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The Relationship between Dutch Fraternity Membership and Economic Connectedness: Exploring  
Friending Bias

Name student: Lex Krishnadath

Student ID number: 525663

Supervisor: Voort, EMC van der

Second assessor: Voois, L

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The views stated in this thesis are those of the author and not necessarily those of the supervisor,  
second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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## Abstract

This study examines the relationship between Dutch fraternity membership and students' economic connectedness (EC), defined in a similar vein to (Chetty et al., 2022a) as 'the proportion of high-socio-economic status (SES) friends among low-SES students'. Furthermore, this research explores the determinant of EC in this relationship: friending bias among students' fraternity friends. Similar to Chetty et al.'s (2022b) definition of friending bias, I define friending bias as the tendency to befriend high-SES fraternity members at lower rates even conditional on exposure. This thesis aims to delve into Chetty et al.'s (2022b) observation that colleges which prominently feature Greek life – i.e., fraternities and/or sororities – are associated with higher friending bias. 190 Dutch students completed a survey that inquired about their fraternity membership, their SES and their three best friends' SES. Analyses include benchmarking of the sample, logistic regression, OLS regressions, and Instrumental Variable (IV) analyses. The IV analyses used strict binding study advice (BSA) as an instrument, which refers to the requirement to obtain 50 or more European Credit Transfer and Accumulation System (ECTS) credits in the first study-year. The results show that high-SES students have odds 5.56 times higher than low-SES students to be a fraternity member, with fraternity membership positively linked to EC and negatively to friending bias. The causal effect of fraternity membership on EC and friending bias was uninterpretable due to a weak instrument problem. The outcomes suggest that social capital is highly concentrated within fraternities. Hence, fraternities may contribute to inequality in access to social capital. Yet, fraternity membership also reduces friending bias. As such, fraternities could play a key role in policymakers' ambition to improve equality of opportunity among students.

*Keywords:* social capital, economic connectedness, friending bias, Greek life, college

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## **The Relationship between Dutch Fraternity Membership and Economic Connectedness: Exploring Friending Bias**

Recently, Chetty et al. (2022a) concluded that economic connectedness (EC), defined as ‘the share of high-socioeconomic status (SES) friends among low-SES people’, is the best predictor to date of economic mobility. Economic mobility is the ability of a person to advance on the income distribution. Additionally, college is the setting where EC for students with low SES is the highest (Chetty et al., 2022b). Therefore, college could be an important setting for students with low SES to build EC. In turn, this could increase economic mobility among students. Students with low SES could develop their EC by increasing their exposure to high-SES people and/or reducing their friending bias. Friending bias is conceptualized as ‘the tendency for people with low SES to befriend people with high SES at lower rates even conditional on exposure’ (Chetty et al., 2022b). Importantly, Chetty et al. (2022b) observed that friending bias is higher at some universities where Greek life, in the form of fraternities and/or sororities, plays a prominent role. Notably, friending bias determines half of EC. Therefore, the strong presence of Greek life at colleges could result in suboptimal levels of EC among low-SES students and thus hamper economic mobility. In this study, Greek life is restrained to fraternities and sororities (hereafter, fraternities) in the Netherlands. Colleges are restrained to Dutch universities, with International Standard Classification of Education (ISCED) levels 6 and 7, and to universities of applied sciences (ISCED level 6)<sup>1</sup>. The former provides university education whereas the latter provides higher professional education (HPE). In this research, I aim to establish the relationship between Dutch fraternity membership and EC, in a college setting, and assess the role of friending bias in this relationship.

Inequality in access to social capital is an important concern that demands resolution. Social capital captures ‘the strength of an individual’s social network and community’ (Chetty et al., 2022a). In this study, social capital is restricted to EC (see Putnam, 2000, Chapter 1; Engbers, 2017, for a discussion of other forms of social capital) as this form of social capital is most strongly associated with economic mobility (Chetty et al., 2022a). In 2021, the Dutch cabinet concluded in their Coalition Agreement that all students need to have the same opportunities to develop themselves (Rijksoverheid [*Dutch government*], 2021). Nonetheless, inequality in opportunity throughout the educational system continues to persist (Sociaal-Economische Raad [*Social and Economic Council, SER*], 2021). Consequently, the Ministerie van Onderwijs, Cultuur en Wetenschap [*Ministry of Education, Culture and Science, OCW*] commissioned Centraal Bureau voor de Statistiek [*Statistics Netherlands, CBS*] in 2022 to include questions in their annual research regarding graduates in higher education to

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<sup>1</sup> Although a MC’s at a university of applied sciences is classified as ISCED level 7 (CBS, 2011), practically no one (1.6%) pursues one (CBS, 2023b)

gain insight into the issue of inequality of opportunity (CBS, 2023a). Notwithstanding the Council's acknowledgement of the growing importance of social capital among students (SER, 2021), no such questions were incorporated. Neglecting inequality in access to social capital among students further worsens the prevailing inequality in opportunity in the Netherlands.

Fraternities present a setting wherein social capital is abundant and where policy changes could result in equality in access to social capital through enforcing institutional changes, thereby increasing EC for low-SES students. Fraternities possess a wealth of social capital as the social origins of fraternity members are more likely to be advantageous (Walker et al., 2015). Furthermore, fraternity members accumulate more social capital than non-fraternity members (Mara et al., 2018). Yet, fraternities are associated with high levels of friending bias (Chetty et al., 2022b), indicative of inequality in access to social capital within fraternities. The crucial role social networks play in employment (Calvó-Armengol & Jackson, 2004), and their explanation for elite positions mainly held by privileged individuals (Friedman & Laurison, 2020), further underscores the magnitude of this issue. In the United States, 51% of fraternity alumni had a job waiting or found one within two months of graduating compared to 36% of non-fraternity alumni (Gallup, 2021). In the Netherlands, fraternity membership (former board members) continues to be important for entering elite positions (Dronkers & Hillige, 1998). Fraternity membership has even been described as providing social capital that confers a 'comparative advantage' to members in their careers (Heemskerk & Fennema, 2009). It is possible to enforce policy changes within fraternities<sup>2</sup> to improve equality in access to social capital as fraternities in the Netherlands receive partial funding from higher education institutions<sup>3</sup> to which they are accountable. Policymakers could enact measures to compel fraternities to be more inclusive and/or to contribute to the accumulation of EC of low-SES students. All in all, the implementation of policies aimed at improving equality in access to social capital in higher education is particularly promising in the setting of fraternities.

Through a survey, I obtained information on the parental education of 190 students, the parental education of their three closest friends, and their fraternity membership status. The sample was benchmarked against public statistics on Dutch students to assess the representativeness of the sample. Logistic regression, simple regression, and instrumental variable (IV) analysis were among the employed methods to establish the hypothesized relationships. Strict binding study advice (BSA), defined as the higher education institution's requirement to obtain 50 or more European Credit

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<sup>2</sup> E.g., Erasmus University Rotterdam enforced 'cultural change' at the fraternity/sorority 'RSC/RVSV' by temporarily suspending their relationship with the fraternity (Erasmus Universiteit Rotterdam, 2018)

<sup>3</sup> E.g., Erasmus University Rotterdam financially supports student associations, including fraternities (Erasmus Universiteit Rotterdam, 2023)

Transfer and Accumulation System (ECTS) credits in the first year to proceed to the next year, was used as an instrument in investigating the effect of fraternity membership on EC and friending bias. Although the instrument is not assigned randomly, it is decided on by the higher education institution and affected fraternity membership in this sample.

The IV analysis was an attempt to circumvent selection bias, a fierce problem in research on fraternity membership and several outcomes. This may be viewed as a valuable contribution to academic literature. Previous studies have attempted to establish causality between fraternity membership and various outcomes using different methods (DeSimone, 2007; McCabe et al., 2005; Walker et al., 2015), but this study is a relatively rare study to employ IV analysis (for a notable exemption, see Mara et al., 2018). IV analysis is arguably superior to regression analysis (e.g., DeSimone, 2007), full-factorial repeated-measures ANOVAs (e.g., McCabe et al., 2005), and propensity-score matching (e.g., Walker et al., 2015) in establishing causal inference.

I found that high-SES students had odds 5.56 times higher than low-SES students of being a fraternity member, which indicates that fraternity members possess substantially more social capital compared to non-fraternity members. In addition, I found that low-SES fraternity members possessed more EC than low-SES non-fraternity members. That is, low-SES fraternity members had a higher share of high-SES friends than the share of high-SES students in the Dutch student population. Low-SES fraternity members also exhibited a lower friending bias – i.e., a lower tendency to befriend high-SES students even conditional on exposure – than low-SES non-fraternity members. Although the IV analysis revealed similar results, causal inference should be interpreted with caution given several issues with the instrument, such as a weak instrument and no random assignment of the instrument.

In summary, I research the relationship between Dutch fraternity membership and EC as well as its determinant friending bias, in a college setting. I conduct my research through a survey inquiring about students' parental education, their friends' parental education and their fraternity membership. I expect that fraternity members possess more social capital and that low-SES fraternity members possess a higher EC and exhibit a lower friending bias. In the following paragraphs, I further elaborate on these hypotheses.

### **Fraternity members are of higher SES than non-fraternity members (H1)**

Fraternity members are more likely to be from higher classes (Martin, 2012) or have more advantageous origins (Walker et al., 2015). Mara et al., (2018) observe that higher levels of endowed social capital are associated with fraternity membership. However, they measure endowed social capital as self-reported physical appearance. Although physical appearance could be conceived as a

facet of social capital of students (Glaeser et al., 2002), it is arguably a less important facet than other measures of social capital, such as parental education.

Furthermore, low-SES students may face hardship in joining a fraternity because of financial constraints, leading to a more homogeneous high-SES group of students within fraternities. Alvarez-Rivadulla et al. (2023) describe economic barriers (e.g., buying lunch instead of bringing lunch, taking a cab instead of using public transport) for students with low SES to form connections with students with high SES. Economic barriers may even be greater when joining a fraternity (Terry, 2014). For example, because of high fraternity dues.

Moreover, fraternity membership is associated with an accumulation of social capital later in life. Mara et al. (2018) used an instrumental variable that exploited plausibly random variation in fraternity membership status to assess the causal effect of fraternity membership on human capital and accumulated social capital. They conclude that fraternity membership causally increases accumulated social capital. Their conceptualization of social capital is questionable as they conclude that despite a decrease in human capital, measured as GPA, an increase in income is observed. They argue that the increase in income can be ascribed to accumulated social capital.

All in all, I expect that fraternity members have access to more social capital than non-fraternity members. Since students possess little social capital themselves, I assume that most of the student's social capital originates from their parents. This aligns with researchers' tendency to measure parental SES as a proxy of student SES in the National Longitudinal Study of Adolescent to Adult Health (Add Health) (e.g., Malacarne, 2017; Weng & Parent, 2023) – one of the most commonly used datasets in research on social ties. This leads to Hypothesis 1: *Fraternity members are of higher SES than non-fraternity members.*

### **Low-SES students who join a fraternity accumulate more EC than low-SES students who do not join a fraternity (H2)**

The theoretical framework that I put forward for Hypothesis 2 posits that any economic agent (or, student) optimises their social capital by befriending a limited number of other agents. In this model, social capital is the sole 'good' an agent invests in. This framework, which conceptualises social capital as a stock good, thus employs an economic approach to EC that parallels Glaeser et al.'s (2002) economic approach to social capital. Glaeser et al. (2002) used a standard investment model to analyse individuals' decision-making regarding the accumulation of social capital. I posit that both low-SES and high-SES students are incentivized to befriend high-SES students.

Indeed, in qualitative research (interviews) by Alvarez-Rivadulla et al. (2023) it was concluded that despite the costs associated with befriending high-SES college students, some college students



with low SES still attempted to establish cross-class ties. In a more quantitative vein, Malacarne (2017) investigated the Add Health dataset that contains information on the social networks of approximately 90,000 secondary school students in 132 middle and high schools in the academic year 1994/1995. Students were asked to nominate their five best friends of each sex. Next, they reported their own parental education and parental occupation, which served as a proxy for SES. Malacarne (2017) found that high-SES students – above average compared to the school – were more often nominated by other students. That means, that low-SES students were not particularly inclined to seek homophilous matches, but instead sought to nominate high-SES students. In short, Malacarne’s (2017) finding indicates heterophily by SES – the tendency of people to befriend dissimilar others in terms of SES.

Even though Chetty et al. (2022a) found homophily by SES, this was most pronounced for high-SES individuals (in the 90th percentile). This indicates that especially high-SES individuals had high-SES friends. When low-SES individuals were compared to high-SES individuals, they found that high-SES individuals’ high-SES friends were overrepresented by 41.2% compared to an underrepresentation of 22.4% for low-SES individuals. Could it be that low-SES individuals seek to form friendships with high-SES people but are not succeeding in their efforts because high-SES individuals are inclined to make high-SES friends? Although little can be inferred about individual preferences, it could mean that low-SES individuals – despite the underrepresentation of high-SES friends – do seek to form high-SES friends whereas high-SES individuals are less inclined to befriend low-SES individuals.

As argued in the first hypothesis, the SES of fraternity members is expected to be higher than that of non-fraternity members. Should low-SES students join a fraternity nevertheless, then according to my framework, they should be incentivized to leverage the access to social capital and thus accumulate more EC than low-SES non-fraternity members. Ultimately, this leads to the hypothesis that *low-SES students who join a fraternity accumulate more EC than low-SES students who do not join a fraternity* (Hypothesis 2).

