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College finances and self-reported depression among university students

by

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Abstract

Do financial capacity and financing concerns affect the frequency of students' feeling depressed? Data from a sample of Philippine college and university students between 2015 and 2018 show that students from income brackets immediately above the poorest ones are less prone to feeling depressed although we do not find similar results from other higher income brackets. Feelings of depression are also less frequent among students whose family incomes are higher than the median in their respective schools. However financial concerns apart from those directly affected by observable absolute or relative income burdens also seem to positively contribute to such feelings of depression. These results suggest that, while partial needs-based financial assistance may help alleviate depressive feelings among students, individual mental health support should be more integrated in the University's health services.

1. Introduction

The Philippines passed the Universal Access to Quality Tertiary Education Act (RA 10931) in May 2017. The Act seeks to provide underprivileged Filipino students the means to earn a college degree by subsidizing tuition and other school fees in all state universities and colleges (SUCs). This Act also provides a platform for alleviating financing concerns of Filipino students that may have affected academic performance. Many studies have discussed the implications of financial circumstances on the well-being of students, particularly on mental health. In this regard, another law, the Mental Health Act (RA 11036), was passed in July 2017, aiming to provide affordable, timely, high-quality, and culturally appropriate mental health services.

This paper examines the relationship between mental health and financing concerns among students enrolled in private colleges/universities in 2015-2018 using the College Experience Survey (CES). The study uses a student's self-reported frequency of feeling depressed as the dependent variable. That is, the study's scope is limited to reported situational depression among students, where depressive moods occur at short-term intervals. This is to be distinguished from clinical depression, which requires proper diagnosis by a licensed physician or psychiatrist to determine if a person has a mental disorder. The survey data nonetheless allows us to explore whether an affective burden is present among students who face financial challenges.

Concerns about mental health especially among young Filipinos have grown recently with two-thirds of Gen Z reported feeling stressed most of the time last year (Lagare 2021). January et al. (2018) and Akhtar et al. (2020) also find that 24.4% of university students from low- and middle-income countries have shown symptoms of depression. College life also coincides with the peak onset for mental health problems, which have been shown to impair academic performance and to cause higher dropout rates (Reavley, McCann, and Jorm 2012).

Studies of UK students have shown a significant link between mental health problems and financial problems and concerns about financing. Financial hardship can have an adverse effect on mental health, social functioning and physical health and may encourage students to work longer hours and engage in prostitution, crime, and drug-dealing to support themselves (Roberts et al. 2000). Student debt is also associated with depression, suicide ideation, problem drinking, drug dependence, and neurotic and psychotic disorders (Richardson et al. 2017). This may also cause poor social functioning and encourage them to work longer hours and engage in illegal activities for financial support (Gerrard and Roberts 2006). Studies have also shown that depression negatively affects academic productivity (Hysenbegasi, Hass, and Rowland 2005), and economic outcomes as it leads to poorer quality of life among students (Gan and Yuen Ling 2019). Policies that have integrated mental health services into schools have been found to have a positive impact on educational and health outcomes where addressing financial distress and financial satisfaction has been seen to be a significant factor to this success (Cammack and Brandt 2014; Archuleta, Dale, and Spann 2013).

Our paper focuses on the effect of these financial factors on the feeling of depression among Philippine college students. Few recent studies have explored this mental health phenomenon in the Philippine setting. Lee et al. (2013) find that students dissatisfied with their financial conditions face greater risk of depression. Financial stress is also seen as a negative predictor of life satisfaction among Filipino students considering the mediating influence of hope-related beliefs (Bernardo and Resurreccion 2018). This paper contributes to the literature in two ways. First, we use a panel of students from eight Philippine colleges and universities, surveying them consistently from their sophomore to their senior year. Two, the analysis uses different finance-related variables and their effect on depressive feelings.

2. Empirical Strategy

2.1. Survey Design and Sample

The study uses the College Experience Survey (CES), an annual, longitudinal survey covering students from eight private Philippine colleges and universities. The data covers the 2014 cohort from their sophomore to senior year. For consistency, the study omits the 2014 Freshmen survey results as the responses were on a four-point Likert scale in contrast to the five-point Likert scale implemented in latter survey rounds. To mitigate the effects of selection bias and attrition rate over the survey period, the study further restricts the sample to students who consistently responded to CES every year. The total number of respondents in this study is 1,055 for the 2014 cohort.

The sample of respondents is determined by stratifying the students according to sex and their enrolled major in the participating school. Survey participation is optional but encouraged by school administrators. The Survey is drafted, reviewed, and approved by the FEU Public Policy Center. The survey is then uploaded online and administered by the participating schools. Respondents are asked to take the survey in the computer laboratories or designated areas inside their respective campuses.

The CES is mainly constructed based on two models of college impact and student engagement: Astin's (1984) I-E-O model and the theory of involvement and Pascarella (1985) general model for assessing change. The survey aims to provide a comprehensive assessment of their critical thinking and problem-solving skills, civic and political engagement, moral uprightness, and perceived employability in the global labour market among others. Similar survey instruments such as UCLA's CIRP surveys and Indiana University's NSSE have been used in many previous investigations on student experience and behavior.

2.2. Specification, Data and Variables

To investigate the link between self-reported depression and financing concerns, the study runs the following specification:

$$y^* = \alpha + \beta f + \gamma r + \delta s + \zeta p + d + \epsilon. \quad (1)$$

Here y^* is the self-reported frequency of the student's feeling of depression, a scalar measured on a five-point Likert scale ranging from "Never", "Rarely", "Sometimes", "Often" and "Very Often". Following Richardson et al. (2017) and Eisenberg, Hunt, and Speer (2013), the study classifies four components that have an impact on negative mental health. The vector f , the main interest of this study, includes variables that describe the financial capacity and burden on the student's household. The vector r includes the status of the student's relationship with his/her family and religious engagement. Many studies have attributed the significant effect of these variables on mood and overall emotional well-being. The student's satisfaction with his/her learning experience s is a scalar also included in the regression as is a vector of demographic variables p . The term α is the intercept term while $\beta, \gamma, \delta, \zeta$ are the parameters to be estimated. The vector d is meant to capture school and year fixed-effects and ϵ is the residual term.

Table 1 shows the list of variables in detail. For further details of the variables, Appendix A presents the descriptive statistics and the polychoric correlation matrix. Appendix B reports the frequency table of the independent variables relative to the ordered responses of the dependent variable, the student's frequency of feeling depressed.

Table 1. List of variables and frequency of responses

Variables	Category (* indicates base category)	#	%
<u>Dependent Variable</u>			
Frequency of feeling depressed	<i>Very often</i>	116	10.76
	<i>Often</i>	199	18.46
	<i>Sometimes</i>	414	38.40
	<i>Rarely</i>	248	23.01
	<i>Never</i>	101	9.37
<u>Independent Variables</u>			
Financial Capacity			
Parent's joint monthly income ¹	<i>Less than 20,000*</i>	171	16.76
	<i>20,000 – 40,000</i>	237	23.24
	<i>40,001 – 80,000</i>	297	29.12
	<i>More than 80,000</i>	315	30.88
Concern for financing	<i>“Major Concern”</i>	364	33.83
	<i>“Some Concern” and “No Concern”*</i>	712	66.17
Loan as a primary or secondary source of funding ²	<i>Loan as primary or secondary source</i>	214	19.81
	<i>Otherwise*</i>	866	80.19
Needs-based willingness to work part-time	<i>Willing to work and “help in family finances”</i>	220	22.40
	<i>Willing to work and “pay for my tuition and other school responses”</i>	66	8.70
	<i>Otherwise*</i>	473	68.90
Economic Status	<i>Same with School Median Income*</i>	306	38.33
	<i>Above the School Median Income</i>	420	38.89
	<i>Below the School Median Income</i>	354	32.78
Social Relationships Status			
Living with family	<i>Living with immediate family, i.e. parents/guardian or siblings</i>	17	1.57
	<i>Otherwise*</i>	1063	98.43
Parents' relationship status ³	<i>Both alive*</i>	813	75.49
	<i>Separated parents</i>	225	20.89
	<i>One or both parents are deceased</i>	39	3.62
Engagement in family social activities (weekly) ⁴	<i>None*</i>	72	6.80
	<i>Less than or equal to 2 hours</i>	381	35.98
	<i>3-5 hours</i>	317	29.93
	<i>6 hours or more</i>	289	27.29
Engagement in religious activities (weekly)	<i>None*</i>	183	17.28
	<i>Less than or equal to 2 hours</i>	582	54.96
	<i>3-5 hours</i>	164	15.49
	<i>6 hours or more</i>	130	12.28

¹ The original survey question gives the following options on joint parental income: (i) Less than 20 000; (ii) 20 000 – 40 000; (iii) 40 000 – 60 000; (iv) 60 000 – 80 000; (v) 80 000 – 100 000; (vi) More than or equal to 100 000. Note that their responses here are based on the student's estimate of his/her parent's income. We have tested with different iterations of collapsing these options in our specification; the other results are not reported here but they are available upon request.

² Students are asked to enumerate which is their primary source, secondary source down to their fourth source of college financing. These sources include family income, own income, school scholarships, etc.

³ Original response options include “both alive and living together”, “both alive, but one works in distant location”, “both alive and separated”, “one or both are deceased”, “single parent”, and “I don't know them”.

⁴ Originally, there are eight response options: (i) None, (ii) Less than one hour a week, (iii) 1-2 hours per week, (iv) 3-5 hours per week, (v) 6-10 hours per week, (vi) 11-15 hours per week, (vii) 16-20 hours per week, and (viii) over 20 hours per week. These options are also the same for item on the engagement in religious activities.

Table 1. List of variables and frequency of responses

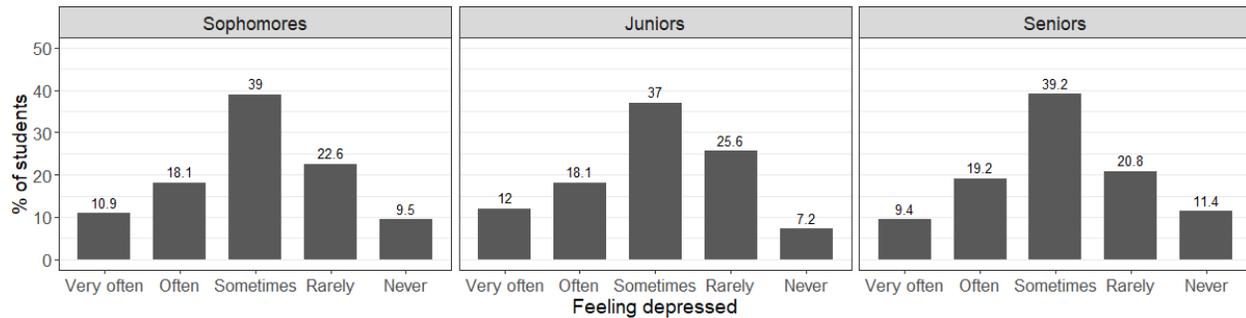
Variables	Category (* indicates base category)	#	%
<i>(continued from last page)</i>			
Satisfaction			
Satisfaction with Academic Experience (main)	<i>“Excellent”, “Very Good”, “Good” = “Satisfied”</i>	1001	92.86
Learning Experience	<i>“Satisfactory”, “Unsatisfactory” = “Less Satisfied”*</i>	77	7.14
Drive to Achieve	<i>“Excellent”, “Very Good”, “Good” = “Satisfied”</i>	1001	92.86
School’s contribution to Initiative and Self-direction	<i>“Satisfactory”, “Unsatisfactory” = “Less Satisfied”*</i>	77	7.14
Expected time to graduate	<i>“Excellent”, “Very Good”, “Good” = “Satisfied”</i>	1001	92.86
	<i>“Satisfactory”, “Unsatisfactory” = “Less Satisfied”*</i>	77	7.14
	<i>Graduate on or before the prescribed time</i>		
	<i>Graduate longer than prescribed time or not at all</i>		
Demographics			
Male	<i>Male</i>	555	48.61
	<i>Female*</i>	525	51.39
Either parent is a college graduate	<i>Mother or Father is at least a college graduate</i>	594	55.00
	<i>Otherwise*</i>	486	45.00

Student’s Feeling of Depression

Students are asked how often they “felt depressed” during the past academic year on a five-point, balanced Likert scale with options “Never”, “Rarely”, “Sometimes”, “Often” and “Very Often”. In using this indicator to measure the student’s negative mental health, the frequency of feeling depressed does not imply a diagnosis of depression of that student nor is it an indicator of depressive symptoms as sometimes used in formally designed questionnaires such as the Depression Anxiety Stress Scale questionnaire (DASS-21; see Lovibond and Lovibond 1995). Note that, since responses are self-reported and no follow-up questions are administered, the condition as measured may be mild and transient compared to what might be classified as depression or depressive symptoms (Andrews, Hejdenberg, and Wilding 2006). The situation may also be confounded with distress, which is conceptually and empirically distinct from depression (Coyne 1994). In this light, we treat this subjective self-assessment with caution and use the term ‘feeling of depression’ throughout this study. This measure may range from proxying for the student’s situational depression (rather than clinical depression) to describing the discrete, negative emotional states such as pain, upset, distress, disappointment, sadness, or other reactions to difficult life experiences during his/her past academic year. That being said, we posit the relationship of this feeling of depression with the occurrence of negative mental and emotional health states such as depression, anxiety, and stress.

