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# Modeling the Effect of the Reverse Credit Transfer Associate's Degree: Evidence from Two States

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**Abstract:** The purpose of this study was to investigate the influence of receiving an associate's degree via reverse credit transfer on retention and bachelor's degree attainment for students in Hawaii and Minnesota who transferred

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## Author's Note

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from a community college to a university before earning an associate's degree. Results showed mostly positive evidence with some null results, and we found no evidence that reverse credit transfer negatively influences students' progress toward the bachelor's degree. The results have implications for states and institutions who are developing and implementing reverse credit transfer programs and policies.

**Keywords:** reverse credit transfer, reverse transfer, transfer, community colleges, degree attainment, policy

### MODELING THE EFFECT OF THE REVERSE CREDIT TRANSFER ASSOCIATE'S DEGREE: EVIDENCE FROM TWO STATES

Many students who transfer from a community college to a bachelor's degree-granting institution prior to earning an associate's degree are in "an 'all or nothing' proposition" (Bragg, Cullen, Bennett, & Ruud, 2011, p. 3). They accumulate a large number of college credits yet earn no credential to mark their effort if they do not persist to the bachelor's degree. Only 20% of students who began at a community college and transferred to a four-year institution completed an associate's degree prior to transfer in both the 1990 (McCormick & Carroll, 1997) and 1996 (Hoachlander, Sikora, & Horn, 2003) cohorts of the Beginning Postsecondary Students (BPS) Longitudinal Study. More recent data from the National Student Clearinghouse show comparable results (Shapiro et al., 2013). Of those community college students who transferred to a 4-year institution, approximately 40% did not complete a bachelor's degree within six years of transfer (Shapiro et al., 2013).

Students who leave college without a degree carry with them the deep financial and time investments of pursuing a college degree, and they do not experience the benefits of a college degree that college graduates experience throughout their lifetime. Compared to those who completed some college but do not hold a degree or those who only hold a high school degree, associate's degree graduates earn a higher income, accumulate higher lifetime earnings, and are less likely to be unemployed (Carnevale, Rose, & Cheah, 2011; de Alva & Schneider, 2013).

To remedy this concern for transfer students, 12 states were funded in 2012 as part of the Credit When It's Due (CWID) initiative to develop and implement reverse credit transfer programs. Reverse credit transfer<sup>1</sup> refers to "programs that award associate's degrees to transfer students when students complete the requirements for the associate's degree while pursuing

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<sup>1</sup>This practice is sometimes referred to simply as "reverse transfer," but we prefer "reverse credit transfer" to distinguish this practice from students who transfer their enrollment from a 4-year to a 2-year college as described by Townsend (2001).

the bachelor's degree" (Lumina Foundation, 2012, n.p.). Four additional states joined the initiative by 2015, and during the first three years of the CWID initiative, nearly 16,000 associate's degrees were conferred to students (Taylor & Cortes-Lopez, 2017). Research is only beginning to examine the extent to which reverse credit transfer can increase the number of transfer students with associate's degrees as well as the policies and practices that allow states and institutions to "optimize" reverse credit transfer, or maximize the number of associate's degrees conferred through reverse credit transfer while maintaining the quality and integrity of degrees (Taylor & Bragg, 2015).

However, thus far no research has examined the effect of receiving an associate's degree through reverse credit transfer on students' progress toward the bachelor's degree. For reasons discussed below, reverse credit transfer could promote university<sup>2</sup> retention and bachelor's degree attainment, or it could also incent students to stop out (Taylor, 2016). Although an increasing number of states and institutions have adopted reverse credit transfer policies in order to increase the proportion of their students that receive a postsecondary degree (Education Commission of the States, 2018a; Garcia, 2015), it is unknown if reverse credit transfer policies and practices result in unintended consequences—namely reduced rates of university retention and bachelor's degree completion.

Given the dearth of research in this area, the purpose of this study is to report evidence from two CWID states—Hawaii and Minnesota—that examines the relationship between receiving the associate's degree via reverse credit transfer. These two states were chosen because they were early adopters of reverse credit transfer policy, allowing sufficient time to observe the university outcomes of students that received an associate's degree through reverse credit transfer. As the results show, the influence of reverse credit transfer is generally positive in both states, but some models found null results. We found no evidence that reverse credit transfer negatively influences students' progress toward the bachelor's degree.

## LITERATURE

There is very little evidence related to the predictive power of an associate's degree on bachelor's degree attainment. Recent descriptive data come from the National Student Clearinghouse, which collects data on postsecondary enrollment and degree attainment from roughly 3,600 colleges and universities that enroll 98% of students attending public and private postsecondary

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<sup>2</sup>The term "university" is used throughout this manuscript because our sample of 4-year institutions included only universities. However, we acknowledge that this study may apply to 4-year colleges that are not universities.

institutions in the United States (National Student Clearinghouse, 2015, n. p.). Their data show that approximately 56% of students who transfer without an associate's degree complete a bachelor's degree after four years compared to 72% of students who transfer with an associate's degree (Shapiro et al., 2013). These data suggest that an associate's degree matters for bachelor's degree attainment, but this analysis is descriptive and does not control for other factors that may influence bachelor's degree attainment.

