Do Students Benefit From Going Backward? The Academic and Labor Market Consequences of Four- to Two-Year College Transfer

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Abstract

Facilitating student transfer from two-year to four-year institutions has been a focus of research and policy in recent years. Much less attention has been given to the phenomenon of four-year to two-year (4–2) college transfer. About 16 percent of students who begin in a four-year college transfer to a two-year college within six years. Using the restricted Education Longitudinal Study (ELS) data and the public higher education data from one small state, this paper examines the effects of 4–2 transfer on "struggling" students, those who earned less than a 3.0 grade point average in the first term. My key identification strategy involves using distance to the closest two-year college as an instrumental variable (IV). Due to the small sample size of the national data, the IV method is only able to gain enough power to produce robust results for the state data and not the national data. As a robustness check, this paper also uses the propensity score matching strategy in addition to the ordinary least square approach. Results indicate that these 4–2 transfer students are more likely than similar non-transfer students to attain two-year college credentials (including associate degrees and long- and short-term certificates); the gain is concentrated in women who tend to enroll in health-related programs. What is more, struggling students who transfer to two-year colleges are no less likely than struggling non-transfer students to earn a bachelor's degree. Early employment outcomes also indicate that the labor market does not penalize 4–2 transfer behavior. Furthermore, the national results show that 4–2 transfer students have higher job satisfaction then non-transfer students. Falsification tests show strong first stage results and no correlation between distance and socioeconomic indicators, which supports the use of distance as an instrumental variable for 4–2 transfer status. The findings indicate that 4–2 transfer can improve college completion for students struggling in four-year institutions.

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1. Introduction

College entry is like an experiment for students in that does not necessarily result in a college degree (Manski & Wise, 1983). According to the U.S. Department of Education (2015), only 39 percent of first-time, four-year students who entered college in 2007 completed at the first institution they attended within four years, and only 59 percent did so within six years. Students are at risk of dropping out if their first-year grade point average (GPA) is under 3.0. Indeed, the Education Advisory Board has reported that while most institutions classify students at risk of dropping out as those with GPAs below 2.0 in the first year, the completion rate drops down to as low as 12 percent for the "murky middle," those with first-year GPAs between 2.0 and 3.0 (Tyson, 2014). These struggling students are more likely to be students of low socioeconomic status (SES) who have been historically underrepresented in higher education (Walpole, 2003). Indeed, sociologists are concerned that drop-out and 4–2 transfer might exacerbate the persistent socioeconomic gap in college completion (Goldrick-Rab & Pfeffer, 2009).

For struggling four-year students who wish to complete a college degree, one option is to transfer to a two-year institution. This is known as reverse transfer; however, because that term has been recently used to describe another transfer process,[1] I refer to students who transfer from a four-year to a two-year college as four- to two-year (4–2) transfer students. In addition to struggling students who transfer to two-year institutions, there are also "strategic" 4–2 transfer students who do so. These students perform well in their four-year college but seek to take advantage of two-year courses as an inexpensive and faster way to complete their requirements. This paper focuses on the former type of 4–2 transfer students, as they are of higher policy relevance.

My calculations with Beginning Postsecondary Students (BPS) data found that 11 percent of beginning four-year college students had two-year colleges as the last institution attended. The percentages were calculated within six years from college entry and were the same across the 1989–90, 1995–96, and 2003–04 beginning cohorts. When including those who transferred to a two-year college and eventually returned to a four-year college, a study using National Student Clearinghouse (NSC) data found the percentage to be 16 percent (Hossler et al., 2012b).

Struggling students at four-year colleges may want to transfer because they perceive that they have a lower likelihood of success at their original institution. And, too, struggling students at four-year colleges have compelling financial reasons to transfer to two-year colleges. The direct cost of two-year college is substantially cheaper than four-year college. For the 2015–16 school year, public four-year students paid $4,000 on average after deducting financial aid and tax credits, and many spent an additional $10,140 in room and board. In contrast, two-year

[1] Reverse transfer also describes the process under which community college students, who transfer to four-year schools prior to receiving their associate degrees, can nonetheless receive a two-year degree if they send their transcript back to their community college.

students had an average net tuition/fee of $0 due to Pell Grants, and many of them lived at home (Baum, Ma, Pender, & Bell, 2015). Furthermore, two-year institutions offer credentials at least two years more quickly at more convenient locations and with more flexible schedules than four-year colleges. The opportunity cost of attending two-year colleges is therefore also potentially much lower.

So far, not only do we know very little about the potential benefits of 4–2 transfer, the phenomenon itself has not been the subject of much discussion in the academic literature. On the one hand, two-year colleges give those who otherwise may not complete a four-year college degree a chance to continue with their postsecondary education, commonly known as the democratization effect (Brint & Karabel, 1989; Rouse, 1995). On the other hand, two-year colleges may divert 4–2 transfer students from returning to four-year institutions with more credentialing options and instead group them with peers who have lower aspirations—known as the "cooling-out" effect.

Past studies have looked at 4–2 transfer outcomes only descriptively or through propensity score matching. Most of the 4–2 transfer literature is qualitative, outdated, and focused on a single school system or region. Even among national studies with more recent data, researchers often directly compared 4–2 transfer students with either four-year dropouts or with four-year students who never transfer, both of whom are inherently very different from 4–2 transfer students. Only one study that I am aware of has attempted to examine the economic value of 4–2 transfer (Kalogrides & Grodsky, 2011).

This paper is the first to provide a quasi-experimental examination of the causal effect of 4–2 transfer on students' academic and short-term labor market outcomes. Of course, students do not transfer out of four-year institutions randomly, and therefore a direct comparison of 4–2 transfer and non-transfer students would be subject to self-selection bias. I address this endogeneity issue by using distance from high school attended to the closest two-year college as an instrumental variable (IV) with national and state-level datasets. The national data is the restricted Education Longitudinal Study data of 2002 including cohorts entering four-year institutions in 2004. The second source of data is a detailed state-level administrative dataset (from a small, anonymous state) on 2005–06 to 2007–08 student cohorts. The validity tests show that the IV strongly correlates with a four-year student's 4–2 transfer status, yet it does not correlate with socioeconomic indicators nor does it predict the outcomes of two-year students. In order to focus on students transferring due to academic difficulties, I limit the sample to students at risk of dropping out—those who have a GPA below 3.0 in the first term. The small sample size of the national data makes it challenging for the IV strategy to produce statistically significant results. As a robustness check, I also included results from propensity scores matching approach.

Among this sample of struggling students, the IV results show that transfer and non-transfer students are equally likely to earn a bachelor's degree. Female struggling 4–2 transfer

students were, straightforwardly, more likely to earn two-year college credentials relative to their peers who did not transfer. They were more likely to major in a health-related field, which have higher two-year completion rates in general. Struggling 4–2 transfer students and non-transfer students also had similar earnings and employment rates five to seven years after enrolling in the initial four-year institution. The national results further found higher job satisfaction seven years after entering college among 4–2 transfer students than non-transfer students. These results suggest that two-year colleges can be beneficial for four-year students who struggle academically in college. Nonetheless, a longer follow-up period would be ideal to provide a proper evaluation of the long-term employment outcomes of 4–2 transfer.

2. Literature Review

Researchers first noticed the behavior of 4–2 transfer in the 1950s (Clark, 1960). While a large body of research has been devoted to examining the student characteristics of 4–2 transfer students (Brimm & Achilles, 1976; Hagedorn & Castro, 1999; Hill-Brown, 1989; Hogan, 1986; Kajstura & Keim, 1992; Kinnick et al, 1997; Klepper, 1990; Quinley & Quinley, 1998; Slark, 1982; Steenhoek, 1985; Swedler, 1983; Vaala, 1991), we know relatively little about their outcomes. And no studies have focused exclusively on 4–2 transfer students who struggled academically at their initial four-year college. Earlier studies often surveyed 4–2 transfer students at two-year colleges to compare their experiences before and after 4–2 transfer. They found that 4–2 transfer students were much more satisfied with their college education after they transferred (Hill-Brown, 1989; Kuznik, 1972). Students reported better experiences with counseling services and the job placement process, and they found the curriculum more relevant to their career expectations at their two-year schools. They also preferred the smaller class sizes and more individualized attention they received at two-year colleges (Kajstura & Keim, 1992; Losak, 1980; Vaala, 1991).

These earlier studies are problematic for numerous reasons. First, survey data were often non-representative since they were subject to survey bias. The studies used very small sample sizes, and the population sampled often drew from a single school or region. Second, these studies used as their sample population students who transferred to and then stayed in two-year colleges, which omits the portion of students who returned to a four-year college. This portion may be as much as 45 percent of all 4–2 transfer students (Hossler et al., 2012a). Third, examining a student's experience before and after 4–2 transfer is not helpful in predicting student outcomes for those who did not transfer. Using beginning two-year students as a comparison group is also inappropriate since they are likely to be very different from 4–2 transfer students who have already gained entrance to four-year colleges.

With the increased availability of national data, three studies published between 1997 and 2012 used large-scale quantitative datasets to investigate the academic outcomes of 4–2 transfer students (Hossler et al., 2012a; Kalogrides & Grodsky, 2011; Yang, 2007).[2] Directly comparing 4–2 transfer students with exclusively four-year students, these studies found that 4–2 transfer students were more likely to earn two-year college credentials and less likely to earn bachelor's degrees. This result seems obvious since community colleges generally do not offer four-year degrees.[3] Hossler et al. (2012a) found that these outcomes had improved slightly for the entering fall 2005 cohort in the NSC data, which are representative of 93 percent of national enrollment. Six years after first entering college, 18 percent of 4–2 transfer students completed a bachelor's degree and 16 percent were still enrolled at any four-year institution. Another one third had either completed or were still enrolled at a two-year college, and another third had neither completed nor were enrolled at any postsecondary institution.

To my knowledge, only Kalogrides and Grodsky (2011) have examined the labor market earnings of 4–2 transfer students. Using propensity score matching, they found that 4–2 transfer students earned almost the same as four-year students who dropped out six years after starting college for the first time, 20 percent less than lateral transfer students, and 24 percent less than bachelor's degree holders. These results seem to discourage 4–2 transfer as they suggest that students typically do not go back and earn a bachelor's degree and thus have less earning power. However, this study and those cited above may not provide a fair assessment of 4–2 transfer due to their descriptive nature and choices of definitions or comparison groups.

Comparing the outcomes of 4–2 transfer and non-4–2 transfer students directly is problematic since individuals do not transfer randomly. If 4–2 transfer students tend to be low SES or lower performing, the results will be biased downward. Yang (2007) attempted to address this selection issue with a multinomial selection model, which is a generalized version of Heckman's (1979) two-stage least squares model. As this model requires researchers to include all of the determinants of 4–2 transfer, data limitations may have prevented Yang from calculating unbiased estimates. Kalogrides and Grodsky (2011) applied the propensity score matching approach, but they matched 4–2 transfer students with three comparison groups instead of one as in the conventional approach. As a result, the matching process dropped any individuals who were not similar to all three groups and returned a highly selected group of individuals. The results may therefore have limited external validity.

In addition, the complexity of intentions underlying student transfer mobility also makes it difficult to identify the appropriate group of 4–2 transfer students for comparison. The literature indicates that 4–2 transfer students transfer for many reasons. Struggling students may transfer to seek a lower cost of education or a less competitive environment for a postsecondary

[2] These studies used different samples of 4–2 transfer students in an attempt to isolate struggling students. I discuss their sample definitions more below.