Figure 1 presents the frequency of students’ reported feeling of depression. The figures show that many respondents report that they felt depressed “sometimes” during their past academic year and the distributions notably almost follow a bell curve throughout the three years. On average and across year levels, a significant 30 percent of respondents report feeling depressed “often” or “very often”.

Figure 1. Distribution of responses of student’s frequency of feeling depressed during the past academic year for the 2014 cohort, 2015-2018.



Financial Capacity and Burden

The variables for financial capacity and burden of interest in this study consist of (i) students’ estimate of their parents’ joint monthly income in Philippine pesos, (ii) their concern for financing college, (iii) their needs-based willingness to work part-time, (iv) loans as a primary or secondary source for college financing, and (v) economic status relative to their peers in their place of study.

While financial issues have been found to have a significant effect on student’s performance, the literature relating financial issues to mental health is small. These studies tend to focus on the subjective concern for financing. We note, however, that this affective concern in the literature has been often interchanged with or taken to mean financial resources such as income. Aselton (2012) in his interviews with U.S. college students treated for depression finds that financial issues are a major source of stress. Students see college fees costing parents a great deal of money and feel pressured to do well academically. A personal financial crisis experienced in the preceding year has also been positively attributed to depression among British students (Andrews and Wilding 2004).

A few notable studies link income directly with student depression, anxiety, and stress. These include those that find a high prevalence of depression among adolescent students in middle-income and low-income countries (Thapar et al. 2012; Akhtar et al. 2020). The work of Teh et al. (2015) also establishes a significant association of monthly family income with depression and stress among Malaysian students.

Although these studies would suggest a direct relationship between students’ financing capability (e.g., income or wealth) and their perception of financial burden—which in turn leads to feelings of depression—others have suggested a need to distinguish between these two variables. Lange and Byrd (1998) find that chronic financial strain negatively affects New Zealand students’ psychological well-being and stress differentiating immediate or ongoing financial situation to explain distress. Considering the actual student’s debt and ongoing concern with paying that debt and other financing concerns, Cooke et al. (2004) find that it is how they perceive these difficulties rather than their anticipated debt that seems to impact their mental health significantly. This finding is also supported by Richardson et al. (2017) who find that it is the degree of distress about debt rather than the size of the debt itself which exacerbates anxiety, depression, and stress. This finance-induced depression is not limited to students but also exists among adults (Selenko and Batinic 2011). Because of these findings, although income or debt may be

related to financing concern, the latter may still show a separate and distinct effect on one's mental health. Thus, we include both variables in estimating Equation (1).

To augment the students' perception of financial distress, needs-based willingness to pay is calculated from the survey. This variable comes from two sequential questions in the survey. The main question asks the students to respond "yes" or "no" to whether they are available to work part-time if such work is available. If they answer "yes", a sub-question asks for the reason from a set of responses. Options include "to help in family finances", "to pay for my tuition and other school responses", "to gain work experience", and "to have an additional source of money for my personal expenses and savings". A corresponding set of responses is presented to students if they answered "no" in choosing to work part-time. Answering either of the first two responses implies that the student is willing to work part-time due to some perceived or experienced financial distress. Khawaja and Duncanson (2008) note that students enrolled part-time have a higher tendency to be depressed. On the other hand, Cooke et al. (2004) find an insignificant relationship of paid work during the student's college years and mental health. The survey's sample are all full-time students and the polychoric correlation between this variable and concern for college financing is +0.384 (see Appendix A, Table A.2).

Many of these studies, including those mentioned above, stress the effect of student loans and other forms of debt financing on student's mental health as well as academic performance and overall well-being. The sample of students in this study, on the other hand, tend to rely mainly (i.e., 86%) on family income as their primary source of financing. Less than 5% borrow money from the bank as their primary source and 37.6% of them use loans as a secondary source of financing. The lack of student loan services in the country may explain this low percentage. Nonetheless, we include this variable to test the effect of debt if any on student's mental health.

Lastly, a related strand of research has focused on the effects of socioeconomic status and inequality on depression among students (Chen and Paterson 2006; Rivenbark et al. 2019; Russell and Odgers 2020). A systematic review by Reiss (2013) confirms that socioeconomically disadvantaged children and adolescents are likely to develop mental health problems. In particular, we test the hypothesis that students may be more sensitive to the perception of their social status by direct comparison with their peers in their local school milieu rather their knowledge of their family income levels in absolute terms. Feelings of financial inadequacy or envy, or conversely superiority, relative to the status of their peers may be a more potent variable inducing feelings of depression. We test the plausibility of this hypothesis by classifying students according to whether their self-reported family income is below or above their school's median income bracket to describe their relative income against their school peers. We then include this new variable, economic status, in the estimation of Equation (1).

Social Relationship Status

Another significant factor possibly contributing to depression, anxiety, and stress among students is their social relationships, particularly with their family. A better quality of family relationships, as measured by the Family Relationship Index (Hoge et al. 1989), is associated with low levels of depression and high levels of self-esteem although it has no significant relationship with stress (Kashubeck and Christensen 1995).

This study uses three variables aim to describe the quality of family relationships. The first is an indicator of whether the student lives with immediate family, i.e., parents, guardians, or siblings, during his/her stay in college. Shamsuddin et al. (2013) find that students who grew up in far rural areas register higher depression and anxiety scores. Students living away in university dormitories are significantly more depressed and more anxious than those living at home (Rab, Mamdou, and Nasir 2008). Michael et al. (2006) argue that although many students tend to adjust easily to university life, a significant number still develop high levels of depression during their early years of their college experience.

The second variable is parental status. It is commonly believed in the Western literature that parental divorce generally affects adolescent depression (Amato and Keith 1991; Cherlin, Chase-Lansdale, and McRae 1998; Størksen et al. 2005; Pálmarsdóttir 2015) . Other studies, however, show that the indirect, mediating effects of divorce or separation may have caused this significant relationship, such as financial difficulty for the single parent, existing social support system, and demographic characteristics (Aseltine 1996). Ross and Wynne (2010) on the other hand fail to find elevated levels of depression or anxiety scores among students reporting parental divorce after controlling for parental depression and family unpredictability, i.e. the inconsistency of parental behavior in fulfilling responsibilities. The ambiguity of the effect, Amato (2000) argues, is due mainly to the limited data comparing the child's behavior before and after the parents' eventual break-up. In including separated parents as a variable, we note that formal legal divorce does not exist in the Philippines and separation may mean heterogeneous relationships ranging from legal to informal separation, with corresponding idiosyncrasies in financial arrangements.

Related to this, the death of a parent is thought to cause depression among children where the persistence of depression varies depending on independent factors such as the social support system and the child's personality (Gray 1987; Siegel, Karus, and Raveis 1996; Rab, Mamdou, and Nasir 2008) .

Third, students' engagement in family social activities aim to describe qualitatively their familial relations. Positive communication among family members is seen as a deterrent to adolescent depression and depressive symptoms (Nunes Baptista, Munhoz Carneiro, and Ferrari Cardoso 2014; Berryhill and Smith 2021).

Lastly, the estimation also includes the student's engagement in religious activities. Indeed, many studies confirmed that religiosity and attendance of religious services correlate negatively with both depression and anxiety (Jansen, Motley, and Hovey 2010; Berry and York 2011; Sakellari et al. 2018).

Satisfaction with Learning Experience

Stress and dissatisfaction in college are associated with student's decreased life satisfaction (Brougham et al. 2009) and heightened risk of depression (Reyes-Rodríguez et al. 2013). To capture this, respondents were also asked about their satisfaction with academic experience (Lardier et al. 2020). A significant result from the estimation here may however be due to the multidimensional and multidirectional structure of academic satisfaction on positive emotional well-being. Experiencing academic success, for instance, may mitigate financial concerns since the prospect of a timely degree-completion reduces the need for extended college financing. In the other direction, financial concerns can independently impact on mental health and affect academic performance. Beyond academic success, learning experience in the sense of

satisfying school contacts can also independently vitiate feelings of depression. We try to tackle this issue by regressing other proxy or predictors of academic satisfaction; this is elaborated in the discussion of our results.

Demographics

In this and in other studies, the student's sex has been a significant predictor of depression, anxiety, and stress. Many studies have identified female students as being more likely to be depressed than their male counterparts (Wiseman, Guttfreund, and Lurie 1995; Dusselier et al. 2005; Dyrbye, Thomas, and Shanafelt 2006; Richardson et al. 2017). Grigoriadis and Robinson (2007) summarize that the gender differences in depression are caused by psychosocial, neurochemical, anatomic, hormonal, genetic and personality factors. These may include women's self-ruminative style of coping with feelings of sadness and societal expectation of looking out for others' needs while minimizing their attention to their own needs.

Parent's education has also been found to have a negative impact on depressive disorders (Yusoff et al. 2013). High educational attainment of the student's mother, in particular, is negatively associated with depression. Zhao and Yiyue (2018) argue that highly educated mothers are more likely to provide parental warmth and prod their children to communicate among family members to cope with negative mental health incidences.

2.3. Methodology

In determining the effect on the student's feeling of depression, we perform an ordered probit panel data regression. We include school- and year-dummies to control for heterogeneity among these groups. Owing to the nature of the data, all independent variables are coded as dummy variables. Since ordered probit regressions calculate the probability of each ordered outcome, our investigation also calculates the marginal effects of financial capacity and concern variables on the students' feeling of depression. Other statistical tests are performed to check for the robustness of results and discusses further in the following section. Stata 15 is the primary software used in the estimation.

3. Results and Discussion

The model's attempt at explaining the student's feeling of depression is shown in Table 2, which shows the ordered probit regression results of the study. Columns (1) to (2) estimates the individual effects of parent's income and concern for financing with social relationship status, academic satisfaction, and demographic variables as controls. Column (3) considers parent's income and financing concern. Column (4) considers loans financing and needs-based willingness to work part-time while Column (5) runs the four financial variables. The individual effect of economic status is seen in Column (6). Column (7) runs the regression with all five financial capacity variables together.

Table 2. Ordered Probit Regression Results on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial capacity and burden							
Parent's monthly income (<i>Base: 0 - 20,000</i>)							
20 001 – 40 000	-0.219** (0.111)		-0.195* (0.111)		-0.192* (0.110)		-0.203 (0.127)
40 001 – 80 000	0.0600 (0.108)		0.0957 (0.109)		0.102 (0.109)		0.0672 (0.269)
More than 80 000	-0.143 (0.106)		-0.0665 (0.108)		-0.0584 (0.109)		0.281 (0.383)
College financing is a major concern		0.242*** (0.0689)	0.256*** (0.0721)		0.248*** (0.0744)		0.251*** (0.0746)
Needs-based willingness to work part-time				0.106 (0.0835)	0.0433 (0.0890)		0.0329 (0.0892)
Loan as a primary/secondary source of financing				0.0523 (0.0896)	0.0102 (0.0927)		0.00588 (0.0930)
<i>Economic Status (Base: Same with median)</i>							
Above-Median School Income						-0.199** (0.0817)	-0.432** (0.205)
Below-Median School Income						-0.213** (0.0855)	-0.116 (0.210)
Social Relationships Status							
Staying with immediate family	0.00137 (0.264)	-0.0296 (0.265)	-0.0272 (0.267)	-0.00231 (0.257)	-0.0262 (0.266)	-0.00398 (0.255)	-0.0323 (0.264)
<i>Parent's status (Base: Both alive and living)</i>							
Separated parent	-0.197* (0.111)	-0.171 (0.105)	-0.179 (0.111)	-0.177* (0.106)	-0.177 (0.111)	-0.184* (0.107)	-0.206* (0.113)
One or both are deceased	0.272 (0.186)	0.305* (0.171)	0.317* (0.179)	0.259 (0.175)	0.310* (0.178)	0.254 (0.169)	0.290* (0.175)
<i>Family Social Activities (Base: 0 hr/wk)</i>							
At least 2 hours a week	0.180 (0.150)	0.223 (0.150)	0.195 (0.150)	0.212 (0.151)	0.196 (0.150)	0.205 (0.149)	0.194 (0.150)
3-5 hours a week	0.195 (0.155)	0.210 (0.154)	0.222 (0.155)	0.190 (0.155)	0.222 (0.155)	0.174 (0.154)	0.216 (0.155)
At most 6 hours a week	0.123 (0.159)	0.181 (0.157)	0.143 (0.159)	0.162 (0.158)	0.142 (0.159)	0.157 (0.156)	0.136 (0.159)
<i>Religious/Church Activities (Base: 0 hr/wk)</i>							
At least 2 hours a week	-0.138 (0.0983)	-0.182* (0.0947)	-0.150 (0.0984)	-0.170* (0.0947)	-0.149 (0.0986)	-0.172* (0.0943)	-0.157 (0.0978)
3-5 hours a week	-0.0472 (0.119)	-0.146 (0.118)	-0.0710 (0.120)	-0.121 (0.117)	-0.0676 (0.121)	-0.127 (0.116)	-0.0776 (0.120)
At most 6 hours a week	0.0642 (0.135)	-0.0136 (0.130)	0.0395 (0.135)	0.0110 (0.130)	0.0403 (0.136)	0.00930 (0.129)	0.0302 (0.136)
Satisfaction with Academic Experience	-0.388*** (0.151)	-0.343** (0.139)	-0.387*** (0.149)	-0.339** (0.140)	-0.385*** (0.149)	-0.357** (0.141)	-0.375** (0.150)
Demographics							
Male	-0.374*** (0.0730)	-0.399*** (0.0712)	-0.391*** (0.0732)	-0.375*** (0.0710)	-0.389*** (0.0737)	-0.367*** (0.0707)	-0.385*** (0.0737)
One parent is a college graduate	-0.0294 (0.0705)	-0.0270 (0.0686)	-0.0257 (0.0707)	-0.0254 (0.0682)	-0.0244 (0.0705)	-0.0466 (0.0681)	-0.0134 (0.0706)

