these percentages.

Table 1: Percentages of Gender Information of the Study Sample

Personal Information		Number	Percentage
Gender	Male	407	75.0
	Female	136	25.0
Total		**543**	

Table 2: Descriptive Statistics of the Quantitative Variables in the Study Sample

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
GPA general	543	1.17	4.00	2.6582	.51628
GPA major	543	.00	4.00	2.2418	1.10615

Table 1 shows that males accounted for 25.0%, and females accounted for 75.0%. Whereas table 2 shows that the mean general GPA for the students in the study sample is around 2.66 out of 4, the mean major GPA is around 2.24 out of 4 with a standard deviation of 0.52 and 1.11, respectively.

4. Estimation Results and Analysis

4.1. Ethical Decision-Making Information Indices EII

Table 3 below shows the mean ethical decision-making factors information indices EII of students' intention outcomes for all respondents and EII according to gender.

Table 3: Mean Ethical Decision-Making Information Index (EII) of the Study Sample

Category		N	Mean	Std. Dev.
Gender	Male	407	.4680	.24799
	Female	136	.4507	.26067
Total EII	All Respondents	543	.4637	.25110

The table shows that the mean ethical decision-making information index EII for the gender group is 0.4680 for males and 0.4507 for females. This means that male respondents have more intention propensity than female respondents do. For the whole sample and for all respondents who indicated their intention to the ethical decision-making factors of students' intention, their intention propensity is 0.4637.

4.2. Modelling the Ethical Decision-Making Factors Information Index

This section will be devoted to model the Ethical Decision-Making Factors Information Index (EII) of students' intention, which is defined as the average of all respondent indices of information of students' intention regarding the ethical decision-making factors assuming Y_i to be the individual information index for the person $i = 1,2, \dots, n$ as defined earlier in the methodology in section 2.

Fig. 1 below shows the original data of EII obtained for all respondents in the sample study.
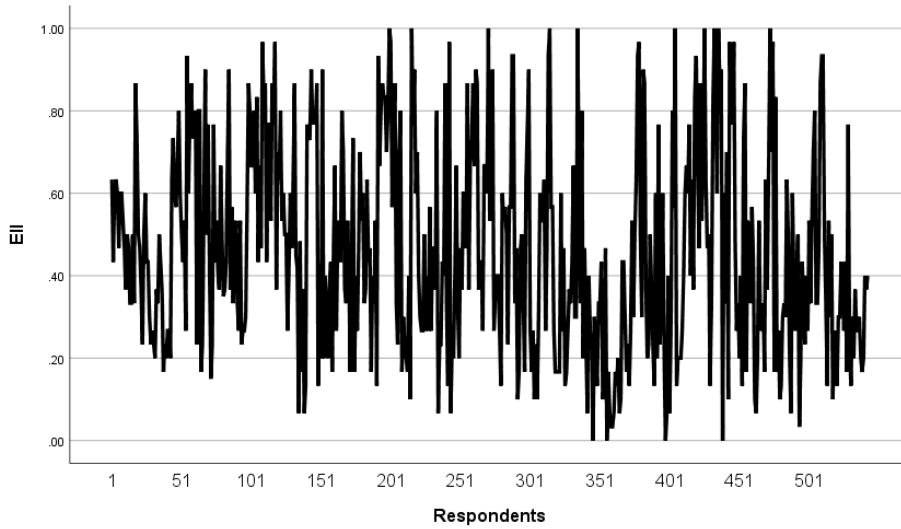
Fig. 1: Original EII of the Study Sample