[3] A growing number of states allow their community colleges to offer bachelor's degrees.

degree. High achievers may take summer courses or use two-year colleges as an economical way to complete their four-year education at a faster pace (Townsend & Dever, 1999). Most of the national-level research has attempted to examine the former group of 4–2 transfer students, the struggling students, since they are of higher policy relevance. This focus aligns with the national college completion agenda—struggling students are the group of students who are most in need of improved completion rates.

In practice, it is challenging to interpret students' intent simply with transcript data. The national research has attempted different ways of identifying 4–2 transfer students in a useful way. McCormick and Carroll (1997) had the most exclusive definition. They defined 4–2 transfer students as students who permanently left their initial four-year college for a two-year college and therefore omitted students who eventually returned to a four-year school. Yang (2007) and Kalogrides and Grodsky (2011) both identified 4–2 transfer students by first transfer status, and the latter study also required a 4–2 transfer student to have earned at least 10 credits at the two-year college. The 10 credit threshold is helpful in identifying the target population, but looking only at first transfer status may omit students who transferred to a two-year college after first transferring to another four-year college.

In light of this issue, Hossler et al. (2012a) expanded the pool of 4–2 transfer students to include those summer course takers who had taken just one course at a two-year college regardless of when they transferred and multiple-term 4–2 transfer students who spent more than one term at a two-year college. While this definition includes students who transferred multiple times, the inclusion of multiple-term 4–2 transfer students fails to exclude high achievers who took more than one course at a two-year college.

Furthermore, these studies use four-year dropouts, exclusively four-year students, or bachelor's degree holders as the comparison group. These groups of individuals are inherently different from struggling 4–2 transfer students. A better comparison group for struggling 4–2 transfer students would be other struggling students who have similar characteristics to these 4–2 transfer students.

This paper makes the following three contributions to the literature on 4–2 transfer. First, using dataset of cohorts of students who started college on or after 2004, this study is based on more recent data. Second, it is the first paper to examine the outcomes of 4–2 transfer students using quasi-experimental methods, allowing for a causal interpretation. Third, I have refined the practical definition and sample limitations of previous studies to capture the target sample of students who struggle academically at the four-year college. To do so, I examine students whose GPA was lower than 3.0 in their first term. Building on previous practical definitions of 4–2 transfer students, I define 4–2 transfer students as those who have ever taken a course in the fall or spring semester at a two-year college, as struggling 4–2 transfer students are more likely to take courses at the two-year college in the academic year than high achievers who attend two-year colleges strategically.

3. Method

Theoretical Framework

Several college persistence theories seek to explain student persistence and completion in college (Bean, 1983; Spady, 1970, 1971). In particular, Bean's student attrition model (1985) and Tinto's student integration model (1975, 1987) provide relevant frameworks on transfer. The student attrition model emphasizes the role of internal and external factors in changing one's beliefs and attitudes, which leads to changes in intentions and finally behavior. College is one such process in which this may occur. Low academic achievement, a competitive environment, and financial burdens are just a few factors that may cause a student to re-evaluate his or her decision to attend a certain college. Many students transfer or drop out after learning more about themselves in college and evaluating the benefits and costs of different options. This paper examines students who entered a four-year college and received GPAs lower than 3.0 in their first term. Struggling students may interpret a low GPA as a sign of their low chance of graduation and may experience doubt about attaining a four-year degree. Assuming that distance is unrelated to socioeconomic status or other characteristics that may influence academic or labor market outcomes, struggling students closer to a two-year school may be more likely than students who do not have a two-year school nearby to transfer to a less expensive and perhaps less challenging higher education path.

The student integration model describes another aspect of transfer and subsequent enrollment. Tinto (1975, 1987) held that college persistence is the result of a proper match between the student's motivation and academic ability and the institution's academic and social factors. In the case of 4–2 transfer, a low-achieving student at a four-year college will be less likely to persist and may be better off at a two-year college. Yet two-year colleges are also very different from four-year institutions in terms of student body, college mission, and campus environment. Persistence in the subsequent two-year institution depends on the academic and social match between the student and the institution.

Empirical Strategy

Basic ordinary least squares model. To examine whether 4–2 transfer is a good option for struggling four-year students, I first use a basic ordinary least squares (OLS) model:

$$Y_{it} = \alpha_i + \beta_i \, transfer + \Omega_i \, X + \xi_i \qquad (1)$$

where outcome Y at time t is a function of transfer status, *transfer*, indicating whether an individual engaged in 4–2 transfer or remained at the four-year level; a vector of prior-transfer student characteristics, X, such as race, age at enrollment, first-term GPA, intent, and remedial and college-level credits earned in first term, and initial four-year institution fixed effects. Given

the differences of variable include in the datasets, the state and national analyses have different controls. In the state analysis, equation (1) also includes major fixed effects, congressional district fixed effects,[4] and a vector of county-level SES indicators. With the national analysis, additional controls in X in equation (1) includes parental education, SES quintile, high school indicators, sector and selectivity of college, financial aid offer, attend college out-of-state dummy, and work hours in first year of college, and state fixed effects and county fixed effect

With equation (1), I explore both academic and labor market outcomes. For academic outcomes, I choose three binary outcomes that equal 1 if individuals earned at least a bachelor's degree, a two-year college credential, or either type of postsecondary credential. Two-year college credentials include associate degrees and long-term and short-term certificates. I also look at enrollment in the fifth, sixth, and seventh years after entering college for the first time. Next I look at three employment outcomes: whether the student was employed, actual earnings, and log earnings for the fifth to seventh years after first entering college. In addition to the covariates in equation (1), I also add the number of years worked to control for differences in students' experiences.

It is possible that 4–2 transfer behavior varies with an individual's major, initial institution, and cohort. For example, certain counties, four-year colleges, or departments may have historically higher rates of 4–2 transfer, or 4–2 transfer rates may be higher in more recent cohorts. To address this potential issue, I included cohort, academic major, and initial four-year institution fixed-effects to the equation for the state analysis and initial four-year institution fixed-effects, county, and state fixed effect for the national analysis.

Addressing self-selection bias with an instrumental variable approach. One of the major concerns in examining transfer behavior is self-selection bias. Students do not transfer randomly, and those who self-select into 4–2 transfer may be substantially different from those who do not. If these omitted selection differences are not controlled for, β will be biased in equation (1). For example, if 4–2 transfer students tend to be low-performing students, β will be biased downward, since they will likely have less favorable outcomes regardless of transfer status. One causal method to address this issue is to use an instrumental variable (IV) that is related to the treatment status but has no relationship to the outcomes. One such example in the returns to education literature is proximity to college (Card, 1995; Long & Kurlaender, 2009).

I use the geodetic distance (which is the shortest curve along the surface of the earth) from high school attended to the closest two-year college as an IV for 4–2 transfer status. Distance from high school attended is a better IV than distance from four-year college attended because students are more likely to move away for four-year education and less likely to do so for two-year college.[5] Since high school students tend to attend school in their own district, high

[4] Equation (1) is unable to control for county fixed effects for state analysis because some counties only have one high school in the dataset. The next level of geographical fixed effects is congressional district fixed effects.
[5] First-stage results using distance from four-year institutions are not statistically significant.

school location is a good proxy for students' home location. The rationale behind the IV is that struggling four-year students are more likely to engage in 4–2 transfer if there is a two-year college close to home.

To carry out the IV approach, the probability of 4–2 transfer is predicted using the IV *Distance* in the first stage:

$$transfer_i = \infty_i + \delta_i \, Distance + \gamma_i \, X + \varepsilon_i \qquad (2)$$

where proximity to two-year college, *Distance*, is calculated in miles. The actual 4–2 transfer status in equation (1) is then substituted with the predicted values of the 4–2 transfer status from equation (2), $\widehat{transfer}$, as the second stage of the two-stage least squares process.

There are several concerns with using distance as an IV in this study. The first concern is the endogeneity of the IV. Individuals who place a higher value on education may choose to live closer to a postsecondary campus (Card, 1995; Long & Kurlaender, 2008; Rouse, 1995; Xu & Jaggers, 2014). In this case, the IV would no longer be random, which violates a crucial assumption of the IV approach. Also, the exclusion restriction assumption would also be violated if residence were directly correlated with academic or labor market outcomes. This problem is more severe when using distance to four-year college as an IV since families are more likely to decide their residence based on the proximity to four-year rather than two-year colleges. The first-term GPA restriction used in the analysis has also reduced this concern to some extent, which ensures homogeneous pre-transfer characteristics in the treatment and control groups (see Table 1). I further include county-level SES indicators (State data) or county fixed effects (national data) in the regressions and conduct falsification tests to examine the correlation between distance and SES.

The same studies also raise concerns about differences in perception of distance depending on location. While students are accustomed to driving farther for college in big states, the distance that individuals are willing to travel in cities that rely on metropolitan transit is much shorter. This concern is minimal in the context of state analysis because this study only examines data from one state. With the state data, the average distance to the closest two-year college is 18.6 miles, and 90 percent of the students are within 38 miles of a two-year college. The differential perception of distance is unlikely to be a concern within such a small range. It may be a bigger concern with using the ELS data. Nevertheless I include rich geographical controls such as congressional district fixed effects, metropolitan area fixed effects, and county-level socioeconomic indicators in all of the analyses to control for any urban/rural and county-specific variations. Finally, the IV must be strongly correlated to the treatment in one direction for the IV to be valid. The first-stage results support this assumption; I discuss them in section 5.

4. Data

Dataset

State Data. The administrative dataset used for this study contains data on first-time-in-college, degree-seeking students from the public higher education system of a small state who first enrolled in the academic years 2005–06, 2006–07, and 2007–08. These students were followed for approximately five to seven years, through the summer of 2013. The system consists of over 30 large, midsize, and small two-year and four-year institutions in rural, urban, and suburban settings. For the above time frame, transcript data are available for approximately 16,000 beginning four-year and 16,000 beginning two-year students.

The dataset contains information on student demographics, high schools attended (including institution name, high school GPA, and standardized test scores), college transcripts for any public institution attended (which include major and degree information, courses taken and grades received, course delivery format, and duration of study), and employment outcomes from the Unemployment Insurance record (quarterly earnings adjusted to 2010 dollars and industry codes).

I merged the data with county-level SES indicators at the time of college enrollment from the Bureau of Labor Statistics and the State Department of Health, such as household income, per capita income, percentage of drinkers or smokers, proportion of mothers under 20 years old, percentage of residents without health insurance, and percentage of students receiving free or reduced-price lunch at schools.

While I use the entire dataset for descriptive statistics and validity testing, I conduct my main analysis with a sample of students who started at four-year colleges intending to receive a bachelor's degree with first-term GPAs below 3.0. This sample contains approximately 7,500 beginning four-year students, in which 25 percent have ever taken a course at a two-year college in the fall or spring semester and another 10 percent have done so only in the summer. I define the former group of students as struggling 4–2 transfer students and the latter as summer course takers.

This dataset is suitable for studying 4–2 transfer students because it contains data on a large number of potential 4–2 transfer students and because of the higher proportion of 4–2 transfer students in the state being studied relative to states with lower student transfer mobility. The state's four-year and six-year graduation rates in 2013 were around 20 percent and 40 percent, approximately one-third lower than national averages (Kena et al., 2015).