The few extant studies that used statistical techniques generally found a positive impact of the associate's degree on retention and bachelor's degree attainment, though not necessarily for all types of associate's degrees. Overall, the majority of studies have found that general education or transfer-oriented Associate of Arts (AA) and Associate of Science (AS) degrees have a significant and positive impact on bachelor's degree attainment, whereas occupational or applied degrees such as the Associate of Applied Sciences (AAS) have no effect or a negative impact on bachelor's degree attainment (Crook, Chellman, & Holod, 2012; Crosta & Kopko, 2014). These findings hold even when controlling for a rich set of demographic and academic characteristics and utilizing quasi-experimental techniques such as propensity score matching. Although, at least one study has found a positive effect of the Associate in Applied Science as well (Ehrenberg & Smith, 2004), this finding is more tenuous given that other studies have found a significant negative impact of this type of associate's degree (Crook, Chellman, & Holod, 2012; Crosta & Kopko, 2014).

However, not all studies have found that earning an associate's degree positively impacts the performance and retention of transfer students. For example, Carlan and Byxbe (2000) found that the associate's degree made no impact on students' performance in their courses, as measured by GPA. The authors concluded that "efforts to require earning the AA [Associate of Arts] degree [prior to transfer] seem void of merit" (p. 38). However, it was unclear whether the authors grouped all types of associate's degrees together or specifically analyzed the impact of the Associate of Arts degree. The former strategy could have reduced the estimated impact of the associate's degree on students' course performance if there are differences in GPA based on associate's degree type. More recent evidence from Wang, Chuang, and McCreedy (2017) and Turk (2018) using nationally representative datasets found that completing the associate's degree pre-transfer had no effect on transfer students' bachelor's degree attainment. Both authors commented that state studies have found mixed results, and the national estimates may wash out any state-level variation in the impact of associate's degrees.

There are two primary reasons why students' who transfer to a 4-year institution with an associate's may be more likely to complete a bachelor's degree compared to transfer students without an associate's. First, students with an associate's degree, on average, completed more credits than their

counterparts without an associate's degree (Crook, Cheklman, & Holod, 2012), making them closer to the bachelor's degree "finish line" at the time of transfer. Unsurprisingly, research shows that the number of credits students earn prior to transferring to a 4-year institution significantly predicts the likelihood of graduation (Koker & Hendel, 2003). This is one possible explanation for the National Student Clearinghouse's findings that transfer students with an associate's degree have a bachelor's degree completion rate that is approximately 15 percentage points higher than those without the associate's, as their study did not control for the number of credits earned prior to transfer.

Second, the *type of credits* students earned prior to transferring may be even more impactful on their likelihood of bachelor's degree attainment than the *number of credits*. Associate of Arts and Associate of Science degrees are often designed as transfer degrees to signify the completion of the first two years of general education courses, and many 2-year/4-year partnerships have articulation agreements that admit transfer students as juniors if they complete the either degree prior to transfer (Smith, 2010). State policies widely recognize these degrees as transferrable, and approximately 33 states have such transfer agreements (Education Commission of the States, 2018b). Thus, even if two students transfer to a 4-year institution with the same number of credits, the student with the transfer-oriented associate's degree may be more likely to complete the bachelor's degree than the student without one because the credits related to the associate's degree are more likely to transfer and apply towards the bachelor's degree. This possibility is supported by studies that have found that transfer-oriented associate's degrees (Associate of Arts and Associate of Science) are more predictive of bachelor's degree completion for transfer students than applied degrees, such as the Associate in Applied Science (Crosta & Kopko, 2014). Similarly, research shows that "credit loss," or credits earned at a previous institution that are not transferable to or accepted toward degree requirements at a receiving institution significantly dampens transfer students' probabilities of bachelor's degree completion (Doyle, 2006; Monaghan & Attewell, 2015). Although there is limited research on credit loss, it is likely that transfer students who pursued transfer-oriented curricular pathways lose fewer credits than those who completed vocationally-oriented courses prior to transfer because historically most state transfer policies focus mostly on the transfer of Associate of Arts and Associate of Science degrees (Ignash & Townsend, 2000).

Although research has examined whether an associate's degree earned *prior* to transfer predicts bachelor's degree completion, there is no evidence that predicts the effect of earning an associate's degree *after* transfer. This is due, in part, to the fact that reverse credit transfer programs are relatively new in many states. Reverse credit transfer emerged at institutions in Texas and Massachusetts within the past decade (Ekal & Krebs, 2011), but expanded

dramatically as a result of the CWID initiative when 16 states were awarded grants to develop and expand reverse credit transfer programs and policies. Recent research by the Education Commission of the States shows that 17 states have statewide policies on reverse credit transfer and another 22 states have institutional agreements, MOUs, or statewide programs (Education Commission of the States, 2018a). Researchers have documented the policy contexts and reverse credit transfer implementation efforts in CWID and non-CWID states (Anderson, 2015a; Friedel & Wilson, 2015; Taylor & Bragg, 2015; Taylor et al., 2017). This research has helped inform policy efforts, but research has not yet examined the impact of these policies on transfer students' progress toward the bachelor's degree.

### ***Conceptual Framework***

Just as there is limited empirical evidence on the effect of associate's degree attainment on university retention and bachelor's degree attainment, there is a similar dearth of theoretical work that has been developed to conceptualize this process. This theoretical void is even more apparent in the case of students receiving an associate's degree post-transfer given the novelty of this practice. However, this study draws upon two related frameworks, human capital theory and the financial nexus model (Paulsen & St. John, 2002), to conceptualize this process.

