The Market for Essays

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This paper investigates the market in essays, an illicit and growing market of concern to both universities and employers. The growth of the essay market creates information asymmetries and hence an economic problem; the signalling of graduate quality via degree class is weakened by widespread plagiarism. Information asymmetries also characterize the market for essays with student buyers frequently struggling to locate 'reputable' suppliers who will provide essays that are both original and of the required quality. It is also characterized by strategic behavior, with those essay companies selling 'lemons' (Akerlof, 1970) having an incentive to hamper buyers' attempts to gain reliable reputational information regarding suppliers.

The demand for essays involves the interplay of risk, penalties and the payoffs associated with cheating and the ethics, norms and risk preferences of the individual facing the option to buy. Since the internet has reduced the search costs for potential buyers of illicit essays so markedly, the cheating market is constrained only by supply side capacity and consumers' willingness to pay.

We investigate students' willingness to pay for original essays supplied by commercial providers. This is done using hypothetical choice experiments in which university students, due to submit an assessed coursework, are presented with choice sets comprising essays which systematically differ in terms of their price and quality, the risk of detection and the penalty if caught.

The purchase and submission of such essays is risky, and such behavior will be conditioned by the risk preferences of the individual. We investigate this by deriving individual-specific estimates of risk aversion via a 2nd choice experiment over consequential pairs of gambles. Students' willingness to pay for essays systematically varies with these estimated risk preferences.
The structure of the paper is as follows: ...rst we summarize the position regarding plagiarism in universities with speciﬁc emphasis on the rise of the market in essays. We then describe the study design, present results from the two choice experiments conducted and discuss their implications.

1 Plagiarism, information asymmetry and contract cheating

The problem of plagiarism is growing in universities. A 2011 survey of over 1000 college presidents in the US revealed that 55 percent thought that plagiarism was on the rise. Business Schools such as those at UCLA and Penn State have recently begun scanning the admission essays of their MBA applicants because of the scale of the problem (Parker et al., 2011). In the UK a 2011 report revealed over 17,000 recorded cases of cheating at universities in 2009-10, an increase of 50 percent from four years previously.

There is an incentive to cheat to enter (a better) university and to secure a (higher class) degree. The prize is not only prestige but also economic; the average salary returns to higher education are approximately 27 percent (Blundell et al., 2005). The class of degree awarded matters also; in the UK workers with higher grade degrees have wages 6 percent higher than other graduates 6 years after graduation (Dolton and Vignoles, 2000).

The eect of widespread cheating within the university system is that the information content of the graduates’ degree as an indicator of their quality to employers is weakened, and an information asymmetry results. There is for able, honest students and for employers, universities and government, an incentive to reduce students’ cheating and the corroded quality signals that result.

This incentive applies to all form of cheating, but this paper addresses a speciﬁc form of it: the submission of commercially acquired assignments. This form of plagiarism was labelled ‘Contract Cheating’ (CC) by Clarke and Lancaster (2006) whose original interest was the market for computer code, in which jobs were posted on sites such as rentacoder 1 and programmers bid for that work. Customers were able to view feedback from programmers’ previous contracts before deciding with

1 http://www.rentacoder.com
whom to make the contract. Contract Cheating is now understood to mean the more typical situation in which students place an order for an assignment of a given level and standard to be delivered in a given period at a fixed price.

The growth of the CC market has been boosted by technological change, in a number of forms. First, technical change has pushed cheaters into the CC market because the probability of detection of traditional cut-and-paste forms of plagiarism, and recycled papers, has increased with the greater use of more powerful scanning systems. TurnItIn, the most widely used system, checks submitted work against a database of over 130 million student papers and 14 billion web pages, and has been adopted by 9,500 institutions. The use of TurnItIn has stimulated adaptation by plagiarizers and given impetus to the CC market.

The internet has revolutionized the process of commissioning and delivering work, reducing to almost zero the potential buyers’ search costs and allowing rapid ordering, payment and delivery. This is only the latest phase of such change; the CC market developed in the 1970s as remote ordering became technically possible and economically viable:

“With advances in telecommunications, duplication, and package delivery technologies, the business of ghostwriting college papers became pro...table. . . students would place their orders for original compositions by long-distance telephone, and their orders would be routed to a shop . . . within a guaranteed time frame” (Morgan and Vaughn, 2010: 756).

The information available about this illicit industry is patchy and nearly all concerns the supply side of the market. Pioneer company Termpapers Unlimited had a $1.2m turnover within a year of its establishment in the early 1970 (Stavisky 1973). Such companies have proliferated since but it is difficult to estimate reliably the scale of the industry. The UK market in CC was estimated to be worth £ 200m in 2006 with one company (UKEssays) reported to have 3,500 writers.