### **Low-SES students who join a fraternity exhibit lower friending bias among their fraternity friends than low-SES students who do not join a fraternity (H3)**

Friending bias – ‘the tendency to befriend high-SES people at lower rates even conditional on exposure’ – is observed to be higher at colleges where fraternity life is dominantly featured (Chetty et al., 2022b). Yet, Chetty et al. (2022b) left two subgroups of students within this setting of college unexamined: fraternity and non-fraternity members. Students make both fraternity and non-fraternity friends, regardless of their fraternity membership. To delve into these subgroups of potential friends, I adjust Chetty et al.’s (2022b) concept of friending bias. I define friending bias among students’

fraternity friends as the tendency to befriend high-SES fraternity members at lower rates even conditional on exposure.<sup>4</sup>

On one hand, fraternity members interact with their peers on campus or in class like any other students. Yet, on the other hand, fraternities have an exclusive character (Stuber et al., 2011) and potentially exhibit denser closed-of networks (Overgoor et al., 2010). Overgoor et al. (2010) analysed the social networks of 7.6 million Facebook users across 1,159 U.S. institutions of higher education and found that schools with high fraternity participation showed more clustering – a measure for network density referring to the fraction of friends who are also friends with each other. As such, although non-fraternity members are exposed to high-SES fraternity members on campus, it could be that non-fraternity members befriend less high-SES fraternity members, nevertheless. This leads to Hypothesis 3: *Low-SES students who join a fraternity exhibit lower friending bias among their fraternity friends than low-SES students who do not join a fraternity.*

## **Methodology**

### **Data**

Primary data is collected from a sample of the population. Secondary data is used to benchmark the sample against the population on various characteristics. To that end, the population, benchmarking data sources, data collection and sample selection, and ethical considerations are described.

### **Population**

The population consist of all current Dutch students who started their studies in the academic years 2013/2014 to 2022/2023, in the Netherlands. This includes students who graduated in the academic year 2022/2023. A student is someone who studies at a Dutch university or a Dutch university of applied sciences in the Netherlands. The number of enrolled students in 2021/2022 (measured on the 1<sup>st</sup> of October) serves as a proxy for the population. In 2021/2022, 456.670 Dutch students were enrolled at a Dutch university of applied sciences and 264.230 Dutch students were enrolled at a Dutch university, totalling 720,900 students (CBS, 2023b).

There are two subpopulations: fraternity members and non-fraternity members. Fraternity members are current students who are current or former members of a fraternity in the Netherlands. Non-fraternity members are students who are currently not a member of any fraternity or student association in the Netherlands and have not been a member either. The National Chamber of Fraternities and Sororities (*Landelijke Kamer van Verenigingen*) represents 47,000 fraternity members

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<sup>4</sup> Although I obtain information about students' friending bias among non-fraternity friends too, this was not the focus of this study. Hence, I only discuss friending bias among fraternity friends.

of 49 fraternities and sororities in 13 cities as communicated on their website (Landelijke Kamer van Verenigingen, n.d.) on the 10<sup>th</sup> of July, 2023. Although likely an underestimation, fraternity members make up only a small portion of Dutch students in the Netherlands (6.5%).

### ***Data sources used for benchmarking analysis***

The sample is benchmarked against publicly available information on the population to assess the representativeness of the sample. Specifically, the sample characteristics of age, gender, type of degree, type of education, parental education, and current living situation are benchmarked. For this purpose, four publications are consulted and described.

The first publication is the Landelijke Monitor Studentenhuisvesting 2022 [*National Student Housing Monitor 2022*]. A digital report delivered by ABF Research at the request of Kences – knowledge centre and partnership for student housing and chair of the Landelijk Platform Studentenhuisvesting [*National Platform for Student Housing*] in the Netherlands (<https://www.kences.nl/over-kences/>). The used data sources are provided by Statistics Netherlands and the Dienst Uitvoering Onderwijs [*Education Executive Agency, DUO*] (ABF Research, 2022). The publication includes statistics on the living situation of full-time (including dual education) students in 2021/2022 at universities and universities of applied sciences in the Netherlands.

The second and third publications are published by Statistics Netherlands and provide information on the number of females in higher education in the Netherlands (CBS, 2022) and the percentage of students per type of education (university education/higher professional education) and the level of education (bachelor's/master's) (CBS, 2023b).

The fourth and final publication 'Monitor beleidsmaatregelen hoger onderwijs 2021-2022 [*Monitor policy measures higher education*] published by ResearchNed (2022), as commissioned by OCW, provides information on the highest level of education of parents of students in higher education. The used data sources are CBS micro data in combination with 1Cijfer Hoger Onderwijs [*1Figure Higher Education, 1cHO*], the register of student registrations in higher education.

### ***Data collection and sample selection***

Primary data were collected utilising a survey (see Appendix A). The survey was written in Dutch and developed in Qualtrics, an online survey tool. The survey was distributed via an online anonymous link on WhatsApp, Instagram, and LinkedIn.

Sample selection was limited to convenience and snowballing sampling. Nevertheless, only participants who qualified as current students or graduates of the academic year 2022/2023 and who did not commence their studies earlier than in the academic year 2013/2014 were included.

Participants who did not qualify were excluded. In addition, participants who did not complete the survey, or completed the survey in less than one minute were excluded (the survey was designed such that it could be completed within 5 minutes).

### ***Ethical considerations***

I filled out a mandatory ethical questionnaire from Erasmus University and discussed the results of the questionnaire with E.M.C van der Voort before distributing the survey. In addition, I pre-registered for this study on AsPredicted.org. Anyone can access the pre-registration via <https://aspredicted.org/y98qt.pdf> (see Appendix B). The pre-registration improves the quality of this study as it limits *p*-hacking – researchers' tendency to not report on conducted non-significant analyses (Simonsohn et al., 2014).

Participants were briefed about the nature of the research and explicitly asked for consent before they commenced with the survey. Specifically, participants were told that the survey aimed to gain an understanding of the relationship between social capital of students and student involvement in student associations (see Appendix A). Upon completion of the survey, participants received a personalized debrief based on their responses (see Appendix C).

In Qualtrics, the option to collect anonymized responses was selected. IP Addresses, location data, and contact information were not recorded. In Qualtrics, data is processed according to their privacy policy. Data is not stored on a personal computer but in the cloud (SharePoint) of a student account of Erasmus University. Collected data will be stored for a maximum of 10 years conforming to the Netherlands Code of Conduct for Research Integrity (KNAW et al., 2018). Data will not be shared with third parties beyond Qualtrics and is used only for research purposes.

### **Measures**

In this section, I conceptually replicate Chetty et al.'s (2022a, b) computation of EC based on microdata and adjust it to survey data. Some variables and values were recoded (see Appendix D) but are not discussed here.

### ***Economic connectedness***

Before describing the computation of EC, I first motivate my measurement of SES and the distinction between high-SES and low-SES as well as my definition of friendship. Instead of a continuous SES-score based on 22 variables (Chetty et al., 2022a, b), I restrict SES to parental education attainment. Given the complexity of measuring social capital (Engbers et al., 2017), a strong justification is needed for the choice of employed measurements. Although parental education is most commonly used in researching social ties among college students (Brooks et al., 2011), operationalization varies. Parental

education has been operationalized as the sum of maternal and paternal levels of education (Brooks et al., 2011), as parental years of education (De Graaf et al., 2000), and as the highest level of completed education among both parents (Lenkewitz & Wittek, 2022; Zwier & Geven, 2023). I opted for the highest level of completed education among both parents because it is in accord with more recent papers on friendship networks (Lenkewitz & Wittek, 2022; Zwier & Geven, 2023) and it is in line with Statistics Netherlands' measurement of parental education (CBS, 2020). High-SES students are defined as students who have at least one main parental caregiver who completed a university degree. Conversely, low-SES students are defined as students who have at least one main parental caregiver who attained a higher professional education degree (for motivation, see Appendix E).

Friends are defined as the student's self-reported three friends out of their closest ten made during their study times of which they knew the parental education levels best and of which the student has 70% or more confidence in the correctness of the parental education of those friends. If the confidence is below 70%, the friend is not counted as a friend (see Appendix F for motivation). Although several researchers, such as Campigotto et al. (2022) and Malacarne (2017), inquired about up to five friends, I follow Verbrugge's (1977) seminal work on friendships in inquiring about three. Inquiring about more than three friends is likely to limit the ability of respondents to inform on the parental education of their fourth and fifth friends. In fact, inquiring about three friends already posed a problem (see Appendix F).

Identical to high-SES students' definition, high-SES *friends* are defined as friends who have at least one main parental caregiver who completed a university degree. In contrast, low-SES friends are friends<sup>5</sup> who have at least one parent who completed a higher professional education degree (for motivation, see Appendix F). Formally, a student's EC to high-SES students is defined as:

$$EC_{H,i} = \frac{f_{H,i}}{w_H}, \quad (1)$$

where  $f_{H,i}$  equals the share of high-SES friends of individual  $i$  and where  $w_H$  denotes the share of non-fraternity members who have at least one main parental caregiver who completed a university degree.  $w_H$  serves as a proxy for the share of high-SES students in the Dutch student population. In this sample,  $w_H$  equals 34.7%. It is not possible to verify if the observed  $w_H$  in this sample is representative of  $w_H$  in the Dutch student population as Statistics Netherlands does not publish information about  $w_H$  (Van den Broek et al., 2022).

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<sup>5</sup> Note that it is likely that most (if not all) friends of students in this study are students. Students are biased towards befriending students as compared to other groups (Verbrugge, 1977)

If  $EC_{H,i} > 1$ , student  $i$  has a greater number of high-SES friends than what would be expected under random friending and if low- and high-SES students would form an equivalent quantity of friendships. Random friending means that friendships are formed regardless of SES – or absence of homophily by SES. That is, students have an equal probability of befriending high-SES people regardless of their SES (low or high). In contrast,  $EC_{H,i} < 1$  shows that student  $i$  forms fewer friendships with high-SES people than one would expect if friendships were formed at random and if low- and high-SES students would form an equivalent quantity of friendships.

### ***Exposure and friending bias***

$EC_{H,i}$  is decomposed into exposure and friending bias per group (see Appendix G for a complete decomposition). In this context, students can form friendships within two distinct groups: fraternity and non-fraternity circles:

$$G = \{g_1, g_2\}, \quad (2)$$

where  $g_1$  refers to the pool of fraternity members and  $g_2$  refers to the pool of non-fraternity members. Note that the computation of friending bias required a division into two groups. However,  $g_2$  will not be further discussed apart from the decomposition in this section. Exposure per group is formalized as,

$$Exposure_{H,g} = \frac{w_{H,g}}{w_H}, \quad (3)$$

where  $w_{H,g}$  is the proportion of high-SES people in group  $g$  and  $w_H$  the share of high-SES students in the Dutch student population. As such, exposure is defined as the normalised share of high-SES people in group  $g$ . If  $Exposure_{H,g} < 1$ , the fraction of high-SES people in group  $g$  is below the average. Conversely, if  $Exposure_{H,g} > 1$ , the fraction of high-SES people in group  $g$  is above the average. Lastly, friending bias is defined as:

$$Friending\ bias_{H,i,g} = 1 - \frac{f_{H,i,g}}{w_{H,g}}, \quad (4)$$

where  $f_{H,i,g}$  denotes the share of high-SES friends of individual  $i$  in group  $g$  and  $w_{H,g}$  the proportion of high-SES people in group  $g$ . I use the sample statistics of this study to determine the share of high-SES students among fraternity members ( $w_{H,g1} = 84.3\%$ ). Specifically, I sum the number of high-SES students with the number of high-SES friends in group  $g$  and divide it by the sum of the total students and friends in group  $g$ . Thereby, I assume that the selected friends are different for everyone such that there are no doubles in the dataset. In total, data from 452 individuals was used to estimate

$w_{H,g1}$ . Note that,  $w_{H,g}$  in (4) differs from  $w_H$  in (1) and (3) since friends are excluded when calculating  $w_H$  but included when calculating  $w_{H,g}$ .

Formally, friending bias ranges from minus infinity to 1, with negative values signifying the opposite of friending bias – low-SES students have a higher proportion of high-SES friends than the share of high-SES people in group  $g$ . A friending bias of 0 indicates no friending bias, meaning that low-SES-students make as many high-SES-friends as one would expect under random friending given the exposure to high-SES-friends in group  $g$ . That is, under random friending and equivalent quantities of friendships for low- and high-SES students,  $f_{H,i,g} = w_{H,g}$ , which sets *friending bias* $_{H,i,g} = 0$ . A maximum friending bias of 1 in group  $g$  signifies that one does not establish any high-SES-friendships despite being exposed to a proportion of high-SES people in group  $g$  ( $w_{H,g}$ ). Note that, as in Chetty et al. (2022b), friending bias is mostly a statistical phenomenon and does not directly convey information about individual preferences.

However, the results of this survey show that in the fraternity group, high-SES students have 45.3% more friends of whom they know the parental education with 70% confidence or more compared to low-SES students. If high-SES students make  $X_g > 1$  times more friends in group  $g$  than low-SES students, friending bias would be negative. That is,

$$\text{Friending bias}_{H,i,g} = \frac{1 - X_g}{1 + \frac{w_{H,g}}{1 - w_{H,g}} X_g} < 0. \quad (5)$$

In fraternity groups, where  $X_{g1} = 1.453$  and  $w_{H,g1} = 84.3\%$ , friending bias would be -0.05. If friending bias is above zero in relation to the aforementioned figure, it indicates a substantial departure from random friendship formation conditional on exposure. Friending bias would mean that low-SES students have less than 84.3% of high-SES fraternity friends despite high-SES students forming 1.45 more friends on average.

Although the above variables are presented as continuous, recall that the variables are computed based on a maximum of three friends. Therefore, the variables have a limited number of potential values and could be considered categorical variables.