From the perspective of human capital theory, students can be understood as rational actors that make attendance and persistence decisions based on the perceived costs and benefits of their education (Becker, 1993; Paulsen, 2001; Tinto, 1975). Costs include the monetary cost of financing one's education, the cost of foregone earnings while one is pursuing education, and any personal costs or sacrifices related to the educational process. Similarly, benefits include both the long-term economic and social benefits provided by education as well as personal or intrinsic benefits one receives from their educational experience. Importantly, a component of rational choice theory is that actors make implicit calculations about the probabilities of receiving benefits when making decisions. Students not only estimate the benefits they will receive from higher education, but also predict the likelihood that they will be able to successfully persist in order to receive these benefits. Students are predicted to invest in education until the marginal benefits are equal to or lower than the marginal costs (Clotfelter, 1991).

Paulsen and St. John (2002) extend this theoretical approach by elaborating upon how students' socioeconomic background influences their perceptions of costs and benefits, which in turn influences their college choice decisions, as well as the interrelationship between the cost-benefit calculus students make when choosing a college and their subsequent persistence decisions. From their perspective, once students enroll in a college they continue to compare "their actual experiences of costs and benefits with earlier perceptions and

expectations about them” (p. 194). This model also highlights how both college choice and persistence decisions are situated both in an individual’s personal financial context and in the financial context provided by the institution in which they enroll (such as tuition and financial aid policies). Changes in either the students’ personal financial context or the institution’s financial context can influence students’ decision to persist or stop out.

Paulsen and St. John (2002) support this conceptualization by reviewing research on how different student groups value and respond differently to financial considerations related to college. For example, low-income students are more sensitive to college costs than high-income students, and community college students are likewise more sensitive to financial considerations than students enrolled in 4-year institutions (Heller, 1997; Leslie & Brinkman, 1988). The influence of financial factors on persistence decisions is therefore predicted to vary by demographic group and institutional type.

These frameworks lead to interesting, and somewhat contraindicating, predictions related to the effect of receiving an associate’s degree through reverse credit transfer on university retention and bachelor’s degree attainment. If the associate’s degree has strong labor market value, as suggested by a number of studies (Carnevale, Rose, & Cheah, 2011; de Alva & Schneider, 2013), receiving an associate’s degree post-transfer could alter students’ persistence calculus more in favor of stopping out and seeking employment. The costs of persistence could be higher given that the amount of foregone potential earnings has increased, and the benefits of persistence could be lower given that the relative payoff of a bachelor’s degree is lower for someone with an associate’s degree compared to a student with some college and no degree. If the associate’s degree shifted students’ persistence calculus in this manner, reverse credit transfer could lead to reduced persistence and bachelor’s degree attainment rates, particularly for students at the margins of persistence. That is, receiving an associate’s degree post-transfer could actually prompt more students to stop out to seek employment.

However, as mentioned previously, a critical component of this perspective is that students also weigh the expected likelihood of receiving a particular benefit when they are making persistence decisions. Research has shown that many community college students experience difficulties related to the transition that can affect retention and bachelor’s degree attainment, evidenced by phenomena such as “transfer shock” (Diaz, 1992; Laanan, 2001). Receiving the associate’s degree after transfer may validate students’ investment in their education and affirm that students are able to succeed in college. This may be particularly important for first-generation and underrepresented students who disproportionately begin postsecondary at a community college and are less likely to complete a bachelor’s degree after transfer (Cohen, Brawer, & Kisker, 2014). If receiving an associate’s degree has this type of motivational effect and leads to students increasing their expected probabilities of persis-

tence, reverse credit transfer could have a positive impact on retention and bachelor's degree attainment.

Overall, our conceptual framework leads to different predictions of the relationship between associate's degree conferral and the university outcomes of transfer students. Although the existing research on the impact of receiving the associate's prior to transfer shows mixed effects on retention and bachelor's degree attainment for transfer associate's degrees, thus far no research has examined the impact of receiving an associate's degree after transfer. The purpose of this study is to investigate which predictions are born out in the data.

### REVERSE CREDIT TRANSFER CONTEXTS IN HAWAII AND MINNESOTA

As mentioned previously, this study utilized state administrative data from Hawaii and Minnesota to investigate the impact of reverse credit transfer degree conferral on students' university outcomes. These two states were chosen because they were early adopters of reverse credit transfer and adequate data were collected on reverse credit transfer participation and subsequent student outcomes. Although these two states shared many common characteristics in terms of their reverse credit transfer implementation, there were also some key differences between them. The following sections provide a brief overview of Hawaii and Minnesota's reverse credit transfer policies and broader higher education context drawn from interviews, site visits, and a review of state and institutional policies as part of the CWID data collection.

#### *Hawaii*

The University of Hawaii (UH) system consists of ten campuses, seven of which are public community colleges and three of which are public bachelor's degree-level institutions. The UH system is governed by a 15-member Board of Regents. The framework for transfer and articulation policy in Hawaii is embedded in the Board of Regents Executive Policy E.5209, first implemented in 1989 and revised in 1994, 1998, and most recently 2006. Among the features of this policy is the notion that transfer among the UH campuses should be as easy as possible for students, while also honoring the independence of individual campus curriculum, degree requirements, and policies. Smooth transfer from community colleges to the universities has been a fundamental principle of system policy.