While the internet has reduced the costs of locating suppliers hugely, the difficulties of assessing online suppliers’ quality are substantial. Information asymmetry also characterizes the Contract Cheating
market. Lemon essays exist as well as lemon graduates. For the buyer there are 2 forms of lemon essay. The purchased work may be original and therefore impervious to scanning, but the quality of the work may not be what was ordered (whether too low, or too high, the latter risking arousing suspicion). Such an essay is an experience good the quality of which may only be revealed after purchase via the student’ own assessment (if they have the ability to determine it) or via grading. The second forms concerns the originality of the work, regardless of its quality. If the work has been previously sold, or is sold again, then there is an increasing risk that it will be scanned and incorporated by TurnItIn and hence the customer will be identi…ed as a cheat. In this case the essay remains an experience good after receipt until scanning or grading has taken place. Indeed many essay companies respond to student buyer fraud (for example the buyer using a stolen credit card) by posting the sold essay online so it will become incorporated within TurnItIn’ database and the fraudulent plagiarizer caught.s

Observation of the market, and anecdotal evidence, suggests that the market in essays is awash with lemons. The aspiring cheat is su…ering because the good essays are being driven out by the bad. The incentive to reduce the information asymmetry exists for both good companies and buyers. The bene…ciaries of the market failing are bad companies, and also honest students, universities and employers. Buyers try to reduce the information asymmetry by seeking reputational information regarding companies. Online forums for buyers feature large volumes of tra…c in which people either request market intelligence on companies or report the practice, good or bad, of companies.

The conveying of reputational information was also attempted via a now defunct ‘quality assurance’ mark for commercial essay providers named EssayFraud, the stated aim of which was "protecting students from foreign essays and coursework fraud". The bad companies’ incentive is to maintain the information asymmetry. This is apparent in the frequent disappearance of companies online and the emergence of new ones, often a rebranding of a previous organization. Hence discussion in the forums often concerns the past lives of new companies.

Bad companies employ other strategies. Although it is hard to verify, it appears evident in the online forums that certain posters (most likely working for bad companies) systematically sabotage the accurate sharing of information on good/bad companies. Almost every request for information about,
and discussion of, a company leads to contradictory statements and the hurling of allegations that posters work for one CC company or another. There appears to be systematic churning of information to keep the consumer poorly informed and buying lemons rather than cherries.

The contract cheating market is significant because of the implications it has for universities and employers regarding the informational quality of grades and degree classes. As the CC market grows so does the problem of lemons driving out cherries in the graduate market. If university grades contain less information, a greater burden falls on business to determine the quality of those they seek to employ.

While there have been many studies within the education literature on plagiarism and cheating, there are very few economic analyses of the student’s decision to cheat and none of the contract cheating market. Research in education has found that those with high intrinsic motivation, who regard study as being conducted for its own sake, are less likely to cheat than those who exhibit extrinsic motivation and regard study as a means to an end (Davy et al., 2007; Murdock and Anderman, 2006). In addition, perceptions of social norms regarding cheating, especially those of the person’s cohort or peer group, are found to affect the likelihood of cheating (McCabe et al., 1997; O’Rourke et al., 2010).

An alternative, but related, perspective comes from the economics of crime and punishment, and rational choice (Becker, 1968). Collins et al. (2007) and Quandt (2010) develop theoretical models of student cheating within an expected utility framework. Their models have intuitive outcomes: whether cheating occurs, and the extent of it, will depend on both institutional parameters (detection probabilities and penalties) and individuals’ characteristics (preferences for grades and risks). If the utility costs associated with detection are large enough, then even opportunities for cheating which have zero direct costs and low detection rates will not be exploited. Further, the utility costs of detection depend upon the interaction of the penalties imposed and the individual’s characteristics.

In this study the interplay of institutional parameters (risk of detection and penalty) and personal characteristics (academic ability, risk preferences) in generating the demand for essays are analyzed empirically, within a formal framework, for the first time. We examine the demand for essays, and how their value varies with the characteristics of both essay and buyer. We analyze how the willingness to
pay for an essay varies with its quality, the risk of being caught plagiarizing and the penalty associated with detection. The cost and quality will be determined in the market. The penalty will be set by the university, while the risk of detection is a function of both the university’s actions and the functioning of the market (whether a cherry or lemon is bought). The relevant characteristics of the buyer include, inter alia, their attitude to risk, their abilities in the subject matter and their opportunity costs of time.

2 Study Design

In common with other illicit markets (Pudney, 2003; Cook et al. 2007) direct observation of prices and demand levels in the essay market is problematic. Hence we use a discrete choice experiment (CE) to investigate students’ willingness to pay for essays. Choice experiments originate from the conjoint techniques developed in marketing and are now widely used in, inter alia, health (Ryan et al., 2008), environmental (Bateman et al., 2004) and transport (Hensher and Greene, 2003) economics. Their theoretical underpinnings originate in Lancaster (1966) and the decomposition of a product’s values into the sum of the values of its attributes. This theoretical framework was made operational with the development of random utility theory and associated statistical models of choice (McFadden, 1974).

Respondents in a discrete choice experiment are presented with repeated choice sets. Each option within the sets is comprised of a series of attributes which vary in level. Respondents identify which of the options they prefer. With sufficient responses across a sufficiently wide range of choice situations, one can estimate the implicit weight given to attributes’ levels in the choices that have been made. Further, one can analyze the marginal rates of substitution (MRS) between attribute levels and, where a monetary attribute is included, the MRS between the monetary attribute and non-monetary attributes represents the willingness to pay (WTP) for changes in attribute levels.

In this study we conduct two choice experiments. The first concerns essays, the second is over consequential gambles. The objective of the second CE is to identify individuals’ risk preferences since we believe a priori that these will be important in explaining willingness to pay for the illicit essays. The
recruitment process and structure of the two experiments is now outlined.

3 Recruitment

To make the essay choice scenarios as realistic as possible they had to be presented in the context of a specific piece of work that was due to be submitted not long after the experiment was conducted.