## **Associations and causal inference**

### ***Association***

Three regressions were conducted to investigate the relationship between fraternity membership and SES, EC, or friending bias. Firstly, a binary logistic regression (6) of fraternity membership on being of high SES, defined as having at least one main parental caregiver who completed a university degree ( $ParentUni_i$ ), was conducted:

$$\log\left(\frac{p(\text{Fraternitymembership}_i)}{1-p(\text{Fraternitymembership}_i)}\right) = \beta_0 + \beta_1 * \text{ParentUni}_i + \varepsilon_i, \quad (6)$$

where  $i$  represents individual indices and  $p(\text{Fraternitymembership}_i)$  denotes the probability that individual  $i$  is a fraternity member. No control variables were included because it is reasonable to assume that none of the observed variables influences whether a student has at least one main parental caregiver who completed a university degree. A binary logistic regression best suits the hypothesized relationship because it models the probability of falling into the category of fraternity membership. Note that regression (6) is written as an equation with the log odds of being a fraternity member as a linear function of  $\text{ParentUni}_i$ . As such, regression (6) could show that students of high SES have odds of being a fraternity member  $\beta_1$  times higher compared to students whose main parental caregivers did not attain the same educational level.

Secondly, for students with low SES, an OLS multiple regression (7) of EC on fraternity membership with and without several control variables, as represented by the vector  $\chi_{ji}$ , was conducted:

$$EC_i = \beta_0 + \beta_1 * \text{Fraternitymembership}_i + \beta_j * \chi_{ji} + \varepsilon_i, \quad (7)$$

where  $i$  indexes individuals. The sample is restricted to low-SES students because EC is defined, in line with Chetty et al. (2022a), as the proportion of high-socio-economic status (SES) friends among low-SES students. Including high-SES students in the analysis would not reflect cross-class friendships of low-SES students, but instead reflect a mixture of cross-class friendships by both low and high-SES students.

OLS regression fits the relationship best as EC is (in theory) a continuous variable. Controls are added because various observed variables are likely to both influence fraternity membership as well as EC. Even though no causality is inferred from these regressions, it is best to include such variables to mitigate omitted variable bias (OVB). The chosen controls are gender, age, whether the student is a higher professional education student, year of commencement of studies, expected remaining years of study, and whether the student lives with their parents.

Lastly, for students with low SES, an OLS multiple regression (8) of friending bias among fraternity friends on fraternity membership with and without several control variables, as represented by the vector  $\chi_{ji}$ , was conducted:

$$\text{Friendingbias}_{i,g_1} = \beta_0 + \beta_1 * \text{Fraternitymembership}_i + \beta_j * \chi_{ji} + \varepsilon_i, \quad (8)$$

where  $i$  indexes individuals. Again, as in the previous regression (7), the sample is restricted to low-SES students, using OLS regression with identical controls. Together, the regressions could show that



fraternity membership is positively associated with EC and negatively with friending bias of low-SES students.

### ***Causal inference and instrumental variable analysis***

An Instrumental Variable (IV) regression, using 2-stage least squares (2SLS), was used to estimate the causal effect of fraternity membership on EC and friending bias for low-SES students. As such, the sample in these analyses is restricted to low-SES students. The 1<sup>st</sup> stage regression of fraternity membership on a strict BSA isolates the exogenous variation in fraternity membership due to the instrument (a strict BSA). The regression can be interpreted as a linear probability model because fraternity membership is a binary variable:

$$Fraternitymembership_i = \delta + \gamma * StrictBSA_i + v_i, \quad (9)$$

where  $i$  indexes individuals. The 1<sup>st</sup> stage regression (9) is used in combination with the 2<sup>nd</sup> stage regressions (10) and (11) to estimate a causal effect of fraternity membership on EC (12) and friending bias (13):

$$EC_i = \theta + \tau * StrictBSA_i + \eta_i, \quad (10)$$

$$Friendingbias_{i,g_1} = \theta + \tau * StrictBSA_i + \eta_i, \quad (11)$$

where  $i$  indexes individuals. The 2<sup>nd</sup> stage regressions estimate the effect of the instrument on EC (12) and friending bias (13) respectively. Together, the regressions of interest (12) and (13) are estimated, with  $\rho = \frac{\tau}{\gamma}$ :

$$EC_i = \alpha + \rho * Fraternitymembership_i + v_i, \quad (12)$$

$$Friendingbias_{i,g_1} = \alpha + \rho * Fraternitymembership_i + v_i, \quad (13)$$

where  $i$  indexes individuals. The instrumental variable is whether the higher education institution at which the student studies has a strict binding study advice (BSA) rule in the first year. I define a strict BSA rule as follows; first-year students need to obtain at least 50 out of 60 ECTS credits to receive a positive BSA. A positive BSA is required to proceed to the next academic year. Erasmus University Rotterdam is the only university in the Netherlands that currently applies the maximum BSA rule of 60 out of 60 ECTS credits. All other higher education institutions apply a less strict BSA rule between 0 and 60 ECTS credits, with most institutions in this sample applying a BSA of 45 ECTS credits. I consciously avoid the use of the number of ECTS credits due to its discontinuous nature. In addition, to avert multicollinearity issues between a strict BSA (defined by 60 ECTS) and studying at Erasmus University, I establish a strict BSA rule of  $\geq 50$  ECTS credits.

IV regression has three core assumptions, a strong 1<sup>st</sup> stage, the independence assumption, and the exclusion restriction. The assumption of a strong 1<sup>st</sup> stage is evaluated in the Results section. The independence criterion proves difficult to hold. The instrumental variable – a strict BSA – is not randomly assigned to universities. Instead, the number of ECTS is chosen by university management. Therefore, confounding variables could be present. For example, it could be that students differ substantially depending on which university (and thus whether a strict BSA rule applies) they choose to enrol in. Although the independence assumption cannot be verified, it can be falsified. In the Results section, this assumption is informally tested using an OLS regression of strict BSA on several observed variables, as represented by the vector  $\chi_{ji}$ :

$$\text{Strictbsa}_i = \beta_0 + \beta_j * \chi_{ji} + \varepsilon_i, \quad (14)$$

where  $i$  indexes individuals. Although a logistic regression would be a better fit because the dependent variable is binary, the 2SLS regression does not use a logistic regression in the 1<sup>st</sup> stage either. As such, the regression should be interpreted as a linear probability model. Significant predictors of a strict BSA would falsify the assumption as it signals that the instrument is correlated to the error term.

The exclusion restriction of this instrumental variable is expected to be held. It is unlikely that the BSA in the first year affects the accumulated EC throughout a student's time at university or one's friending bias. One could argue that having less time in the first year may negatively impact EC. However, each student needs to obtain the same amount of ECTS credits to acquire their bachelor's diploma (a BSA is not part of a master's degree). Thus, even if a higher BSA negatively impacts EC in the first year, this effect is expected to disappear throughout students' time at a higher education institution.

To conclude, the instrumental variable is not a perfect instrumental variable. There is no randomness in the 'assignment' of a strict BSA to students. Nevertheless, it could provide a better estimation of the effect of joining a fraternity on EC among fraternity members than a simple regression of EC on fraternity membership.

## Results

IBM SPSS Statistics version 29.0.1.0 (171) was used for data preparation and STATAMP 17 was used for all analyses. This section commences with descriptive statistics, then describes the benchmarking analysis, and concludes with hypothesis testing.

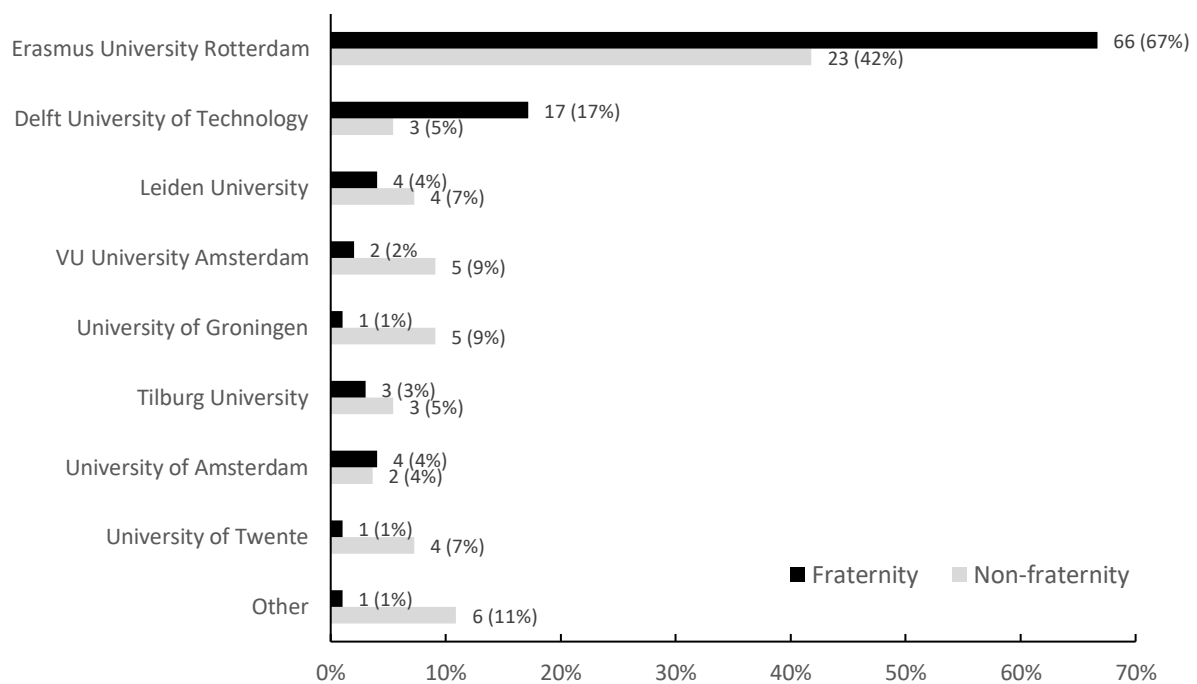
### Descriptive statistics

In total, 219 responses were collected of which 208 qualified for the study. Another 18 respondents were excluded based on exclusion criteria as defined in the Data collection and sample selection

section. The final sample size was 190 and consisted of 42.1% females. None of the respondents self-identified as non-binary. Four respondents did not disclose their age. Respondents ( $N = 186$ ) were on average 22.7 years old ( $M = 22.7$ ,  $SD = 1.7$ ).

**Figure 1**

*Bar Chart of Percentage of Current Students per University by Fraternity Membership*



*Note.*  $N_{\text{Fraternity}} = 99$ ,  $N_{\text{Non-fraternity}} = 55$ . All universities with three or fewer observations in total (Technical University Eindhoven, Maastricht University, Utrecht University, and Nyenrode Business University) were categorized as 'Other'. Universities at which students graduated in 2022/2023 are included. Universities of applied sciences are not displayed because the majority are classified as 'Other'.

Respondents started their studies on average in 2018/2019 ( $M = 2018.3$ ,  $SD = 1.6$ ) and expected to study on average for 1.4 more years ( $M = 1.4$ ,  $SD = 1.3$ ). 171 respondents were current students and 19 respondents graduated in 2022/2023. 83.2% of respondents (including graduates) study at a university and 16.8% at a university of applied sciences in 2022/2023. 89 (57.4%) of the university students (including graduates) study at Erasmus University Rotterdam, 20 (12.9%) at Delft University of Technology and the remaining 46 (29.7%) students study at one of 10 other universities (see Figure 1). 13 (37.1%) of the higher professional education students (including graduates) study at Christelijke Hogeschool Windesheim, 7 (20%) at Hogeschool Rotterdam, and the other 15 (42.9%) were roughly evenly distributed over 9 other universities of applied sciences. 92 (54.8%) of the respondents (excluding graduates) pursue a bachelor's degree and 78 (46.4%) pursue a master's degree (excluding graduates) in 2022/2023. The sum of the previous two percentages is above 100% because two students pursued both a bachelor's degree and a master's degree in 2022/2023. Finally, 66.3% lived

with their parents. None of the respondents either currently pursued a master's or associate degree at a university of applied sciences or had completed one.

The sample consisted of 115 fraternity members and 75 non-fraternity members. 58 (50.4%) of the fraternity members were members of 'Rotterdamsch Studenten Corps en de Rotterdamsche Vrouwelijke Studenten Vereniging', followed by 15 (13.0%) 'Delftsch Studenten Corps'-members, and 7 (6.1%) 'S.V. Laurentius'-members. All 35 other fraternity members were members of one of 19 other fraternities.

Table 1 shows that students do not differ considerably in terms of the year of commencement of studies, age, and the remaining number of expected study years. However, fraternity members have substantially more friends of whom they know the parental education than non-fraternity members. This disparity grew larger after excluding friends of which respondents' confidence in the accuracy of the self-reported parental education of their friends was below 70% (see Appendix F). Lastly, only one respondent indicated that the researcher was one of the three chosen friends (not displayed), indicating that the researcher's network did not bias the analysis.

**Table 1**

*Student Characteristics by Fraternity Membership*

| Characteristic                                  | Fraternity members |           | Non-fraternity members |           |
|---|--------------------|-----------|------------------------|-----------|
|   | <i>M</i>           | <i>SD</i> | <i>M</i>               | <i>SD</i> |
| Year of commencement of studies                 | 2018.1             | 1.5       | 2018.6                 | 1.7       |
| Age   | 22.8               | 1.5       | 22.4                   | 1.9       |
| Expected remaining years of study               | 1.4                | 1.2       | 1.5                    | 1.4       |
| Number of friends before exclusion <sup>a</sup> | 2.9                | 0.3       | 2.3                    | 1.1       |
| Number of friends after exclusion <sup>a</sup>  | 2.8                | 0.5       | 2.1                    | 1.1       |

*Note.* N = 115 for fraternity members and N = 75 for non-fraternity members except for age with N = 112 and N = 74, respectively.

<sup>a</sup> Exclusion refers to the exclusion of friends of which respondents' confidence in the accuracy of the self-reported parental education of their friends was below 70%. The maximum number of friends is 3.

### **Benchmarking analysis**

In Table 2, the observed characteristics of the sample are benchmarked against the population using a Chi-Square Goodness of Fit<sup>6</sup> to assess the representativeness of the sample. A Chi-Square Goodness of Fit Test is the right test for this purpose as it tests whether the categorical-variable distributions drawn from this sample differ from a hypothesized distribution. In this case, the hypothesized distribution resembles the population's distribution since the used data sources contain information

<sup>6</sup> Chi-Square Goodness of Fit Test could not be performed for the 'pursues HPE master's' category because zero respondents belonged to this category.