Recent policy has also moved the UH system away from course-by-course articulation to more global articulation policy. Historically, the University Committee on Articulation was responsible for approving articulation agreements, but policy has shifted to procedures that allow for waiver of the course-by-course review. As indicated in the Memorandum of Agreement: Transfer of General Education Core Requirements in May 2010, articulation

now allows for either acceptance of general education in whole or components of the general education core. That is, students who complete a core general education requirement or all general education requirements within the general education framework at one UH institution will be considered as satisfying those requirements at another UH institution and course-by-course review can be waived. This policy is supported by a cloud technology solution (STAR) that interacts in real time with the underlying Student Information System that is shared by all 10 UH campuses (Rodwell, 2014). Thus, transferring general education courses has become an automatic process facilitated by the STAR Academic Pathway solution, and this technology component is an important dimension of Hawaii's reverse credit transfer efforts.

The UH system piloted reverse credit transfer one year before CWID was initiated and then expanded reverse credit transfer to the entire UH system in fall 2013. Hawaii established four eligibility criteria in order for students' transcripts to be audited for a reverse credit transfer associate's degree in fall 2013. Those criteria were that the student: (a) transferred from a UH 2-year to UH 4-year campus and was enrolled in fall 2013; (b) earned 12 or more credits from one UH 2-year college (the residency requirement); (c) had at least a 2.0 GPA from the UH 2-year institution; (d) accumulated at least 60 cumulative college credits; and (e) did not already complete an Associate of Arts degree or higher. System administrators conducted a centralized degree audit via the STAR system on all students who met those four criteria. If students met the requirements for an associate's degree after the degree audit, UH contacted students to consent to reverse credit transfer. Hawaii has an "opt-out" policy meaning that unless students indicate they do not want the degree, the associate's degree is conferred. UH continued to implement reverse credit transfer in subsequent fall and spring semesters. This study focuses only on the fall 2013 implementation to allow adequate time to observe student outcomes.

### **Minnesota**

Public higher education in Minnesota includes two systems: the University of Minnesota system and the Minnesota State Colleges and Universities (MnSCU) system. The MnSCU system is the focus of this study, because it led reverse credit transfer implementation as part of Minnesota's CWID grant. The MnSCU system includes twenty-four 2-year colleges and seven 4-year universities, is governed by the Board of Trustees, and is overseen by a system Chancellor.

Transfer and articulation policy in Minnesota dates to the early 1990s when the Minnesota Transfer Curriculum was developed, which provided a transferrable package of general education courses related to 10 competencies if students completed a 40-credit hour core. In 2001, legislation allowed for course-to-course transfer rather than the full 40-credit block of general

education. More recently, 2010 legislation resulted in the development of a Smart Transfer Plan, which mandated that credit transfer is transparent on institutional websites and instituted the right for students to appeal credit transfer decisions. Within the MnSCU system and relevant to reverse credit transfer is that both 2-year and 4-year institutions have the ability to award associate's degrees as provided by state legislation. However, few 4-year institutions regularly award associate's degrees.

As part of the CWID grant, MnSCU focused reverse credit transfer implementation efforts on transfer students who: (a) transferred from a MnSCU 2-year to a MnSCU 4-year institution between 2008 and 2013; (b) earned at least 12 credits from the MnSCU 2-year prior to transferring (residency requirement); and (c) did not already complete an AA degree, given that MnSCU decided to only award AA degrees through reverse credit transfer. MnSCU also maintains an integrated data repository that includes data on all courses students have ever taken at a MnSCU institution, allowing MnSCU administrators to manually conduct a centralized audit of students' records. However, the MnSCU data system was not automated like Hawaii's STAR system, and they used a two-stage degree audit process. In the first stage (the MnSCU audit), MnSCU staff first identified transfer students that met the three eligibility criteria and then manually audited students' courses against requirements of associate's degrees offered by the 2-year and 4-year institutions students previously attended or the 4-year institution the student currently attended. If MnSCU determined that the student met or was close to meeting the requirements for an associate's degree, they sent students' MnSCU transcripts to the institution which was most likely to award the student the degree (which could have been the 2-year or 4-year institution). The institution then conducted its own degree audit (the institutional audit) and determined if the student met AA degree requirements. In select instances, the first institution to audit the student's transcript was unable to award a degree, but the transcript was then sent to a second institution to audit the degree and award the degree. In the majority of cases, students either received the degree from the first institution or did not receive a degree through reverse credit transfer at all.

Due to the time and effort required to implement this process, MnSCU divided potentially eligible students into seven groups, based on the 2-year MnSCU institution from which students transferred and the year they transferred. Transcript exchanges and degree audits began for the first group in the summer of 2013, and by the end of fall 2013, students in the first three groups were awarded as associate's degree via reverse credit transfer if they met all degree requirements. All students in groups 1–3 transferred by the fall of 2011. Additionally, MnSCU initially used an opt-out consent method for groups 1–3, in which institutions could award degrees to eligible students without their consent. However, this policy was changed to opt-in, in which

students had to affirmatively consent to the degree award, beginning with the fourth group. The switch to an opt-in consent method substantially reduced the percentage of students awarded a degree through reverse credit transfer. For these reasons and to be consistent with Hawaii's implementation in fall 2013, this current study focuses on students in groups 1–3.

## METHODS

This study is designed to address the following research question: Controlling for other factors, how does receiving a reverse credit transfer associate's degree predict university retention and bachelor's degree attainment? As described below, we do this by comparing the outcomes of reverse credit transfer students to four comparison groups of transfer students.