The process conducted at 3 UK universities was to identify a 2nd/3rd year undergraduate course which had an assignment due which accounted for a significant proportion of the unit’s final mark. Then, with the approval of the unit lecturer, students were invited to attend the experiment which was held 2-3 weeks before the submission date. At the session the precise purpose and format of the experiment was explained and students given the opportunity to leave. It was made clear that the research was unequivocally based on confidentiality, and had been approved by a University Research Ethics Committee on that basis.

We recruited 90 students who were a mix of Humanities and Science students. The questionnaire comprised sections concerning demographics and educational past, views and experiences of plagiarism, and the choice experiments over essays and gambles.

4 Choice experiment over essays

Students were asked to consider purchasing essays for the forthcoming unit assignment. The essays differed in terms of 4 attributes: price, grade, risk and penalty, as shown in Table 1.

Table 1 here

An experimental design maximizing D-Eciency (Ferrini and Scarpa, 2007) was generated to combine the attributes and levels into options and sets. The design comprised 2 blocks of 8 choice sets with

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2Identified here only as Universities A, B and C

3The UK undergraduate system classifies marks as: 70%+ [1st class], 60-69% [Upper Second: 2(i)], 50-59% [Lower Second: 2(ii)] and 40-49% [3rd class]. Marks below 40% are classified as fails.
each set comprising 4 alternatives. Respondents were randomly allocated to either block of 8 choice sets. The 4th alternative in each set was a ‘buy none’ option. An example essay choice set is shown in Figure 1.

Figure 1 here

The ‘buy none’ option warrants some further comment. It comprises an essay with zero penalty, risk and price and of the grade the student predicts they will obtain if they write the essay themselves. Consequently we ask the participating students for a predicted grade if they were to submit their own assignment.

This grade prediction varies over students, and defines the ‘none’ option in each of their choice sets. This emphasizes an important issue regarding the design of a study of this nature. A student may be prepared to buy an essay for one course unit in which they struggle, but not in another in which they excel. This means that research into the demand for papers should be conducted regarding specific course units, it can not be done meaningfully in a generic context.

5  Choice experiment over gambles

We expect individuals’ risk preferences to affect their willingness to buy, and their marginal valuations of, essays of differing quality. As risk preferences are unobservable we conduct a second CE, over consequential gambles, to estimate them. We employ a lottery design based on Holt and Laury (2002) in which students choose a preferred gamble to play (e.g. A or B in Figure 2). Respondents made 8 such choices between gamble pairs in which the expected payoffs varied. To ensure all choices were consequential, it was explained that one of the gambles would be selected at random and played at the end of the session, with the associated rewards paid in cash.

Figure 2 here
6 Modelling Choice

The analysis of the choice experiment data for both essays and gambles is based on Random Utility Theory, and extensions of the conditional logit model (McFadden, 1974). We outline the approach in general here before specifying the detail of the econometric implementation for the essay and gamble choice data, which differed.

Assume individual i is faced with a choice situation t with M alternatives with the attributes in the mth choice set defined as the vector $z_{itm}$: We denote $Z_{it} = \{z_{itm}: m = 1\}$ as the set of attributes defining choice situation t for individual i and $\theta_i$ as the parameters defining the ith individual's utility function.

The probability that they select alternative m is given by:

$$P(y_{it} = m | Z_{it}; \theta_i)$$

The conditional logit model of this probability is given by:

$$P(y_{it} = m | Z_{it}; \theta_i) = \frac{\exp V_{mizt}; \theta_i}{\sum_{m=1}^{M} \exp V_{mizt}; \theta_i}$$

where $V_{mizt}; \theta_i$ is the systematic component of utility derived from the attributes' levels, which differ across alternatives, and the additive random component of utility is drawn from a Gumbel distribution.

We now outline the specification of the RUT models employed for the analysis of choice over gambles and essays, beginning with the former.

6.1 Modelling Gamble Choices

The purpose of the analysis of the choice of gamble from the pairs offered is to derive a measure of risk aversion for each individual. These risk preferences are then to be used to explain choices over
essays. The decision to cheat may be viewed as an economic gamble and thus attitudes toward risk, revealed by choices over monetary gambles, may also explain the decision to cheat$^4$.

Two approaches to measuring risk aversion have dominated within the economics literature. The …rst is rooted in Expected Utility Theory (EUT), whereby risk preferences are defined in terms of the …rst and second derivatives of a monetary utility function. The second approach expresses risk preferences in terms of the distributional moments of uncertain monetary outcomes, most commonly their mean and variance. A bridge between the two approaches can be constructed by appealing to Taylor approximations (Levy and Markowitz, 1979) or by making distributional assumptions such as normally distributed payo$s$ or, more generally, location-scale restrictions (Meyer, 1987). However, the well documented anomalies of EUT (see Rabin and Thaler 2001) have spawned many alternative approaches to conceptualizing behavior under risk such as Prospect Theory (Kahneman and Tversky, 1979) and ‘…rst order’ risk aversion (Epstein and Zin, 1990).