**Table 2**

*Characteristics of Fraternity and Non-Fraternity Members Benchmarked Against Characteristics of All Students in The Netherlands in '21-'22*

| Characteristics                                       | Population                  |               |      | Sample             |         |                        |         |
|---|-----------------------------|---------------|------|--------------------|---------|------------------------|---------|
|   | Students in the Netherlands |               |      | Fraternity members |         | Non-fraternity members |         |
|   | <i>N</i>                    | <i>Base N</i> | %    | <i>N</i>           | %       | <i>N</i>               | %       |
| Female <sup>a</sup>                                   | 442,909                     | 836,069       | 53.0 | 43                 | 37.4*** | 37                     | 49.3    |
| Level of education by type of degree <sup>b</sup>     |                             |               |      |                    |         |                        |         |
| Pursues HPE bachelor's                                | 445,200                     | 720,900       | 61.8 | 16                 | 13.9*** | 17                     | 22.7*** |
| Pursues university bachelor's                         | 169,340                     | 720,900       | 23.5 | 45                 | 39.1*** | 27                     | 36.0*** |
| Pursues HPE master's                                  | 11,470                      | 720,900       | 1.6  | 0                  | .0      | 0                      | .0      |
| Pursues university master's                           | 94,890                      | 720,900       | 13.2 | 55                 | 47.8*** | 29                     | 38.7*** |
| Level of education by parental education <sup>c</sup> |                             |               |      |                    |         |                        |         |
| Pursues HPE and parent HPE or higher                  | n/a                         | n/a           | 56.0 | 11                 | 78.6    | 12                     | 66.7    |
| Pursues UD and parent HPE or higher                   | n/a                         | n/a           | 81.0 | 99                 | 98.0*** | 44                     | 77.2    |
| Level of education by living situation <sup>d</sup>   |                             |               |      |                    |         |                        |         |
| Pursues HPE and lives with their parents              | 261,000                     | 655,800       | 39.8 | 4                  | 3.5***  | 16                     | 21.3*** |
| Pursues UD and lives with their parents               | 98,100                      | 655,800       | 15.0 | 26                 | 22.6    | 18                     | 24.0    |

*Note.* N = 115 for fraternity members and N = 75 for non-fraternity members. HPE refers to higher professional education at a university of applied sciences and UD refers to a university degree at a university. Percentages in the 'population' section are computed relative to a 'base N' since several data sources used different definitions of 'students', base N differs per data source. Base N of 655,800 represents full-time and dual education Dutch students whereas the other base Ns include international and part-time students. N and Base N are missing in the rows about 'level of education by parental education' as these were not disclosed by the data source. Two non-fraternity members and one fraternity member did not disclose their type of degree. None of the participants self-identified as non-binary.

<sup>a</sup> CBS (2022) was consulted for data in the 'population' columns.

<sup>b</sup> CBS (2023b) was consulted for data in the 'population' columns.

<sup>c</sup> Van den Broek et al. (2022) were consulted for data in the 'population' columns.

<sup>d</sup> Landelijke Monitor Studentenhuisvesting (2022) was consulted for data in the 'population' columns.

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, tested in comparison to the population using a Chi-Square Goodness of Fit Test

about all students in the Netherlands. According to Hypothesis 1 of this research, fraternity members differ from non-fraternity members. Therefore, the sample is split into two corresponding subsamples: fraternity members and non-fraternity members. Among both fraternity and non-fraternity students, there's an overrepresentation of university students as compared to higher professional education students. Furthermore, there is an overrepresentation of master's students as compared to bachelor students for both fraternity and non-fraternity members. 39.1% of fraternity members and 36.0% of non-fraternity members pursued a bachelor's at the university level whereas 23.5% in the general population of students in the Netherlands pursued a bachelor's at a university in '21-'22. Moreover, 47.8% of fraternity members and 38.7% of non-fraternity members pursued a master's at the university level whereas 13.2% of the general population of students in the Netherlands 13.2% pursued a master's in '21-'22.

The non-fraternity sub-sample is representative of the population in terms of gender and university students with at least one main parental caregiver who completed HPE, whereas the fraternity sub-sample is not. Females are underrepresented (37.4%) in fraternities as compared to the benchmark (53.0%),  $\chi^2(1, 115) = 11.25, p < .001$ . Furthermore, the percentage of university students with at least one main parental caregiver who completed HPE (98.0%) in the fraternity sub-sample deviates upwards from the 81% benchmark,  $\chi^2(1, 101) = 19.01, p < .001$ . In contrast, the non-fraternity subsample does not deviate significantly from the benchmark in terms of parental education.

## **Hypothesis testing**

### ***Association between SES and fraternity membership (H1)***

A binary logistic regression was conducted to test whether fraternity members are of higher SES than non-fraternity members (see Table 3). The binary logistic regression of fraternity membership on having at least one main parental caregiver who completed a university degree (high SES) revealed that being of high SES is a significant positive predictor of the log odds ratio between high and low-SES students of being a fraternity member ( $B = 1.72, p < .001$ ). Exponentiating the coefficient gives an odds ratio of 5.56, which indicates that the odds of being a fraternity member increase by a factor of 5.56 when a student is of high SES instead of low SES. This suggests that fraternity members are substantially more likely to be of high SES as compared to non-fraternity members.

Two considerations. First, note that the McFadden pseudo-R-squared, which serves as a goodness of fit metric, is relatively weak ( $< 0.20$ ). This implies that the model might not be a good fit for the data. Furthermore, the 95% confidence interval of the coefficient in Table 3 is relatively wide. However, the lower odds ratio is still close to three. A significant upwards departure from an odds ratio

equal to one can be interpreted as substantially higher. Therefore, I conclude that the evidence is both statistically and practically significant.

**Table 3**

*Binary Logistic Regression of Fraternity Membership on Having at Least One Main Parental Caregiver Who Completed a University Degree*

| Variable                 | <i>B</i> | <i>R.SE</i> | <i>p</i> | 95% CI for Odds Ratio |            |       |
|--------------------------|----------|-------------|----------|-----------------------|------------|-------|
|                          |          |             |          | Lower                 | Odds Ratio | Upper |
| Parent university degree | 1.72     | 0.32        | < .001   | 2.96                  | 5.59       | 10.56 |
| Constant                 | -0.52    | 0.23        | .026     |                       |            |       |

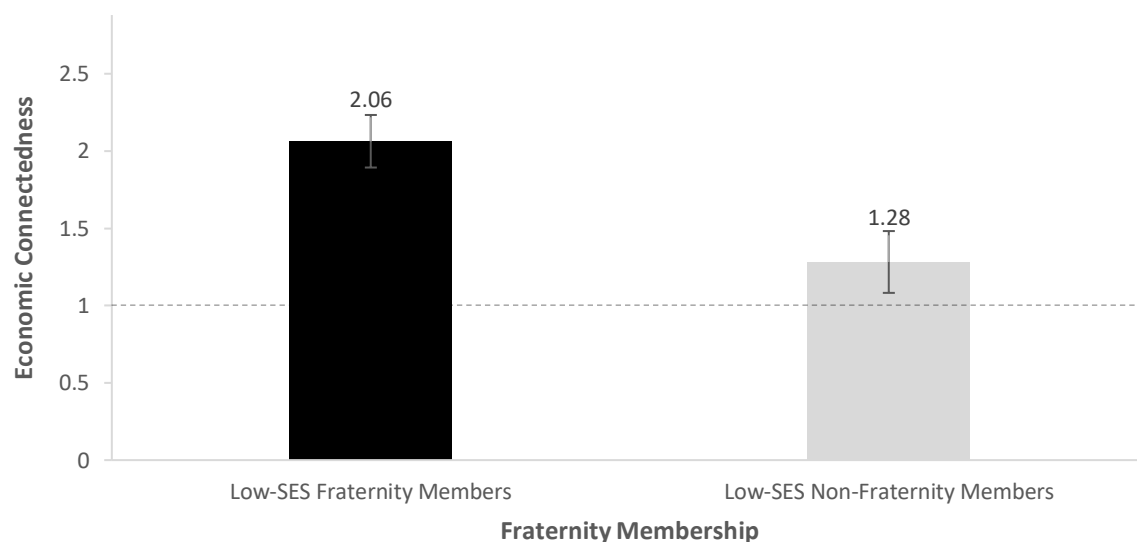
*Note.* N = 190. McFadden pseudo  $R^2 = 0.12$ . Model  $\chi^2(1) = 28.06$ ,  $p < .001$ , *R.SE* = robust standard error. Maximum-likelihood estimation.

***Effect of fraternity membership on economic connectedness (H2)***

OLS regressions and IV analysis were used to test the hypothesis that low-SES students who join a fraternity accumulate more EC than low-SES students who do not join a fraternity (Hypothesis 2). As such, the sample in this analysis is restricted to low-SES students (N = 54).

**Figure 2**

*Mean Scores of Economic Connectedness by Fraternity Membership*



*Note.* Error bars indicate standard errors. Data labels indicate means. Values above the dotted line indicate that on average, a student has more high-SES friends than one would expect under random friending and if low- and high-SES students would form an equivalent quantity of friendships. Conversely, values *below* the dotted line indicate that on average, a student has *less* high-SES friends than one would expect under random friending and if low- and high-SES students would form an equivalent quantity of friendships. N = 54 with N = 24 for low-SES fraternity members and N = 30 for low-SES non-fraternity members.

Figure 2 shows that both fraternity and non-fraternity members of low-SES have on average higher shares of high-SES friends ( $EC > 1$ ) than expected under random friending and if low- and high-SES students would form an equivalent quantity of friendships. Furthermore, Figure 2 displays that the average EC of low-SES fraternity members is higher than that of low-SES non-fraternity members. Specifically, for low-SES fraternity members the share of high-SES friends is more than twice the expected share of high-SES friends.

A simple regression of EC on fraternity membership revealed that fraternity membership is a significant positive predictor ( $B = 0.78, p < .01$ ) of EC for low-SES students (see Model 1 in Table 4). For low-SES students, fraternity membership is associated with an increase in EC of 0.78. In other words, fraternity membership is associated with an increase of 61%<sup>7</sup> in the share of high-SES friends of low-SES students. Although this does not indicate a causal relationship, it does show a strong association.

**Table 4**

*Economic Connectedness of Low-SES Students on Fraternity Membership*

|   | Model 1<br>Coeff. (R.SE) | Model 2<br>Coeff. (R.SE) |
|---|--------------------------|--------------------------|
| Fraternity member                           | 0.78** (0.26)            | 0.98** (0.30)            |
| Gender                                      |                          | 0.07 (0.28)              |
| Age   |                          | 0.24* (0.10)             |
| Higher professional education student (HPE) |                          | -0.66* (0.28)            |
| Year of commencement of studies             |                          | 0.18 (0.13)              |
| Expected remaining years of study           |                          | 0.19 (0.11)              |
| Lives with parents                          |                          | -0.31 (0.28)             |
| Constant                                    | 1.28*** (0.20)           | -359.16 (253.22)         |
| $R^2$                                       | .14                      | .36                      |
| $N$   | 54                       | 52                       |

*Note.*  $N = 52$  in Model 2 as two respondents did not disclose their ages. Standard errors in parentheses. OLS regression.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Model 2 in Table 4 shows that the observed effect remains and is even larger after controlling for various observed variables. Two controls significantly affected EC. First, age was a significant positive predictor of EC which can be explained by the fact that older students have had more time in befriending high-SES students than younger students. Second, pursuing HPE was a significant negative

<sup>7</sup>  $(2.06 - 1.28)/1.28 * 100\% = 61\%$



predictor of EC. Potentially because HPE students are less exposed to high-SES students than assumed in this study and therefore could befriend fewer high-SES students than expected. Beyond that, Model 2 in Table 4 is not discussed in depth because the model proves difficult to interpret as the constant has no meaning. To illustrate, an individual cannot be aged zero or started their studies in the year zero.

To estimate the causal effect of fraternity membership on EC, an IV regression of EC of low-SES students on fraternity membership with strict BSA as the instrument was conducted. The 1<sup>st</sup> stage regression of fraternity membership on strict BSA in the first year of the study revealed a positive effect ( $B = 0.25, p = .070$ ), which is significant at the 10% level (see Table H1 in Appendix H). However, the 1<sup>st</sup> stage was not a strong first stage,  $F(1,52) = 3.43$ , which is below the rule of thumb of  $F > 10$ .

The assumption of independence was not falsified when a regression of BSA on observed variables was conducted (see Table 5). That is, none of the observed variables was a significant predictor of having a strict BSA. The assumption of exclusion is defended in the Causal inference and instrumental variable analysis section.

**Table 5**

*Regression of Strict BSA on Observed Variables*

|   | Model 1<br>Coeff. (R.SE) |
|---|--------------------------|
| Number of friends                           | 0.14 (0.09)              |
| Gender                                      | -0.15 (0.16)             |
| Age   | -0.07 (0.07)             |
| Higher professional education student (HPE) | 0.22 (0.19)              |
| Year of commencement of studies             | 0.01 (0.07)              |
| Expected remaining years of study           | -0.04 (0.07)             |
| Lives with parents                          | -0.22 (0.16)             |
| Constant                                    | -8.92 (148.84)           |
| <i>N</i>                                    | 52                       |

*Note.*  $N = 52$  as two respondents did not disclose their ages.  $R^2 = .15$ . R.SE = robust standard error, in parentheses. OLS regression.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The IV regression reveals a significant positive effect ( $B = 3.70, p = .055$ ) of fraternity membership on EC for low-SES students at the 10% level (see Table 6). According to the IV coefficient, fraternity membership causes an increase of 3.70 in EC among low-SES students. However, this coefficient cannot exist as the maximum score of EC is  $EC_{\max} = \frac{1}{w_H} = \frac{1}{.347} = 2.88$ . Furthermore, the

IV analysis indicates that non-fraternity members would have a negative EC. Again, this is impossible as one cannot have a negative share of high-SES students. This indicates that the coefficient estimates are biased, a problem that is known to arise with weak instruments (Staiger & Stock, 1994). Furthermore, the 95% confidence interval [-0.08; 7.49] of the coefficient of fraternity membership in the IV (see Table 6) is far wider than the 95% confidence interval [1.10; 1.63] of the coefficient of fraternity membership in Model 1 in Table 4 (not displayed). This indicates another problem with weak instruments – inefficient estimates with large standard errors. In fact, the standard error of the IV estimate is more than 10 times larger than the OLS estimate in Model 1 in Table 4 (not displayed). Keeping the standard error ( $SE = 1.93$ ) fixed and setting the coefficient ( $B = 3.70$ ) to the theoretical maximum ( $B = 2.88$ ) would result in a considerably lower t-statistic ( $1.49^8$  instead of 1.92) and thus a higher  $p$ -value, rendering the effect insignificant. Given these problems, I refrain from interpreting the coefficient as a causal effect.