### *Sample*

The data for this analysis were gathered from administrative datasets from the UH and MnSCU systems. Both datasets included all students that transferred to a public university that was participating in the CWID initiative (3 in UH and 7 in MnSCU) and were enrolled in fall 2013 at one of these universities. The datasets included not only students that were awarded an associate's degree via reverse credit transfer but many potential comparison groups. In our analyses, the primary independent variable and group of interest were those students who received a degree through reverse credit transfer in fall 2013. We then determined if receipt of the reverse credit transfer associate's degree predicted retention and bachelor's degree attainment rates by comparing reverse credit transfer recipients to four comparison groups: (a) students that met all state-level eligibility criteria but did not receive the associate's degree via reverse credit transfer in fall 2013; (b) students that transferred from a CWID-participating 2-year institution to a CWID-participating 4-year institution without an associate's but did not meet the residency requirement (i.e., did not complete at least 12 credits at public 2-year institution); (c) all students that completed an associate's degree prior to transfer; and (d) students that transferred from any institution other than a CWID-participating 2-year and did not have an associate's degree. The fourth comparison group included transfer students that previously attended non-participating 2-year institutions, 4-year public institutions (lateral transfers), private institutions, and out-of-state institutions.

The sample of students for UH included all transfer students<sup>3</sup> who were enrolled in one of three public UH universities in fall 2013 and who earned

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<sup>3</sup>There is not a consensus in the literature on the definition of transfer students. For the purpose of this study, transfer students were defined as any student who previously attended an institution of higher education and had greater than or equal to one college-level credit at the time of transfer.

at least one college-level credit from another institution prior to their transfer to the UH public university ( $n=10,279$ ). Of these 12,719 students, 1,206 (9%) met UH's five reverse credit transfer eligibility criteria previously described. Of this group of students, 387 students were awarded an associate's degree in fall 2013 through reverse credit transfer. Some of these students also completed their bachelor's degree in fall 2013 ( $n=77$ ), so they were excluded from the analysis because we were interested in student outcomes in subsequent semesters. Another 67 students were also excluded because they transferred to the university more than four years before reverse credit transfer implementation and these students were likely perpetual students with large numbers of credits, potentially skewing the results; these student groups were also excluded from the comparison groups. The final number of reverse credit transfer students included in the analysis was 243. As previously noted, four comparison groups were constructed including: (a) students that met all state-level eligibility criteria but did not receive the associate's degree via reverse credit transfer in fall 2013 ( $n=920$ ); (b) students that transferred from a CWID-participating 2-year institution to a CWID-participating 4-year institution without an associate's but did not meet the residency requirement at a public 2-year ( $n=159$ ); (c) students that transferred from a CWID participating 2-year and completed an associate's degree prior to transfer ( $n=866$ ); and (d) students that transferred from any institution other than a CWID-participating 2-year and did not have an associate's degree ( $n=4,517$ ). Students' demographic characteristics and academic histories for the UH sample are provided in Table 1.

The sample of students from MnSCU included transfer students who were enrolled in one of the seven MnSCU universities in fall 2013. MnSCU targeted reverse credit transfer implementation on students who transferred to a MnSCU university between 2008 and 2012. MnSCU then disaggregated this entire sample into seven groups (based on the community college) and proceeded to audit degrees in order of the groups. By the end of fall 2013, MnSCU had completed degree audits and conferred degrees for the first three groups. Because of the significant lag time between when some of these students transferred and when reverse credit transfer was implemented, we further restricted the sample to students who transferred in either 2010 or 2011 and had not earned a bachelor's degree by fall 2013 ( $n=4,473$ ). Of these 4,473 students, 1,392 (31%) met MnSCU's three eligibility criteria for the reverse credit transfer program. Of the 1,392 students eligible for reverse credit transfer, 323 earned an associate's degree via reverse credit transfer by fall 2013. Similar to the UH sample, the MnSCU analytic sample included 108 students who had completed a bachelor's degree in fall 2013 and were excluded from the sample, leaving 215 students for the analysis. The four comparison groups were: (a) students that met all state-level eligibility criteria

**TABLE 1.**  
**DEMOGRAPHIC CHARACTERISTICS AND STUDENTS' ACADEMIC HISTORY (HAWAII)**

	Received RT (n=243)	Comparison Group 1 (n=920)	Comparison Group 2 (n=159)	Comparison Group 3 (n=866)	Comparison Group 4 (n=4,517)
Race					
Hispanic/Latino	0%	0%	0%	0%	0%
Amer. Ind./Alas. Nat.	<1%	<1%	0%	<1%	1%
Asian	43%	44%	55%	38%	22%
Black	1%	1%	1%	<1%	3%
Nat. Haw./Pac. Isl.	7%	5%	4%	7%	8%
White	13%	14%	9%	13%	36%
Two or more races	34%	34%	29%	38%	27%
Unknown race/ethnicity	2%	2%	2%	2%	4%
Nonresident	0%	0%	0%	0%	0%
Male	49%	51%	36%	43%	43%
Female	51%	49%	64%	57%	57%
Age 18 to 24	63%	56%	89%	51%	75%
Age 25 and Older	37%	44%	11%	49%	25%
Pell Recipient	59%	51%	42%	59%	58%
Non-Pell Recipient	41%	49%	58%	41%	42%
Participated in Remediation	64%	63%	1%	77%	13%
Did not Participate in Remediation	36%	37%	99%	23%	87%
Transfer GPA (mean)	3.03	3.10	3.01	3.16	2.97
Number of Credits Earned Prior to Transfer (mean)	66	71	32	78	54
Number of Sending Institutions					
1	47%	44%	61%	41%	62%
2	34%	31%	23%	33%	24%
3	12%	16%	9%	16%	9%

Table 1, cont.