Table 2. Ordered Probit Regression Results on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>(continued from last page)</i>							
Threshold variables							
<i>cut 1</i>	-1.923*** (0.247)	-1.691*** (0.230)	-1.799*** (0.247)	-1.723*** (0.234)	-1.781*** (0.252)	-1.969*** (0.242)	-1.886*** (0.362)
<i>cut 2</i>	-1.012*** (0.243)	-0.790*** (0.226)	-0.883*** (0.243)	-0.827*** (0.231)	-0.866*** (0.248)	-1.070*** (0.239)	-0.967*** (0.359)
<i>cut 3</i>	0.0503 (0.241)	0.267 (0.223)	0.185 (0.240)	0.227 (0.229)	0.202 (0.246)	-0.0129 (0.236)	0.104 (0.357)
<i>cut 4</i>	0.782*** (0.242)	1.001*** (0.224)	0.922*** (0.242)	0.957*** (0.229)	0.940*** (0.247)	0.720*** (0.236)	0.844** (0.357)
No. of observations	999	1053	997	1055	997	1055	997
Pseudo-R²	0.0328	0.0327	0.0371	0.0293	0.0372	0.0311	0.0392
χ²-statistic	95.26	103.1	107.4	91.99	107.9	99.12	117.2
P(χ²)	1.91e-10	1.85e-12	3.45e-12	3.29e-10	1.27e-11	1.99e-11	1.45e-12

Note: Dependent variable is a five-point, balanced Likert scale of the student's self-reported frequency of feeling depressed during his/her past academic year. The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. All results include school and year dummies. Threshold variables are not reported here but available upon request. White-corrected standard errors are in parentheses.

3.1. Main Results – Financial capacity, relative status, and financing concern on the feeling of depression

For ease of analysis of Table 3, we present the average marginal effects of financial capacity and burden variables based on the estimation from Table 2, Column (7). Other information such as average marginal effects based on the estimations from Table 2, Columns (1) to (6) and their respective predictive margins are in Appendix E.

Table 3. Average Marginal Effects of Selected Variables on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018, (based on Table 2, Column (7))

	<i>Dependent Variable = Felt Depressed</i>				
	Never	Rarely	Sometimes	Often	Very Often
<i>Economic Status (Base: Same bracket as school median income)</i>					
<i>Above-median income</i>	0.0701* (0.0394)	0.0761** (0.0320)	-0.00933 (0.0147)	-0.0640** (0.0288)	-0.0729** (0.0316)
<i>Below-median income</i>	0.0153 (0.0288)	0.0212 (0.0390)	0.00314 (0.00454)	-0.0164 (0.0307)	-0.0232 (0.0407)
<i>Parent's joint monthly income (Base: < 20,000)</i>					
<i>20 001 – 40 000</i>	0.0387* (0.0215)	0.0332 (0.0238)	-0.0126 (0.00864)	-0.0302 (0.0194)	-0.0291 (0.0219)
<i>40 001 – 80 000</i>	-0.0110 (0.0449)	-0.0117 (0.0462)	0.00152 (0.00740)	0.00988 (0.0393)	0.0113 (0.0445)
<i>More than 80 000</i>	-0.0403 (0.0568)	-0.0500 (0.0653)	-0.00267 (0.00598)	0.0396 (0.0519)	0.0534 (0.0730)
College financing is a major concern	-0.0373*** (0.0110)	-0.0463*** (0.0139)	0.000814 (0.00292)	0.0376*** (0.0113)	0.0451*** (0.0142)
Needs-based willingness to work part-time	-0.00512 (0.0136)	-0.00596 (0.0162)	0.000407 (0.000906)	0.00492 (0.0133)	0.00575 (0.0157)
Loan as a primary/secondary source of financing	-0.000921 (0.0145)	-0.00106 (0.0168)	0.0000856 (0.00130)	0.000878 (0.0139)	0.00102 (0.0161)

Note: Results are based on estimation from Table 2, Column (7). Dependent variable is a five-point, balanced Likert scale of the student's self-reported frequency of feeling depressed during his/her past academic year. The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. Regressions include school dummies and year dummies. Threshold variables are included but not reported here. Some variables are dropped due to lack of degrees of freedom in the combination of responses.

Parent's monthly income. From Table 2, the negative and significant sign of the coefficient for students whose parents earn a monthly income of ₱20,001 - ₱40,000 in Column (1) (at 5% level of significance) and in Columns (3) and (5) (at 10% level of significance), suggests that students in that income bracket experience feelings of depression less frequently than the poorest baseline income group with monthly family incomes of less than ₱20,000. It is notable however that students from higher income brackets do not differ significantly from the lowest income group in their reported frequency feeling depressed.

The significance of the effect of the bracket ₱20,001 - ₱40,000 lends partial support to earlier findings about income and student depression (Richardson et al. 2017). But the finding also echoes the results from some studies (albeit not directly regarding students), about threshold effects of income on the prevalence of depression. Zimmerman and Katon (2005) find that the effect of income on depression scores is negative but flattens out at sufficiently high incomes. Transforming income into logged income, however, show that “proportionately equal changes in both below- and above-median households are associated with proportionately equal changes in depression symptomology.” (p. 1210) Akhtar-Danesh and Landeen (2007) also observe this threshold effect of household income on both lifetime and 12-month depression.

In short, having a level of family income somewhat above the lowest category appears to reduce feelings of depression. But further increases in family income no longer produce the same effect, which suggests that reported feelings of depression may then be caused by other situational factors. This statement must be qualified, however, since neither family size nor household expenditures are controlled for here and may fail to account for the relative allocation on educational expenditures that can cause difficulty in the household; this may cause us to underestimate the effect of higher income. The measure also represents students' best estimate of their parents' joint income which may be under- or over-reported.

The statistical significance and the magnitude of the effect of income are notably modest from our results. The effect also becomes negligible when the constructed variable, economic status, is included in the regression as seen in Table 2, Column (7). Similarly, we observe in Table 3 that students with parent's income belonging to ₱20,001 - ₱40,000 a month are more likely to respond “Never” (at a 10% level of significance) but no similar finding are found on other income brackets and other responses to the feeling of depression.

Economic Status. Students whose families earn more than the school's median family income tend to feel depressed less often (at a 5% significance level), confirming the result from previous studies. The insignificant coefficients for students with family incomes at or below median incomes mean that students above-median income fare better in terms of feelings of depression than those from poorer families. Also telling is the fact that including this economic status variable results in the loss of significance of the absolute-income variable itself. This suggests that students' feeling of financial inadequacy may be measured not in absolute terms but in comparison with their school peers. More affluent students in a school milieu of poorer students will tend to feel depressed less often—or conversely, students with median or lower incomes will feel depressed more often than more affluent ones. Indeed, students who

are comfortable in absolute terms but who attend a university with high median incomes may not be immune from feelings of depression because of their relative position. We note from Table 3 that students of higher economic status, defined in this relative sense, are more likely to feel depressed “never” or “rarely” and less likely to feel depressed “often” or “very often”.

Concern for financing. Turning to the affective measure of financial burden, Table 2 shows that students who report a major concern for college financing are likely to report more frequent feelings of depression, with all four estimates significant at the 1% level. In Table 3, students reporting major concern for college financing are more likely to respond that they feel depressed “often” and “very often” while less likely to respond “never” and “rarely”. This implies that financing concern or perception of financial burden to college financing is enough to elicit the feeling of depression. In interpreting this finding, such perception could either truthfully reveal the extent of their financial distress or depict their relative status among their peers. The finding also echoes with Rivenbark et al. (2019), among other similar studies, claim that subjective social status is correlated with internalizing mental health problems in young adolescents. In fact, a systematic review by McCloud and Bann (2019) find that subjective measures of economic factor such as financing concern is more robust than income in explaining negative mental health outcomes.

In light of the literature that suggests some disconnect between these two variables, i.e., between financing concern and income, we try to check which has a mediating effect on the other through a control function approach (see Wooldridge 2015). That is, we use income as an instrument of financing concern as well as financing concern as an instrument of income. Although both variables have a negative polychoric correlation of -0.28 (see Appendix C), the results, show that either variable can be a weak instrument of the other, where the correlation coefficients between residuals of the two probits are insignificant. This supports the hypothesis that factors other than income can affect concern over financing (Cooke et al. 2004). The factors underlying such a concern deserve further study.

Needs-based willingness to work part-time. The insignificant coefficient of this variable may be due to a number of reasons. One is the veracity of respondents’ willingness to work part-time, which may require further questions or probes. Second, as Sprung and Rogers (2021) have argued, it is not working to fund college fees that necessarily induces stress among students but rather achieving a work-life balance, which can mediate anxiety and depressive symptoms. Third, some institutional or cultural factors may be at play, such as the Filipino attitude towards allocating resources within the family to support its members pursuing higher education. Further research may be able to explore this beyond our anecdotal claim.

Loans as a primary or secondary source of financing. Taking out loans has no significant association with the student’s feeling of depression. Debt burden is an important socioeconomic determinant of health (Sweet et al. 2013) and the problem of student loans, particularly in the US, has received great attention among researchers. While debt is generally seen to cause health problems (Walsemann, Gee, and Gentile 2015; Kim and Chatterjee 2019), evidence is generally mixed (McCloud and Bann 2019). Richardson et al. (2017) find that debt can have concurrent negative mental health effects during a student’s time in college, while others have found the effects to occur only after student life (Sato et al. 2020; Anong and Henager 2021). Cooke et al. (2004), and Richardson, Elliott, and Roberts (2015), on the other hand, find mental

health being affected even by anticipated debt among graduating students in the UK. The literature suggests that the effect of debt on student's mental health therefore may vary depending on time.

3.2. The effect of social relationships, school satisfaction, and demographics

From Table 2, we see that *living in the same residence with an immediate family member* has no significant effect. Some literature suggests that any effect of living separately from one's family may be transient and that most students may show quick adaptability in coping with university life (Michael et al. 2006). But we note the data also provide no information on the distance of students' residence from their families' main residence and fail to account for new factors such as the ease of social communication.

Some nuance is required when interpreting the effect of *parent's status*. While its coefficients in Columns (1), (4) and (6) show a negative relationship with the feeling of depression at a 10% level of significance, the coefficients become statistically insignificant when the variable on concern for financing is included in the estimation as seen in Columns (2), (3) and (5). The inclusion of financing concern also reveals that students who have lost one or both of their parents have more frequent feeling of depression than those who have both are alive and together. This finding suggests that, by controlling for financing concern, the loss of a parent carries more weight than parental separation on the feeling of depression. Aseltine (1996) argues that depression among youths of single-parent families stems from their greater vulnerability to financial stress. As seen in Column (7), the loss of a parent has a positive association with the feeling of depression while the coefficient indicating separated parents is negative. The latter result is confounding and may be attributed to the absence of *de jure* divorce in the Philippines. Future studies can focus more on this relationship.

While some literature claims that engagement exhibiting family support has a positive impact on mental health, results show that they do not have any insignificant effect on the feeling of depression. In this study, *engagement with family social activities* is admittedly a weak indicator of the quality of family relationships, since we suspect the former may be understood by the respondents as more formal affairs such as family reunions and may not describe the type of communication or social support that can alleviate the feeling of depression. Burton, Stice, and Seeley (2004), moreover, find that family support has predictive utility on lessening depression mostly after experiences of negative life events.

Attending masses or religious services for at least two hours a week has a negative association with the feeling of depression at 10% level of significance but becomes statistically insignificant after controlling for parental income. This implies that income and religiosity may share a link in alleviating the feeling of depression. Schnittker (2001) also explains that the effect of religious salience on depression, like the effect of family support, occurs only when the individual experiences multiple negative life events rather than any single discrete event. Not accounting for recent life events may have affected the significance of these variables.