We compare two alternative approaches to estimating risk aversion. The …rst is an expected utility approach using the expo power utility function employed by Holt and Laury (2002). The second speciﬁes the utility function in terms of the …rst and second moments of the gamble payo$s$ distribution. Both approaches are implemented via estimation of mixed (random parameter) logit models (Revelt and Train, 1998). To date there have been very few applications of the mixed logit model to estimate risk preferences via consequential gambles. The approach has however recently received attention with Andersen et al. (2011) motivating their approach within EUT under constant relative risk aversion and von Gaudecker et al. (2011) estimating a model similar to the mixed logit in which gamble choices are predicted using certainty equivalents while allowing for loss aversion and varying dates for uncertainty resolution.

The expected utility approach uses the utility function:

\[ U_i (w_{itm}) = \exp \left( \alpha + \beta w_{itm} \right) \]  

\[ (3) \]

$^4$Estimates of risk aversion may be context speciﬁc, however, here we simply assume that the estimates of risk aversion derived from gamble choices are correlated with risk aversion relevant to essay choices.
where \( w_i \) is the (unobserved) wealth of individual \( i \), \( w_{i,t,m} \) is a monetary amount presented within alternative \( t \) in gamble \( m \), and \( \beta_i \) and \( \gamma_i \) are individual-specific parameters to be estimated. Risk aversion for the individual can be summarized by \( \beta_i \), which is the relative risk aversion for large gambles. The expected utility of a gamble between two monetary amounts \( w_{i,t,m} \) and \( w_{i',t,m} \) with probabilities \( p_{i,t,m} \) and \( 1 - p_{i,t,m} \) is therefore:

\[
G:EU_{i,t,m} = (p_{i,t,m} U_i (w_{i,t,m}) + (1 - p_{i,t,m}) U_i (w_{i',t,m}))
\]

(4)

The 'moment function' approach is implemented using:

\[
G: MV_{i,t,m} \text{oment} = \beta_i \frac{\alpha_{i,t,m}}{2} + \gamma_i \frac{\beta_i^2}{2 \alpha_{i,t,m}} + \frac{\gamma_i^2}{2} \alpha_{i,t,m}
\]

(5)

where \( \alpha_{i,t,m} \) is the expected payoff faced by individual \( i \) in alternative \( t \) in gamble \( m \), and \( \beta_i \) is the variance of that payoff, with \( \alpha_{i,t,m} = 0 \) and \( \alpha_{i,t,m} = 1 \) to be estimated along with individual-specific parameters \( \beta_i \) and \( \gamma_i \). When \( \alpha_{i,t,m} = 1 \); equation [5] takes the form that would be derived from a second order Taylor approximation of an expected utility function, where \( \gamma_i \) is proportional to the Pratt-Arrow measure of absolute risk aversion. We implement and compare 4 formulations of the Moment model. Moment model 1 is unrestricted. However, in portfolio theory the utility function is more commonly specified without the quadratic term on payoffs (\( \alpha_{i,t,m} = 0 \)) and Moment models 2-4 are variants of this. In Moment model 2 \( \alpha_{i,t,m} \) is constrained to be zero while \( \beta_i \) is unrestricted. In Moment model 3 \( \alpha_{i,t,m} = 0 \) and \( \beta_i = 1 \). Within the literature on risk aversion it has been suggested (Epstein and Zin, 1990) that the standard deviation may be a better predictor of behavior than the variance which gives Moment model 4 \( \alpha_{i,t,m} = 0; \beta_i = 1 \).

In estimating the parameters using non-linear mixed logit models a gumbel error is added to equations [4] and [5] in which case the probability of a given choice takes a logistic form. The parameters of interest are \( g(i) = (i; \beta_i; \gamma_i; \alpha_{i,t,m}) \) for [4] where \( \alpha_{i,t,m} \) is an additional parameter representing the scale variance of the Gumbel error, and \( g(i) = (i; \beta_i; \gamma_i; \alpha_{i,t,m}) \) for [5]. The \( \alpha_{i,t,m} \) are assumed to be normally distributed with mean \( Z_i \) and covariance with constant parameters \( (0, 1) \) having zero variance.
The matrix $Z_i$ is a set of covariates describing each individual. An advantage of mixed logit estimation is the derivation of (risk) preference estimates at the individual level.

In the expected utility model we assumed that all parameters $\theta_i$ were log normal, therefore the utility function imposed increasing relative risk aversion, with absolute risk aversion free to be decreasing, increasing or constant. Within the Moment model $\theta_i$ was specified as log normal and $\theta_i$ was specified as normal. The parameter $\theta_0$ was constrained to lie on the unit interval by specifying

$$0 = \frac{\theta_0}{1+\theta_0}$$

where the parameter $\theta_0$ could take any real value: The parameter $\theta_1$ was constrained to be strictly positive by specifying $\theta_1 = e^{\theta_1}$ where $\theta_1$ could take any real value.

6.2 Modelling Essay Choices

To model essay choices we employ a mixed logit model with discrete mixing distributions (McFadden and Train, 2000). This specification of the mixed logit considers there to be a finite number of discrete classes of preferences. We believe a priori that preferences toward cheating are polarized and in estimation seek to identify the number of discrete classes that best approximate the choice behavior observed, noting that as the number of classes increases in the limit the model approximates the continuous mixed logit model.