	Received RT (n=243)	Comparison Group 1 (n=920)	Comparison Group 2 (n=159)	Comparison Group 3 (n=866)	Comparison Group 4 (n=4,517)
4	6%	5%	3%	6%	3%
5	1%	2%	1%	2%	1%
6	<1%	1%	1%	1%	1%
7	0%	<1%	1%	<1%	<1%
8	0%	<1%	1%	<1%	<1%
11	--	--	--	<1%	--
Completed Certificate	3%	7%	3%	10%	2%
Completed AA	0%	27%	0%	68%	5%
Completed AS	0%	3%	0%	15%	<1%
Completed AAS	0%	2%	0%	7%	<1%

but did not receive the associate's degree via reverse credit transfer in fall 2013 ( $n=736$ ); (b) students that transferred from a CWID-participating 2-year institution to a CWID-participating 4-year institution without an associate's but did not meet the residency requirement at a public 2-year ( $n=935$ ); (c) students that transferred from a CWID-participating 2-year that completed an associate's degree prior to transfer ( $n=359$ ); and (d) students that transferred from any institution other than a CWID-participating 2-year and did not have an associate's degree ( $n=577$ ). Students' demographic characteristics and academic histories for the MnSCU sample are provided in Table 2.

### ***Data Analysis and Variables***

We used logistic regression analysis to determine if the reverse credit transfer associate's degree predicted students' retention and bachelor's degree completion. Retention data (i.e., semester-to-semester enrollment) and bachelor's degree attainment data were available for all institutions within the system of public 4-years implementing CWID in each state. Two separate dependent variables were used to assess bachelor's degree completion and retention within a two-year observation period. The first outcome variable was a binary variable coded as 1 if students completed a bachelor's degree from any university within the public university system by fall 2015 and coded as 0 if not. The second outcome variable, retention, was a binary variable coded as 1 if students either completed a bachelor's degree or were still enrolled by fall 2015 in any 4-year institution within the system; students were coded as 0 if they had not received a bachelor's degree and were no longer enrolled at any 4-year institution within the system.

We controlled for several variables in the logistic regression models, including demographic variables, pre-transfer academic performance, the number of postsecondary institutions the student had previously attended, and credentials earned prior to transfer. Demographics included gender, race/ethnicity, age, and Pell grant receipt (any time after transfer). Pre-transfer academic variables included students' pre-transfer GPA, the number of credits earned prior to transfer, and whether students ever participated in a remedial/developmental education course prior to transfer. We also included a categorical variable that represented the number of institutions attended prior to transfer. Data on prior credentials took the form of dummy variables representing whether students had received postsecondary certificates, associate's degrees of different types (AA, AS, AAS, other), or a bachelor's or higher before transferring to the CWID-participating 4-year.

## **RESULTS**

Descriptive outcomes for the dependent variables are reported in Table 3. In Hawaii, 90% of the reverse credit transfer recipients were retained two

**TABLE 2.**  
**DEMOGRAPHIC CHARACTERISTICS AND STUDENTS' ACADEMIC HISTORY (MINNESOTA)**

	Received RT (n=215)	Comparison Group 1 (n=736)	Comparison Group 2 (n=935)	Comparison Group 3 (n=359)	Comparison Group 4 (n=577)
Race					
Hispanic/Latino	2%	3%	2%	3%	2%
Amer. Ind./Alas. Nat.	1%	1%	0%	1%	1%
Asian	5%	6%	4%	5%	2%
Black	6%	8%	5%	5%	1%
Nat. Haw./Pac. Isl.	<1%	<1%	<1%	<1%	<1%
White	84%	78%	85%	80%	91%
Two or more races	1%	3%	3%	5%	2%
Unknown race/ethnicity	<1%	1%	1%	1%	1%
Nonresident	<1%	1%	1%	1%	2%
Male	37%	45%	42%	42%	41%
Female	63%	55%	58%	58%	59%
Age 18 to 24	87%	70%	87%	60%	98%
Age 25 and Older	13%	30%	12%	40%	2%
Pell Recipient	56%	55%	47%	70%	37%
Non-Pell Recipient	44%	45%	53%	30%	73%
Participated in Remediation	42%	47%	17%	65%	5%
Did not Participate in Remediation	58%	53%	83%	35%	95%
Transfer GPA (mean)	3.07	3.04	3.07	3.09	2.93
Number of Credits Earned Prior to Transfer (mean)	42	48	24	77	19
Number of Sending Institutions					
1	60%	57%	51%	46%	79%
2	24%	29%	35%	32%	19%
3	12%	9%	11%	17%	2%

4	3%	3%	2%	5%	<1%
5	<1%	<1%	<1%	<1%	0%
6	0%	<1%	<1%	0%	0%
7	0%	<1%	0%	0%	0%
8	0%	<1%	0%	0%	0%
Completed Certificate	5%	11%	4%	9%	<1%
Completed AS	3%	13%	1%	4%	<1%
Completed AAS	3%	8%	2%	3%	1%

years after receiving the associate's degree. The first three comparison groups had comparable retention rates, and only 68% of students in the fourth comparison group were retained. In terms of bachelor's degree completion, 67% of reverse credit transfer recipients completed a bachelor's degree within two years of receiving the associate's degree via reverse credit transfer. The four comparison groups all had lower bachelor's degree completion rates than the group of reverse credit transfer recipients within the same time frame (ranging from 35% to 52%). In Minnesota, reverse credit transfer recipients and students that transferred from institutions other than MnSCU 2-years had the highest rates of retention or completion at 91%. The retention rates for the three other comparison groups ranged between 87–89%. In terms of bachelor's degree completion, reverse credit transfer recipients had the second highest rate of bachelor's degree attainment (73%) while students who already had an AA at the time of transfer had the highest (79%). The bachelor's degree completion rate was between 60–68% among the other three comparison groups.