This dataset is useful for addressing some of the methodological challenges found in the previous literature because it contains both four-year and two-year students starting college in 2005–08. Other than Hossler et al. (2012a), no study has examined cohorts who entered school after the 2000s. The dataset also contains detailed transcript records that include student majors

and specific course information for all courses taken and institutions attended in the state system. These details enable me to control for any major- or institution-specific effects of 4–2 transfer.

Despite the strength of the dataset, it has several shortcomings. First, it only contains transcript records from the state's public system, which prevents examination of students who started in or transferred to out-of-state or private colleges. Fortunately, the presence of private college students is very small among 4–2 transfer students. According to the U.S. Department of Education (2006), about 85 percent of four-year students in the current state began at a public university while the percentage is 65 percent nationally for the 2005-06 cohort. My calculations from Hossler et al. (2012a) also indicate that 98 percent of 4–2 transfer students transfer to *public* two-year colleges nationally. Thus my results and analysis still provide meaningful estimations for an average 4–2 transfer student.

Second, the earnings data do not cover out-of-state workers, military personnel, some federal personnel, independent contractors and self-employed individuals, and laborers in the informal sector. The Bureau of Labor Statistics suggests that about 10 percent of civilians are not included in the UI data, mainly because they are independent contractors (see Stevens, 2007). Reassuringly, the coverage in the current data is high. As much as 98 percent of the individuals have at least one earnings record within five years after they enrolled.

Finally, the data have no direct information on the socioeconomic status (SES) of individuals. Since one of the concerns with using distance as an IV is that residences may correlate with SES, I merged the data with county-level SES indicators to be included in the regressions and falsification tests.

National Data. The second data source is the Education Longitudinal Study of 2002 (ELS). The ELS is a nationally representative survey of students who were in 10th grade in 2002. These students were followed up with an additional survey wave in 2004 (for most, their final year of high school), and the sample was freshened to be representative of students enrolled in 12th grade in the spring of 2004. Additional follow ups were in 2006 (when most were in college for some period) and in 2012 (by which time many had terminated their postsecondary education).

The ELS includes a comprehensive set of demographic variable and the key variable to construct the distance IV – zip code. It also has detailed information high school performance prior to college enrollment. Over the college years there is information on awards obtained, as well as on college experiences and labor market activities. This information is extended through to 2012, when the respondents were aged 26.

The final sample consists of around 650 four-year beginning students with non-missing zip code, transcript, and labor market records. Due to the inconsistency of term-level data from different institutions, I am only able to loosely definite 4–2 transfer as any beginning four-year students who have ever taken a course at a two-year college.

The main shortcomings of the data are inability to compare across term-level data and the small sample size. Since the term-level transcript data are from different institutions across the nation, the inconsistency of data and academic calendar makes it difficult to clearly identify term as the simple "fall", "spring", and "summer". As a result, the definition of 4–2 transfer in the national results includes students that have only enrolled in a two–year college in the summer.

The longitude nature of survey data also comes with higher attrition rate and higher proportion of missing data than the state administrative data. Since the analysis requires zip code, transcript, and employment data, the final sample size is much smaller than that of the state data. The main strategy of the paper –IV analysis requires a large sample for the estimation to reach statistically significant results. With a small sample, it is challenging to interpret whether a non-statistically significant result is the result of the lack of power or the lack of correlation. As a alternative methods, I present findings using propensity scores matching approach. Notwithstanding, the national and state results are consistent with each other and I will draw my main conclusions from my preferred estimation using state data.

Sample Description

The goal of this study is to examine whether 4–2 transfer can be beneficial to students who struggle academically at a four-year college. To capture the effect of 4–2 transfer on struggling students as opposed to high achievers, I restrict the sample to students who exhibited academic difficulty, defined as having a first-term GPA below 3.0.[6] Figure 1 presents the relationship between first-term GPA and the six year graduation rate using the state sample. It shows that any students with a first-term GPA below 3.0 had a less than 50 percent chance of graduating.

[6] The results for using a lower GPA threshold (2.5) are similar. However, using the 3.0 GPA threshold provides more power for subgroup analysis.

Figure 1. Dropout Rate by First-Term GPA

State Sample. Table 1a presents the student characteristics of the full sample from the state data by transfer status and first-term GPA. Around 25 percent of struggling student engaged in 4–2 transfer in the non-summer months, and around 18 percent of high achievers did so. The treatment group is students who have ever attended a two-year college in the non-summer months with first-term GPAs below 3.0 (column 1). The comparison group is non-4–2 transfer students with first-term GPAs below 3.0 (column 2). Table 1a shows that pre-transfer characteristics of the treatment and control group are very similar to each other but different from those with higher first-term GPAs, which justifies the necessity of the restriction.

Among struggling and high achieving students in public four-year colleges in this state, women were slightly more likely to engage in 4–2 transfer. Other than their proximity to a two-year college, struggling 4–2 transfer students had similar pre-transfer characteristics as struggling students who did not transfer, including racial composition, age at enrollment, high school and first-term GPA, credits earned, probability of living in a metropolitan area, and county-level characteristics.

About 39 percent of struggling 4–2 transfer students eventually returned to a four-year institution. The corresponding figure is 48 percent among high achieving 4–2 transfer students. (As mentioned before, some students attend two-year colleges in the summer to complement their four-year courses; therefore, a small proportion of the non-transfer students last attended a two-year college.)

Struggling 4–2 transfer students tended to stay in school longer than struggling non-transfer students. The enrollment rate in the sixth and seventh years after college entry for struggling 4–2 transfer students is 40 percent and 24 percent respectively. The same percentages are 26 percent and 12 percent for struggling students who never transferred to a two-year college.

Table 1a. State Data Summary

	(1) 4–2 Transfer < 3.0 GPA	(2) 4-Year Only < 3.0 GPA	(3) 4–2 Transfer ≥ 3.0 GPA	(4) 4-Year Only ≥ 3.0 GPA
Demographic characteristics				
Female	56%	47%	65%	55%
White	69%	63%	66%	72%
Black	25%	30%	28%	21%
Hispanic	2%	2%	2%	2%
Other races	3%	3%	3%	3%
Age at enrollment	19	19	19	19
Distance to the closest two-year college	14	18	15	17
Entering cohort: 2005–06	37%	34%	38%	37%
Entering cohort: 2006–07	34%	34%	31%	33%
Entering cohort: 2007–08	29%	32%	31%	30%
High school GPA	2.98	2.96	3.08	3.33
GPA term 1	2.23	2.25	3.36	3.48
GPA year 1	2.31	2.32	3.09	3.32
Credits earned year 1	20	21	19	23
Last attended a four-year university	39%	93%	48%	96%
Lives in a metropolitan area	62%	63%	63%	65%
County-level characteristics				
Household income	$32,678	$31,941	$32,289	$32,069
Percentage mothers with college degree	40%	39%	40%	40%
Percentage without insurance	18%	18%	18%	18%
Percentage smokers/ drinkers	23%	23%	23%	23%
Percentage Black in school district	32%	30%	33%	29%
Percentage Hispanic in school district	6%	5%	5%	5%
Percentage other races in school district	2%	2%	1%	2%
Percentage receiving free/reduced lunch	56%	57%	57%	57%
Highest degree earned in 2013				
Certificate	11%	0%	8%	0%
Associate degree	20%	0%	27%	0%
Bachelor's degree	13%	32%	18%	57%
Still enrolled in the 5th year	53%	42%	54%	45%
Still enrolled in the 6th year	40%	26%	41%	26%
Still enrolled in the 7th year	24%	12%	21%	12%
Employed in the 5th year	84%	79%	82%	77%
Employed in the 6th year	83%	77%	83%	74%
Employed in the 7th year	85%	79%	82%	74%
Earnings in the 5th year	$15,889	$16,154	$16,642	$18,170
Missing or zero earnings (all cohorts)	779	2,669	658	3,556
Earnings in the 6th year	$18,575	$18,703	$19,485	$21,656
Missing or zero earnings (2005–07 & 2006–07 cohorts)	237	908	188	1,372
Earnings in the 7th year	$19,582	$20,782	$20,362	$23,333
Missing or zero earnings (2005–06 cohort)	110	403	91	643
Observations	1,913	5,609	1,561	7,309

Eventually, 13 percent of the struggling 4–2 transfer students earned a bachelor's degree, which is approximately 17 percent less than the struggling students who did not transfer to a two-year college. Nonetheless, another one third of the struggling 4–2 transfer students earned two-year college credentials, two thirds of these being associate degrees. Overall, the raw statistics indicate that a higher proportion of struggling 4–2 transfer students than struggling non-transfer students completed any college credential. The postsecondary credential attainment rate was 45 percent for struggling 4–2 transfer students and only 32 percent for struggling students who did not transfer.

Regarding employment outcomes and work experience, struggling 4–2 transfer students were slightly more likely to be employed than struggling students that did not transfer. Comparing all groups, earnings were highest among high achieving students who did not transfer.

National Sample. Table 1b presents the descriptive statistics of the ELS sample. Similar to the state sample, female were slightly more likely to transfer to engage in 4–2 transfer, yet unlike the state sample, more minority students seemed to do so. 4–2 transfer students were also more likely to live closer a two-year college. After limiting the sample to struggling students, none of the differences in demographic characteristics, GPA or family income are statistically significant. Regarding the characteristics of the initial four-year institution, 4–2 transfer students came from all sectors and level of institutional selectivity, yet they were slightly more likely to enroll in colleges with medium and low selectivity.

Eventually, as much as 51% of the 4–2 transfer students returned to a four-year university. This percentage is much higher than the state statistics. While 68% of the non-transfer struggling students have earned a bachelor's degree, 32% of the 4–2 transfer students did so. Another one third of the 4–2 transfer students earned a certificate or associate degree.

The raw means on financial aid indicate that 4–2 transfer students borrow less and receive more Pell grant. Regarding labor market outcomes, 4–2 transfer students received similar hourly earnings and worked similar hour in 2012, but were less likely to work full time in 2012. The two groups of students also report similar level of job satisfaction.

These raw statistics are helpful in grasping the characteristics of struggling 4–2 transfer students in comparison with others. The GPA restriction also makes the treatment and control groups similar enough for a meaningful comparison. Nonetheless, it is still difficult to discern the effects of two-year college attendance on struggling students who transfer. If individuals chose to engage in 4–2 transfer based on unobserved variables that also affect outcomes, such as motivation or ability bias, the outcomes trend observed here could be a result of those unobserved variables. I rely on the IV approach to address this concern.