**Table 6**

*Instrumental Variable Regression of Economic Connectedness of Low-SES Students on Fraternity Membership*

| Variable              | $B$   | $R.SE$ | $p$   | 95% CI |       |
|-----------------------|-------|--------|-------|--------|-------|
|                       |       |        |       | Lower  | Upper |
| Fraternity membership | 3.70  | 1.93   | 0.055 | -0.08  | 7.49  |
| Constant              | -0.02 | .87    | .985  | -1.73  | 1.70  |

*Note.*  $N = 54$ . Model  $\chi^2(1) = 3.68$ ,  $p = .055$ ,  $R.SE$  = robust standard error. 2-stage least squares regression. Instrumental variable: strict BSA ( $\geq 50$  ECTS credits) in the first year of study.

***Effect of fraternity membership on friending bias among fraternity friends (H3)***

OLS regression and IV analysis were employed to evaluate the hypothesis that low-SES fraternity members exhibit a lower friending bias among their fraternity friends than low-SES non-fraternity members. Students exhibit friending bias when they form fewer friendships with high-SES fraternity members even conditional on exposure to high-SES fraternity members. In this sample, exposure to high-SES fraternity students is assumed to be equivalent regardless of fraternity membership and is equal to 2.43. An exposure of 2.43 indicates that, among fraternity members, the proportion of high-SES students (84.3%) is 2.43 times as large as the proportion of high-SES students in the Netherlands (34.7%) (see the Exposure and friending bias section). To provide context, low-SES non-fraternity

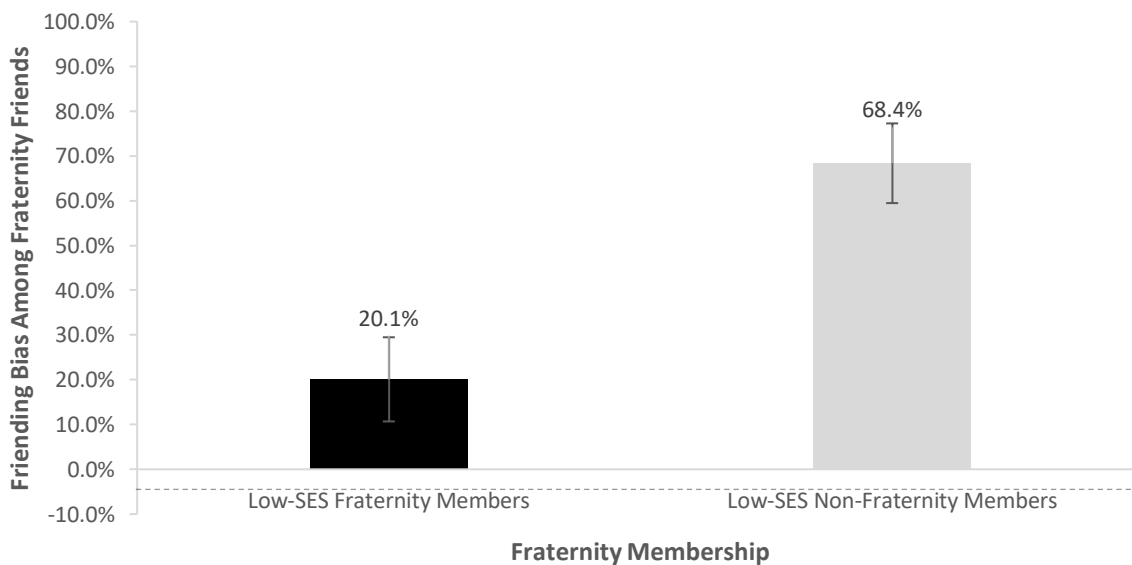
<sup>8</sup>  $2.88/1.93 = 1.49$ . 1.93 represents the robust standard error for the coefficient in Table 6

members had on average 35.0% fraternity friends and low-SES fraternity members had on average 79.9% fraternity friends.

Figure 3 shows that both fraternity and non-fraternity members exhibit friending bias among their fraternity friends. That means that the proportion of high-SES fraternity friends of low-SES students, regardless of fraternity membership, is on average lower than the proportion of high-SES students in the pool of fraternity members (84.3%). Low-SES non-fraternity members exhibit on average a higher friending bias among their fraternity friends (68.4%) than low-SES fraternity members (20.1%). In other words, low-SES non-fraternity members had on average 68.4% fewer high-SES fraternity friends relative to the proportion of high-SES students within fraternities (84.3%). That is, instead of having the expected share of high-SES friends under random friending and an equivalent number of friendships formed regardless of SES (84.3%), low-SES non-fraternity members have on average 26.7%<sup>9</sup> of their fraternity friends being of high-SES. Applying the same logic, the fraternity friends of low-SES fraternity members are on average 67.4% of high SES instead of the expected 84.3%.

**Figure 3**

*Friending Bias among Fraternity Friends by Fraternity Membership*



*Note.* Error bars indicate standard errors. Data labels indicate means. Considering that high-SES students make more friends than low-SES students (see the Exposure and friending bias section), friending bias should be contrasted against a friending bias of -0.05 (the dotted line). Values above the dotted line indicate that on average, a student exhibit friending bias. Conversely, values *below* the dotted line indicate that on average, a student exhibits negative friending bias. N = 54 with N = 24 for low-SES fraternity members and N = 30 for low-SES non-fraternity members.

<sup>9</sup>  $84.3\% * (1 - 0.684) \approx 26.7\%$

A simple OLS regression of friending bias among fraternity friends of low-SES students on fraternity membership (see Model 1 in Table 7) resulted in a significant negative predictor ( $B = -0.483, p < .001$ ). This indicates that for low-SES students, being a fraternity member is associated with a significant decrease of 48.3 percentage points in friending bias among fraternity friends. These results are robust when several control variables are added and result in an even greater effect (see Model 2 in Table 7). None of the control variables had a significant effect on friending bias among fraternity friends. Beyond that, Model 2 in Table 7 is not discussed in depth because the model proves difficult to interpret as the constant has no meaning.

**Table 7**

*Friending Bias Among Fraternity Friends of Low-SES Students on Fraternity Membership*

|   | Model 1<br>Coeff. (R.SE) | Model 2<br>Coeff. (R.SE) |
|---|--------------------------|--------------------------|
| Fraternity member                           | -0.483*** (0.13)         | -0.586*** (0.14)         |
| Gender                                      |                          | 0.02 (0.15)              |
| Age   |                          | -0.08 (0.07)             |
| Higher professional education student (HPE) |                          | 0.21 (0.15)              |
| Year of commencement of studies             |                          | -0.05 (0.08)             |
| Expected remaining years of study           |                          | -0.08 (0.07)             |
| Lives with parents                          |                          | -0.14 (0.14)             |
| Constant                                    | 0.684*** (0.09)          | 107.436 (155.26)         |
| $R^2$                                       | .21                      | .30                      |
| $N$   | 54                       | 52                       |

Note.  $N = 52$  in Model 2 as two respondents did not disclose their ages. R.SE = robust standard error, in parentheses. OLS regression.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

To estimate the causal effect of fraternity membership on friending bias among fraternity friends of low-SES students, an IV regression of friending bias on fraternity membership, with strict BSA as the instrument, was conducted (see Table 8). The results show that fraternity membership is a significant negative predictor ( $B = -1.10, p = .065$ ) of friending bias among fraternity friends for low-SES students at the 10% significance level. Even though the coefficient falls within the mathematically allowed range (minus infinity to 1), it is difficult to defend that non-fraternity members exhibit a near-maximum friending bias of 96%. Furthermore, becoming a fraternity member would not only completely erase friending bias, but it would also result in a negative friending bias, indicating that low-SES students have more high-SES friends than the proportion of high-SES students in the

population. Although the problems with a weak instrument seem to be less severe in this IV analysis as compared to the IV analysis in Hypothesis 2, they remain existent. Hence, I conclude that I cannot interpret the negative effect of fraternity membership on friending bias among fraternity friends as a causal effect.

**Table 8**

*Instrumental Variable Regression of Friending Bias Among Fraternity Friends of Low-SES Students on Fraternity Membership*

| Variable              | B     | R.SE | p     | 95% CI |       |
|-----------------------|-------|------|-------|--------|-------|
|                       |       |      |       | Lower  | Upper |
| Fraternity membership | -1.10 | 0.60 | .065  | -2.27  | .07   |
| Constant              | 0.96  | 0.29 | < .01 | 0.39   | 1.53  |

*Note.* N = 54. Model  $\chi^2(1) = 3.39$ ,  $p = .065$ , R.SE = robust standard error. 2-stage least squares regression. Instrumental variable: strict BSA ( $\geq 50$  ECTS credits) in the first year of study.

### Discussion

Although the Social and Economic Council acknowledged the role of social capital in inequality of opportunity for Dutch students (SER, 2021), it has not been implemented yet as a metric by Statistics Netherlands in its research into this matter (CBS, 2023a). In support of the point made by the SER, I found that social capital is highly concentrated within fraternities and may prove inaccessible to low-SES non-fraternity members. This inequality in access to social capital is evidenced through a positive association between EC and fraternity membership and a negative association between friending bias among fraternity friends and fraternity membership. Encouragingly, fraternities' affiliation with universities positions them as promising settings for institutional change aimed at reducing inequality of opportunity by tackling this inequality in access to social capital. To this end, this study employed Chetty et al.'s (2022a, b) measurement of EC and friending bias in a Dutch college setting to explore the relationship between EC and Dutch fraternity membership.

In line with previous findings, such as Martin's (2012) positive association between fraternity membership and higher social class, as well as Walker et al.'s (2015) findings on the advantageous social origins of fraternity members, the first hypothesis was confirmed. Students with at least one main parental caregiver who attained a university degree (high SES) had 5.56 times higher odds of being fraternity members than students whose parents did not attain the same educational level. This confirmation of Hypothesis 1 is unlikely to stem from low parental education among non-fraternity members, particularly because the benchmark analysis revealed that the non-fraternity sample was

representative of the Dutch student population in terms of parental education. This further strengthens the evidence for Hypothesis 1. Moreover, the benchmark analysis showed a significant deviation in parental education of fraternity members studying at university from the Dutch student population. To illustrate, a substantially higher proportion (98%) of fraternity members studying at university had at least one main parental caregiver who completed higher professional education (HPE) or higher, compared to the benchmark figure of 81%. Together, these results suggest a high concentration of social capital within fraternities among Dutch students.

The second hypothesis that low-SES students who join a fraternity accumulate more EC than low-SES students who do not join a fraternity, was confirmed. Fraternity membership was significantly positively associated with EC. Low-SES fraternity members had on average an EC of 2.06. This indicates that low-SES fraternity members had on average twice the share of high-SES friends (71.5%) than the observed share of high-SES students (34.7%) in the population. Although the EC of low-SES non-fraternity members was lower (EC = 1.28), it was still above one. Therefore, low-SES non-fraternity members had on average a higher share of SES friends (44.4%) as compared to the population (34.7%). In essence, the share of high-SES friends of both low-SES non-fraternity and fraternity members were over-represented. As such, my findings suggest heterophily by SES, indicating that low-SES students tend to form dissimilar friendships in terms of SES.

An instrumental variable analysis, using strict BSA as an instrument, revealed a positive significant effect at the 10% level of fraternity membership on EC for low-SES students. However, the 1<sup>st</sup> stage regression revealed a weak instrument. The weak instrument led to observable biased estimates above the theoretical maximum of the coefficients and inefficient estimates as reflected by large standard errors and wide confidence intervals, even flipping the sign of the coefficient. Furthermore, the instrument itself is not randomly assigned to students. Students could choose a higher education institution over another based on the strictness of BSA, which would imply selection bias. Although the independence assumption was not falsified and the exclusion criterion assumption is likely to hold, I cannot ignore the aforementioned issues. All in all, this leads me to conclude that I cannot interpret the estimated positive coefficient of fraternity membership on EC as a causal effect.

The observed heterophily by SES in my study contradicts the observation made by Chetty et al. (2022b), who observed that low-SES people tend to have an under-represented share of high-SES friends. Chetty et al.'s (2022a) findings align with the recurrent theme in past studies demonstrating homophily, people's tendency to associate with others similar to themselves (Currarini et al., 2009). Specifically, homophily by SES has been shown among Dutch 6th-grade students (Zwier & Geven, 2023), secondary school students (Campigotto et al., 2022) and US college students (Lewis et al., 2012).

The demarcation of high- and low SES in a largely high-SES population in my study might explain this deviation of homophily by SES. For instance, in the Netherlands, 81% of university students have at least one parent who completed HPE or higher (Van den Broek et al., 2022). Even though the ISCED level of HPE is 6<sup>10</sup>, which is on the higher end of the spectrum, I designated HPE as low SES. Nevertheless, these results align with evidence of low-SES students attempting to form cross-class friendships at an elite college (Alvarez-Rivadulla et al., 2023). The results also support Malacarne's (2017) discovery that high-SES students, who were above the school average, received more nominations from peers. Malacarne's (2017) discovery suggests that low-SES students seek heterogenous matches by SES instead of homophilous matches. All in all, these contrasting findings hint at a greater complexity in homophily by SES than previously assumed. It could be that heterophily by SES manifests within high-SES majority populations, like student cohorts, but this pattern may diminish in the general population.