Satisfaction with their academic experience is found to be highly significant in reducing students' feeling of depression, which supports previous findings (Richardson et al. 2017). The results also show that

females are more likely to report a higher frequency of feeling depressed, supporting such similar findings in the literature as explained by pressure from societal roles. These two factors exhibit notably strong associations with the feeling of depression and are further investigated in the following subsections. Meanwhile, *having either parent as a college graduate* is found to have an insignificant effect.

3.3. Gender and feelings of depression

There is general agreement in the literature that males and females exhibit significant variation in behavior due to financial strain. To drill down on this issue, we run separate ordered probit regressions for males and females and present the results in Table 4.

Table 4. Ordered Probit Regression Results on the Student’s Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018, Broken down by Gender

	Male		Female	
	Coef.	Std. Error	Coef.	Std. Error
Financial capacity and burden				
Parent’s joint monthly income (<i>Base: < 20,000</i>)				
20 001 – 40 000	-0.193	0.154	-0.200	0.170
40 001 – 80 000	0.0352	0.150	0.173	0.165
More than 80 000	-0.134	0.153	0.0254	0.164
College financing is a major concern	0.190*	0.115	0.259**	0.105
Needs-based willingness to work part-time	0.0576	0.116	-0.00428	0.126
Loan as a primary/secondary financing	-0.0628	0.131	0.0637	0.133
Social Relationships Status				
Staying with immediate family	0.502	0.391	-0.582	0.390
Parent’s status (<i>Base: Both alive and living</i>)				
Separated parent	-0.206	0.152	-0.142	0.171
One or both are deceased	0.463**	0.223	0.0728	0.393
Family Social Activities (<i>Base: 0 hrs/wk</i>)				
< 2 hrs/wk	-0.0925	0.187	0.572**	0.233
2-6 hrs/wk	0.00103	0.195	0.566**	0.237
> 6 hrs/wk	-0.128	0.203	0.488**	0.241
Religious/Church Activities (<i>Base: 0 hrs/wk</i>)				
< 2 hrs/wk	-0.161	0.141	-0.188	0.140
2-6 hrs/wk	-0.206	0.186	0.00772	0.170
> 6 hrs/wk	-0.251	0.216	0.196	0.179
Satisfaction with Academic Experience	-0.376*	0.208	-0.365**	0.183
Demographics				
Mother or Father is a college graduate	-0.0488	0.102	0.0309	0.111
No. of observations	513		484	
χ-statistic (p-value)	0.00000		0.00561	

Note: Dependent variable is a five-point, balanced Likert scale of the student’s self-reported frequency of feeling depressed during his/her past academic year. The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. Threshold variables are not reported here but available upon request. Regressions include school dummies and year dummies.

The gender-specific results shown in Table 4 show notable differences from the aggregate results in Table 2. First, the significance of the effect of income dissipates for both genders. Second, the effect of financing concern among female students is larger and more statistically significant than among male students. This supports findings from other studies (e.g. Richardson et al. 2017) where females are more concerned about finances than their male counterparts. Third, the loss through death of one or both parents affects males significantly, while no similar finding is found among female students. The difference may lie in the cultural expectation that male students must bear more of a burden in family affairs when a parent passes away. Fourth, female students who spend weekly family social activities feel depressed more frequently than those who do not; no similar result exists among male students. This curious but significant finding merits future study to see whether family pressures have a gender-differentiated role on mental health outcomes.

3.4. Satisfaction and the feeling of depression

The second variable where we take a deeper dive is satisfaction with academic experience. Our previous results showed that satisfaction with academic experience is a significant deterrent to the frequent feeling of depression. The satisfaction variable aims to capture functional impairments to academic performance which have an explanatory link to student's mental health (Eisenberg, Hunt, and Speer 2013). We augment this result by replacing this satisfaction measure with four proxies or predictors of satisfaction with the school⁵ and a component score. (The reader is referred to Table 1 for the definition and summary statistics of these alternative measures.)

One proxy is the student's *self-rating of academic and scholarly ability*, which may represent the student's satisfaction with academic experience with the school. Note that the polychoric correlation coefficient between the two variables is 0.233, which is considered low-to-moderate. Column (1) of Table 4 finds that (self-rated) academic ability has no effect on feeling depressed. That is, students of varying academic competence may equally experience depressive feelings. In addition, the insignificance of the latter perhaps means that their academic satisfaction does not easily translate into improvements in their ability. This ambiguous yet important relationship has been extensively debated in education research (Bean and Bradley 1986).

Proactivity is thought to regulate negative moods and feelings (Bindl et al. 2012; O'Leary 2008). The trait explains how they can actively take charge of situations to bring about change in a future-focused way.

⁵ Alternatively, we have presumed that the feeling of depression is dependent on a set of socioeconomic variables. However, individuals may have genetic predispositions towards depression and other mental health problems. These, in turn, can affect their academic performance and satisfaction (Mirhosseini et al. 2021). To determine the causal direction of the relationship, we use the said proxy variables as instruments in the regression to explain student's satisfaction with academic experience. Results (not presented in this paper but available upon request) show that the effect of financing concern and gender remain significant but the effect of academic satisfaction now becomes negligible. We note that the insignificance of the correlation coefficient of the residuals tells us that the first-stage and second-stage probit estimations can be estimated separately, implying endogeneity of academic satisfaction is not an issue. Moreover, the instruments poorly describe the suspected endogenous variable to begin with and interpretation of those results should be taken with caution.

As an additional check, we also performed the same regression specifications from Table 2 with the academic satisfaction variable removed (not presented in this paper but available upon request). The results remain qualitatively similar to results found in Table 2.

The second and third predictors, *drive to achieve* and *school's contribution to student's initiative and self-direction*, aim to capture such a trait, with the estimated coefficients presented in Columns (2) and (3), respectively. The drive to achieve proves to be a regulator of depressive feelings at a 10% level of significance. The school's effect on initiative, however, shows no significant association. This suggests that certain dispositional proactivity, rather than induced proactivity, can mitigate this feeling of depression. Another alternative measure is their *expected time to graduate from their program*. Note that this item is only asked during sophomore and junior years. Should they expect to graduate on or before the prescribed time for their program, students are presumed to be confident about their academic performance. The measure is also related to optimism which is also a significant predictor of student satisfaction and performance (e.g. Yalçın 2011; McIlveen, Beccaria, and Burton 2013). But we likewise find no significant relationship between this and with frequency of depressive feelings in our sample, as seen in Column (4).

Table 5. Ordered Probit Regression Results on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018, Satisfaction variable replaced by various proxy measures

	(1)	(2)	(3)	(4)	(5)	(6)
Satisfaction						
Academic Ability	-0.0956 (0.0689)					0.00730 (0.0984)
Drive to achieve		-0.143* (0.0768)				-0.137 (0.103)
School's contribution on initiative			-0.191 (0.316)			0.131 (0.472)
Expected time to graduate				-0.188 (0.131)		-0.165 (0.134)
PC Score 1 – <i>School-referenced satisfaction</i>					-0.0609* (0.0346)	
PC Score 2 – <i>Self-referenced satisfaction</i>					-0.0757* (0.0443)	
Satisfaction with Academic Experience						-0.320* (0.180)
Financial capacity and burden						
Parent's joint monthly income (<i>Base: Less than 20,000</i>)						
20 001 – 40 000	-0.173 (0.113)	-0.167 (0.113)	-0.173 (0.112)	-0.184 (0.141)	-0.167 (0.112)	-0.175 (0.142)
40 001 – 80 000	0.121 (0.110)	0.127 (0.110)	0.120 (0.110)	0.133 (0.140)	0.125 (0.110)	0.141 (0.141)
More than 80 000	-0.0182 (0.112)	-0.0142 (0.111)	-0.0253 (0.111)	-0.0373 (0.141)	-0.0128 (0.111)	-0.0264 (0.141)
College financing is a major concern	0.240*** (0.0729)	0.235*** (0.0731)	0.242*** (0.0730)	0.264*** (0.0894)	0.247*** (0.0729)	0.270*** (0.0892)
Needs-based willingness to work part-time	0.120 (0.0781)	0.120 (0.0782)	0.126 (0.0779)	0.146 (0.0995)	0.113 (0.0780)	0.140 (0.0997)
Loan as a primary/secondary source of financing	0.0188 (0.0940)	0.0230 (0.0941)	0.0216 (0.0940)	-0.0373 (0.112)	0.0161 (0.0946)	-0.0488 (0.112)

Table 5. Ordered Probit Regression Results on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018, Satisfaction variable replaced by various proxy measures

	(1)	(2)	(3)	(4)	(5)	(6)
<i>(continued from last page)</i>						
Social Relationships Status						
Staying with immediate family	-0.0639 (0.276)	-0.0528 (0.277)	-0.0697 (0.270)	-0.206 (0.345)	-0.0318 (0.278)	-0.180 (0.355)
Parent's status (<i>Base: Alive and living</i>)						
<i>Separated parent</i>	-0.223** (0.113)	-0.217* (0.114)	-0.226** (0.113)	-0.270* (0.143)	-0.217* (0.114)	-0.256* (0.145)
<i>One or both are deceased</i>	0.256 (0.184)	0.261 (0.184)	0.275 (0.183)	0.227 (0.215)	0.276 (0.185)	0.230 (0.218)
Family Social Activities (<i>Base: 0 hours</i>)						
<i>At least 2 hours a week</i>	0.152 (0.150)	0.158 (0.150)	0.151 (0.150)	0.253 (0.195)	0.154 (0.150)	0.256 (0.196)
<i>3-5 hours a week</i>	0.166 (0.155)	0.173 (0.155)	0.165 (0.155)	0.174 (0.202)	0.183 (0.156)	0.191 (0.203)
<i>At most 6 hours a week</i>	0.0902 (0.159)	0.0997 (0.159)	0.0838 (0.159)	0.0961 (0.205)	0.102 (0.159)	0.122 (0.205)
Religious/Church Activities (<i>Base: 0 hours</i>)						
<i>At least 2 hours a week</i>	-0.163 (0.0993)	-0.156 (0.0993)	-0.164* (0.0993)	-0.155 (0.129)	-0.155 (0.0991)	-0.139 (0.127)
<i>3-5 hours a week</i>	-0.0874 (0.121)	-0.0793 (0.121)	-0.0936 (0.121)	0.0206 (0.156)	-0.0819 (0.121)	0.0360 (0.155)
<i>At most 6 hours a week</i>	0.0267 (0.136)	0.0230 (0.136)	0.00994 (0.136)	-0.0697 (0.167)	0.0219 (0.136)	-0.0566 (0.167)
Demographics						
Male	-0.392*** (0.0742)	-0.396*** (0.0742)	-0.393*** (0.0751)	-0.458*** (0.0907)	-0.413*** (0.0754)	-0.474*** (0.0922)
One parent is a college graduate	-0.0261 (0.0716)	-0.0245 (0.0715)	-0.0241 (0.0715)	-0.0431 (0.0889)	-0.0272 (0.0714)	-0.0452 (0.0886)
School Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	983	983	983	643	983	643
χ-statistic (<i>p</i>-value)	2.83e-12	7.54e-13	1.44e-11	5.84e-08	6.19e-13	0.000000

Note: Dependent variable is a five-point, balanced Likert scale of the student's self-reported frequency of feeling depressed during his/her past academic year. The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. Threshold variables are not reported here but available upon request. White-corrected standard errors are in parentheses.

The computed component scores contain the initial satisfaction variable and the other proxies except their response about expected time to graduate. (See the analysis and derivation at Appendix E.) The principal component analysis resulted in two component scores with cumulative percentage explained of 63.6%. The first component captures most of the variance in the student's satisfaction with academic experience and school's contribution on initiative and self-direction; we name this component score "school-referenced satisfaction". The second component score explains the variance in the other two measures and named the score as "self-referenced satisfaction". As seen in Column (5), both coefficients are negative and significant. In contrast, Column (6) runs this set of variables distinctly and we only find the initial variable, satisfaction with academic experience. This bewildering result perhaps imply that a related yet underlying variable or even latent set of variables affect the frequency of these negative moods. This warrants further investigation.

Conclusion

Consistent with other findings, we find that the perception of financial difficulty can elicit depressive feelings among college students. The study finds that being in an income bracket higher than the lowest income group may suffice to lessen the feeling of depression among college students, although we find no similar results among those from higher income brackets. This implies that financial assistance to low-income students, even partial support, may reduce the frequency of feeling depressed. Such assistance may improve academic performance and career prospects as suggested by many studies. After performing other tests, however, the said finding loses its statistical significance.

There is evidence however that students' relative economic status, i.e., their economic standing relative to that of their peers, plays a role in affecting students' feeling of depression, supporting findings from previous studies. Higher education institutions and policymakers, therefore would do well to pay attention to the mental health of poorer-than-average students not only in absolute terms but in the specific observable college milieu in which these students find themselves. Students' mental health may benefit from an academic environment that stresses equity and that creates a campus culture that welcomes diverse economic and cultural backgrounds.