Table 1b. National Data Summary

	(1) 4–2 Transfer < 3.0 GPA	(2) 4-Year Only < 3.0 GPA	(3) 4–2 Transfer ≥ 3.0 GPA	(4) 4-Year Only ≥ 3.0 GPA
Demographic characteristics				
Female	45%	41%	58%	55%
White	61%	77%	67%	78%
Black	20%	11%	12%	8%
Hispanic	8%	3%	12%	5%
Other races	11%	8%	8%	9%
Born in 1985	34%	28%	31%	37%
Born in 1986	66%	71%	66%	62%
Distance to the closest two-year college	10.4	12.4	12.7	12.0
Entering cohort: 2004–05	98%	96%	89%	91%
Entering cohort: 2005–06	1%	0%	3%	5%
High school GPA	3.00	2.87	2.92	3.07
GPA term 1	2.05	2.19	3.29	3.31
Credits earned term 1	15	14	19	15
Last attended a four-year university	51%	99%	59%	100%
Socioeconomics (SES) characteristics				
Annual family income less than $35,000	49%	45%	48%	45%
Annual family income more than $35,000 and less	32%	38%	36%	35%
Annual family income more than $75,000	20%	17%	16%	21%
Institutional characteristics				
First four-year sector: Public	76%	72%	70%	66%
First four-year sector: Non-profit	21%	26%	24%	31%
First four-year sector: for-profit	3%	2%	6%	3%
First four-year selectivity: High	18%	29%	18%	31%
First four-year selectivity: Medium	55%	48%	48%	52%
First four-year selectivity: Low	27%	22%	35%	17%
Highest degree earned in 2012				
Certificate or Associate degree	31%	0%	30%	0%
Bachelor's degree	32%	68%	41%	76%
Total loan amount	$18,041	$22,414	$17,758	$23,086
Total Pell received	$6,280	$4,300	$6,620	$3,830
Hourly Earnings in 2012	$15	$17	$18	$18
Working full time in 2012	67%	80%	69%	76%
Weekly hour worked in 2012	49	51	44	50
Job satisfaction: earnings (rating 1-5)	2.97	2.91	3.11	2.91
Job satisfaction: usefulness of degree (rating 1-5)	3.20	3.07	3.20	3.20
Observations	306	347	309	595

Note. As per the restricted data agreement, all of these statistics are weighted.

5. Results

Academic Outcomes

Ordinary least squares results. The analysis begins with an ordinary least squares (OLS) estimation with the state data, equation (1), and three academic outcomes: the probability of completing a bachelor's degree, a two-year college credential (associate degree or long- or short-term certificate), or any postsecondary credential. Columns 1, 3, and 5 of Table 2 present the baseline results with demographics characteristics, geographical controls, initial four-year fixed effects, and county-level SES indicators. Columns 2, 4, and 6 are the results with the preferred specification as they include estimations with cohort and major fixed effects. The OLS estimates show that 4–2 transfer among students with less than a 3.0 GPA lowered an individual's chance of earning a bachelor's degree by 19 percent, but it increased the probability of earning a two-year college credential by 29 percent. Overall, students were 11 percent more likely to earn some kind of postsecondary credential after transferring to a two-year college. The results are robust to alternative specifications.

The national results in table 2b also show similar results. Row 1, 4, and 7 of panel A presents the coefficients for the OLS estimates. 4–2 transfer students with less than a 3.0 GPA were 24 percent less likely to earn a bachelor's degree, but were 34 percent more likely to earn a two-year college credential. Overall, 4–2 transfer does not affect the percent of earning a postsecondary credential. The propensity scores matching results are almost identical to the OLS estimates. That means that the transfer and non-transfer students with less than 3.0 first term GPA are comparable, consistent with the findings in table 1b. Most of the 4–2 transfer students have a comparable match in the matching progress. Validity checks also show support for the assumption of propensity score matching: overall support for treatment groups and balanced characteristics among the 4–2 transfer and non-transfer group. Three people in the treatment group were dropped since they did not have any comparable match.

In additional to academic outcomes, the national data also provide information on student's loan and loan payment. Table 2b indicates that 4–2 transfer and non-transfer students show similar level of amount borrowed and loan repayment.

Table 2a also shows the correlation between different covariates and degree attainment with the state data. Men, African American students, older students, and individuals with lower first-term credits earned and GPA had lower outcomes. The chances of receiving any postsecondary credential were also slightly lower for individuals living in metropolitan areas. The percentage of smokers and of racial/ethnic minorities in the county are proxies of the SES of the county a person lives in; the higher the percentages, the lower the SES. County SES is negatively correlated with college degree attainment.

Table 2a: State's Academic Results From OLS With 2005–06 to 2007–08 Cohorts With Less Than a 3.0 First-Term GPA

	(1) Baseline	(2) Controls	(3) Baseline	(4) Controls	(5) Baseline	(6) Controls
	Bachelor's Degree		Two-Year College Credential		Any Credential	
4–2 Transfer	–0.188***	–0.191***	0.293***	0.292***	0.105***	0.101***
	[0.010]	[0.010]	[0.015]	[0.015]	[0.017]	[0.017]
Demographic characteristics						
Female	0.017	0.023**	0.010**	0.005	0.027**	0.028**
	[0.010]	[0.011]	[0.005]	[0.006]	[0.011]	[0.012]
African American	–0.045***	–0.037***	–0.028***	–0.028***	–0.072***	–0.065***
(base group: White)	[0.012]	[0.012]	[0.008]	[0.009]	[0.015]	[0.015]
Hispanic	–0.021	–0.017	0.008	0.005	–0.013	–0.012
	[0.034]	[0.034]	[0.019]	[0.019]	[0.035]	[0.035]
Other race/ethnicity	–0.022	–0.021	–0.020	–0.022*	–0.042	–0.043
	[0.028]	[0.028]	[0.012]	[0.012]	[0.030]	[0.030]
Older age at enrollment	–0.011***	–0.010***	–0.000	–0.000	–0.011***	–0.010***
	[0.003]	[0.003]	[0.002]	[0.002]	[0.003]	[0.003]
First-term GPA	0.776***	0.842***	0.035*	0.034*	0.812***	0.876***
	[0.029]	[0.031]	[0.020]	[0.020]	[0.032]	[0.033]
First-term credits earned	0.131***	0.134***	0.008	0.009	0.139***	0.143***
	[0.012]	[0.012]	[0.006]	[0.006]	[0.012]	[0.012]
In metropolitan area	0.028***	0.027***	0.004***	0.004***	0.032***	0.031***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]
County-level indicators						
Average household income	0.000*	0.000	0.000	0.000	0.000*	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Percent mothers with college degree	–0.017	–0.009	0.011	0.016	–0.005	0.007
	[0.122]	[0.122]	[0.074]	[0.073]	[0.123]	[0.124]
Percent without health insurance	–0.340	–0.347	0.069	0.067	–0.271	–0.280
	[0.232]	[0.232]	[0.137]	[0.137]	[0.214]	[0.214]
Percentage smokers/drinkers	0.210	0.194	–0.134	–0.136	0.076	0.058
	[0.158]	[0.155]	[0.093]	[0.092]	[0.150]	[0.150]
Percentage other races in school district	–2.525***	–2.612***	0.425	0.457	–2.100***	–2.155***
	[0.620]	[0.624]	[0.472]	[0.467]	[0.725]	[0.747]
Percentage Black in school district	0.056	0.053	–0.038	–0.040	0.018	0.013
	[0.045]	[0.043]	[0.027]	[0.027]	[0.044]	[0.044]
Percentage Hispanic in school district	0.120	0.162	–0.321***	–0.314***	–0.201	–0.152
	[0.144]	[0.147]	[0.081]	[0.081]	[0.156]	[0.160]
Percentage of other races in school district	–2.525***	–2.612***	0.425	0.457	–2.100***	–2.155***
	[0.620]	[0.624]	[0.472]	[0.467]	[0.725]	[0.747]
Percentage receiving free/reduced price lunch	0.000*	0.000	0.000	0.000	0.000*	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	7,522	7,522	7,522	7,522	7,522	7,522
R-squared	0.226	0.234	0.241	0.245	0.192	0.199

Note. Robust standard errors clustered at the high-school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, are residents of the state with a first-term GPA below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the baseline regression include the above variables, geographic controls (congressional district fixed effects), and initial four-year schools fixed effects; columns 2, 4, and 6 include all covariates in the baseline regression with additional cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Table 2b: Academic and Employment Results with ELS Sample and Less Than a 3.0 First-Term GPA

Outcomes	Estimate	Std. Error	N	R^2
A. **Academic Attainment**				
Bachelor's Degree				
(1) OLS	-0.243***	[0.056]	653	0.453
(2) Matching	-0.242***	[0.055]	650	0.458
(3) IV	-0.268	[0.236]	653	0.263
Two-Year College Credential				
(4) OLS	0.342***	[0.033]	653	0.551
(5) Matching	0.343***	[0.033]	650	0.572
(6) IV	0.102	[0.160]	653	0.341
Any Credential				
(7) OLS	0.051	[0.054]	653	0.378
(8) Matching	0.054	[0.053]	650	0.399
(9) IV	-0.187	[0.238]	653	0.130
B. Loan Amount and Payment				
Log Loan Amount 2012				
(1) OLS	-0.115	[0.154]	427	0.498
(2) Matching	-0.141	[0.151]	425	0.513
(3) IV	-0.001	[0.458]	427	0.496
Log Loan payment				
(4) OLS	0.076	[0.165]	266	0.647
(5) Matching	0.056	[0.165]	265	0.665
(6) IV	0.537	[0.791]	26	0.616
C. Employment Outcomes				
Log Earnings 2011				
(1) OLS	-0.204**	[0.097]	592	0.496
(2) Matching	-0.159*	[0.094]	591	0.510
(3) IV	0.194	[0.332]	592	0.471
Employment 2011				
(4) OLS	-0.016	[0.033]	653	0.355
(5) Matching	-0.019	[0.032]	650	0.379
(6) IV	0.183	[0.153]	640	0.291
Job satisfaction: earnings				
(7) OLS	0.156	[0.155]	591	0.411
(8) Matching	0.147	[0.150]	590	0.428
(9) IV	0.349**	[0.153]	590	0.436
Job satisfaction: usefulness of degree				
(10) OLS	0.398***	[0.148]	589	0.475
(11) Matching	-0.057	[0.134]	589	0.394
(12) IV	0.004	[0.131]	588	0.427

Note. All regressions are weighted as per the restricted data requirement; robust standard errors clustered at the high-school level are shown in brackets; sample includes all beginning four-year students from fall 2004 to summer 2007 with a first-term GPA below 3.0 who intend to earn a bachelor's degree, and are enrolled full-time in the first term; covariates in the baseline regression include demographic controls (birth year and quarter, number of siblings, parental education, SES quintile), ability controls (admission test scores, ever drop out of high school, and total credits earned in high school), initial college covariates (start year, sector and selectivity of college, first term GPA and credits earned, financial aid offer, attend college out-of-state dummy, and work hours in first year of college), and geographic controls (state fixed effects and county fixed effect). *** $p < .01$. ** $p < .05$. * $p < .1$.

Comparing IV and OLS estimates. To control for self-selection in the transfer process, I use distance from high school attended to the closest two-year college to instrument for the probability of transferring to a two-year college. Table 3 presents the first stage results (panel A), the reduced form results (panel B), and the IV coefficients (Panel C) under the two-stage least squares analysis with the state data. The results remain robust to alternative specifications.

The first stage results show that distance is a negative and significant predictor of 4–2 transfer in the non-summer months. The F-statistic is over 30, which supports the notion of using distance to instrument for 4–2 transfer (Stevens, 2007). Panel B presents non-statistically significant relationship between the instrument and academic outcomes. Panel C shows that struggling 4–2 transfer students were equally likely as other struggling non-transfer students to earn a bachelor's degree or to earn a two-year college credential. The IV results are also robust to alternative specifications. Compared with the OLS results, the IV results are closer to zero. The OLS results are also more consistent with previous findings (Hossler et al., 2012a; Kalogrides & Grodsky, 2011). One reason for the difference in results may be omitted variable bias. This would mean that the OLS model was unable to control for self-sorting that occurred in the transfer process even with rich controls and a carefully chosen comparison group. If less motivated students tend to transfer from four-year to two-year schools, the OLS results for bachelor's degree attainment would be more negative.