The third hypothesis that low-SES students who join a fraternity would exhibit a lower friending bias among their fraternity friends than low-SES students who do not join a fraternity, was confirmed. Fraternity membership was associated with a significantly lower friending bias for low-SES students, decreasing the bias from 68.4% to 20.1%. Low-SES non-fraternity members befriend high-SES people at a rate 68.4% lower than what one would expect given the exposure to high-SES fraternity members. Although friending bias in this setting is not exactly comparable to friending bias in Chetty et al. (2022b), it is striking that the observed friending bias is more than three times as high as the setting with the highest friending bias in Chetty et al. (2022b). Notably, the 20.1% friending bias of low-SES fraternity members is above this threshold too, indicating that even within a fraternity, low-SES members befriend high-SES students at a much lower rate than what one would expect based on random friending, conditional on exposure. In brief, low-SES students in fraternities exhibit a lower friending bias among their fraternity friends and therefore make more high-SES fraternity friends than low-SES non-fraternity members would, even conditional on exposure. Combined with the first hypothesis, this means that joining a fraternity as a low-SES student is beneficial not only because of the concentrated social capital within a fraternity but also because of an associated reduced bias in befriending high-SES students.

In one way, this finding aligns with Chetty et al.'s (2022b) observation concerning higher friending bias at colleges with a significant presence of fraternity life. As to why, friending bias among fraternity friends was significantly higher for low-SES non-fraternity members than for fraternity

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<sup>10</sup> Although a MC's at a university of applied sciences is classified as ISCED level 7 (CBS, 2011), practically no one (1.6%) pursues one (CBS, 2023b)

members. However, Chetty et al. (2022b) did not specify fraternity as a ‘setting’ and therefore only investigated friending bias at the college level. Conversely, I decomposed friending bias at the college level into friending bias among students’ fraternity friends. Therefore, in another way, this finding is in contrast with Chetty et al.’s (2022b) suggestion, as friending bias among fraternity friends for low-SES fraternity members is associated with a decrease in friending bias.

Although an instrumental variable regression was performed to test for a causal effect of fraternity membership on friending bias among fraternity friends, previously raised issues remain to exist. The reason is that the same weak instrument (strict BSA) was used. Nevertheless, the instrumental analysis revealed a significant negative effect at the 10% level of fraternity membership on friending bias among fraternity friends for low-SES students. Yet, I do not interpret this as a valid causal effect because of the previously raised issues.

### **Contributions and future research**

The primary contribution of this study to academic literature is the unique application of Chetty et al.’s (2022a, b) concept of EC to fraternity membership at college. While Chetty et al. (2022b) confined their study to the broader college context, I explored the variability of friending bias – one of EC’s two determinants – within the same setting but among different subgroups: fraternity and non-fraternity members. This research also demonstrates the adaptability of Chetty et al.’s (2022a, b) framework to survey data. Hence, this study opens new avenues for research in settings where public Facebook data may not be accessible. Such a methodological extension could be especially beneficial for researchers focused on specific groups or contexts.

This study has important societal implications as well. For starters, these findings validate the SER’s (SER, 2023) concerns regarding the role of social capital in inequality in opportunities, as this research reveals inequality in access to social capital among Dutch students. Furthermore, the results offer policymakers practical means to achieve institutional change. Specifically, policymakers at higher education institutions could compel fraternities to ease access for low-SES students as well as promote fraternities among low-SES students.

Although this study shed light on the relationship between fraternities and EC and friending bias among fraternity friends of Dutch students using a survey, it would be most interesting to replicate Chetty et al.’s (2022a, b) research on a large-scale, using Facebook data. Another fruitful avenue of future research concerns uncovering reasons for low-SES students’ decision not to join fraternities since these reasons can provide valuable insights for more focused policymaking. In conclusion, my research applied Chetty et al.’s (2022a, b) concept of EC in a new setting, thereby revealing novel



insights with important implications for EC of low-SES students as well as opening new research avenues.

### **Limitations**

The five most important limitations are discussed. First, snowball sampling could result in a sample which is not representative of the student population. Indeed, the benchmark analysis revealed that university and master students were over-represented in this sample. However, the benchmark analysis highlights a strength of this study as well. The sample of non-fraternity members was representative of the student population in terms of age, gender and parental education. Given the cruciality of parental education in this research, this is a key strength.

A second limitation relates to the definition of low-SES, which had to be restricted to students with at least one parent who completed a higher professional education degree. This is in contrast with Statistics Netherlands, which does not distinguish between university- and higher professional education degrees. Furthermore, this left the de facto target group, low-SES students as defined by having no parents who completed a university nor a higher professional education degree, unexamined.

The focus on low-SES students, and consequently the reduced sample size, in testing Hypothesis 2 and 3 leads to the third limitation: a small sample size ( $N = 54$ ). Small sample sizes bring about multiple issues, such as reduced statistical power, limited generalizability, and problems related to the estimation of the regression. The latter includes a greater susceptibility to outliers as well as a limited precision of the estimates.

Fourth, the analysis is heavily affected by the low quality of the data. Only 22 (29.3%) non-fraternity members had 70% or more confidence in all three friends (see Appendix F). Low in general but more than twice as high, 73 (63.5%) fraternity members had 70% or more confidence in answering the question about the parental education of all three friends correctly. Furthermore, this research is limited to 'strong ties' as only the three closest friends of respondents were examined. Yet, Chetty et al. (2022b) show that results are similar for someone's complete network or for someone's 10 best friends, which indicates that this research might not be substantially different if more friends were examined.

Finally, the validity of the IV regression was severely reduced due to a weak instrument. A weak instrument could lead to invalid inference as the  $p$ -values may not accurately reflect the significance of the tested relationships. Consequently, I abstained from making definitive conclusions

but ensured accurate reporting of the limitations. This approach empowers the reader to interpret the 'evidence' for a causal relationship independently.

### **Conclusion**

This research brought to light a significant concentration of social capital in Dutch fraternities and thus highlights its potential role in providing access to social capital for low-SES students. Consequently, EC of low-SES students could be increased whilst simultaneously decreasing friending bias. The findings demonstrate that low-SES students who join fraternities have significantly more connections with high-SES people compared to their counterparts who are not in fraternities. Considering that EC is the best predictor to date of economic mobility (Chetty et al., 2022a), this research supports the possibility of fraternities serving as promising avenues for policymakers to institute change aimed at reducing inequality of opportunity. However, it is crucial to recognize that this study faces limitations including sampling bias, low data quality, and a 'weak' instrument in the IV analyses. Further research employing large-scale, representative data, is warranted to strengthen the evidence base and inform policy decisions.

## References

- ABF Research. (2022). *Bijlagen - Landelijke monitor studentenhuisvesting 2022*.  
<https://studentenhuisvesting.incijfers.nl/mosaic/documenten/documenten-2>
- Álvarez–Rivadulla, M. J., Camelo, P., Vargas–Serani, M., & Viáfara, D. (2023). The relational costs of crossing class lines. *The British Journal of Sociology*, 74(2), 113-130. <https://doi.org/kh9f>
- Broek, A. van den, Termorshuizen, T. & Cuppen, J. (reds.). (2022). *Monitor beleidsmaatregelen hoger onderwijs 2021-2022*. ResearchNed.  
<https://www.rijksoverheid.nl/documenten/kamerstukken/2022/08/22/monitor-beleidsmaatregelen-hoger-onderwijs-2021-2022>
- Brooks, B., Welsler, H. T., Hogan, B., & Titsworth, S. (2011). Socioeconomic status updates: Family SES and emergent social capital in college student Facebook networks. *Information, Communication & Society*, 14(4), 529-549. <https://doi.org/10.1080/1369118X.2011.562221>
- Campigotto, N., Rapallini, C., & Rustichini, A. (2022). School friendship networks, homophily and multiculturalism: evidence from European countries. *Journal of Population Economics*, 35(4), 1687-1722. <https://doi.org/10.1007/s00148-020-00819-w>
- Calvó-Armengol, A., & Jackson, M. O. (2004). The effects of social networks on employment and inequality. *American Economic Review*, 94(3), 426-454. <https://doi.org/dfvpv7>
- Centraal Bureau voor de Statistiek. (2011). *Niveau ISCED 2011*. <https://www.cbs.nl/nl-nl/onze-diensten/methoden/classificaties/onderwijs-en-beroepen/isced/niveau-isced-2011>
- Centraal Bureau voor de Statistiek. (2020). *Jongeren (15 tot 25 jaar); onderwijsniveau, kenmerken ouders*.  
<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84337NED/table?ts=1684161280190>
- Centraal Bureau voor de Statistiek. (2022). *Leerlingen en studenten; onderwijssoort, woonregio*.  
<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/71450ned/table>
- Centraal Bureau voor de Statistiek (2023a). *Afgestudeerden in het hoger onderwijs*.  
<https://www.cbs.nl/nl-nl/longread/rapportages/2023/afgestudeerden-in-het-hoger-onderwijs>
- Centraal Bureau voor de Statistiek. (2023b). *Hoger onderwijs; internationale studenten, onderwijskenmerken*.  
<https://opendata.cbs.nl/#/CBS/nl/dataset/85125NED/table?ts=1686047303541>

- Chetty, R., Jackson, M. O., Kuchler, T., Stroebel, J., Hendren, N., Fluegge, R. B., Gong, S., Gonzalez, F., Gronding, A., Jacob, M., Johnston, D., Koenen, M., Laguna-Muggenburg, E., Mudekereza, F., Rutter, T., Thor, N., Townsend, W., Zhang, R., Bailey, M., Barberá, P., Bohle, M., & Wernerfelt, N. (2022a). Social capital I: measurement and associations with economic mobility. *Nature*, *608*(7921), 108-121. <https://doi.org/10.1038/s41586-022-04996-4>
- Chetty, R., Jackson, M. O., Kuchler, T., Stroebel, J., Hendren, N., Fluegge, R. B., Gong, S., Gonzalez, F., Gronding, A., Jacob, M., Johnston, D., Koenen, M., Laguna-Muggenburg, E., Mudekereza, F., Rutter, T., Thor, N., Townsend, W., Zhang, R., Bailey, M., Barberá, P., Bohle, M., & Wernerfelt, N. (2022b). Social capital II: determinants of economic connectedness. *Nature*, *608*(7921), 122-134. <https://doi.org/10.1038/s41586-022-04997-3>
- Currarini, S., Jackson, M. O., & Pin, P. (2010). Identifying the roles of race-based choice and chance in high school friendship network formation. *Proceedings of the National Academy of Sciences*, *107*(11), 4857-4861. <https://doi.org/10.1073/pnas.0911793107>
- De Graaf, N. D., De Graaf, P. M., & Kraaykamp, G. (2000). Parental cultural capital and educational attainment in the Netherlands: A refinement of the cultural capital perspective. *Sociology of Education*, *73*(2) 92-111. <https://doi.org/10.2307/2673239>
- DeSimone, J. (2007). Fraternity membership and binge drinking. *Journal of Health Economics*, *26*(5), 950-967. <https://doi.org/10.1016/j.jhealeco.2007.01.003>
- Dronkers, J., & Hillege, S. M. (1998). Board membership of traditional male fraternities and access to Dutch elites: A disappearing avenue to elite positions? *European Sociological Review*, *14*(2), 191-203. <https://doi.org/10.1093/oxfordjournals.esr.a018234>
- Engbers, T. A., Thompson, M. F., & Slaper, T. F. (2017). Theory and measurement in social capital research. *Social Indicators Research*, *132*, 537-558. <https://doi.org/gbhwww>
- Erasmus Universiteit Rotterdam. (2018, January 5<sup>th</sup>). *Erasmus Universiteit schort relatie met RSC/RVSV op* [Press Release]. <https://www.eur.nl/nieuws/erasmus-universiteit-schort-relatie-met-rscrvsv-op>
- Erasmus Universiteit Rotterdam. (2023). *Reglementen, richtlijnen en regelingen: Regelingen profileringsfonds*. <https://www.eur.nl/onderwijs/praktische-zaken/begeleiding-advies/rechtspositie/reglementen>

- Friedman, S., & Laurison, D. (2020). *The Class Ceiling Why it Pays to be Privileged*. Policy Press.  
<https://doi.org/10.1093/sf/soz170>
- Gallup. (2021). *Fraternities and Sororities: Experiences and Outcomes in College, Work and Life*.  
[https://greekuniversity.org/wp-content/uploads/2021/07/NPCNIC\\_Report\\_051721\\_og.pdf](https://greekuniversity.org/wp-content/uploads/2021/07/NPCNIC_Report_051721_og.pdf)
- Glaeser, E. L., Laibson, D., & Sacerdote, B. (2002). An economic approach to social capital. *The Economic Journal*, 112(483), F437-F458. <https://doi.org/10.1111/1468-0297.00078>
- Heemskerk, E., & Fennema, M. (2009). Network dynamics of the Dutch business elite. *International Sociology*, 24(6), 807-832. <https://doi.org/10.1177/0268580909343496>
- KNAW; NFWO; NWO; TO2-federatie; Vereniging Hogescholen; VSNU (2018): *Nederlandse gedragscode wetenschappelijke integriteit* [Netherlands Code of Conduct for Research Integrity]. DANS. <https://doi.org/10.17026/dans-2cj-nvwu>
- Landelijke Kamer van Verenigingen. (n.d.) *Homepage*. <https://www.lkv.nl/>
- Lenkewitz, S., & Wittek, M. (2022). Social networks and educational decisions: Who has access to social capital and for whom is it beneficial? *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 74(4), 437-472. <https://doi.org/10.1007/s11577-022-00866-z>
- Lewis, K., Gonzalez, M., & Kaufman, J. (2012). Social selection and peer influence in an online social network. *Proceedings of the National Academy of Sciences*, 109(1), 68-72.  
<https://doi.org/10.1073/pnas.1109739109>
- Malacarne, T. (2017). Rich friends, poor friends: Inter–socioeconomic status friendships in secondary school. *Socius*, 3, 1-13. <https://doi.org/10.1177/2378023117736994>
- Mara, J., Davis, L., & Schmidt, S. (2018). Social animal house: The economic and academic consequences of fraternity membership. *Contemporary Economic Policy*, 36(2), 263-276.  
<https://doi.org/10.1111/coep.12249>
- Martin, N. D. (2012). The privilege of ease: Social class and campus life at highly selective, private universities. *Research in Higher Education*, 53, 426-452. <https://doi.org/fq588k>
- McCabe, S. E., Schulenberg, J. E., Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Kloska, D. D. (2005). Selection and socialization effects of fraternities and sororities on US college student substance use: A multi-cohort national longitudinal study. *Addiction*, 100(4), 512-524.  
<https://doi.org/10.1111/j.1360-0443.2005.01038.x>