We model the utility associated with an essay as a linear-in-parameters function of $P$ attributes, the levels of which vary across the $m$ alternatives. Additionally, we assume that there are a number of discrete latent classes ($x = 1; \ldots; K$) within the sample, which differ with respect to the parameters of the utility function. We define the class specific vector of parameters as $\theta = \theta_1; \ldots; \theta_P$ and the set of all parameters as $\theta = \theta_1; \ldots; \theta_K$. The vector of essay attributes faced by the $i$th individual in set $t$ is $Z_{itm} = (Z_{itm1}; \ldots; Z_{itmP})$ and, as above, we denote $Z_{itm} = f(Z_{itm})_m$. The systematic component of utility for a member of class $x$, is modelled as:

$$V_{mjk} = \theta x_p \prod_{p=1}^{X_p} Z_{itmp}$$

The attributes in (6) are defined as the price and grade of the essay being purchased (defined as
dummy variables) and the risk-penalty regime in which it is available. We specify the risk and penalty attributes as a combined term (Table 2) since the risk attribute has little intuitive meaning if there is no penalty, and vice versa.

Table 2

\[ \text{Essay } V_{mijx; att; z} = x_0 \cdot \text{price}_m + X_3 \cdot x_0 \cdot \text{grade}_{tmg} + X_4 \cdot r \cdot \text{RP}_{tmt} \]  

(7)

where:

- \( \text{grade}_{tmg} \) is the grade of the essay in alternative \( m \) in choice set \( t \).
  
  For essays offered for purchase this is the level of the grade attribute (specified as \( g \) dummies for a 1st through to 3rd class essay, the latter used as the baseline; see Table 1).
  
  For the ‘none’ option this will be the respondent’s self-predicted grade (1st through to 3rd class, since no student predicted they would fail).

- \( \text{price}_m \) is the price of the essay in alternative \( m \) in choice set \( t \);

- \( \text{RP}_{tmt} \) is the risk/penalty regime (specified as dummies, see Table 2) operational in alternative \( m \) within choice set \( t \).

- \( x_r \) is the utility associated with risk-penalty level \( r \), for members of class \( x \).

Introducing latent classes, we re-state (2) as:

\[ P(\gamma_i = m | j; x; Z) = P \left( \frac{\exp V_{mij|x;z; \text{att}}}{\sum_{m=1}^{M} \exp V_{m0j|x; z_0; \text{att}}} \right) \]  

(8)

We explicitly model class membership using a multinomial logit functional form, based on a J
vector of characteristics $C_i$ and a set of parameters $\phi = f_{xg_{x=1}}$ where $x = (x_0; x_1 \ldots x_J)$ such that:

$$P(x | C_i) = PK \frac{\exp S_{xj|C_i}}{\exp S_{x0|C_i} x_0}$$

where:

$$S_{xj|C_i} = x_0 + \sum_{j=1}^{X_J} x_j C_{ij}$$

and the restriction $PK_{x=1} x_j = 0$ is imposed for purposes of identification.

The likelihood of individual $i$ making their sequence of choices over the $T$ choice sets faced is:

$$P(y_i | fZ_{it}^T gT; C_i; att) = \prod_{t=1}^{X_K} P(x | C_i; att) \prod_{t=1}^{Y_T} P(y_i | x; Z_{it}; att)$$

where $y_i$ is the vector of all responses by the $ith$ individual. The likelihood function is therefore the product of (11) over all individuals in the sample. Estimation proceeds by maximizing this likelihood with respect to $\text{att}$ and $\text{att}$.

7 Results

7.1 Gamble Choices

Mixed logit models of the alternative gamble choice specifications [4] and [5] are estimated using Bayesian methods (Train and Sonnier, 2005; Train 2003; Balcombe et al., 2009) with $i$, $i$ conditioned on the individual' characteristics (students' genders and university). Mixed logit estimations involves estimation of the parameters (mean and variance) which define the distribution from which the preferences of those in the sample are drawn. Estimation also permits inferences to be drawn

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5See Booth and Nolen (2012) for more on the evidence regarding, and possible causes of, gender differences in risk aversion.
regarding the preferences of each respondent conditional on that distribution and their individual choices. Bayesian Monte Carlo Markov Chain estimation make this trivial since it requires that latent parameters for each individual are drawn from their posterior distribution.

Using \( \tilde{j}; \tilde{D} \) to denote a draw of \( \tilde{j}; \tilde{D} \) from its conditional distribution given \( j; D \), with \( D \) denoting the data (choices made by all individuals), estimation proceeds by taking some arbitrary starting values of \( \tilde{j}; \tilde{D} \) and proceeding to draw \( f \tilde{i}; g; \tilde{j}; \tilde{D}; f \tilde{i}; g; \tilde{j}; \tilde{D}; f \tilde{i}; g; \tilde{j}; \tilde{D}; f \tilde{i}; g; \tilde{j}; \tilde{D}; f \tilde{i}; g; \tilde{j}; \tilde{D}; f \tilde{i}; g; \) and repeating this sequence for \( g = 1, \ldots, G \). The \( \ldots \text{rst} \) \( g \) draws are disregarded so that the draws are approximately independent of their starting values. Accordingly, the draws for \( \{ \tilde{j}; g \} \) from each iteration \( g \) of the chain can be recorded. The priors for all \( \tilde{\theta} \) estimated were normal with mean zero with covariance \( I \).