Fig. 2 and 3 below show the autocorrelation and partial autocorrelation functions of the observed EFII obtained from the respondents' survey.
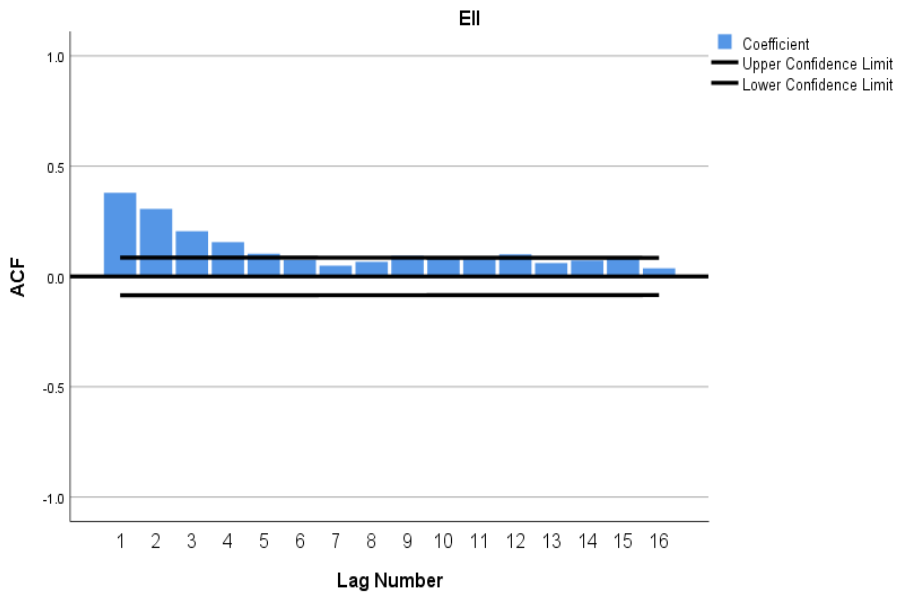

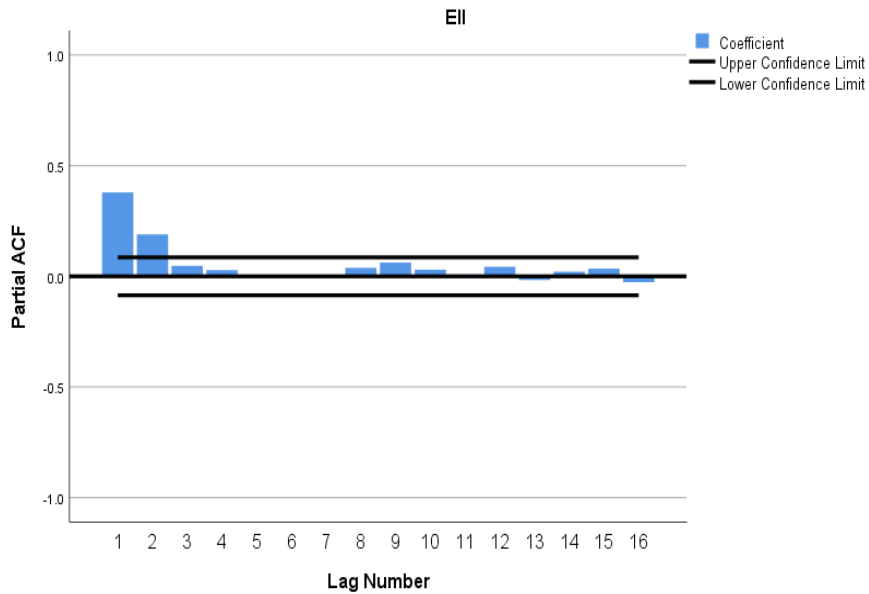Fig. 2: Autocorrelation Function (ACF) for the Observed EII

Fig. 3: Partial Autocorrelation Function (PACF) for the Observed EII

Looking at the ACF and PACF for the observed EII shown in Fig. 2 and 3, respectively. An autoregressive integrated moving average of order, ARIMA (1,1,2), model was suggested to fit the EII data.

The ARIMA (1, 1, 2) model is given by

$$EII_t = \phi_0 + \phi_1 EII_{t-1} - \theta_2 \varepsilon_{t-2} - \theta_1 \varepsilon_{t-1} - \varepsilon_t \,. \tag{6}$$

Using the SPSS Software, the model parameter estimates were as follows: $\hat{\phi}_0 = 0.000$, $\hat{\phi}_0 = -0.986$, $\hat{\theta}_1 = -0.246$, and $\hat{\theta}_2 = 0.721$ all with p-value 0.000, which are significant at 0.05 level of significance. The fitted model is then given by

$$EII_t = -0.986 EII_{t-1} - 0.721 \varepsilon_{t-2} + 0.246 \varepsilon_{t-1} - \varepsilon_t \tag{7}$$