- Overgoor, J., State, B., & Adamic, L. A. (2020). The structure of U.S. college networks on Facebook. *Proceedings of the International AAAI Conference on Web and Social Media*, 14(1), 499-510. <https://doi.org/10.1609/icwsm.v14i1.7318>
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community* Touchstone Books/Simon & Schuster. <https://doi.org/10.1145/358916.361990>
- Rijksoverheid. (2021). *Coalitieakkoord 2021 – 2025: Omzien naar elkaar, vooruitkijken naar de toekomst*. VVD, D66, CDA en ChristenUnie. <https://www.rijksoverheid.nl/documenten/publicaties/2022/01/10/coalitieakkoord-omzien-naar-elkaar-vooruitkijken-naar-de-toekomst>
- Rijksoverheid. (2023). *Verbeteren van welzijn studenten door aanpassen bsa* [Press Release]. <https://www.rijksoverheid.nl/actueel/nieuws/2023/05/08/verbeteren-van-welzijn-studenten-door-aanpassen-bsa>
- Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). P-curve: A key to the file-drawer. *Journal of Experimental Psychology: General*, 143(2), 534. <https://doi.org/10.1037/a0033242>
- Sociaal-Economische Raad. (2021). *Gelijke kansen in het onderwijs: Structureel investeren in kansengelijkheid voor iedereen* (NR. 09 – juni 2021). <https://www.ser.nl/nl/Publicaties/gelijke-kansen-onderwijs>
- Staiger, D. O., & Stock, J. H. (1994). Instrumental variables regression with weak instruments (NBER Technical Working Paper No. 0151. National Bureau of Economic Research. <https://doi.org/10.3386/t0151>
- Stuber, J. M., Klugman, J., & Daniel, C. (2011). Gender, social class, and exclusion: Collegiate peer cultures and social reproduction. *Sociological Perspectives*, 54(3), 431-451. <https://doi.org/10.1525/sop.2011.54.3.431>
- Terry, L. (22 January 2014). Greek diversity: why not socioeconomic too? *The Crimson White*. <https://cw.ua.edu/17926/opinion/greek-diversity-why-not-socioeconomic-too/>
- Verbrugge, L. M. (1977). The structure of adult friendship choices. *Social forces*, 56(2), 576-597. <https://doi.org/10.1093/sf/56.2.576>
- Walker, J. K., Martin, N. D., & Hussey, A. (2015). Greek organization membership and collegiate outcomes at an elite, private university. *Research in Higher Education*, 56, 203-227. <https://doi.org/10.1007/s11162-014-9345-8>

Weng, H., & Parent, O. (2023). Beyond homophilic dyadic interactions: the impact of network formation on individual outcomes. *Statistics and Computing*, 33(2), Article 43.  
<https://doi.org/10.1007/s11222-023-10215-5>

Zwier, D., & Geven, S. (2023). Knowing me, knowing you: Socio-economic status and (segregation in) peer and parental networks in primary school. *Social Networks*, 74, 127-138.  
<https://doi.org/10.1016/j.socnet.2023.03.003>

## Appendix A

### Main Survey Questions and Instructions (Dutch)

Deze enquête duurt ongeveer 5 minuten.

Welkom bij dit onderzoek naar sociale relaties onder studenten in het hoger onderwijs. Dit onderzoek is onderdeel van mijn bachelorscriptie van de Bachelor Economie en Bedrijfseconomie aan de Erasmus School of Economics (ESE).

Deze enquête is uitsluitend bedoeld voor huidige studenten of afgestudeerden in het academisch jaar 2022/2023.

In dit onderzoek wil ik graag inzicht krijgen in de relatie tussen sociaal kapitaal van studenten en de betrokkenheid bij activiteiten en (studenten)verenigingen.

De resultaten van het onderzoek kunnen gebruikt worden om sociale relaties onder studenten te bevorderen.

#### Data en anonimiteit

Deze enquête is volledig anoniem. Uw identiteit kan niet gelinkt worden aan uw antwoorden omdat er niet naar persoonlijke informatie gevraagd wordt. Uw gegevens worden verwerkt volgens het privacybeleid van Qualtrics, een online enquêtetool. De bewaartermijn van de gegevens bedraagt maximaal 10 jaar, conform de 'Netherlands Code of Conduct for Research Integrity' (VSNU, 2018).

#### Privacyrechten onder de Algemene Verordening Gegevensbescherming (AVG)

U hebt het recht op inzage, rectificatie en aanvulling, vergetelheid, beperking van verwerking, dataportabiliteit en het recht om bezwaar te maken tegen de verwerking van uw gegevens. Als u vragen heeft of problemen ondervindt tijdens het invullen van deze enquête, kunt u contact met mij opnemen via [525663lk@eur.nl](mailto:525663lk@eur.nl).

#### Participatie

Door deel te nemen aan dit onderzoek geeft u toestemming om uw gegevens te verwerken in het kader van deze studie. Als u op enig moment tijdens de enquête besluit uw toestemming in te trekken, kunt u dit doen door de enquête te verlaten of contact met mij op te nemen via e-mail.

Er zijn geen risico's geassocieerd met deelname aan dit onderzoek. Potentiële voordelen omvatten het verwerven van inzicht in uw sociale relaties.

*Note.* In order of display: instructions followed by questions on fraternity membership, parental education of the respondent, parental education of friend 1, and fraternity membership status of friend 1.



Dank voor uw tijd en medewerking.

Graag ontvang ik uw akkoord door **alle** onderstaande beweringen aan te vinken voordat u doorgaat met het onderzoek.

- Ik begrijp dat ik het recht heb om deelname te weigeren en me terug te trekken uit het onderzoek nadat ik ben begonnen, zonder enige negatieve gevolgen en zonder enige verklaring te geven
- Ik begrijp dat ik vragen over dit onderzoek kan stellen door contact op te nemen met de onderzoeker
- Ik geef toestemming voor de verwerking van mijn anonieme gegevens
- Ik geef toestemming om mijn onderzoeksgegevens voor maximaal 10 jaar op te slaan
- Ik heb de bovenstaande informatie gelezen en ga akkoord met deelname aan het onderzoek

Selecteer alle verenigingen waarbij u **momenteel** lid van bent of **voorheen** lid van bent geweest sinds de **start** van uw studietijd.

- Sportverenigingen (bijv. voetbal, tennis, hockey)
- Muziekverenigingen (bijv. koor, orkest)
- Culturele verenigingen (bijv. theatergroep, filmclub)
- Studieverenigingen (bijv. studievereniging Psychologie)
- Religieuze studentenverenigingen (bijv. Ichthus)
- Studentenverenigingen (bijv. A.S.C./A.V.S.V.)
- Debatingclubs (bijv. Erasmus Debating Society)
- Politieke verenigingen (bijv. Jongerenorganisatie Vrijheid en Democratie, JOVD)
- Internationaal georiënteerde verenigingen (bijv. Erasmus Student Network)
- Studentenraden (bijv. Universiteitsraad)
- Vrijwilligersorganisaties (bijv. Rode Kruis)
- Arbeidsmarkt- en/of ondernemerschapsverenigingen (bijv. Integrand)
- Verenigingen gericht op een specifiek onderwerp anders dan hierboven genoemd (bijv. Erasmus Pride, Erasmus Sustainability Hub, The New Fashion Society)
- Overig, namelijk; \_\_\_\_\_

Van uw ouderlijke verzorgers, wat is het hoogste voltooide onderwijsniveau?

Gelieve **enkel** het hoogste voltooide onderwijsniveau te rapporteren, ongeacht welke ouderlijke

verzorger dit heeft voltooid.

Als het onderwijs niet in Nederland is gevolgd, selecteer dan naar uw beste weten het Nederlandse equivalent.

Voorbeeld: Stel dat uw ene ouderlijke verzorger een MBO-diploma heeft en uw andere ouderlijke verzorger een HBO-diploma, dan kiest u 'Hoger beroepsonderwijs (HBO)'.

- Lager onderwijs (basisschool)
- Voortgezet onderwijs (middelbare school)
- Middelbaar beroepsonderwijs (MBO)
- Hoger beroepsonderwijs (HBO)
- Universitair onderwijs (WO)
- Weet ik niet

De volgende vragen hebben betrekking op het onderwijs dat de primaire ouderlijke verzorgers van uw vrienden afgesloten hebben. Na de instructie volgen de vragen.

#### **Instructie**

Denk aan uw tien beste vrienden die u heeft gemaakt sinds de start van uw studietijd en die tevens student zijn (geweest) aan een hoge school/universiteit.

**Kies hieruit 3 vrienden** waarvan u het beste weet wat het hoogst voltooide onderwijsniveau van hun primaire ouderlijke verzorgers is.

Als het onderwijs niet in Nederland is gevolgd, selecteer dan naar uw beste weten het Nederlandse equivalent.

Ter bevestiging dat u bovenstaande gelezen hebt, selecteer het juiste **aantal vrienden** dat u **kiest**.

- 1
- 3
- 10

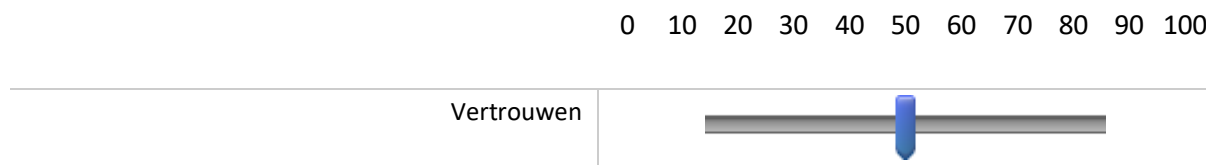
Van de ouderlijke verzorgers van **vriend(in) 1**, wat is het **hoogste** voltooide onderwijsniveau?

Gelieve **enkel** het hoogste voltooide onderwijsniveau te rapporteren, ongeacht welke ouderlijke verzorger dit heeft voltooid.

*Voorbeeld:* Stel dat de ene ouderlijke verzorger een MBO-diploma heeft en de andere ouderlijke verzorger een HBO-diploma, dan kiest u 'Hoger beroepsonderwijs (HBO)'.

- Lager onderwijs (basisschool)
- Voortgezet onderwijs (middelbare school)
- Middelbaar beroepsonderwijs (MBO)
- Hoger beroepsonderwijs (HBO)
- Universitair onderwijs (WO)
- Ik heb een vriend(in) in gedachten, maar ik weet het hoogste voltooide onderwijsniveau niet
- Ik kan de vraag niet beantwoorden omdat ik geen vriend(in) in gedachten heb

Hoeveel vertrouwen heeft u in de juistheid van uw antwoord op de  **vorige**  vraag op een schaal van 0-100%.



Is **vriend(in) 1** lid (geweest) van een studentenvereniging?

- Ja
- Nee
- Weet ik niet

## Appendix B

### Aspredicted Pre-registration Form



#### Fraternity Membership - Economic Connectedness, Netherlands, June 2023 (#133168)

Created: 05/23/2023 11:07 AM (PT)

Public: 05/23/2023 11:08 AM (PT)

**Author(s)**

Lex Krishnadath (Erasmus University) - 525663lk@eur.nl

**1) Have any data been collected for this study already?**

No, no data have been collected for this study yet.

**2) What's the main question being asked or hypothesis being tested in this study?**

Hypothesis 1: Fraternity members have a higher parental socio-economic status (SES) than non-fraternity members.

Hypothesis 2: Students randomly assigned to wait a year before joining the fraternity will exhibit lower friending bias than students who were randomly assigned to join immediately.

Hypothesis 3: Total contribution to connectedness of a group of fraternity members is lower than of a group of non-fraternity members.

Hypothesis 4: Students with low SES who do join a fraternity, accumulate more economic connectedness than students with low SES who do not join a fraternity.

**3) Describe the key dependent variable(s) specifying how they will be measured.**

SES is measured as the highest level of educational attainment of either of the two main parental caregivers.

Friending bias is measured as  $1 - \text{the share of high SES friends of individual } i \text{ in group } g$  where  $g$  is an element of  $G = \{\text{fraternity, non-fraternity}\}$ . Friending bias is determined among low SES students and high SES students. Most interestingly is friending bias among low SES students.

Exposure is measured as the share of high SES individuals in a group divided by the share of above-median-SES students in that group.

Total contribution to connectedness of a group is measured as  $(1 - \text{Exposure}_g) \times \text{Exposure}_g \times (1 - \text{Friending bias}_g)$  where exposure and friending bias are averages of low SES individuals.

Economic connectedness is measured as the share of high SES friends divided by the share of above-median-SES students.

Binding study advice is the minimum number of European Credit Transfer and Accumulation System (ECTS) credits a student is required to obtain in the first year of studying to proceed to the next year.

**4) How many and which conditions will participants be assigned to?**

There are no conditions.