Even controlling for income, financial concerns remains a robust predictor of feelings of depression. What factors lie behind this enduring perception beyond absolute and relative income status is an important topic for other studies. For academic decision-makers, however, the more immediate takeaway is that broad-brush policies such as subsidies and scholarships may not suffice to resolve the problem completely. Rather, individualized counselling and guidance may be required to identify and counsel students who may suffer from mental health difficulties. Among others, we also find that female students, and male students who have experienced loss of a parent be among the groups vulnerable to heightened feelings of depression.

In contrast to other studies, we find no evidence of a link between debt reliance on college financing and the feelings of depression. Students' willingness to work part-time based on financial need is also found to have an insignificant effect. We speculate the insignificance of these variables is due to the underdeveloped financial access in the country and culture-specific disposition towards education. Likewise, there is no strong evidence that participation in family social activities and attending religious activities can mitigate the feeling of depression. The study also shows an insignificant effect of parental education on these feelings of depression. Further studies may focus more on these relationships.

The lack of information in the data regarding household size or education-related expenditures is a limitation. Given the growing importance of mental health in educational outcomes and overall well-being, a valid inventory of depression, anxiety and stress scale can present more descriptive and reliable measure to communicate to school administrators and policymakers. Future studies with larger datasets may observe a broader story between socioeconomic status and psychological distress, anxiety, and

depressive moods. These can elucidate the prevalence of these mental health problems among college students as more large-scale longitudinal studies allow for other possible factors in this type of studies.

References

- Akhtar, Parveen, Lu Ma, Ahmed Waqas, Sadiq Naveed, Yixuan Li, Atif Rahman, and Youfa Wang. 2020. "Prevalence of Depression among University Students in Low and Middle Income Countries (LMICs): A Systematic Review and Meta-Analysis." *Journal of Affective Disorders* 274 (September): 911–19. <https://doi.org/10.1016/j.jad.2020.03.183>.
- Akhtar-Danesh, Noori, and Janet Landeen. 2007. "Relation between Depression and Sociodemographic Factors." *International Journal of Mental Health Systems* 1 (1): 4. <https://doi.org/10.1186/1752-4458-1-4>.
- Amato, Paul R. 2000. "The Consequences of Divorce for Adults and Children." *Journal of Marriage and Family* 62 (4): 1269–87. <https://doi.org/10.1111/j.1741-3737.2000.01269.x>.
- Amato, Paul R., and Bruce Keith. 1991. "Parental Divorce and the Well-Being of Children: A Meta-Analysis." *Psychological Bulletin* 110 (1): 26–46. <https://doi.org/10.1037/0033-2909.110.1.26>.
- Andrews, Bernice, Jennie Hejdenberg, and John Wilding. 2006. "Student Anxiety and Depression: Comparison of Questionnaire and Interview Assessments." *Journal of Affective Disorders* 95 (1–3): 29–34. <https://doi.org/10.1016/j.jad.2006.05.003>.
- Andrews, Bernice, and John M. Wilding. 2004. "The Relation of Depression and Anxiety to Life-Stress and Achievement in Students." *British Journal of Psychology* 95 (4): 509–21. <https://doi.org/10.1348/0007126042369802>.
- Anong, Sophia T., and Robin Henager. 2021. "Student Loans and Health-Related Financial Hardship." *Journal of Student Financial Aid* 50 (2).
- Archuleta, Kristy L., Anita Dale, and Scott M. Spann. 2013. "College Students and Financial Distress: Exploring Debt, Financial Satisfaction, and Financial Anxiety." *Journal of Financial Counseling and Planning* 24 (2): 50–62.
- Aseltine, Robert H. 1996. "Pathways Linking Parental Divorce With Adolescent Depression." *Journal of Health and Social Behavior* 37 (2): 133. <https://doi.org/10.2307/2137269>.
- Aselton, Pamela. 2012. "Sources of Stress and Coping in American College Students Who Have Been Diagnosed With Depression." *Journal of Child and Adolescent Psychiatric Nursing* 25 (3): 119–23. <https://doi.org/10.1111/j.1744-6171.2012.00341.x>.
- Astin, Alexander W. 1984. "Student Involvement: A Developmental Theory for Higher Education." *Journal of College Student Personnel* 25: 297–308.
- Bean, John P., and Russell K. Bradley. 1986. "Untangling the Satisfaction-Performance Relationship for College Students." *The Journal of Higher Education* 57 (4): 393–412. <https://doi.org/10.1080/00221546.1986.11778785>.
- Bernardo, Allan B. I., and Katrina Bernardo Resurreccion. 2018. "Financial Stress and Well-Being of Filipino Students: The Moderating Role of External Locus-of-Hope." *Philippine Journal of Psychology* 51 (1): 33–61.
- Berry, Devon M., and Kate York. 2011. "Depression and Religiosity and/or Spirituality in College: A Longitudinal Survey of Students in the USA." *Nursing & Health Sciences* 13 (1): 76–83. <https://doi.org/10.1111/j.1442-2018.2011.00584.x>.
- Berryhill, Micha Blake, and Jessica Smith. 2021. "College Student Chaotically-Disengaged Family Functioning, Depression, and Anxiety: The Indirect Effects of Positive Family Communication and Self-Compassion." *Marriage & Family Review* 57 (1): 1–23. <https://doi.org/10.1080/01494929.2020.1740373>.
- Bindl, Uta K., Sharon K. Parker, Peter Totterdell, and Gareth Hagger-Johnson. 2012. "Fuel of the Self-Starter: How Mood Relates to Proactive Goal Regulation." *Journal of Applied Psychology* 97 (1): 134–50. <https://doi.org/10.1037/a0024368>.
- Brougham, Ruby R., Christy M. Zail, Celeste M. Mendoza, and Janine R. Miller. 2009. "Stress, Sex Differences, and Coping Strategies Among College Students." *Current Psychology* 28 (2): 85–97. <https://doi.org/10.1007/s12144-009-9047-0>.
- Burton, Emily, Eric Stice, and John R. Seeley. 2004. "A Prospective Test of the Stress-Buffering Model of Depression in Adolescent Girls: No Support Once Again." *Journal of Consulting and Clinical Psychology* 72 (4): 689–97. <https://doi.org/10.1037/0022-006X.72.4.689>.

- Cammack, Nicole, and Nicole Evangelista Brandt. 2014. "Funding Expanded Mental Health Programs: Research, Training, Practice, and Policy." In *Handbook of School Mental Health*, 17–30. Springer US.
- Chen, Edith, and Laurel Q. Paterson. 2006. "Neighborhood, Family, and Subjective Socioeconomic Status: How Do They Relate to Adolescent Health?" *Health Psychology* 25 (6): 704–14. <https://doi.org/10.1037/0278-6133.25.6.704>.
- Cherlin, Andrew J., P. Lindsay Chase-Lansdale, and Christine McRae. 1998. "Effects of Parental Divorce on Mental Health Throughout the Life Course." *American Sociological Review* 63 (2): 239. <https://doi.org/10.2307/2657325>.
- Cooke, Richard, Michael Barkham, Kerry Audin, Margaret Bradley, and John Davy. 2004. "Student Debt and Its Relation to Student Mental Health." *Journal of Further and Higher Education* 28 (1): 53–66. <https://doi.org/10.1080/0309877032000161814>.
- Coyne, James C. 1994. "Self-Reported Distress: Analog or Ersatz Depression?" *Psychological Bulletin* 116 (1): 29–45. <https://doi.org/10.1037/0033-2909.116.1.29>.
- Dusselier, Lauri, Brian Dunn, Yongyi Wang, Mack C Shelley II, and Donald F Whalen. 2005. "Personal, Health, Academic, and Environmental Predictors of Stress for Residence Hall Students." *Journal of American College Health* 54 (1): 15–24. <https://doi.org/10.3200/JACH.54.1.15-24>.
- Dyrbye, Liselotte N, Matthew R Thomas, and Tait D Shanafelt. 2006. "Systematic Review of Depression, Anxiety, and Other Indicators of Psychological Distress Among U.S. and Canadian Medical Students." *Academic Medicine* 81 (4).
- Eisenberg, Daniel, Sarah E. Gollust, Ezra Golberstein, and Jennifer L. Hefner. 2007. "Prevalence and Correlates of Depression, Anxiety, and Suicidality among University Students." *American Journal of Orthopsychiatry* 77 (4): 534–42. <https://doi.org/10.1037/0002-9432.77.4.534>.
- Eisenberg, Daniel, Justin Hunt, and Nicole Speer. 2013. "Mental Health in American Colleges and Universities: Variation Across Student Subgroups and Across Campuses." *The Journal of Nervous and Mental Disease* 201 (1): 60–67.
- Gan, G G, and H Yuen Ling. 2019. "Anxiety, Depression and Quality of Life of Medical Students in Malaysia." *The Medical Journal of Malaysia* 74 (1): 57–61.
- Gerrard, Eve, and Ron Roberts. 2006. "Student Parents, Hardship and Debt: A Qualitative Study." *Journal of Further and Higher Education* 30 (4): 393–403.
- Gray, Ross E. 1987. "Adolescent Response to the Death of a Parent." *Journal of Youth and Adolescence* 16 (6): 511–25. <https://doi.org/10.1007/BF02138818>.
- Grigoriadis, Sophie, and Gail Erlick Robinson. 2007. "Gender Issues in Depression." *Annals of Clinical Psychiatry* 19 (4): 247–55. <https://doi.org/10.1080/10401230701653294>.
- Hoge, Robert D., D. A. Andrews, Penny Faulkner, and David Robinson. 1989. "The Family Relationship Index: Validity Data." *Journal of Clinical Psychology* 45 (6): 897–903. [https://doi.org/10.1002/1097-4679\(198911\)45:6<897::AID-JCLP2270450611>3.0.CO;2-T](https://doi.org/10.1002/1097-4679(198911)45:6<897::AID-JCLP2270450611>3.0.CO;2-T).
- Hysenbegasi, Alketa, Steven L Hass, and Clayton R Rowland. 2005. "The Impact of Depression on the Academic Productivity of University Students." *The Journal of Mental Health Policy and Economics* 8 (3): 145–51.
- Jansen, Kate L., Rebecca Motley, and Joseph Hovey. 2010. "Anxiety, Depression and Students' Religiosity." *Mental Health, Religion & Culture* 13 (3): 267–71. <https://doi.org/10.1080/13674670903352837>.
- January, James, Munyaradzi Madhombiro, Shalote Chipamaunga, Sunanda Ray, Alfred Chingono, and Melanie Abas. 2018. "Prevalence of Depression and Anxiety among Undergraduate University Students in Low- and Middle-Income Countries: A Systematic Review Protocol." *Systematic Reviews* 7 (1): 57. <https://doi.org/10.1186/s13643-018-0723-8>.
- Kashubeck, Susan, and Sue A. Christensen. 1995. "Parental Alcohol Use, Family Relationship Quality, Self-Esteem, and Depression in College Students." *Journal of College Student Development* 36 (5): 431–43.
- Khawaja, Nigar G., and Krystle Duncanson. 2008. "Using the University Student Depression Inventory to Investigate the Effect of Demographic Variables on Students' Depression." *Australian Journal of Guidance and Counselling* 18 (2): 195–209. <https://doi.org/10.1375/ajgc.18.2.195>.
- Kim, Jinhee, and Swarn Chatterjee. 2019. "Student Loans, Health, and Life Satisfaction of US Households: Evidence from a Panel Study." *Journal of Family and Economic Issues* 40 (1): 36–50. <https://doi.org/10.1007/s10834-018-9594-3>.