Thus, the predicted model will be as follows:

$$\text{Pr\_} EII_t = -0.986 EII_{t-1} - 0.721 \varepsilon_{t-2} + 0.246 \varepsilon_{t-1} \tag{8}$$

For the fitted model's compatibility with original observations, we use the autocorrelation function ACF and the partial autocorrelation function PACF for the residuals of the above-fitted model. Fig. 4 below shows these plots.
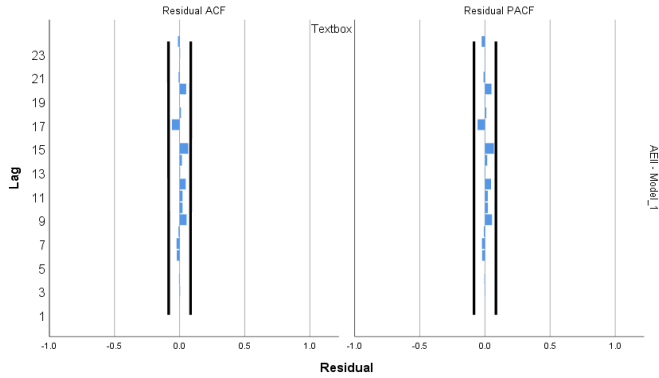
Fig. 4: ACF and PACF of the residual of the EII model

The ACF and PACF plots (Fig. 4) above clearly support that the fitted ARIMA (1, 1, 2) model is a statistically adequate representation of the EII data.

Fig. 5 below shows the observed and the predicted values of the expressive factors information index EFII of students' intention.

Fig. 5: Observed and the Predicted Values of the Ethical Decision-Making Factors Information Index EII

4.4. Probit Regression Model

The regression coefficients are estimated using the method of maximum likelihood. Using SPSS Software, we estimate the parameters as follows:

Table 4: Predicted coefficient of the Probit Model

	B	Std. Error	t	Sig.
(Constant)	.269	.057	4.746	.000
general GPA	.087	.025	3.474	.001
major GPA	.006	.011	.481	.000
Gender	-.022	.024	-.888	.000

Dependent Variable: EII

Note the coefficient of the general GPA, major GPA, and gender are significant at 0.05 level of significance.

Therefore, the predicted Probit model will be given by:

$$\Pr\_EII = \Phi(0.296 + 0.087\,generalGPA + 0.006\,majorGPA - 0.022\,Gender) \quad (9)$$

For the fitted model's compatibility with original observations, we use the autocorrelation function ACF and the partial autocorrelation function PACF for the residuals of the above-fitted model. Fig. 5 and 6 below show these plots.

Fig. 5: The ACF of the residual of the EII model

Fig. 6: The PACF of the residual of the EII model

The ACF and PACF plots (Fig. 5 and 6) above clearly support that the fitted Probit model is a statistically adequate representation of the EII data.