We compare the performance of the EU model and the four formulations of the Moment model using 2 criteria. In the \( \ldots \text{rst} \) (predictive power) the individuals’ gamble choices are compared against those predicted from the individual level utility function estimates. In the second we calculate the Marginal Likelihood (LMargL) for each model (following Balcombe et al. 2011). The LMargL is a general Bayesian method for model comparison, able to compare models which are non-nested and differ in the number of parameters. If there is no difference in the prior odds of two models then the ratio of their Marginal Likelihoods gives the posterior odds of one over the other. The results on both criteria are presented in Table 3.

Table 3 here

From Table 3, the EU model is outperformed by all the Moment models on both criteria (LMargL and Prediction). The highest LMargL is for Moment model 2 with \( \hat{\theta}_0 = 0 \) but \( \hat{\theta}_1 \) estimated, suggesting that \( \hat{\theta}_1 \) played no useful role in model performance. In Moment models 1 and 2 the estimates of \( \hat{\theta}_1 \) were 0.32 and 0.23 respectively, suggesting the model was not linear in variance (since that would imply \( \hat{\theta}_1 = 1 \)). These estimates suggest that even "\( \ldots \text{rst order} \) risk (\( \hat{\theta}_1 = 1, \hat{\theta}_2 = 2 \))" overstates the power to which the gamble standard deviation should be raised.

Imposing linearity in variance (\( \hat{\theta}_1 = 1 \)) (Moment model 3) caused the LMargL to deteriorate markedly. However the predictive power of this linear in variance model still outperformed the more general
Moment model 2. Likewise, when linearity in the standard deviation was imposed (Moment model 4, \( \theta_1 = \frac{1}{2} \)), there was a decline in the LMargL relative to Moment model 2, however this fall was small and the estimates of individuals’ risk preferences from this model performed best in predicting gamble choices. It is this Standard Deviation Moment model with which we proceed, noting that the correlation in the estimates of risk aversion is very high (0.97 - 0.99) for Moment models 1, 2 and 4.

We report (Table 4) the full results of the Standard Deviation Moment model in which the means of the distributions of \( v_{ij} \) and \( i \) are conditioned on students’ university (A; B; C) and gender (\( \text{gen} = 1 \) for females):

\[
g_{V_{mj}}^{G} = \exp(\theta_i + b B_i + c C_i + \text{gen} \cdot \text{gen}) + \text{itm} + \frac{\theta_i + b B_i + c C_i + \text{gen} \cdot \text{gen}}{2} \text{itm} \tag{12}
\]

The upper panel of Table 4 reports the mean and standard deviations of the estimates of the mean of the distributions of \( v_{ij} \) and \( i \) for the base group (\( \theta_o; o; \) University A, males) and the terms which shift the means of these parameters’ distribution by University (\( C, B; B, C \)) and gender (\( \text{gen}, \text{gen} \)). The lower panel of Table 4 shows the mean and standard deviations of the estimates of the variance of the distributions of \( v_{ij} \) and \( i \).

Table 4 here

The estimate of \( \text{var}(\cdot) \) indicates significant heterogeneity around the means of the distributions for each university-gender combination. Students at University A are more risk averse (\( \theta = -0.265 \)) than the rest of the sample, since increases in \( v_{ij} \) represent increasing preference for risk. Males are less risk averse than females (\( \text{gen} = -0.286 \), ceteris paribus. The degree of the heterogeneity in risk aversion is evident in Figure 3, a kernel density plot of the distribution of students’ risk preference coefficients (\( i \)).

Figure 3 here

The primary motivation of deriving individual-specific measures of risk aversion (\( i \)) is to assess
whether these risk preferences play a significant role in the model of essay choice, and hence we consider the risk aversion estimates further when discussing the models estimated on essay choice data.

7.2 Essay Choices

Each respondent was presented with 8 essay choice sets, leading to 720 choice occasions in total. Half of the sample indicated they would buy at least one of the essays offered. The proportion of ‘buyers’ was stable across the 3 universities. The frequency of ‘purchase’ was variable across the sample, with 7 people indicating they would buy on every occasion while ten people were persuaded to ‘buy’ on only one of the 8 choice occasions.

Latent class models, using the utility function specification in (7), are estimated. While it is possible to segment the sample into classes on the basis only of choices, individual characteristics may be used additionally to explain class membership (see equation 9). A range of demographic and attitudinal characteristics were tested but only two were found to be consistently significant: English not being the student’s first language (EAL =1, 0 otherwise) and the individual’s degree of risk aversion, derived from the gamble experiment.

Estimation requires the number of classes to be specified ex ante. We follow current practice (Hensher and Greene, 2003; Train, 2008) of using information criteria (IC) to compare model specifications. The Bayesian Information Criterion and Consistent Akaike Information Criterion (CAIC) support a 2 class specification and it is results from this specification which we report in Table 5.

Table 5 here

The model correctly predicts 83 percent of the essay choices. For both classes the price term is negative and there is the expected progression of increased utility from essays of higher grade. A striking difference between the two classes occurs in the impact of changes in the risk-penalty regime. For Class 1 the marginal utilities for risk-penalty are all negative from RP1 through to RP4 and the utility gain from moving from the lowest grade of paper (3rd class) to the highest grade (1st) would
cause a net utility loss under all risk-penalty regimes except RP₂. Even in that case, the net utility gain from buying one way from the bottom to the top pass grade is very small. This suggests that for this class of person, if they predict they will pass (however low their grade), there is almost no incentive to participate in the market.