**5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.**

Hypothesis 1 and 3 are about association. I will not specify the exact method, but the analysis will be correlational.

Hypothesis 2, method 1. Simple linear regression with friending bias on winning the lottery and relevant controls.

Hypothesis 2, method 2. Instrumental variable analysis of friending bias on joining the fraternity in the first year of studying with the binding study advice as instrument.

Hypothesis 4, method 1. Simple linear regression with economic connectedness on winning the lottery and relevant controls.

Hypothesis 4, method 2. Instrumental variable analysis of economic connectedness on joining the fraternity in the first year of studying with the binding study advice as instrument.

**6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.**

I will exclude any participants who complete the survey in less than 1 minute.

**7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.**

I will continue data collection until at least 100 non-fraternity members and 100 fraternity members have completed the survey or until June 7, 2023 (whichever comes first).

**8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)**

Nothing else to pre-register.

Version of AsPredicted Questions: 2.00

Available at <https://aspredicted.org/y98qt.pdf>

(Permanently archived at [http://web.archive.org/web/\\*/https://aspredicted.org/y98qt.pdf](http://web.archive.org/web/*/https://aspredicted.org/y98qt.pdf))

*Note.* Aspredicted.org can be consulted at <https://aspredicted.org/y98qt.pdf>. The third hypothesis was dropped as the data proved inappropriate for hypothesis testing. Hypothesis 2 and analyses were adjusted because there was an insufficient number of respondents who took part in the lottery.

## Appendix C

### Personalized Debrief (Dutch) at the End of the Survey

Bedankt voor het invullen van de survey.

Het sociaal kapitaal van uw sociale relaties is te vinden in Tabel 1.

#### Tabel 1 - Sociaal kapitaal (onderwijs) per vriend

*Ouder vriend 1:* Hoger beroepsonderwijs (HBO)

*Ouder vriend 2:* Universitair onderwijs (WO)

*Ouder vriend 3:* Middelbaar beroepsonderwijs (MBO)

#### Als u willekeurig vrienden zou maken...

1/3 van alle HBO- en WO studenten bestaat uit eerstegeneratiestudenten.

Eerstegeneratiestudenten zijn studenten wiens beide ouders geen HBO- of WO-opleiding hebben afgerond.

Als u willekeurig vrienden zou maken en **niet** een eerstegeneratiestudent zou zijn, zou 1 van uw 3 vrienden een eerstegeneratiestudent zijn.

Als u willekeurig vrienden zou maken en **wel** een eerstegeneratiestudent zou zijn, zouden 2 van uw 3 vrienden **geen** eerstegeneratiestudenten zijn.

*Note.* 'Tabel 1' differed for each respondent depending on their answers.

## Appendix D

### Recoding of Variables

Two open-ended 'other, please specify' questions and one closed-ended question were recoded. Regarding the first open-ended question, fraternity membership was recoded to 'non-fraternity member' if the respondent indicated that they were a fraternity member of R.S.K.V. Erasmus (N = 1) because it classifies as a sports association. Skadi (N = 5) and Nereus (N = 1) were not counted as sports associations despite being student rowing associations because these associations are respectively sub-associations of RSC/RVSV and ASC/AVSV, which are both fraternities. The second open-ended question that was recoded is about the current higher education institution. Open-ended answers that included 'Viaa' (N = 3) were coded as 'Viaa Christian University of Applied Sciences'.

The variable age had two response options that were recoded. 17 or younger and 28 or older were recoded to respectively 17 (N=1) and 28 (N=1). These options were included in the question to increase survey accessibility.

One respondent indicated that they pursued a bachelor's but 'did not currently study' in a later open-ended question. This respondent is *not* excluded because the respondent likely pursued a bachelor's in 2022/2023, but already graduated.

## Appendix E

### Motivation for Distinction Between High- and Low-SES

In the general Dutch population, a higher professional education degree from a university of applied sciences may be considered high SES, as it shares the same ISCED classification—level 6 (bachelor's) or 7 (master's)—with a traditional university degree (CBS, 2011). Yet, applying this standard does not align with the Dutch context, as only a fraction of students (1.6% in 2021) pursue a master's degree at a university of applied sciences (CBS, 2023b), thus falling into ISCED level 6. Conversely, a larger proportion (13.2% in 2021) pursues a master's degree at a university (CBS, 2023b), which is classified at ISCED level 7. Furthermore, of all students who obtained a bachelor's degree at a university of applied sciences in 2021, only 21% pursued another degree (CBS, 2023a). In contrast, 82% of university bachelor's graduates pursued another degree in 2021 (CBS, 2023a). These statistics indicate that most Dutch master's students are pursuing their master's at a university, thus falling into ISCED level 7. Therefore, I argue that a more appropriate standard would be ISCED level 6 for a higher professional education degree and ISCED level 7 for a university degree. Lastly, a lower cutoff would create insufficient variability in the sample. Indeed, the actual number of low-SES students in my sample – those whose parents did not complete any higher education degree – was too low (12.1%) to perform regression analysis. Furthermore, I chose not to include the former students in my definition of low-SES students as these groups of students are substantially different. Hence, I opted for this particular distinction.

## Appendix F

### Confidence in Accuracy of Parental Education of Friends 1, 2, 3 by Fraternity Membership

Exploratory data analysis was conducted to investigate respondents' confidence in the accuracy of their answers relating to the parental education of their friends 1, 2, and 3 (see Table F1). Respondents' ability to answer these recall-based questions is crucial for conducting valid hypothesis testing. The wrong conclusion might be drawn if the data is inaccurate. However, excluding respondents would result in flawed conclusions as well. This could be the case because the confidence in the accuracy of a respondent's answer to the parental education of their friends could be evaluated as an outcome variable. In fact, it could serve as a proxy for the strength of friendship. Knowledge of a friend's parental education is not salient and requires some level of friendship before acquiring it.

**Table F1**

*Confidence in Accuracy of Parental Education of Friends 1, 2, 3 by Fraternity Membership*

| Variable                            | Non-fraternity members<br>N (%) | Fraternity members<br>N (%) |
|-------------------------------------|---------------------------------|-----------------------------|
| <b>Friend 1</b>                     |                                 |                             |
| Unable to answer <sup>a</sup>       | 11 (14.7%)                      | 1 (0.9%)                    |
| Confidence ≥ 70%                    | 57 (76.0%)                      | 111 (96.5%)                 |
| Confidence ≥ 80%                    | 52 (69.3%)                      | 103 (89.6%)                 |
| Confidence ≥ 90%                    | 45 (60.0%)                      | 94 (81.7%)                  |
| <b>Friend 2</b>                     |                                 |                             |
| Unable to answer <sup>a</sup>       | 19 (25.3%)                      | 1 (0.9%)                    |
| Confidence ≥ 70%                    | 53 (70.7%)                      | 110 (95.7%)                 |
| Confidence ≥ 80%                    | 44 (58.7%)                      | 101 (87.8%)                 |
| Confidence ≥ 90%                    | 36 (48.0%)                      | 86 (74.8%)                  |
| <b>Friend 3</b>                     |                                 |                             |
| Unable to answer <sup>a</sup>       | 21 (28.0%)                      | 7 (6.1%)                    |
| Confidence ≥ 70%                    | 45 (60.0%)                      | 103 (89.6%)                 |
| Confidence ≥ 80%                    | 41 (54.7%)                      | 95 (82.6%)                  |
| Confidence ≥ 90%                    | 34 (45.3%)                      | 88 (76.5%)                  |
| <b>Friends 1, 2, and 3 combined</b> |                                 |                             |
| Unable to answer*                   | 9 (12.0%)                       | 0 (0.0%)                    |
| Confidence ≥ 70%                    | 38 (50.7%)                      | 100 (87.0%)                 |
| Confidence ≥ 80%                    | 29 (38.7%)                      | 85 (73.9%)                  |
| Confidence ≥ 90%                    | 22 (29.3%)                      | 73 (63.5%)                  |

*Note.* Confidence is on a scale from 0 – 100%. N = 190, with N = 75 for non-fraternity members and N = 115 for fraternity members.

<sup>a</sup> Excludes respondents that were unable to answer because they could not come up with a friend and only includes respondents who were able to come up with a friend but did not know the parental education.

Excluding respondents with lower levels of strength of friendship is associated with three issues that could result in flawed conclusions. First, Type 2 error is more likely to occur as the sample size is reduced and thus the power to detect an effect. Secondly, the sample size might be reduced



unevenly by fraternity membership status. This could introduce selection bias in the sample that was previously non-existent. To illustrate, fraternity members might have stronger friendships than non-fraternity members. One would be unable to find this effect if non-fraternity members with weaker friendships were excluded. This proves problematic in this context because the strength of friendships is potentially related to EC. Third, one draws conclusions based on an unrepresentative sample as only students *with strong friendships* remain if students with weaker friendships are excluded. Table E1 illustrates the severity of these three issues in this sample.

Next, I will provide a solution that addresses the issues of Type 2 error, introduced selection bias, and introduced unrepresentativeness of the sample associated with excluding respondents. Instead of excluding respondents, I recode friendships 1, 2, and 3 to non-friends. Specifically, I recode friends of whom the respondent is unable to provide parental education as non-friend. Likewise, parental education of friends that have a confidence level lower than 70% are considered non-friends. In essence, I fix the quality of friends and allow for variation in quantity instead of fixing the quantity of friends and allowing for variation in quality. For the interpretation of friending bias, I correct for differences in the number of friends made by calculating how many more friends a high-SES student makes as compared to a low-SES student (see the Exposure and friending bias section).

## Appendix G

### Decomposing Economic Connectedness into Exposure and Friending Bias

Following Chetty et al.'s (2022b) methods,  $EC_{H,i}$  is decomposed into exposure and friending bias per group. In this context, students can form friendships within two distinct groups: fraternity and non-fraternity circles:

$$G = \{g_1, g_2\}, \quad (2)$$

where  $g_1$  refers to the pool of fraternity members and  $g_2$  refers to the pool of non-fraternity members. Let  $\phi_{i,g}$  represent the share of friends student  $i$  has in group  $g$  and let  $f_{H,i,g}$  denote the share of high-SES friends student  $i$  has in group  $g$ . In contrast to Chetty et al. (2022a, b),  $\sum_{g \in G} \phi_{i,g} = 0$  for 14 students (7.4%) because there are students in this sample with zero friends of which they know the parental education with a confidence of at least 70% (see Economic connectedness section for the definition of friends). For all other students ( $N = 176$ ),  $\sum_{g \in G} \phi_{i,g} = 1$ . If  $\phi_{i,g} = 0$  in one group but not in two groups,  $f_{H,i,g}$  is set to 0. This is not a problem because the outcome of formula (14) remains unaffected since  $\phi_{i,g} = 0$ .

EC of individual  $i$  equates to the product of three components in  $g_1$  summed with the product of three components in  $g_2$ :

$$EC_{H,i} = \frac{f_{H,i}}{w_H} = \sum_{g \in G} \left[ \phi_{i,g} \times \frac{f_{H,i,g}}{w_H} \right] = \sum_{g \in G} \left[ \phi_{i,g} \times \frac{w_{H,g}}{w_H} \times \frac{f_{H,i,g}}{w_{H,g}} \right]$$

$$EC_{H,i} = \sum_{g \in G} \left[ \phi_{i,g} \times \frac{w_{H,g}}{w_H} \times \frac{f_{H,i,g}}{w_{H,g}} \right] = \sum_{g \in G} \left[ \phi_{i,g} \times Exposure_{H,g} \times (1 - Friending\ bias_{H,i,g}) \right] \quad (15)$$

## Appendix H

### First-Stage and Second-Stage IV Regressions

**Table H1**

*1<sup>st</sup> Stage Regression of Fraternity Membership on Strict BSA*

| Variable   | <i>B</i> | <i>R.SE</i> | <i>p</i> | 95% CI |       |
|------------|----------|-------------|----------|--------|-------|
|            |          |             |          | Lower  | Upper |
| Strict BSA | 0.25     | 0.13        | .070     | -0.02  | 0.52  |
| Constant   | 0.33     | 0.09        | <.001    | 0.16   | 0.51  |

*Note.* N = 54. Model  $\chi^2(1) = 3.43$ ,  $p = .070$ , *R.SE* = robust standard error.  $R^2 = .06$ . 2-stage least squares regression. Instrumental variable: strict BSA ( $\geq 50$  ECTS credits) in the first year of study.

**Table H2**

*2<sup>nd</sup> Stage Regression of Economic Connectedness on Strict BSA*

| Variable   | <i>B</i> | <i>R.SE</i> | <i>p</i> | 95% CI |       |
|------------|----------|-------------|----------|--------|-------|
|            |          |             |          | Lower  | Upper |
| Strict BSA | 0.93     | 0.26        | <.01     | 0.41   | 1.43  |
| Constant   | 1.22     | 0.19        | <.001    | 0.83   | 1.60  |

*Note.* N = 54. Model  $\chi^2(1) = 13.07$ ,  $p < .001$ , *R.SE* = robust standard error.  $R^2 = .19$ . 2-stage least squares regression. Instrumental variable: strict BSA ( $\geq 50$  ECTS credits) in the first year of study.

**Table H3**

*2<sup>nd</sup> Stage Regression of Friending Bias Among Fraternity Friends on Strict BSA*

| Variable   | <i>B</i> | <i>R.SE</i> | <i>p</i> | 95% CI |       |
|------------|----------|-------------|----------|--------|-------|
|            |          |             |          | Lower  | Upper |
| Strict BSA | -0.27    | 0.14        | .056     | -0.56  | 0.01  |
| Constant   | 0.59     | 0.10        | <.001    | 0.40   | 0.78  |

*Note.* N = 54. Model  $\chi^2(1) = 3.82$ ,  $p = .059$ , *R.SE* = robust standard error.  $R^2 = .07$ . 2-stage least squares regression. Instrumental variable: strict BSA ( $\geq 50$  ECTS credits) in the first year of study.