Fig. 7 below shows the observed and the predicted values of the Probit model for

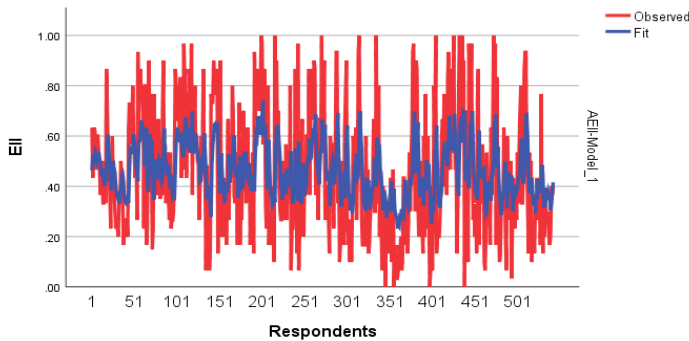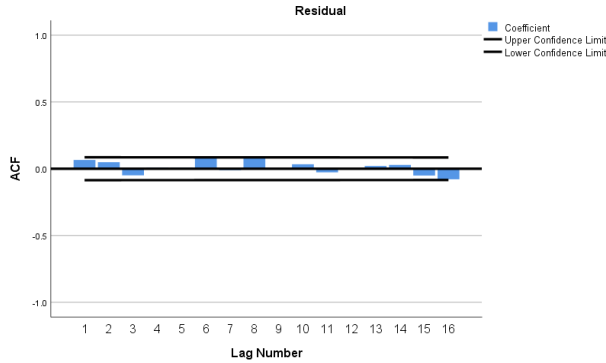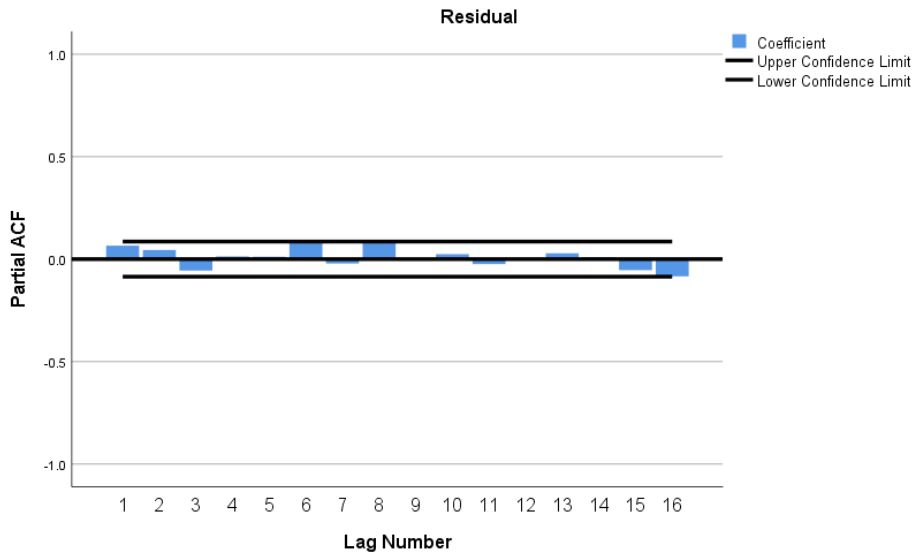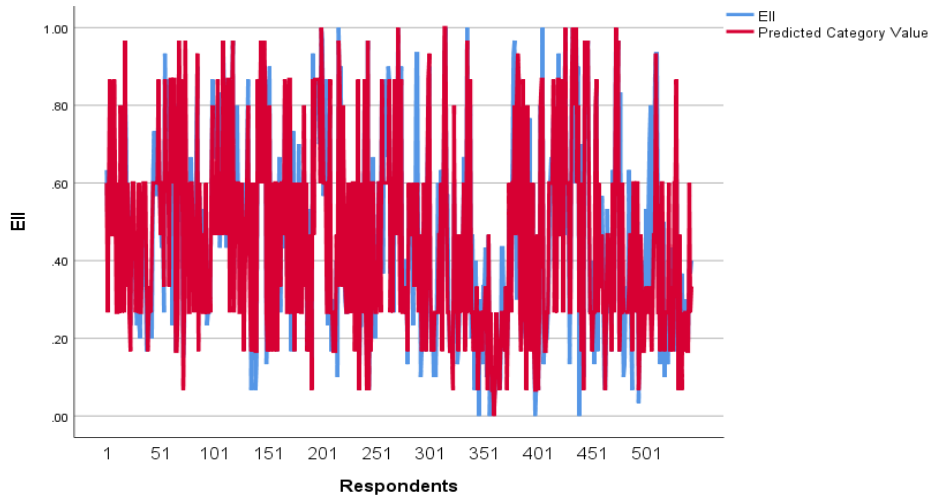the expressive factors information index EFII of students' intention.

Fig. 7: The Observed and the Predicted Probit Values of the Ethical Decision-Making Factors Information Index EII

4.4. Checking the Mean Differences for Both Suggested Models of EII

The On-Way Analysis of Variance (ANOVA) test is used to check for the mean differences among both suggested predicted models: The Ethical Decision-Making Factors Information Index ARIMA (1,1,2) model in equation (8) and the Probit model in equation (9) as well as the original EII values obtained in equation (3). Table 5 below shows the one-way ANOVA results:

Table 5: One-Way ANOVA table

Source of Variations	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.021	2	.011	.214	.808
Within Groups	80.284	1624	.049		
Total	80.305	1626			

Table 5 above shows no significant difference between the original and the predicted EII using ARIMA (1, 1, 2) and Probit models at 0.05 level of significance since the p-value is equal to 0.808. This means that both suggested models work fine in measuring the students' intention propensity of the ethical decision-making factors. Table 6 shows some descriptive statistics and 95% confidence intervals for these models that finally support the findings.