For Class 2, the risk-penalty coefficients show a progression from positive and significant, through to negative and significant for the most stringent regime, RP₄. Many grade upgrades, under several risk-penalty regimes, generate a net utility gain, implying that Class 2 represents those who are willing to enter into the market if they consider the conditions right.

Not having English as a first language is found to be determinant of class membership: those without English as a first language (EAL=1) are significantly more likely to be a member of Class 2. In addition, those who are less risk averse (larger) are more likely to be members of Class 2 and hence more likely to enter the essay market.

A fuller assessment of the interpretation of the behaviors represented by the 2-class model of essay choice requires a formal consideration of willingness to pay (WTP) for essays, and predicted probabilities of purchase. This analysis requires consideration of an additional piece of information: the individuals’ expectation of the grade they would receive for their own work. This is considered next.

8 Essay Valuations and Probabilities of Purchase

Choice experiment data permit estimation of both the value associated with a marginal change in an attribute level and the value associated with switching from one alternative to another. The CE design was such that the ‘purchased essay’ options always featured a non-zero level of risk and penalty, while the ‘buy none’ option always featured zero risk and penalty. Hence the risk-penalty variables collectively represent both the risk-penalty characteristics of a purchased essay and other, unstated, elements associated with purchasing an essay. These include both positive aspects of purchase (savings
in time and effort) and negative aspects (ethical or moral qualms associated with the illicit act).  

Derivation of the value of an essay to a student must take account of the paper's quality and cost, the risk-penalty regime under which it is bought, and the risk preferences and English Language status of the student and their own-grade expectation.  

The WTP for a paper will be individual- and class-specific and can be identified as that price \( \text{price}_{igr} \) at which student \( i \) becomes indifferent between buying an essay of grade \( g \) under risk-penalty regime \( r \) and submitting their own work. We define self-predicted grade as \( P \) and hence \( x_P \) represents the utility from submitting one’s own paper in the expectation of that grade. Student \( i \) is therefore indifferent between purchase and submission of their own work when:  

\[
x_P = x_0 \, \text{price}_{igr} + x_g + x_r
\]  

(13)  

Rearranging (13) yields the maximum price at which the student will purchase:  

\[
\text{price}_{igr} = \frac{x_P - x_g - x_r}{x_0}
\]  

(14)  

The parameters in (14) will be class \( (x) \) specific and hence one can generate conditional WTP values for each class, or an unconditional value based on the expected probability of class membership.  

WTP for essays in specific conditions are obtained through simulation. Taking 1000 random draws of the parameters, based on a multivariate normal distribution and utilizing the estimated variance covariance matrix of the parameters, a distribution of simulated WTP values is generated (Krinsky and Robb, 1986). This distribution yields median WTP and associated confidence intervals for each essay type. These WTP values are displayed in Figure 4 and Table 6, the latter including confidence intervals also.  

Each of the four panels in Figure 4 shows how WTP varies with the grade the student expects if they  

---

6 Decomposition of these effects would require essays that could be bought with zero risk of detection. Including such options in the design was thought too unrealistic.  

7 The significance of a WTP value is based on a 1-tail test since our concern is identifying statistically significant positive WTP values.
submit their own work. Within each panel the WTP is shown for each combination of the 4 essay grades one could buy and the 4 risk-penalty regimes. Only significant WTP values are shown. In the first panel, representing students who predict their own work would receive a 1st class mark, an essay will only be purchased if it is also a 1st and only within the least stringent risk-penalty regime, RP1. The value of such a paper is £ 93 and represents the amount the individual is prepared to pay to avoid the work needed to submit their own work in that risk-penalty environment; there is no grade upgrade involved, only the avoidance of work.

Inspection of the other panels reveals that as predicted grade falls, WTP for all essays increases, up to a maximum of £ 277 for a 1st class essay bought by a student expecting a 3rd class grade, under the low detection, low penalty regime, RP1. There is never a positive WTP for an essay under the most severe risk-penalty regime (RP4). Table 5 reports these WTP values including the 95 percent confidence intervals for those values which are significantly positive.

Figure 4 here

Table 6 here

We consider the unconditional probability that a student will purchase coursework. This requires evaluation of the probability that a member of each class will purchase an essay, combined with the probability of class membership for a specific individual. The former requires assumptions about the cost and grade of the purchased paper, the buyer’s own predicted grade, and the risk-penalty regime in place. The probability of class membership is determined by English language status and risk preference. Figure 5a shows the probability of purchasing a 1st class essay for £ 200 (the order of magnitude of prices for such essays online), if the student has English as a first language and predicts they would attain a 3rd class grade. The evolution of the probability as the individual’s risks aversion changes is displayed for each of the risk-penalty regimes. Figure 5b displays these purchase probabilities for a student without English as a first language. These graphs show the very low probability of purchase under the most severe risk-penalty regime, and the relatively high probability of purchase under the lowest risk-penalty regime. The role of English language in our sample is also
highlighted here, such that a student who has English as their …rst language and low risk aversion has a similar probability of purchase as a student for whom English is not their …rst language and strong risk aversion. For those with English as an additional language, the distribution of the sample is such that approximately 75 percent of this sub-sample have a probability of purchase in excess of 50 percent when the risk-penalty regime is at its most lax (RP1).