It may be surprising that struggling 4–2 transfer students were no less likely than struggling non-transfer students to earn a bachelor's degree. It is possible that struggling students have such a low four-year completion rate that the chances of earning a bachelor's degree are similar regardless of transfer status. It is also possible that two-year institutions have better prepared some students to return to a four-year college. Previous research has consistently reported that 4–2 transfer students found the two-year environment more encouraging to learning and to maintaining a work-life balance (Hill-Brown, 1989; Kajstura & Keim, 1992; Kuznik, 1972; Losak, 1980; Vaala, 1991). In this case, some students may have been able to use their two-year education as a springboard to return to a four-year college without compromising their chances of earning a bachelor's degree.

As for the national results, the first stage result is negative and statistically significant and the F-statistics is over 15. Table 2b presents the IV results using academic (panel A), loan (panel B), and employment outcomes (panel C). Unfortunately, the sample size is too small for the IV estimations to generate precise estimates. It is difficult to determine whether an insignificant estimate is a result of lack of power or lack of correlation. Furthermore, most of the IV estimates are not significantly different from the OLS estiamtes. One should interpret all the IV with cautions.

Table 3. State's Academic Results From IV (2005–06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA)

	(1) Baseline	(2) Controls	(3) Baseline	(4) Controls	(5) Baseline	(6) Controls	(7) Baseline	(8) Controls
	4–2 Transfer		Bachelor's Degree		Two-Year College Credential		Any Credential	
A. First Stage								
Distance	–0.003***	–0.004***						
	[0.001]	[0.001]						
F-Stat	31.76	37.98						
Observations	7,522	7,522						
R-squared	0.011	0.055						
B. Reduced Form								
Distance to two-years			–0.000	–0.000	–0.000	–0.000	–0.000	–0.001
			[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
Observations			7,522	7,522	7,522	7,522	7,522	7,522
R-squared			0.184	0.201	0.029	0.036	0.175	0.191
C. IV Coefficients								
4–2 Transfer			0.060	0.066	0.072	0.086	0.132	0.152
			[0.143]	[0.139]	[0.073]	[0.071]	[0.142]	[0.141]
Observations			7,522	7,522	7,522	7,522	7,522	7,522
R-squared			0.170	0.174	0.120	0.141	0.192	0.197

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the baseline regression include demographic characteristics (gender, race, and age at enrollment), geographic controls (congressional district fixed effects, a dummy for being in a metropolitan area), initial four-year controls (first term GPA, first-term credit earned, initial four-year schools fixed effects), and county-level SES indicators (percentage of drinkers/smokers, percentage without health insurance, household income, mothers with college degrees, percent of White/Asian/Black/Hispanic students in the school district, free or reduced price lunch status); columns 2, 4, 6 and 8 include all covariates in the baseline regression with additional cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Academic results by gender. Earlier research on degree attainment and returns to education has shown that men and women often have different education outcomes. I therefore test the full specification and compare the results for men and women together as well as by gender with the state data, shown in Table 4. Panel A summarizes the IV and OLS estimates using both genders, which also appeared in columns 2, 4, and 6 in Tables 2 and 3.

Table 4. State's Academic Results by Gender Using Preferred Specification (2005–06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA)

	(1) IV	(2) OLS	(3) IV	(4) OLS	(5) IV	(6) OLS
	Bachelor's Degree		Two-Year College Credential		Any Credential	
A. All						
4–2 Transfer	0.066	–0.191***	0.086	0.292***	0.152	0.101***
	[0.139]	[0.010]	[0.071]	[0.015]	[0.141]	[0.017]
Observations	7,522	7,522	7,522	7,522	7,522	7,522
R-squared	0.174	0.234	0.141	0.245	0.197	0.199
B. Women						
4–2 Transfer	0.024	–0.212***	0.279**	0.317***	0.303	0.105***
	[0.195]	[0.013]	[0.110]	[0.019]	[0.218]	[0.021]
Observations	3,705	3,705	3,705	3,705	3,705	3,705
R-squared	0.194	0.246	0.271	0.274	0.162	0.194
C. Men						
4–2 Transfer	0.124	–0.168***	–0.092	0.262***	0.032	0.094***
	[0.175]	[0.016]	[0.109]	[0.018]	[0.173]	[0.021]
Observations	3,817	3,817	3,817	3,817	3,817	3,817
R-squared	0.164	0.235		0.216	0.208	0.211

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the above regressions include demographic characteristics (gender, race, and age at enrollment), geographic controls (congressional district fixed effects, a dummy for being in a metropolitan area), initial four-year controls (first term GPA, first-term credit earned, initial four-year schools fixed effects), and county-level SES indicators (percentage of drinkers/smokers, percentage without health insurance, household income, mothers with college degrees, percent of White/Asian/Black/Hispanic students in the school district, free or reduced price lunch status), and cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Comparing panels B and C, the estimates for women and men are similar when using bachelor's degree attainment as an outcome. Though the IV estimate for the two-year college credential is insignificant when using both genders, this masks the large positive result among women. The chances of earning an associate degree or long- or short-term certificate for struggling women and men were 28 percent and –9 percent respectively, with the former being statistically significant. The higher two-year college credential rate among women is likely due to the fact that more female 4–2 transfer students enroll in allied health or nursing programs than men. In fact, 50 percent of struggling female 4–2 transfer students enrolled in health programs while only 36 percent of struggling male 4–2 transfer students did so. These programs tend to be more structured, and the returns are extremely high; they may therefore have higher completion rates than other programs (Liu, Belfield, & Trimble, 2014). The second most popular field was art, humanities, and English, with about 15 percent of both genders.

Table 5 presents enrollment results with the State data. The OLS results show that struggling 4–2 transfer students were more likely to be in school five, six, and seven years after first enrollment in college regardless of gender. Most of the IV coefficients are positive while some of them are negative. Yet none of them are statistically significant. This indicates that struggling 4–2 transfer students were no more likely than struggling non-transfer students to be still enrolled in college in this period. Once again, the omitted variable bias with the OLS regressions may cause the OLS estimates to be greater in magnitude.

Labor Market Results by Gender

Gainful employment is an important accountability indicator for higher education. Unfortunately, the employment data in this dataset only allow for the following of students up to the seventh year after first enrollment at a four-year college (2005–06 cohort). Students may just be finishing up their studies and entering the labor market in this period, so I am only able to explore the short-term returns to 4–2 transfer. Short-term employment outcomes are nevertheless helpful to students and policymakers in determining whether employers value struggling 4–2 transfer students differently from other struggling students.

Table 6 presents the OLS and IV results using employment in the five to seven years after initial college entry as the outcome with the State data. Similar to Table 5, the results are from the preferred specification and displayed by gender as well as together. Both the OLS and IV results show that the entry-level employment rate of struggling 4–2 transfer students was similar to other struggling students who remained at a four-year college. The only exception is in panel B, which presents employment outcomes six years from initial enrollment. Struggling 4–2 transfer students were less likely to be employed in the sixth year. Yet, the negative findings disappear in the seventh year.

Table 7 presents two types of earnings outcomes. All earnings are the yearly average of the quarterly earnings data adjusted to the 2010 dollars. Panels A and B show actual earnings and panels C and D show log earnings conditional on employment. Based on the earnings data,

employers do not seem to differentiate between struggling 4–2 transfer students and other struggling students. The seventh year earnings estimates are all positive though not statistically significant.

Table 5. State's Enrollment Results by Gender With Preferred Specification (2005–06, 2006–07 & 2007–08 Cohorts With Less Than a 3.0 First-Term GPA)

	(1) IV	(2) OLS	(3) IV	(4) OLS	(5) IV	(6) OLS	(7) IV	(8) OLS
	4th Year		5th Year		6th Year		7th Year	
A. All								
4–2 Transfer	0.174	0.125***	–0.060	0.120***	0.038	0.152***	0.191	0.189***
	[0.147]	[0.013]	[0.146]	[0.016]	[0.184]	[0.017]	[0.212]	[0.026]
Observations	7,522	7,522	7,522	7,522	5,278	5,278	2,653	2,653
R-squared	0.179	0.181	0.088	0.111	0.046	0.057	0.063	0.063
B. Women								
4–2 Transfer	0.071	0.114***	0.060	0.119***	–0.095	0.165***	0.031	0.211***
	[0.178]	[0.018]	[0.177]	[0.019]	[0.277]	[0.022]	[0.290]	[0.032]
Observations	3,705	3,705	3,705	3,705	2,572	2,572	1,323	1,323
R-squared	0.165	0.166	0.097	0.100	–0.000	0.061	0.047	0.082
C. Men								
4–2 Transfer	0.319	0.132***	–0.152	0.119***	0.192	0.132***	0.271	0.162***
	[0.216]	[0.019]	[0.218]	[0.023]	[0.231]	[0.024]	[0.308]	[0.039]
Observations	3,817	3,817	3,817	3,817	2,706	2,706	1,330	1,330
R-squared	0.182	0.205	0.085	0.134	0.069	0.072	0.059	0.070

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the above regressions include demographic characteristics (gender, race, and age at enrollment), geographic controls (congressional district fixed effects, a dummy for being in a metropolitan area), initial four-year controls (first term GPA, first-term credit earned, initial four-year schools fixed effects), and county-level SES indicators (percentage of drinkers/smokers, percentage without health insurance, household income, mothers with college degrees, percent of White/Asian/Black/Hispanic students in the school district, free or reduced price lunch status), and cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Table 6. Employment Results by Gender With Preferred Specification (2005–06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA)

	(1) IV	(2) OLS	(3) IV	(4) OLS	(5) IV	(6) OLS
	All		Women		Men	
A. 5 years after initial four-year enrollment (all cohorts)						
4–2 transfer	0.134	0.008	0.186	0.010	0.106	0.001
	[0.110]	[0.009]	[0.129]	[0.012]	[0.170]	[0.015]
Observations	7,522	7,522	3,705	3,705	3,817	3,817
R-squared	0.218	0.235	0.218	0.255	0.213	0.224
B. 6 years after initial four-year enrollment (2005-06 & 2006-07 cohorts)						
4–2 transfer	–0.256*	0.007	–0.143	–0.004	–0.347	0.014
	[0.148]	[0.011]	[0.175]	[0.016]	[0.223]	[0.016]
Observations	5,278	5,278	2,572	2,572	2,706	2,706
R-squared	0.183	0.254	0.248	0.270	0.127	0.249
C. 7 years after initial four-year enrollment (2005-06 cohort)						
4–2 transfer	0.249	0.012	0.350	0.006	0.096	0.015
	[0.209]	[0.016]	[0.270]	[0.024]	[0.331]	[0.021]
Observations	2,653	2,653	1,323	1,323	1,330	1,330
R-squared	0.171	0.226	0.123	0.245	0.225	0.231

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the above regressions include demographic characteristics (gender, race, and age at enrollment), geographic controls (congressional district fixed effects, a dummy for being in a metropolitan area), initial four-year controls (first term GPA, first-term credit earned, initial four-year schools fixed effects), and county-level SES indicators (percentage of drinkers/smokers, percentage without health insurance, household income, mothers with college degrees, percent of White/Asian/Black/Hispanic students in the school district, free or reduced price lunch status), cohort and major fixed effects, experience, experience squared, and enrollment in the year of the employment outcome.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Table 7. Earnings Results by Gender With Preferred Specification (2005–06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA)