Table 4 and Table 5 display the results from Hawaii's regression models. Table 4 displays regression models that predict bachelor's degree completion. In all four models and after controlling for demographic and academic characteristics, there was a statistically significant and positive relationship between receiving an associate's degree via reverse credit transfer and bachelor's degree attainment within two years of implementation. Estimates ranged from reverse credit transfer recipients being 16–32% more likely to complete a bachelor's degree compared to the different comparison groups. The models that predict retention within two years of reverse credit transfer implementation are displayed in Table 5. Controlling for other factors, receiving an associate's degree via reverse credit transfer had a statistically significant positive relationship with retention within two years of implementation in one of the models (comparison Group 4); there were no significant differences in the other models.

Table 6 and Table 7 present the logistic regression results for Minnesota. Reverse credit transfer recipients were estimated to be significantly more likely (10–11%) to earn a bachelor's degree compared to students in the first two comparison groups. Reverse credit transfer recipients were significantly less likely to earn a bachelor's degree compared to Group 3, and there was no significant difference for Group 4.

The findings in Minnesota for retention are similar to Hawaii in that the RCT coefficient was only statistically significant for one comparison group. Reverse credit transfer recipients were 5% more likely than students in Group 2 to be retained or receive a bachelor's degree within two years of implementation. There was no significant difference in the retention rates between reverse credit transfer recipients and the other three comparison

**TABLE 3.**  
**BACHELOR'S DEGREE ATTAINMENT AND RETENTION RATES TWO YEARS AFTER REVERSE CREDIT TRANSFER IMPLEMENTATION, BY STATE**

	<b>Hawaii</b>				
	<i>Received RT</i> (n=243)	<i>Comparison Group 1</i> (n=920)	<i>Comparison Group 2</i> (n=159)	<i>Comparison Group 3</i> (n=866)	<i>Comparison Group 4</i> (n=4,517)
Bachelor's Degree	67%	45%	52%	43%	35%
Bachelor's Degree or Retained	90%	88%	91%	89%	68%

  

	<b>Minnesota</b>				
	<i>Received RT</i> (n=215)	<i>Comparison Group 1</i> (n=736)	<i>Comparison Group 2</i> (n=935)	<i>Comparison Group 3</i> (n=359)	<i>Comparison Group 4</i> (n=577)
Bachelor's Degree	73%	61%	60%	79%	68%
Bachelor's Degree or Retained	91%	87%	87%	89%	91%

groups. Across both states and all models, we found no negative coefficients, suggesting that reverse credit transfer has no negative influence on transfer students' progress toward the bachelor's degree.

### DISCUSSION

Overall, the results from this study show mostly positive and some null effects of receiving an associate's degree via reverse credit transfer in the two states studied. In both Hawaii and Minnesota, receiving an associate's degree via reverse credit transfer was a significant predictor of bachelor's degree completion within two years. For the retention outcome, receiving a reverse credit transfer associate's degree had a positive effect for one model in both states, and a null effect on retention within two years in the remaining three models. We found no negative effects of reverse credit transfer on students' progress toward the bachelor's degree.

So what do these results mean? First, it is critical to observe that in both states, the implementation context likely influenced students in different ways. For example, we suspect that the implementation lag time in Minnesota may partially explain the null effect on retention; in Hawaii, some students were awarded the associate's degree via reverse credit transfer up to three years after they transferred to the university. The timing of reverse credit transfer