Table 6. The Descriptive Statistics and the 95% confidence Intervals

	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
EII	543	.4637	.25110	.4425	.4848

| ARIMA(1,1,2) | 542 | .4636 | .14802 | .4511 | .4761 |
| Probit | 542 | .4560 | .25164 | .4347 | .4772 |

The following Fig. 8 shows the plot for both prediction models and the original values of the ethical decision-making information index EII.
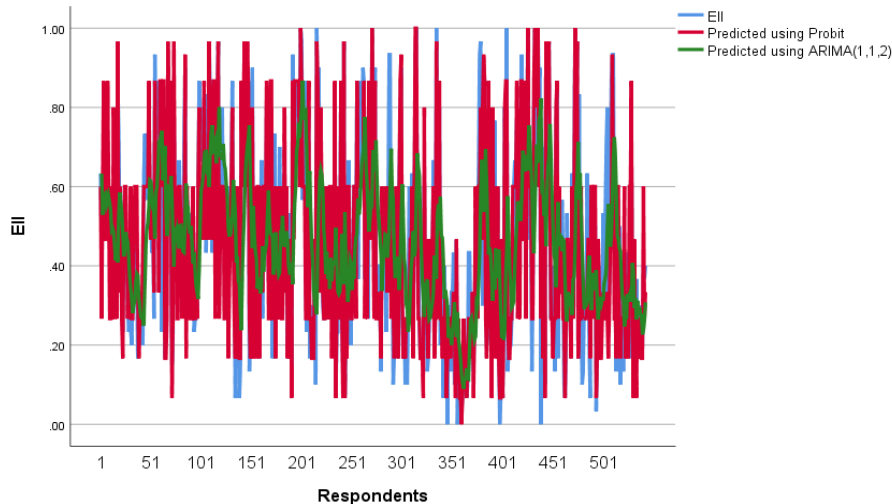

Fig. 8: The Observed and both the ARIMA (1, 1, 2) and the Predicted Probit Values of the Ethical Decision-Making Factors Information Index EII

5. CONCLUDING REMARKS and recommendations

The analyses shown in this paper provide insights into a group of ethical decision-making factors that play an essential part in the intention of the students of the College of Business Administration at Kuwait university. This paper estimated the information index model for the decision-making factors of students' intention EII. We provided forecasts of the intention propensity for the students using the predicted model of EII.

The presented model of decision-making Factors Information Index EII is fundamentally based on respondents' stated intentions and does not take care of explanatory variables predicting respondents' intention probabilities. As such, we have estimates of the EII of the student's choice, which turns out to fit the stated EII data well.

An ARIMA (1,1,2) is found to be an appropriate model to fit these EII. The Probit model is a suitable model that measures the explanatory variables such as gender, general GPA, and major GPA on EII. Also, the one-way ANOVA test shows that both models have no differences in their means compared with the original EII, which supports both models and is excellent for forecasting future intention propensities for business students.

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Appendix: The Questionnaire

Gender: 0) Female   1) Male

   General GPA: ………

   Major GPA: ……….

The following factors are intended to identify ethical decision-making:

Item	Subject	No (0)	Yes (1)
1	I choose the right impact of the decision that affected the people from my point of view.		
2	My duty is to reflect the truth in the company record to others.		
3	Business and ethics are related.		
4	My ethical beliefs always taken from religious values.		
5	Since business is the truth, not ethics, I expect rarely if ever be confronted with ethical questions.		
6	The ethical questions that confront the business people should be eliminated or simplified.		
7	Sometimes I need religious guidance to solve the ethical dilemmas.		
8	The only ethical duty for me is to present the truth as the company's records.		
9	I look for rules or laws that are set down.		
10	The greatest number of people is better for ethical.		
11	My ethical judgment is based on what is right for me.		
12	What is best for me is what I always choose.		