	(1) IV	(2) OLS	(3) IV	(4) OLS	(5) IV	(6) OLS
	All		Women		Men	
A. 6 years after initial four-year enrollment						
4–2 Transfer	–4,294	1,427***	–1,283	1,278**	–6,865	1,534**
	[4,654]	[412]	[5,731]	[542]	[7,246]	[616]
Observations	5,278	5,278	2,572	2,572	2,706	2,706
R-squared	0.199	0.229	0.242	0.249	0.170	0.224
B. 7 years after initial four-year enrollment						
4–2 Transfer	10,489	1,300**	8,734	753	11,916	1,563
	[7,528]	[606]	[8,913]	[773]	[12,402]	[1,006]
Observations	2,653	2,653	1,323	1,323	1,330	1,330
R-squared	0.164	0.228	0.194	0.252	0.153	0.220
C. Log earnings 6 years after initial four-year enrollment						
4–2 Transfer	–0.395	0.092**	–0.567	0.105	–0.128	0.075
	[0.412]	[0.042]	[0.753]	[0.068]	[0.454]	[0.063]
Observations	4,133	4,133	2,020	2,020	2,113	2,113
R-squared	0.088	0.119	0.064	0.118	0.124	0.130
D. Log Earnings 7 years after initial four-year enrollment						
4–2 Transfer	0.283	0.042	0.401	0.021	0.420	0.033
	[0.695]	[0.052]	[0.935]	[0.081]	[0.946]	[0.072]
Observations	2,045	2,045	1,026	1,026	1,019	1,019
R-squared	0.147	0.155	0.135	0.155	0.154	0.175

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; Covariates in the above regressions include demographic characteristics (gender, race, age at enrollment), geographic controls (congressional district fixed effects, dummy for being in a metropolitan area), initial four-year controls (first term GPA, first term credit earned, initial four-year schools fixed effect), and county level SES indicators (percentage of drinkers/smoker, percentage without health insurance, household income, mothers with college degree, Whites/Asian/Black/Hispanic in school district, free or reduced price lunch status), cohort and major fixed effects, experience, experience squared, and enrollment in the year of the employment outcome.

*** $p < .01$. ** $p < .05$. * $p < .1$.

The national employment results are presented in panel C of table 2b. The outcome for row 1 to 3 is the log of earnings in 2011 (about seven years from college entry). The OLS and matching coefficients are negative and statistically significant, yet the IV result is positive. The standard deviation for the IV estimate is much larger than the IV coefficient, so it is highly likely that the estimate lacks precision from the small sample size. Yet, the OLS coefficient is likely to bias downward since the matching coefficient is more positive and in theory the matching process should eliminate some selection bias. Using the probability of employment in 2011 as outcome, all of the estimates indicate that 4–2 transfer and non-transfer students are equally likely to be employed.

The ELS asked individuals to rate their satisfaction toward their job on a scale of 1 to 5. Row 7 to 12 of panel C presents the outcomes of two job satisfaction index. Though without statistical significant, the OLS and matching estimates show that both type of students rate their satisfaction towards their earnings similarly. The IV result even shows a positive and statistically significant results among struggling students that transfer from a four-year to a two-year institution. When asked to rate the usefulness of their degree, the OLS estimates in row 10 is positive and statistically significant. The matching and IV results indicate a similar level of satisfaction in terms of the usefulness of their degree when performing their jobs among 4–2 transfer and non-transfer students.

The Validity of Distance as an Instrumental Variable

The strength and validity of the IV. The premise of using distance as an IV is that students alter their 4–2 transfer behavior based on how far the closest two-year school is from their high school. As discussed earlier, Table 3 presents strong first stage results even after controlling for covariates when using distance as an instrument for 4–2 transfer. In addition, Figure 2 presents a clear negative relationship between distance and the struggling student 4–2 transfer rate in the state sample. The closer a two-year college is to a student's high school, the higher the 4–2 transfer rate.

Table 8 presents the relationship between the IV and 4–2 transfer status. Row 1 is the same as panel A of Table 3 with the preferred specification. Row 2 presents the relationship between 4–2 transfer at any time (in or out of the summer months); the OLS coefficient is negative and significant, controlling for variables in the preferred specification.

Another concern about using distance as an IV is the issue of endogeneity. If the IV is correlated with the error term, this violates the exclusion restriction under the IV approach, which requires that the IV not affect outcomes other than through the treatment. As noted earlier, families who live closer to a two-year campus may be more highly motivated and may have better academic outcomes as a result. Figures 3 and 4 show the relationship between county-level SES indicators and proximity to two-year colleges. It does not seem that distance is correlated with the percentage of: drinkers, smokers, students with free or reduced price lunch status, people without health insurance, or mothers younger than 20 in the county. The average household income and per capita income in the county also do not have strong relationships with

distance. Furthermore, Figure 5 plots the relationship between degree attainment and distance. The graph shows no strong relationship between the two variables.

Figure 2. 4–2 Transfer Rate by Distance for 2005–06 , 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA

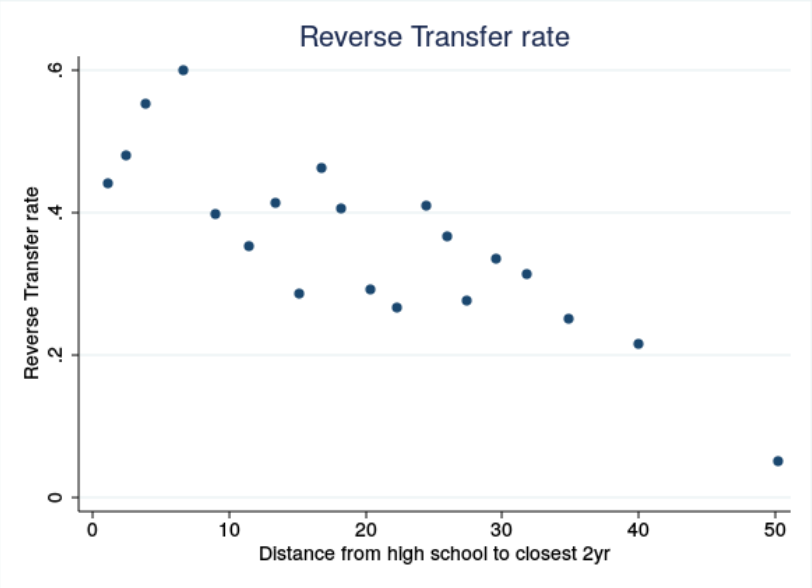


Table 8. The Role of Distance on Transfer Status and Other Outcomes (2005-06, 2006–07, and 2007–08 Cohort)

	Outcomes	Distance	Standard Error	F-stat	Sample	Observations	R-squared
(1)	4–2 Transfer (non-summer)	–0.004***	[0.001]	37.98	Starting 4yr, gpa<3.0	7,522	0.055
(2)	Ever 4–2 transfer	–0.007***	[0.001]	95.87	Starting 4yr, gpa<3.0	7,522	0.079
(3)	Ever lateral transfer	0.006***	[0.001]	99.98	Starting 4yr, gpa<3.0	7,522	0.076
(4)	Dropout completely	0.001	[0.001]	1.43	Starting 4yr, gpa<3.0	7,522	0.191
(5)	Dropout completely	–0.000	[0.001]	0.74	Starting 4yr, gpa>=3.0	7,280	0.261
(6)	Ever upward transfer	0.000	[0.000]	0.02	Starting 2yr	15,746	0.119

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state, and who are enrolled full-time and not co-enrolled in another two-year college in the first term. Covariates in all regressions include demographic characteristics (gender, race, age at enrollment, experience, experience square), geographic controls (congressional district fixed effects, dummy for being in the metropolitan areas), initial four-year controls (first term GPA, first-term credit earned, intent, initial four-year schools fixed effect), and county level SES indicators (percentage of drinkers/smoker, percentage without health insurance, household income, mothers with college degree, White/Asian/Black/Hispanic in school district, free or reduced price lunch status), and cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Figure 3. County Annual Income ($) and Distance for 2005-06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA

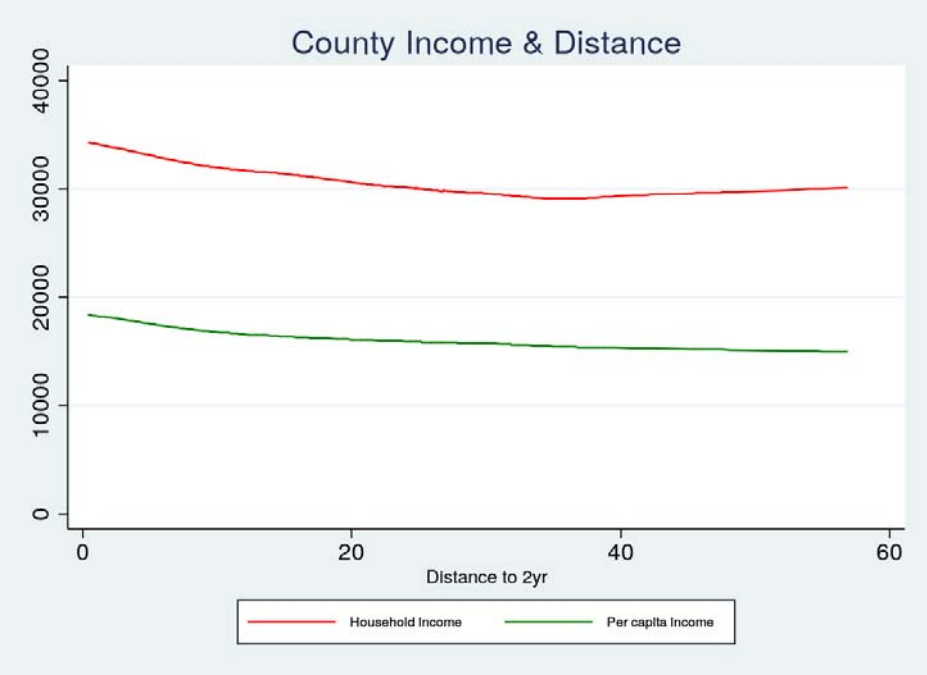


Figure 4. County Characteristics by Distance for 2005-06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA

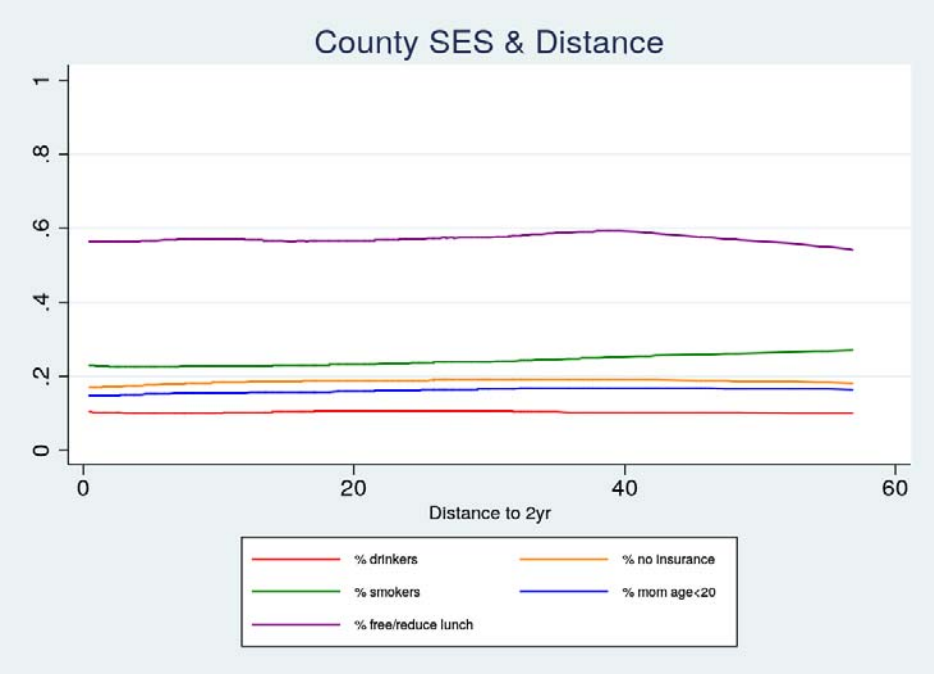
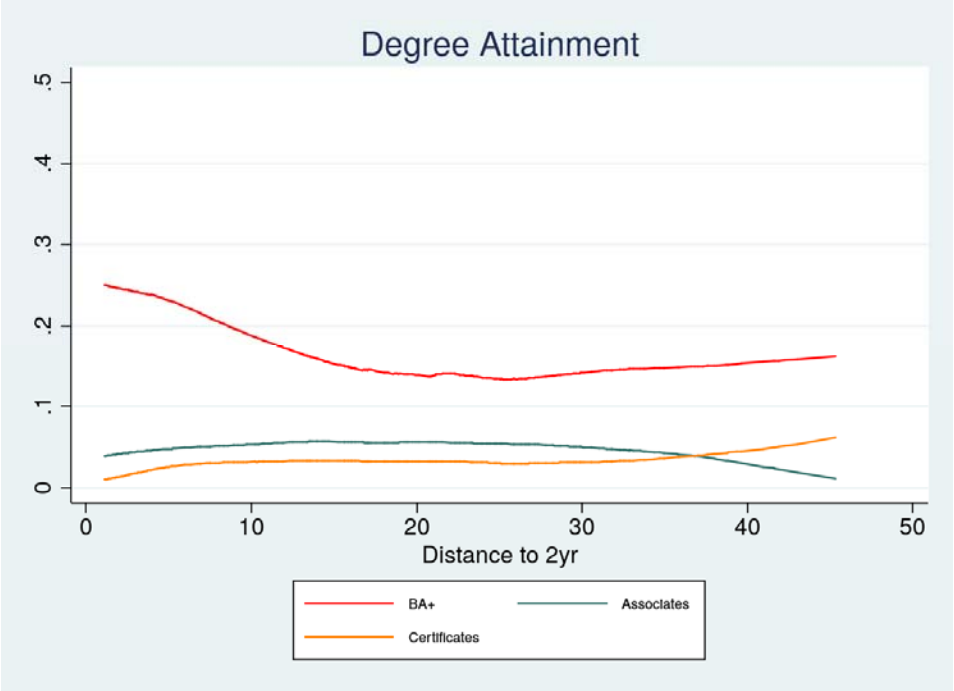


Figure 5. Degree Attainment by Distance for 2005-06, 2006–07, and 2007–08 Cohorts With Less Than a 3.0 First-Term GPA



I also explore the correlation between the distance IV and academic outcomes in rows 4 to 6 of Table 8. If distance is correlated with educational motivation, promixity to a two-year college may lower the dropout rate among high achieving students and discourage upward transfer from two-year to four-year colleges. Reassuringly, Table 8 indicates no statistically significant relationship between the IV and these outcomes.

IV variation: Who is affected by the IV? The IV approach provides causal estimates only for the sample that is sensitive to the IV; this is known as the local average treatment effect (LATE). To understand the external validity of the IV, it is important to understand who is in this sample and where the variation comes from.

Beginning four-year students have four possible education statuses: 4–2 transfer, lateral transfer to another four-year institution, continued enrollment at the initial institution, and dropping out completely from postsecondary education. If distance to the closest two-year college induces students who started at a four-year institution to transfer to a two-year college, one would expect it to have a negative relationship with 4–2 transfer and a positive relationship with lateral transfer status. Rows 1 to 3 of Table 8 are consistent with this theory.

I next look at 4–2 transfer and lateral transfer status as a function of both distance to two-year college and to four-year institution. Table 9 confirms that the variations of the IV mainly come from students who intended to transfer.

Table 9. Relationships Between Transfer Status and Distance to Two-Year and Four-Year Colleges With Less Than a 3.0 First-Term GPA

	(1) 4–2 Transfer	(2) 4–2 Transfer	(3) Lateral Transfer	(4) Lateral Transfer
Distance to two-year college	–0.003***	–0.004***	0.002***	0.003***
	[0.000]	[0.001]	[0.000]	[0.000]
Distance to four-year college	0.002***	0.003***	–0.002***	–0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
Observations	7,522	7,522	7,522	7,522
R-squared	0.026	0.056	0.020	0.064

Note. Robust standard errors clustered at the high school level are shown in brackets; sample includes all beginning four-year students from fall 2005 to summer 2008 who intend to earn a bachelor's degree in the public sector, who are residents of the state with first-term GPAs below 3.0, and are enrolled full-time and not co-enrolled in another two-year college in the first term; covariates in the above regressions include demographic characteristics (gender, race, and age at enrollment), geographic controls (congressional district fixed effects, a dummy for being in a metropolitan area), initial four-year controls (first term GPA, first-term credit earned, initial four-year schools fixed effects), and county-level SES indicators (percentage of drinkers/smokers, percentage without health insurance, household income, mothers with college degrees, percent of White/Asian/Black/Hispanic students in the school district, free or reduced price lunch status), and cohort and major fixed effects.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Proximity to the closest two-year college is positively related to 4–2 transfer and negatively correlated with lateral transfer. The effect of the distance to four-year institution is the opposite. That implies that proximity to two-year colleges induced students who would otherwise have transferred to another four-year college to transfer to a two-year college instead. A possible explanation is that when students are overmatched academically or financially, they seek lower costs or a less demanding academic environment. Proximity to a two-year college may have drawn them to enroll in that two-year college instead of another four-year institution.

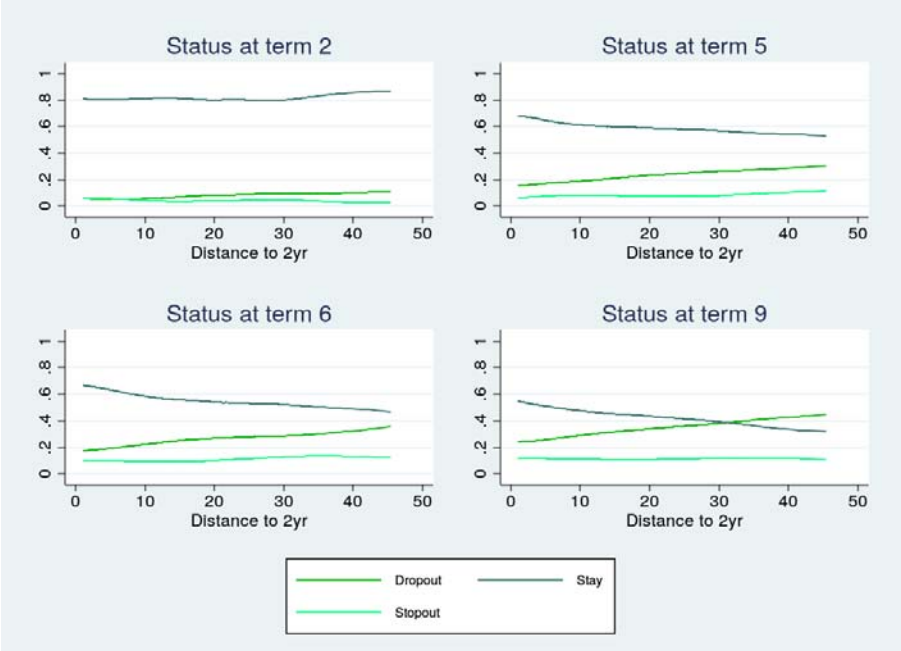
Furthermore, the source of the variation differs with time. Figures 6 and 7 provide a graphical presentation of the relationship between distance and transfer status by term[7] since first enrollment for the fall cohorts. While the general trend in each term is similar to rows 1 to 4 in Table 8, variation in the distance IV is much stronger in term 2 (spring of year 1) and term 5 (fall of year 2). Fall of year 2 also happens to be the term that most of the 4–2 transfer students made their switch to a two-year college (Figure 8).

In sum, the LATE estimates are based on the variation among students who were sensitive to the distance to a two-year college and students who had the intention to transfer within the first three years of four-year enrollment.

[7] There are four terms in this higher education system: fall, spring, summer 1, and summer 2.

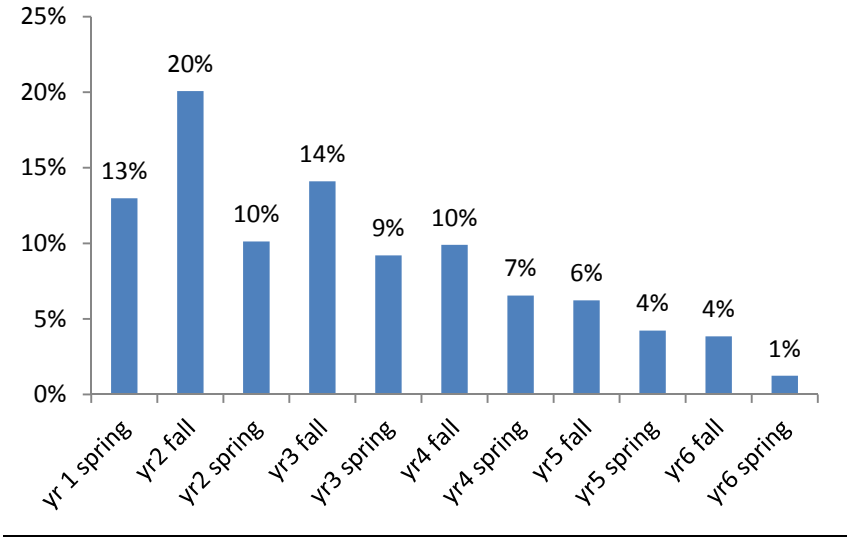
Figure 6. Transfer Status and Distance by Term for Fall 2005–06 , 2006–07, and 2007–08 Entering Cohorts With Less Than a 3.0 First-Term GPA

Figure 7. College Status by Term and Distance for Fall 2005–06 , 2006–07, and 2007–08 Entering Cohorts With Less Than a 3.0 First-Term GPA



Note: Stopout refers to students who do not enroll in the term but who return to college later.

Figure 7. Timing for 4–2 Transfer (Fall 2005–06 , 2006–07, and 2007–08 Entering Cohorts With Less Than a 3.0 First-Term GPA)



6. Conclusion

To investigate whether transferring to a two-year college is a good option for four-year students who are struggling academically, I used state administrative and national datasets in combination with proximity to the closest two-year college from a student's high school as an IV for 4–2 transfer status. Restricting my sample to four-year students with less than a 3.0 GPA in the first term, I found that 4–2 transfer students were more likely than non-transfer students to complete a two-year college credential (including associate degrees and long- and short-term certificates); and more likely to earn any postsecondary credential (including bachelor's degrees and two-year college credentials). These findings are robust to adding controls for SES indicators and cohort, initial four-year institution, and major fixed effects. After correcting for selection bias, the IV results also show that struggling 4–2 transfer students were no less likely than struggling non-transfer students to earn a bachelor's degree.