Figure 5 here

When assessing the valuations and purchase probabilities from stated preference studies a degree of caution is required. When considering the potential for hypothetical bias one is wary of systematic misreporting of preferences. In particular, choice experiments in which there is a ‘warm glow’ associated with certain options are at risk of over-valuing those products and attributes. In the case of essays it might be the case that students did not treat the choices su ciently seriously and over-report their willingness to buy. However, there may be an opposite e ect: the fear of self incrimination may have caused respondents to under-report their willingness to buy since the experiments were conducted on-campus, under the supervision of academics. The warm glow of giving might have been replaced by the cold fear of self-incrimination. The net e ect of these pressures to over- and under-report is unknown.

The papers’ valuations under risk-penalty regimes RP2 and RP3 are very similar. Thus the movement from low to high penalty can be o set for the buyer by a shift from high to low risk of detection. The information asymmetries and associated quality uncertainty in the market about whether a purchased paper is truly original will translate into higher risks of detection. Thus the market constraining impact of lemon essays in reducing incentives for plagiarism can be o set by low penalties if caught. However it is only when both the risk of being caught and the penalty are high that students in Class 2 are deterred from entering the market at all. Thus, although it may be encouraging that the essay market is characterized by information asymmetries, universities also have to provide su ciently negative incentives, via su ciently harsh penalties, to constrain the market.

It should also be noted that the ‘low’level of the penalty attribute (zero mark for the course unit) is
more severe than the penalty that is applied in many institutions for a first offence (Tennant et al., 2007) and so WTP is expected to be higher under these more lax regimes. Also, no student predicted they would fail and therefore we can not estimate the WTP for an essay, and the probability of its purchase, for such students. We expect their valuations, and their likelihood of entering the market for papers, to be higher than those reported here.

9 Conclusions

This paper is the first formal economic investigation of the demand for essays. It reports university students’ willingness to buy, and their valuations of, bespoke papers from commercial providers. To investigate the demand for papers accurately it is necessary to pose the option to buy with respect to a realistic scenario. An individual’s willingness to buy may differ across course units hence it is necessary to frame the choices with respect to a specific piece of work. This approach is employed using choice experiments with 90 students at 3 UK universities. Given the anticipated role of risk preferences in the decision to cheat, a consequential gambling experiment is conducted, from which individual specific risk preferences are derived. In the second, essay choice, experiment, students revealed their willingness to purchase an essay for submission for credit. Students in our sample who are less risk averse and have English as an additional language are more likely to buy. The WTP value for some in the sample reaches £277 for a 1st class piece of work. The valuations decline with the quality of the essay, increases in risk and penalty and the student’s own-grade expectations.

Further analysis of the demand for essays would be enriched by a greater understanding of the attitudes and norms of the students and their peer groups. Knowledge of the variability in the time it would take students to write, rather than buy, papers and their opportunity costs of time would also enrich further work on contract cheating. A critical aspect of the market which should be incorporated in further work is uncertainty about the quality of the paper being purchased. In this study buyers were assured that the essay purchased would be of the stated grade. Asymmetric information and the fear of buying a lemon may well prevent some buyers in this hypothetical study from participating in the
real market. In this case the activities of reputable (and disreputable) companies to reduce (increase) the information asymmetries facing buyers will significantly affect the growth of the market in essays.

We consider it remarkable how many students, in a study administered by academics, indicate a willingness to buy. The assurances of confidentiality were genuine but the level of purchasing indicated was contrary to the expectations of both the authors and their colleagues. Why is there such an apparent lack of stigma in revealing a willingness to purchase essays? It may be that the ethical line that most Faculty perceive as being crossed when such purchases are made is not that significant to many students. At a time when the university student is increasingly treated as a consumer demanding value for money it would appear that subcontracting some of the work required to achieve their degree is seen as a rational choice for many consumers on campus.
References


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Current Status and Future Directions." Educational Psychologist (41): 121-145.

O'Rourke, Jillian, Je¤rey Barnes, Anna Deaton, Kristopher Fulks, Kristina Ryan and David A. Rettinger. 2010. "Imitation Is the Sincerest Form of Cheating: The Influence of Direct Knowledge and Attitudes on Academic Dishonesty." Ethics & Behavior 20 (1): 47-64

Quandt, Richard E. "Some models of academic corruption." European Journal Of Law And Economics. Published Electronically 27th May 2010


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</tr>
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<td>Risk of being caught</td>
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</tr>
<tr>
<td>Penalty</td>
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</tr>
<tr>
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<tr>
<td>Probability of Detection</td>
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</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
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<td>1/100</td>
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<td>Moment Model 2: $0 = 0; 1 &gt; 0$</td>
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<td>Moment Model 4: $0 = 0; 1 \frac{1}{2}$ (St.Dev Model)</td>
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**Table 4: Parameter Estimates: Mixed Logit Model on Gamble Choices**

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N=720; LMargL = -284.62
Table 5: A 2 Class Model Of Essay Choice.

Utility functions:

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Class membership:

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N=720; LL = -367.637
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<td>142</td>
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<td>------------</td>
<td>------------</td>
<td>------------</td>
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<td>3rd Class</td>
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What would you do?
Tick one option (✓)

Figure 1: An example essay choice set
Figure 2: An example gamble choice set
Figure 3: Kernel Density plot of $i$
Figure 4: WTP for Essays of Differing Grade, by Own Grade Expectation and Risk-Penalty Regime