- Lagare, Jordeene B. 2021. "Most Gen Zs Anxious, Stressed – Survey." *The Manila Times*, July 16, 2021.
- Lange, Clare, and Mark Byrd. 1998. "The Relationship Between Perceptions of Financial Distress and Feelings of Psychological Well-Being in New Zealand University Students." *International Journal of Adolescence and Youth* 7 (3): 193–209. <https://doi.org/10.1080/02673843.1998.9747824>.
- Lardier, David T., Chih-Yuan Steven Lee, Jose Miquel Rodas, Pauline Garcia-Reid, and Robert J. Reid. 2020. "The Effect of Perceived College-Related Stress on Depression, Life Satisfaction, and School Satisfaction: The Coping Strategies of Hispanic College Students From a Hispanic Serving Institution." *Education and Urban Society* 52 (8): 1204–22. <https://doi.org/10.1177/0013124519896845>.
- Lee, Romeo B., Madelene Sta. Maria, Susana Estanislao, and Cristina Rodriguez. 2013. "Factors Associated with Depressive Symptoms among Filipino University Students." *PLoS ONE* 8 (11): e79825. <https://doi.org/10.1371/journal.pone.0079825>.
- Lovibond, S.H., and P.F. Lovibond. 1995. "Manual for the Depression Anxiety Stress Scales."
- McCloud, Tayla, and David Bann. 2019. "Financial Stress and Mental Health among Higher Education Students in the UK up to 2018: Rapid Review of Evidence." *Journal of Epidemiology and Community Health* 73 (10): 977–84. <https://doi.org/10.1136/jech-2019-212154>.
- McIlveen, Peter, Gavin Beccaria, and Lorelle J. Burton. 2013. "Beyond Conscientiousness: Career Optimism and Satisfaction with Academic Major." *Journal of Vocational Behavior* 83 (3): 229–36. <https://doi.org/10.1016/j.jvb.2013.05.005>.
- Michael, K.D., T.J. Huelsman, C. Gerard, T.M. Gilligan, and M.R. Gustafson. 2006. "Depression among College Students: Trends in Prevalence and Treatment Seeking." *Counseling and Clinical Psychology Journal* 3 (2): 60–70.
- Mirhosseini, Seyedmohammad, Milad Bazghaleh, Mohammad Hasan Basirinezhad, Ali Abbasi, and Hossein Ebrahimi. 2021. "The Relationship between Depression and Academic Satisfaction in Medical Science Students." *The Journal of Mental Health Training, Education and Practice* 16 (2): 99–111. <https://doi.org/10.1108/JMHTEP-03-2020-0017>.
- Nunes Baptista, Makilim, Adriana Munhoz Carneiro, and Hugo Ferrari Cardoso. 2014. "Depression, Family Support and Hopelessness: A Correlated Study." *Universitas Psychologica* 13 (2). <https://doi.org/10.11144/Javeriana.UPSY13-2.dfs>.
- O’Leary, John v. 2008. "Putting It Together While Falling Apart." *Contemporary Psychoanalysis* 44 (4): 531–50. <https://doi.org/10.1080/00107530.2008.10745974>.
- Pálmarsdóttir, Hildur. 2015. "Parental Divorce, Family Conflict and Adolescent Depression and Anxiety."
- Park, Alison L., Rebecca Fuhrer, and Amélie Quesnel-Vallée. 2013. "Parents’ Education and the Risk of Major Depression in Early Adulthood." *Social Psychiatry and Psychiatric Epidemiology* 48 (11): 1829–39. <https://doi.org/10.1007/s00127-013-0697-8>.
- Pascarella, Ernest T. 1985. "College Environmental Influences on Learning and Cognitive Development: A Critical Review and Synthesis." In *Higher Education: Handbook of Theory and Research, Volume 1*, edited by J. Smart, 1–64. New York: Agathon.
- Rab, F., R. Mamdou, and S. Nasir. 2008. "Rates of Depression and Anxiety among Female Medical Students in Pakistan." *EMHJ - Eastern Mediterranean Health Journal* 14 (1): 126–33.
- Reavley, Nicola J, Terence V. McCann, and Anthony F. Jorm. 2012. "Actions Taken to Deal with Mental Health Problems in Australian Higher Education Students." *Early Intervention in Psychiatry* 6: 159–65.
- Reiss, Franziska. 2013. "Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents: A Systematic Review." *Social Science & Medicine* 90 (August): 24–31. <https://doi.org/10.1016/j.socscimed.2013.04.026>.
- Reyes-Rodríguez, Mae Lynn, Carmen L. Rivera-Medina, Luis Cámara-Fuentes, Alba Suárez-Torres, and Guillermo Bernal. 2013. "Depression Symptoms and Stressful Life Events among College Students in Puerto Rico." *Journal of Affective Disorders* 145 (3): 324–30. <https://doi.org/10.1016/j.jad.2012.08.010>.
- Richardson, T., P. Elliott, and R. Roberts. 2015. "The Impact of Tuition Fees Amount on Mental Health over Time in British Students." *Journal of Public Health* 37 (3): 412–18. <https://doi.org/10.1093/pubmed/fdv003>.
- Richardson, Thomas, Peter Elliott, Ron Roberts, and Megan Jansen. 2017. "A Longitudinal Study of Financial Difficulties and Mental Health in a National Sample of British Undergraduate Students." *Community Mental Health Journal* 53: 344–52.

- Rivenbark, Joshua G., William E. Copeland, Erin K. Davisson, Anna Gassman-Pines, Rick H. Hoyle, Joy R. Piontak, Michael A. Russell, Ann T. Skinner, and Candice L. Odgers. 2019. "Perceived Social Status and Mental Health among Young Adolescents: Evidence from Census Data to Cellphones." *Developmental Psychology* 55 (3): 574–85. <https://doi.org/10.1037/dev0000551>.
- Roberts, Ron, John Golding, Tony Towell, Steven Reid, Sally Woodford, Arlene Vetere, and Irene Weinreb. 2000. "Mental and Physical Health in Students: The Role of Economic Circumstances." *British Journal of Health Psychology* 5 (3): 289–97. <https://doi.org/10.1348/135910700168928>.
- Ross, Lisa Thomson, and Stacie Wynne. 2010. "Parental Depression and Divorce and Adult Children's Well-Being: The Role of Family Unpredictability." *Journal of Child and Family Studies* 19 (6): 757–61. <https://doi.org/10.1007/s10826-010-9366-7>.
- Russell, Michael A., and Candice L. Odgers. 2020. "Adolescents' Subjective Social Status Predicts Day-to-Day Mental Health and Future Substance Use." *Journal of Research on Adolescence* 30 (S2): 532–44. <https://doi.org/10.1111/jora.12496>.
- Sakellari, Evanthia, Maria Psychogiou, Anna Georgiou, Milena Papanidi, Vasso Vlachou, and Despina Sapountzi-Krepia. 2018. "Exploring Religiosity, Self-Esteem, Stress, and Depression Among Students of a Cypriot University." *Journal of Religion and Health* 57 (1): 136–45. <https://doi.org/10.1007/s10943-017-0410-4>.
- Sato, Yukihiko, Richard G. Watt, Yasuaki Saijo, Eiji Yoshioka, and Ken Osaka. 2020. "Student Loans and Psychological Distress: A Cross-Sectional Study of Young Adults in Japan." *Journal of Epidemiology* 30 (10): 436–41. <https://doi.org/10.2188/jea.JE20190057>.
- Schnittker, Jason. 2001. "When Is Faith Enough? The Effects of Religious Involvement on Depression." *Journal for the Scientific Study of Religion* 40 (3): 393–411. <https://doi.org/10.1111/0021-8294.00065>.
- Selenko, Eva, and Bernad Batinic. 2011. "Beyond Debt. A Moderator Analysis of the Relationship between Perceived Financial Strain and Mental Health." *Social Science & Medicine* 73 (12): 1725–32. <https://doi.org/10.1016/j.socscimed.2011.09.022>.
- Shamsuddin, Khadijah, Fariza Fadzil, Wan Salwina Wan Ismail, Shamsul Azhar Shah, Khairani Omar, Noor Azimah Muhammad, Aida Jaffar, Aniza Ismail, and Raynuha Mahadevan. 2013. "Correlates of Depression, Anxiety and Stress among Malaysian University Students." *Asian Journal of Psychiatry* 6 (4): 318–23. <https://doi.org/10.1016/j.ajp.2013.01.014>.
- Siegel, Karolynn, Daniel Karus, and Victoria H. Raveis. 1996. "Adjustment of Children Facing the Death of a Parent Due to Cancer." *Journal of the American Academy of Child & Adolescent Psychiatry* 35 (4): 442–50. <https://doi.org/10.1097/00004583-199604000-00010>.
- Sprung, Justin M., and Anna Rogers. 2021. "Work-Life Balance as a Predictor of College Student Anxiety and Depression." *Journal of American College Health* 69 (7): 775–82. <https://doi.org/10.1080/07448481.2019.1706540>.
- Størksen, Ingunn, Espen Røysamb, Torbjørn Moum, and Kristian Tambs. 2005. "Adolescents with a Childhood Experience of Parental Divorce: A Longitudinal Study of Mental Health and Adjustment." *Journal of Adolescence* 28 (6): 725–39. <https://doi.org/10.1016/j.adolescence.2005.01.001>.
- Sweet, Elizabeth, Arijit Nandi, Emma K. Adam, and Thomas W. McDade. 2013. "The High Price of Debt: Household Financial Debt and Its Impact on Mental and Physical Health." *Social Science & Medicine* 91 (August): 94–100. <https://doi.org/10.1016/j.socscimed.2013.05.009>.
- Teh, Choon Khim, Choon Wei Ngo, Rashidatul Aniyah binti Zulkifli, Rammiya Vellasamy, and Kelvin Suresh. 2015. "Depression, Anxiety and Stress among Undergraduate Students: A Cross Sectional Study." *Open Journal of Epidemiology* 05 (04): 260–68. <https://doi.org/10.4236/ojepi.2015.54030>.
- Thapar, Anita, Stephan Collishaw, Daniel S Pine, and Ajay K Thapar. 2012. "Depression in Adolescence." *The Lancet* 379 (9820): 1056–67. [https://doi.org/10.1016/S0140-6736\(11\)60871-4](https://doi.org/10.1016/S0140-6736(11)60871-4).
- Walsemann, Katrina M., Gilbert C. Gee, and Danielle Gentile. 2015. "Sick of Our Loans: Student Borrowing and the Mental Health of Young Adults in the United States." *Social Science & Medicine* 124 (January): 85–93. <https://doi.org/10.1016/j.socscimed.2014.11.027>.
- Wiseman, Hadas, Daniel G. Guttfreund, and Itamar Lurie. 1995. "Gender Differences in Loneliness and Depression of University Students Seeking Counselling." *British Journal of Guidance & Counselling* 23 (2): 231–43. <https://doi.org/10.1080/03069889508253008>.

- Wooldridge, Jeffrey M. 2015. "Control Function Methods in Applied Econometrics." *Journal of Human Resources* 50 (2): 420–45. <https://doi.org/10.3368/jhr.50.2.420>.
- Yalçın, İlhan. 2011. "Social Support and Optimism as Predictors of Life Satisfaction of College Students." *International Journal for the Advancement of Counselling* 33 (2): 79–87. <https://doi.org/10.1007/s10447-011-9113-9>.
- Yusoff, Muhamad Saiful Bahri, Ahmad Fuad Abdul Rahim, Abdul Aziz Baba, Shaiful Bahari Ismail, Mohamad Najib Mat Pa, and Ab Rahman Esa. 2013. "Prevalence and Associated Factors of Stress, Anxiety and Depression among Prospective Medical Students." *Asian Journal of Psychiatry* 6 (2): 128–33. <https://doi.org/10.1016/j.ajp.2012.09.012>.
- Zhao, Sib0, and Guo Yiyue. 2018. "The Effects of Mother's Education on College Student's Depression Level: The Role of Family Function." *Psychiatry Research* 269 (November): 108–14. <https://doi.org/10.1016/j.psychres.2018.08.030>.
- Zimmerman, Frederick J., and Wayne Katon. 2005. "Socioeconomic Status, Depression Disparities, and Financial Strain: What Lies behind the Income-Depression Relationship?" *Health Economics* 14 (12): 1197–1215. <https://doi.org/10.1002/hec.1011>.

Appendix A

Descriptive Statistics and Correlation Matrix

A.1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Frequency of Feeling Depressed	1,075	2.983	1.106	1	5
Parent's Joint Monthly Income	1,020	3.200	1.500	1	5
College financing is a Major Concern	1,073	0.339	0.474	0	1
Need-based willingness to work parttime	1,077	0.218	0.413	0	1
Loan as primary/secondary source	1,077	0.199	0.399	0	1
Economic Status	1,080	1.044	0.781	0	2
Student staying with immediate family	1,077	1.546	1.091	1	5
Family Social Activities	1,077	0.016	0.125	0	1
Attending Religious/Church Activities	1,056	2.779	0.925	1	4
Satisfaction: Overall academic experience	1,075	0.928	0.258	0	1
Male/Female	1,077	0.485	0.500	0	1
A Parent is College Graduate	1,077	0.549	0.498	0	1

A.2. Polychoric Correlation Matrix

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
[1]	Frequency of Feeling Depressed	1.000												
[2]	Parent's Joint Monthly Income	-0.021	1.000											
[3]	College financing is a Major Concern	0.177	-0.282	1.000										
[4]	Need-based willingness to work part-time	0.084	-0.310	0.384	1.000									
[5]	Loan as primary/secondary source	0.068	-0.032	0.183	0.017	1.000								
[6]	Economic Status	-0.101	-0.542	0.119	0.137	-0.010	1.000							
[7]	Status of Parents	-0.003	-0.142	-0.134	0.040	-0.093	0.019	1.000						
[8]	Student staying with immediate family	-0.039	0.081	0.097	-0.053	-0.106	-0.024	-0.063	1.000					
[9]	Family Social Activities	-0.025	0.067	-0.069	-0.004	0.016	-0.046	-0.126	-0.021	1.000				
[10]	Attending Religious/Church Activities	0.014	-0.059	0.073	-0.012	0.091	0.002	0.117	0.064	0.380	1.000			
[11]	Satisfaction: Overall learning experience	-0.165	-0.036	+0.052	-0.016	-0.057	-0.075	0.896	0.213	0.093	0.100	1.000		
[12]	Male/Female	-0.132	0.060	0.129	-0.094	0.002	0.063	0.015	-0.196	0.150	0.096	-0.114	1.000	
[13]	Parent is College Graduate	-0.019	0.091	-0.070	-0.109	0.037	-0.141	0.071	-0.001	0.106	0.092	0.053	0.140	1.000