A second observation is that the gains were heterogeneous across gender. It seems that only women benefitted from 4–2 transfer. In particular, the gains in two-year college credentials favored women, due to the fact that they tended to be enrolled in nursing or health care programs, which have more structured programs and higher completion rates than other programs.

These academic gains merit attention from policymakers and administrators and proponents of the college completion agenda. The raw statistics show that the chances of

completing a bachelor's degree was less than 32 percent for those who scored less than a 3.0 GPA in their first semester. Facilitating the transfer process to a two-year college may thus give struggling students a better chance of completing a college credential, which in turn may make them more competitive in the labor market.

The short-term employment outcomes indicate that the labor market does not penalize 4–2 transfer students in comparison with other struggling students. Though this study does not examine the medium and long-term returns for 4–2 transfer students, research on the returns to two-year education has shown strong gains for two-year college credentials and for even as little as one year of credits, with especially large gains in technical fields (Bahr, 2014; Dadgar & Weiss, 2012; Jacobson, LaLonde, & Sullivan, 2005; Jepsen, Troske, & Coomes, 2014; Liu et al., 2014; Marcotte, Bailey, Borkoski, & Kienzl, 2005; Xu & Trimble, 2015). The national results also found high job satisfaction among 4–2 transfer students.

The current study has several limitations, and future research should extend the 4–2 transfer literature in three ways. First, though short-term outcome findings are helpful, longer-term outcomes are important to properly evaluate the value of 4–2 transfer. That would require longer follow-up for attainment and employment data. Second, while the national results provide 4–2 transfer information beyond this one state, the precision of the IV estimate is limited due to the small sample size. Better, more, and more recent national data would be helpful for policy planning. Third, the IV approach only provides the local average treatment effects of 4–2 transfer. The ability to generalize these results depends on the heterogeneity of the effects across all 4–2 transfer students, which is impossible to test based on the small sample size.

Despite these limitations, this is the first causal study that investigates the academic and employment outcomes of 4–2 transfer students. These findings are especially important as President Obama and others have proposed making community college free for students, which would no doubt encourage 4–2 transfer. If a substantial percentage of students who drop out of a four-year college can successfully complete a postsecondary credential at a two-year college, policies that facilitate the 4–2 transfer process would move states much closer to meeting their college completion goals.

This study also prompts policymakers and administrators to rethink the role of four-year versus two-year education as well as the two in combination. The path to higher education credentials is now more complex than ever. This study only looks at 4–2 transfer. In the future, policymakers and college administrators should consider evaluating various transfer paths and then facilitate transitions that are beneficial to students.

References

Bahr, P. R. (2014). *The labor market return in earnings to community college credits and credentials in California.* Ann Arbor, MI: University of Michigan, Center for the Study of Higher and Postsecondary Education, School of Education.

Baum, S., Ma, J., Pender, M., & Bell, D. W. (2015). *Trends in student aid 2015*. New York, NY: The College Board.

Bean, J. P. (1983). The application of a model of turnover in work organizations to the student attrition process. *The Review of Higher Education, 6*(2), 129.

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal, 22*(1), 35–64.

Brimm, J., & Achilles, C. (1976). The reverse transfer student: A growing factor in higher education. *Research in Higher Education, 4*(4), 355–360.

Brint, S., & Karabel, J. (1989). *The diverted dream: Community colleges and the promise of educational opportunity in America, 1900–1985.* New York, NY: Oxford University Press.

Card, D. (1995). Using geographic variation in college proximity to estimate the return to schooling. In L. N. Christofides, E. K. Grant, & R. Swidinsky (Eds.), *Aspects of labor market behavior: Essays in honour of John Vanderkamp*. Toronto, Canada: University of Toronto Press.

Clark, B. R. (1960). The "cooling-out" function in higher education. *American Journal of Sociology*, *65*(6), 569–576.

Dadgar, M., & Weiss, M. J. (2012). *Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay?* (CCRC Working Paper No. 45). New York, NY: Columbia University, Teachers College, Community College Research Center.

Goldrick-Rab, S., & Pfeffer, F. T. (2009). Beyond access: Explaining socioeconomic differences in college transfer. *Sociology of Education, 82*(2), 101–125.

Hagedorn, L. S., & Castro, C. R. (1999). Paradoxes: California's experience with reverse transfer students. *New Directions for Community Colleges, 1999*(106), 15–26.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica*, *47*(1), 153–161.

Hill-Brown, H. A. (1989). *An institutional case study of reverse transfer students.* (Order No. 9024174). Available from ProQuest Dissertations & Theses Global. (303808647). Retrieved from http://eduproxy.tc-library.org/?url=/docview/303808647?accountid=14258

Hogan, R. R. (1986). An update on reverse transfers to two-year colleges. *Community Junior College Quarterly of Research and Practice, 10*(4), 295–306.

Hossler, D., Shapiro, D., Dundar, A., Chen, J., Zerquera, D., Ziskin, M., & Torres, V. (2012a). *Reverse transfer: A national view of student mobility from four-year to two-year institutions* (Signature Report No. 3). Herndon, VA: National Student Clearinghouse Research Center.

Hossler, D., Shapiro, D., Dundar, A., Ziskin, M., Chen, J., Zerquera, D., & Torres, V. (2012b). *Transfer and mobility: A national view of pre-degree student movement in postsecondary institutions* (Signature Report No. 2). Herndon, VA: National Student Clearinghouse Research Center.

Jacobson, L., LaLonde, R. J., & Sullivan, D. (2005). The impact of community college retraining on older displaced workers: Should we teach old dogs new tricks? *Industrial and Labor Relations Review*, *583*(3), 398–415.

Jepsen, C., Troske, K., & Coomes, P. (2014). The labor-market returns to community college degrees, diplomas, and certificates. *Journal of Labor Economics, 32*(1), 95–121.

Kajstura, A., & Keim, M. C. (1992). Reverse transfer students in Illinois community colleges. *Community College Review, 20*(2), 39–44.

Kalogrides, D., & Grodsky, E. (2011). Something to fall back on: Community colleges as a safety net. *Social Forces, 89*(3), 853–877.

Kena, G., Musu-Gillette, L., Robinson, J., Wang, X., Rathbun, A., Zhang, J., Wilkinson-Flicker, …. Dunlop Velez, E. (2015). *The condition of education 2015* (NCES 2015-144). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Kinnick, M. K., Ricks, M. F., Bach, S., Walleri, D., Stoering, J., & Tapang, B. (1997). *Student transfer and outcomes between community colleges and a university within an urban environment*. Paper presented at Association for Institutional Research Annual Forum, Orlando, FL.

Klepper, D. (1990). *A descriptive analysis of completer transfer students at a Virginia community college.* (Order No. 9112051). Available from ProQuest Dissertations & Theses Global. (303898138). Retrieved from http://eduproxy.tc-library.org/?url=/docview/303898138?accountid=14258

Kuznik, A. (1972). Reverse transfers: Students who transfer from four-year to two-year colleges. *Journal of College Student Personnel, 13*(5), 425–428.

Liu, V., Belfield, C., & Trimble, M. J. (2014). The medium-term labor market returns to community college awards: Evidence from North Carolina. *Economics of Education Review, 44*, 42–55.

Long, B. T., & Kurlaender, M. (2009). Do community colleges provide a viable pathway to a baccalaureate degree? *Educational Evaluation and Policy Analysis*, *31*(1), 30–53.

Losak, J. (1980). Student comparisons of educational experiences at the two-year college and the university: A preliminary study. *Community Junior College Research Quarterly, 4*(4), 361–377.

Manski, C. F., & Wise, D. A. (1983). *College choice in America*. Cambridge, MA: Harvard University Press.

Marcotte, D. E., Bailey, T., Borkoski, C., & Kienzl, G. S. (2005). The returns of a community college education: Evidence from the National Education Longitudinal Survey. *Educational Evaluation and Policy Analysis, 27*(2), 157–175. doi:10.3102/01623737027002157

McCormick, A. C., & Carroll, C. D. (1997). *Transfer behavior among beginning postsecondary students: 1989–94* (NCES 97-226). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Quinley, J. W., & Quinley, M. P. (1998). *Four-year graduates attending community colleges: A new meaning for the term "second chance."* New York, NY: Columbia University, Teachers College, Community College Research Center.

Rouse, C. E. (1995). Democratization or diversion? The effect of community colleges on educational attainment. *Journal of Business & Economic Statistics, 13*(2), 217–224.

Slark, J. (1982). *Reverse transfer student study*. Santa Ana, CA: Santa Ana College, Institutional Research Office.

Spady, W. G. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange, 1*(1), 64–85.

Spady, W. G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange, 2*(3), 38–62.

Steenhoek, A. C. P. (1984). *The reverse transfer student and comparisons of the reverse transfer student to the lateral transfer student, and the native student at Cerritos College* (Order No. 8521257). Available from ProQuest Dissertations & Theses Global. (303354435). Retrieved from http://eduproxy.tc-library.org/?url=/docview/303354435?accountid=14258

Stevens, D. W. (2007). *Employment that is not covered by state unemployment insurance laws* (Technical Paper No. TP-2007-04). Suitland, MD: U.S. Census Bureau, Longitudinal Employer–Household Dynamics Program.

Swedler, J. A. (1983). Reverse transfers who return to a university: An analysis of their academic progress. *Community Junior College Quarterly of Research and Practice, 7*(2), 131–137.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of educational research, 45*(1), 89-125.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*: Chicago, IL: University of Chicago Press.

Townsend, B. K., & Dever, J. T. (1999). What do we know about reverse transfer students? *New Directions for Community Colleges, 1999*(106), 5–14.

Tyson, C. (2014, September 10). The 'murky middle.' *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2014/09/10/maximize-graduation-rates-colleges-should-focus-middle-range-students-research-shows

U.S. Department of Education (2006). *Total fall enrollment in degree-granting institutions, by control, level of enrollment, type of institution, and state or jurisdiction: 2005* (Table 202). Retrieved from NCES website: https://nces.ed.gov/programs/digest/d06/tables/dt06_202.asp

U.S. Department of Education. (2015). *Graduation rate from first institution attended for first-time, full-time bachelor's degree-seeking students at 4-year postsecondary institutions, by race/ethnicity, time to completion, sex, control of institution, and acceptance rate: Selected cohort entry years, 1996 through 2008* (Table 326.10). Retrieved from NCES website: https://nces.ed.gov/programs/digest/d15/tables/dt15_326.10.asp

Vaala, L. D. (1991). Attending two-year college after attending a four-year university in Alberta, Canada. *Community College Review, 18*(4), 13–20.

Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcomes. *Review of Higher Education, 27*(1), 45–73.

Xu, D., & Jaggars, S. S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas. *The Journal of Higher Education*, *85*(5), 633–659.

Xu, D., & Trimble, M. (2015). What about certificates? Evidence on the labor market returns to nondegree community college awards in two states. *Education Evaluation and Policy Analysis*. doi: 10.3102/0162373715617827

Yang, P. (2007). *Four-year college transfer, academic match, and student success* (Order No. 3285207). Available from ProQuest Dissertations & Theses Global. (304862996).