Appendix B

Frequency Table of Responses based on the Student's Reported Frequency of Feeling Depressed for 2014 and 2015 Cohorts

(Number of Respondents)

	Felt depressed during the past academic year				
	Never	Rarely	Some-times	Often	Very Often
Financial capacity and concern					
Parent's joint monthly income					
< 20 001	14	32	74	30	21
20 001 – 40 000	28	67	91	31	20
40 001 – 80 000	23	63	102	69	40
> 80 000	32	76	124	56	26
College financing is a major concern					
Yes	18	77	146	67	56
No	83	170	267	132	60
Needs-based willingness to work parttime					
Yes	24	41	90	45	36
No	77	207	324	154	80
Loan as a primary/secondary source of financing					
Yes	17	44	87	39	27
No	84	204	327	160	89
Economic Status					
Same with School Median Income	21	65	109	67	44
Above School Median Income	42	99	160	80	37
Below School Median Income	38	84	145	52	35
Social Relationships Status					
Staying with immediate family					
Yes	1	7	4	3	2
No	100	241	410	196	114
Parent status					
Alive, together	78	217	353	166	99
Alive, separated	19	27	46	18	13
Either deceased	4	3	13	15	4
Family Social Activities					
None	9	16	23	15	9
< 2 hrs/wk	32	88	138	81	42
3-5 hrs/wk	32	71	129	50	35
> 6 hrs/wk	25	66	117	51	29
Religious/Church Activities					
None	17	34	69	37	26
< 2 hrs/wk	61	144	212	102	62
3-5 hrs/wk	12	38	74	27	13
> 6 hrs/wk	8	25	52	31	14
Satisfaction					
Overall Academic Experience					
Satisfied	97	231	391	183	99
Less Satisfied	4	17	23	16	17
Demographics					
Female	50	115	201	120	69
Male	51	133	213	79	47
Parent is a college graduate					
Yes	62	141	208	120	62
No	39	107	206	79	54

(Percentage, in %)

	Felt depressed during the past academic year				
	Never	Rarely	Some- times	Often	Very Often
Financial capacity and concern					
Parent's joint monthly income					
< 20 001	8.19	18.71	43.27	17.54	12.28
20 001 – 40 000	11.81	28.27	38.40	13.08	8.44
40 001 – 80 000	7.74	21.21	34.34	23.23	13.47
> 80 000	10.19	24.20	39.49	17.83	8.28
College financing is a major concern					
Yes	4.95	21.15	40.11	18.41	15.38
No	11.66	23.88	37.50	18.54	8.43
Needs-based willingness to work parttime					
Yes	10.17	17.37	38.14	19.07	15.25
No	9.14	24.58	38.48	18.29	9.50
Loan as a primary/secondary source of financing					
Yes	7.94	20.56	40.65	18.22	12.62
No	9.72	23.61	37.85	18.52	10.3
Economic Status					
Same with School Median Income	6.86	21.24	35.62	21.90	14.38
Above School Median Income	10.05	23.68	38.28	19.14	8.85
Below School Median Income	10.73	23.73	40.96	14.69	9.89
Social Relationships Status					
Staying with immediate family					
Yes	5.88	41.18	23.53	17.65	11.76
No	9.43	22.71	38.64	18.47	10.74
Parent status					
Alive, together	8.54	23.77	38.66	18.18	10.84
Alive, separated	15.45	21.95	37.4	14.63	10.57
Either deceased	10.26	7.69	33.33	38.46	10.26
Family Social Activities					
None	12.5	22.22	31.94	20.83	12.50
< 2 hrs/wk	8.40	23.10	36.22	21.26	11.02
3-5 hrs/wk	10.09	22.40	40.69	15.77	11.04
> 6 hrs/wk	8.68	22.92	40.63	17.71	10.07
Religious/Church Activities					
None	9.29	18.58	37.70	20.22	14.21
< 2 hrs/wk	10.50	24.78	36.49	17.56	10.67
3-5 hrs/wk	7.32	23.17	45.12	16.46	7.93
> 6 hrs/wk	6.15	19.23	40.00	23.85	10.77
Satisfaction					
Overall Academic Experience					
Satisfied	9.69	23.08	39.06	18.28	9.89
Less Satisfied	5.19	22.08	29.87	20.78	22.08
Demographics					
Female	9.01	20.72	36.22	21.62	12.43
Male	9.75	25.43	40.73	15.11	8.99
Parent is a college graduate					
Yes	10.46	23.78	35.08	20.24	10.46
No	8.04	22.06	42.47	16.29	11.13

Appendix C

Instrumented (2SRI) Ordered Probit Regression Results

C.1 First-stage Regression of *Concern* on the instrument *Parent's Income*, and vice-versa for the 2014 Cohort, 2015-2018

<i>Dependent Variable</i>	Concern	Parent's income
Financial capacity and burden		
Parent's joint monthly income (<i>Base: Less than 20,000</i>)		
20 001 – 40 000	-0.212 (0.173)	
40 001 – 80 000	-0.255 (0.366)	
More than 80 000	-0.740 (0.536)	
College financing is a major concern		-0.138 (0.169)
Needs-based willingness to work part-time	0.625*** (0.112)	-0.103 (0.168)
Loan as a primary/secondary source of financing	0.347*** (0.119)	0.126 (0.186)
Economic Status (<i>Base: Same with median</i>)		
Above-Median School Income	0.0601 (0.287)	10.31*** (3.175)
Below-Median School Income	0.0182 (0.286)	-14.08*** (1.565)
Social Relationships Status		
Staying with immediate family	0.358 (0.362)	0.224 (0.794)
Parent's status (<i>Base: Both alive and living together</i>)		
<i>Separated parent</i>	-0.210 (0.155)	-0.550* (0.297)
<i>One or both are deceased</i>	-0.553** (0.273)	0.538 (0.530)
Family Social Activities (<i>Base: None</i>)		
< 2 hrs/wk	-0.117 (0.190)	0.000551 (0.298)
3-5 hrs/wk	-0.291 (0.202)	0.266 (0.316)
> 6 hrs/wk	-0.250 (0.201)	0.296 (0.335)
Religious/Church Activities (<i>Base: None</i>)		
< 2 hrs/wk	0.180 (0.131)	-0.186 (0.224)
3-5 hrs/wk	0.368** (0.175)	0.131 (0.140)
> 6 hrs/wk	0.300	-0.666**

<i>Dependent Variable</i>	Concern	Parent's income
	(0.185)	(0.332)
Satisfaction		
Satisfied with Academic Experience	-0.0157 (0.175)	-0.516 (0.353)
Demographics		
Male	0.194** (0.0974)	0.305* (0.156)
Parents are college graduates	-0.0604 (0.0947)	0.0827 (0.169)
Threshold variables		
cut 1		-14.77*** (1.690)
cut 2		-2.734* (1.427)
cut 3		2.134 (1.745)
School Dummies	Yes	Yes
Year Dummies	Yes	Yes
No. of observations	997	997
p-value	7.36e-14	2.89e-146
Note: The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. Standard errors are obtained by bootstrapping 1 000 replications.		

C.2 Main Regression on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018

	Concern	Parent's income
Financial capacity and burden		
Parent's joint monthly income (<i>Base: Less than 20,000</i>)		
20 001 – 40 000		-0.393 (0.298)
40 001 – 80 000		-0.134 (0.407)
More than 80 000		0.0957 (0.463)
College financing is a major concern	-0.423 (0.745)	
Needs-based willingness to work part-time	0.194 (0.191)	0.0893 (0.0916)
Loan as a primary/secondary source of financing	0.0736 (0.125)	0.0347 (0.0971)
Economic Status (<i>Base: Same with median</i>)		
Above-Median School Income	-0.274** (0.123)	-0.432** (0.215)
Below-Median School Income	-0.199* (0.102)	-0.138 (0.227)
Social Relationships Status		
Staying with immediate family	0.0548 (0.288)	-0.0109 (0.280)
Parent's status (<i>Base: Both alive and living together</i>)		
<i>Separated parent</i>	-0.223* (0.117)	-0.220* (0.118)
<i>One or both are deceased</i>	0.151 (0.228)	0.246 (0.192)
Family Social Activities (<i>Base: None</i>)		
< 2 hrs/wk	0.181 (0.158)	0.187 (0.161)
3-5 hrs/wk	0.142 (0.176)	0.198 (0.167)
> 6 hrs/wk	0.0601 (0.181)	0.120 (0.174)
Religious/Church Activities (<i>Base: None</i>)		
< 2 hrs/wk	-0.113 (0.113)	-0.141 (0.0984)
3-5 hrs/wk	-0.00486 (0.159)	-0.0498 (0.119)
> 6 hrs/wk	0.109 (0.168)	0.0562 (0.143)
Satisfaction		
Satisfied with Academic Experience	-0.372**	-0.370**

	Concern	Parent's income
	(0.158)	(0.152)
Demographics		
Male	-0.350*** (0.0838)	-0.366*** (0.0762)
Parents are college graduates	-0.0313 (0.0740)	-0.0208 (0.0738)
$\rho(\text{concern})$	0.409 (0.444)	
$\rho(\text{parent's income})$		0.0106 (0.0164)
Threshold variables		
cut 1	-2.092*** (0.319)	-2.164*** (0.504)
cut 2	-1.175*** (0.317)	-1.252** (0.500)
cut 3	-0.109 (0.313)	-0.185 (0.498)
cut 3	0.629** (0.312)	0.551 (0.498)
School Dummies	Yes	Yes
Year Dummies	Yes	Yes
No. of observations	997	997
p-value	1.82e-10	1.25e-09
Note: The asterisks ***, **, * corresponds to 1%, 5% and 10% significance level of the coefficients respectively. Standard errors are obtained by bootstrapping 1 000 replications.		

Appendix D

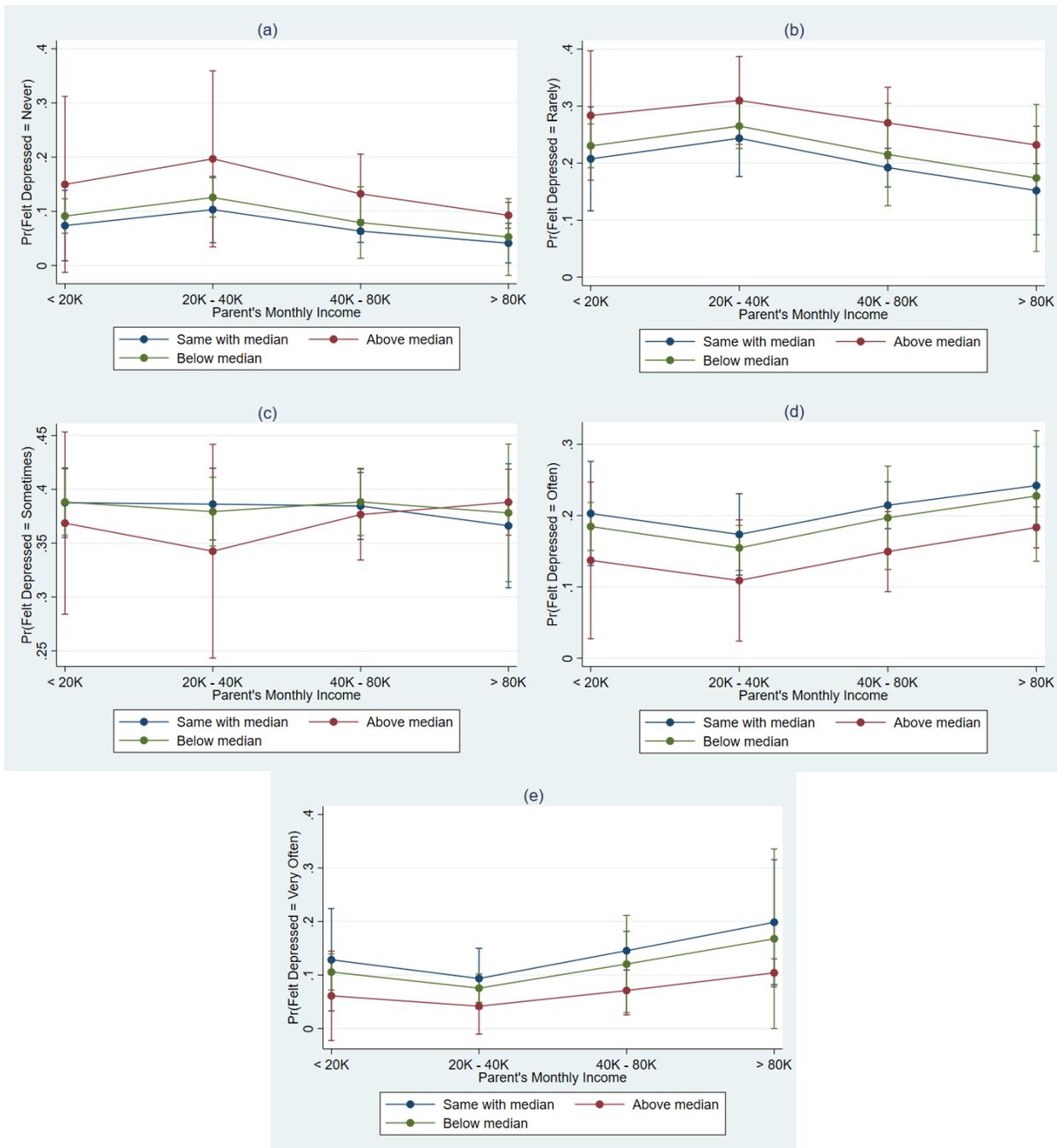
Predicted Marginal Effects of Financial Capacity and Burden Variables on the Student's Frequency of Feeling Depressed for the 2014 Cohort, 2015-2018

A. Average Marginal Effects (based on Table 2, Column (7))

	(1)	(2)	(3)	(4)	(5)	(6)
Felt Depressed: Never (1)						
Parent's joint monthly income (Base: Less than 20,000)						
20 001 – 40 000	0.0362** (0.0179)		0.0330* (0.0184)		0.0326* (0.0184)	
40 001 – 80 000	-0.00824 (0.0150)		-0.0135 (0.0157)		-0.0144 (0.0158)	
More than 80 000	0.0224 (0.0163)		0.0104 (0.0167)		0.00915 (0.0168)	
College financing is a major concern		-0.0363*** (0.0102)	-0.0383*** (0.0106)		-0.0371*** (0.0110)	
Needs-based willingness to work part-time				-0.0161 (0.0121)	-0.00672 (0.0136)	
Loan as a primary/secondary source of financing				-0.00811 (0.0136)	-0.00160 (0.0145)	
Economic Status (Base: Same School Median)						
Above-Median School Income						0.0296** (0.0121)
Below-Median School Income						0.0319** (0.0129)
Felt Depressed: Rarely (2)						
Parent's joint monthly income (Base: Less than 20,000)						
20 001 – 40 000	0.0400* (0.0205)		0.0349* (0.0202)		0.0343* (0.0200)	
40 001 – 80 000	-0.0113 (0.0203)		-0.0178 (0.0202)		-0.0189 (0.0202)	
More than 80 000	0.0264 (0.0199)		0.0122 (0.0200)		0.0107 (0.0200)	
College financing is a major concern		-0.0448*** (0.0129)	-0.0475*** (0.0136)		-0.0459*** (0.0139)	
Needs-based willingness to work part-time				-0.0194 (0.0156)	-0.00785 (0.0163)	
Loan as a primary/secondary source of financing				-0.00957 (0.0165)	-0.00184 (0.0168)	
Economic Status (Base: Same School Median)						
Above-Median School Income						0.0368** (0.0152)
Below-Median School Income						0.0393** (0.0158)
Felt Depressed: Sometimes (3)						
Parent's joint monthly income (Base: Less than 20,000)						
20 001 – 40 000	-0.00590 (0.00449)		-0.00689 (0.00474)		-0.00698 (0.00478)	
40 001 – 80 000	-0.00110 (0.00198)		-0.00102 (0.00174)		-0.00103 (0.00180)	
More than 80 000	-0.00208 (0.00246)		-0.00101 (0.00168)		-0.000900 (0.00168)	
College financing is a major concern		-0.000314 (0.00286)	0.000803 (0.00301)		0.000857 (0.00290)	
Needs-based willingness to work part-time				0.000127 (0.00141)	0.000511 (0.000844)	
Loan as a primary/secondary source of				0.000295	0.000148	

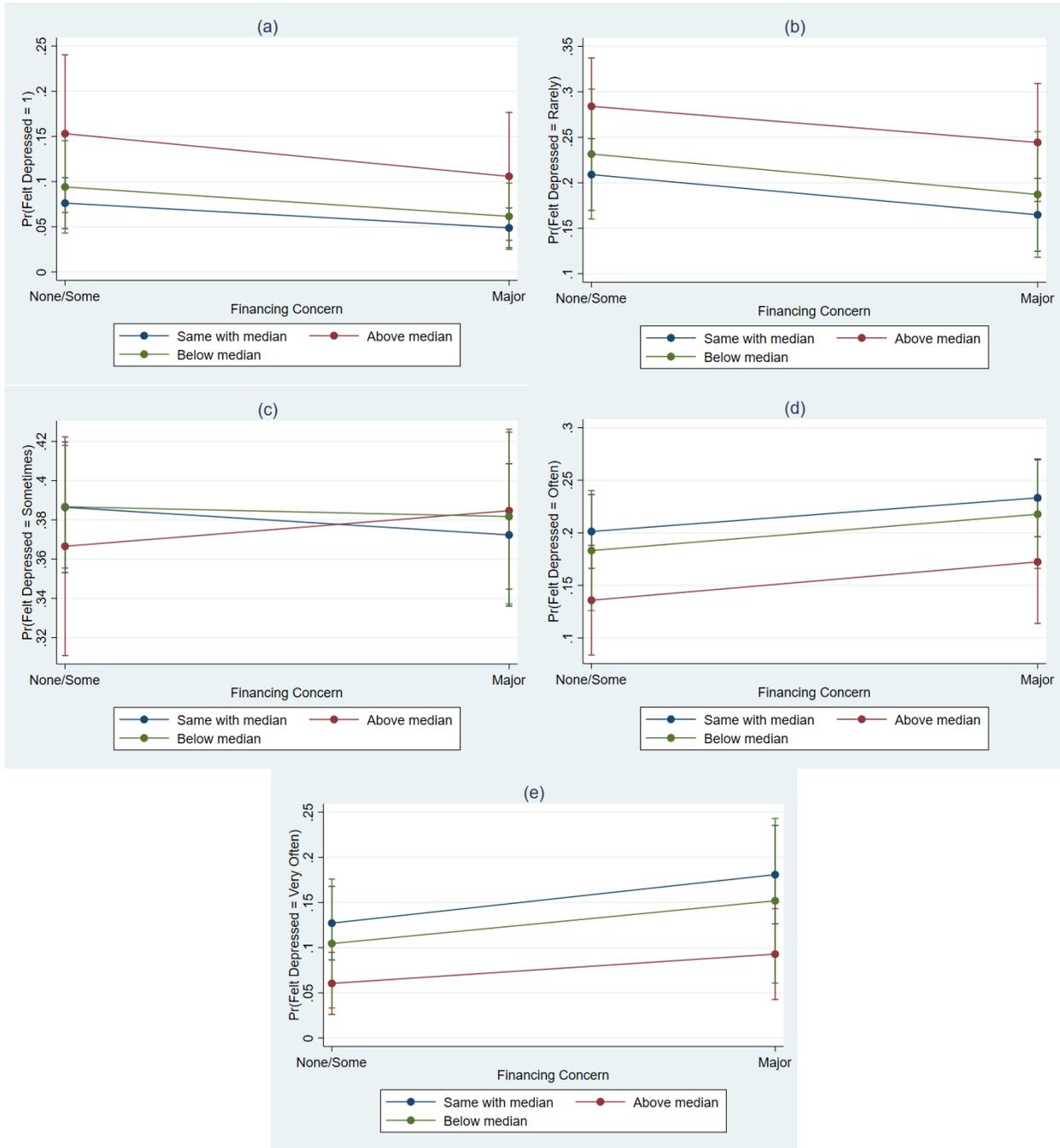
financing				(0.000589)	(0.00126)	
Economic Status (<i>Base: Same School Median</i>)						
<i>Above-Median School Income</i>						0.000912 (0.00284)
<i>Below-Median School Income</i>						0.000506 (0.00302)
<hr/>						
Felt Depressed: Often (4)						
Parent's joint monthly income						
(<i>Base: Less than 20,000</i>)						
20 001 – 40 000	-0.0337** (0.0170)			-0.0298* (0.0170)		-0.0294* (0.0169)
40 001 – 80 000	0.00888 (0.0161)			0.0142 (0.0162)		0.0151 (0.0163)
More than 80 000	-0.0218 (0.0161)			-0.0101 (0.0164)		-0.00887 (0.0165)
College financing is a major concern		0.0366*** (0.0104)		0.0386*** (0.0110)		0.0374*** (0.0114)
Needs-based willingness to work part-time				0.0159 (0.0125)		0.00648 (0.0133)
Loan as a primary/secondary source of financing				0.00790 (0.0135)		0.00153 (0.0139)
Economic Status (<i>Base: Same School Median</i>)						
<i>Above-Median School Income</i>						-0.0299** (0.0123)
<i>Below-Median School Income</i>						-0.0320** (0.0130)
<hr/>						
Felt Depressed: Very Often (5)						
Parent's joint monthly income						
(<i>Base: Less than 20,000</i>)						
20 001 – 40 000	-0.0365* (0.0192)			-0.0312* (0.0184)		-0.0306* (0.0182)
40 001 – 80 000	0.0118 (0.0210)			0.0182 (0.0204)		0.0193 (0.0204)
More than 80 000	-0.0249 (0.0192)			-0.0115 (0.0190)		-0.0101 (0.0190)
College financing is a major concern		0.0448*** (0.0135)		0.0463*** (0.0138)		0.0447*** (0.0141)
Needs-based willingness to work part-time				0.0195 (0.0160)		0.00759 (0.0158)
Loan as a primary/secondary source of financing				0.00948 (0.0166)		0.00177 (0.0162)
Economic Status (<i>Base: Same School Median</i>)						
<i>Above-Median School Income</i>						-0.0374** (0.0158)
<i>Below-Median School Income</i>						-0.0396** (0.0162)
No. of observations	999	1053	1055	1055	997	1055

B. Predictive Margins by interacting Parent's Joint Monthly Income and Economic Status (based on Table 2, Column (7))



Note: Graphs generated based on the estimation result from Table 5. The y-axis (Dependent Variable) represents the student's frequency of feeling depressed on a five-point, Likert scale and x-axis represents the parent's monthly income of the student classified into four income brackets. Plotted lines represent the economic status with 95% confidence interval.

C. Predictive Margins by interacting Parent's Joint Monthly Income and Economic Status (based on Table 2, Column (7))



Note: Graphs generated based on the estimation result from Table 5. The y-axis (Dependent Variable) represents the student's frequency of feeling depressed on a five-point, Likert scale and x-axis represents the student's financing concern. Plotted lines represent the economic status with 95% confidence interval.

Appendix E

Principal Component Analysis of Satisfaction variables

E.1. Descriptive Statistics

Variable	2014 cohort				
	Obs	Mean	Std. Dev.	Min	Max
Frequency of Feeling Depressed	1,078	2.983	1.106	1	5
Satisfaction: Overall academic experience	1,078	0.929	0.258	0	1
Academic & Scholarly Ability	1,080	0.466	0.499	0	1
Drive to Achieve	1,080	0.720	0.449	0	1
School's contribution to initiative and self-direction	1,078	0.984	0.125	0	1
Expected time to graduate	716	0.804	0.397	0	1

E.2. Polychoric Correlation Matrix

		[1]	[2]	[3]	[4]	[5]	[6]
[1]	Frequency of feeling depressed	1					
[2]	Satisfaction with academic experience	-0.1098***	1				
[3]	Academic & Scholarly Ability	-0.0749***	0.2325***	1			
[4]	Drive to Achieve	-0.1159***	0.1569***	0.6887***	1		
[5]	School's contribution to student's initiative and self-direction	0.0074***	0.5377***	0.2439	0.3438***	1	
[6]	Expected time to graduate	-0.1425***	0.1606***	0.4511***	0.2190***	0.2037***	1

E.3. Principal Component Analysis

(N = 1,078, no. of factors = 4)

Factor	Eigenvalue	Difference	Proportion	Cumulative
1	1.5046	0.4660	0.3762	0.3762
2	1.0386	0.1483	0.2596	0.6358
3	0.8902	0.3237	0.2226	0.8584
4	0.5666	.	0.1416	1.0000

Factor Loadings

Variable	Unrotated		Rotated – Orthogonal; Varimax		Rotated – Oblique; Promax*		Uniqueness
	PC Score 1	PC Score 2	PC Score 1	PC Score 2	PC Score 1	PC Score 2	
Satisfaction with academic experience	0.3693	0.6164	0.1043	0.7110	0.0506	0.7100	0.4836
Academic & Scholarly Ability	0.7944	-0.2965	0.8474	0.0313	0.8504	-0.0196	0.2810
Drive to Achieve	0.8008	-0.2638	0.8407	0.0639	0.8412	0.0137	0.2892
School's contribution to student's initiative and self-direction	0.3096	0.7078	0.0141	0.7724	-0.0450	0.7774	0.4031

Summary statistics of PC Scores

Variable	Obs	Mean	Std. Dev.	Min	Max
PC Score 1 – School-referenced satisfaction	1,078	0.000	1	-1.6282	1.2426
PC Score 2 – Self-referenced satisfaction	1,078	0.000	1	-7.8509	0.2896