**TABLE 4.**  
**AVERAGE MARGINAL EFFECTS ON BACHELOR'S DEGREE**  
**ATTAINMENT (HAWAII)**

	<i>Group 1</i> <i>Coef. (SE)</i>	<i>Group 2</i> <i>Coef. (SE)</i>	<i>Group 3</i> <i>Coef. (SE)</i>	<i>Group 4</i> <i>Coef. (SE)</i>
Received RCT	.24*** (.04)	.16** (.08)	.20*** (.05)	.32*** (.03)
Associate's Degree				
Female (male)	.03 (.03)	-.06 (.05)	.02 (.03)	.00 (.01)
Race/Ethnicity (White)				
Hispanic/Latino	--	--	--	--
Amer. Ind./Alas. Nat.	-.05 (.22)	--	--	-.11 (.08)
Asian	-.03 (.05)	.09 (.08)	.13*** (.05)	.01 (.02)
Black	-.17 (.16)	-.17 (.31)	.12 (.24)	-.08* (.04)
Nat. Haw./Pac. Isl.	.00 (.07)	-.03 (.13)	.01 (.07)	-.09*** (.03)
Two or more races	-.02 (.05)	-.01 (.08)	.06 (.05)	-.03* (.02)
Race Unknown	.03 (.12)	.20 (.14)	.17* (.10)	.01 (.04)
Nonresident	--	--	--	--
Age: Over 24 (18–24)	-.06* (.03)	-.01 (.07)	-.07** (.03)	-.06*** (.02)
Pell Recipient	-.03 (.03)	-.02 (.05)	.03 (.03)	.02 (.01)
(Non-Recipient)				
Transfer GPA	.07** (.03)	.04 (.03)	.06* (.03)	.06*** (.01)
Number of Transfer	.00 (.00)	.00* (.00)	.00** (.00)	.00*** (.00)
Credits				
Remediation Participant	.02 (.03)	.09 (.06)	.05 (.03)	-.04** (.02)
(Non-Participant)				
<i>n</i> Sending Institutions (1)				
2	.03 (.03)	.03 (.06)	.07** (.03)	.00 (.02)
3	.08* (.04)	.05 (.09)	.08* (.05)	.01 (.03)
4	.09 (.07)	.09 (.12)	.01 (.07)	.05 (.04)
5	.12 (.10)	-.03 (.25)	.17* (.10)	.05 (.06)
6	.12 (.16)	.20 (.20)	.07 (.20)	-.07 (.08)
7	.27 (.20)	.07 (.31)	.08 (.24)	.22 (.21)
8	-.01 (.25)	--	--	.29 (.26)
Completed Certificate	.02 (.08)	.13 (.13)	-.04 (.06)	-.06 (.06)
Completed Associate	.03 (.04)	--	-.06 (.04)	.06 (.04)
of Arts				
Completed Associate	-.07 (.11)	--	-.06 (.06)	-.01 (.12)
of Science				
Completed Applied	-.06 (.14)	--	-.15** (.07)	.09 (.13)
Associate				
University Fixed Effects				
(UH-Manoa)				
UH-Hilo	-.09* (.05)	.03 (.08)	-.02 (.04)	.00 (.02)
UH-West Oahu	.04 (.04)	.15* (.08)	.02 (.04)	-.09*** (.02)
Model Statistics				
Total N	1,163	400	1,105	4,760
Log Likelihood	-772.48	-254.71	-721.81	-2,965.91
Pseudo	0.04	0.05	0.06	0.05

Note: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ ;

**TABLE 5.**  
**AVERAGE MARGINAL EFFECTS ON RETENTION AND BACHELOR'S**  
**DEGREE ATTAINMENT (HAWAII)**

	<i>Group 1</i> <i>Coef. (SE)</i>	<i>Group 2</i> <i>Coef. (SE)</i>	<i>Group 3</i> <i>Coef. (SE)</i>	<i>Group 4</i> <i>Coef. (SE)</i>
Received RCT	.00 (.02)	.01 (.05)	-.04 (.04)	.25*** (.02)
Associate's Degree				
Female (male)	.01 (.02)	-.07** (.03)	-.02 (.02)	.02 (.01)
Race/Ethnicity (White)				
Hispanic/Latino	----	----		
Amer. Ind./Alas. Nat.	-.02 (.12)	----	-.22** (.09)	
Asian	-.02 (.03)	.09* (.05)	.09*** (.03)	.07*** (.02)
Black	-.03 (.13)	-.09 (.20)	---.12*** (.04)	
Nat. Haw./Pac. Isl.	-.04 (.06)	-.02 (.07)	.04 (.03)	-.05* (.03)
Two or more races	-.05 (.03)	.02 (.04)	---.01 (.02)	
Race Unknown	-.02 (.09)	--.02 (.03)	.03 (.03)	
Nonresident	----	.06* (.03)	--	
Age: Over 24 (18–24)	-.04* (.02)	-.03 (.04)	-.04** (.02)	-.05*** (.02)
Pell Recipient	-.01 (.02)	.01 (.03)	.02 (.02)	.00 (.01)
(Non-Recipient)				
Transfer GPA	.05*** (.02)	.06*** (.02)	.05*** (.02)	.03*** (.01)
Number of Transfer	.00** (.00)	.00** (.00)	.00 (.00)	.00*** (.00)
Credits				
Remediation Participant	-.02 (.02)	.04 (.04)	.02 (.02)	-.21*** (.02)
(Non-Participant)				
<i>n</i> Sending Institutions (1)				
2	-.02 (.02)	.02 (.04)	.02 (.02)	-.04** (.02)
3	-.07* (.04)	.02 (.05)	.03 (.02)	-.04 (.03)
4	.06 (.06)	.09** (.04)	.03 (.03)	-.04 (.04)
5	-.13 (.10)	-.28 (.24)	.03 (.05)	.01 (.06)
6	--	----	-.11 (.09)	
7	--	--	-.14 (.19)	.16 (.14)
8	-.64 (.23)***	--	--	--
Completed Certificate	.02 (.04)	--	-.02 (.03)	-.06 (.06)
Completed Associate	.03 (.02)	--	-.04 (.03)	.01 (.03)
of Arts				
Completed Associate	-.04 (.08)	--	-.01 (.04)	.06 (.09)
of Science				
Completed Applied	-.12 (.12)	--	-.08 (.06)	.07 (.09)
Associate				
University Fixed Effects				
(UH-Manoa)				
UH-Hilo	-.08 (.04)	.05 (.04)	.01 (.03)	.01 (.02)
UH-West Oahu	-.06 (.03)	.02 (.04)	-.08** (.03)	-.16*** (.02)
Model Statistics				
Total N	1,150	374	1,095	4,757
Log Likelihood	-383.66	-112.04	-347.21	-2,751.12
Pseudo	0.06	0.12	0.07	0.06

Note: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$

**TABLE 6.**  
**AVERAGE MARGINAL EFFECTS ON BACHELOR'S DEGREE**  
**ATTAINMENT (MINNESOTA)**

	<i>Group 1</i> <i>Coef. (SE)</i>	<i>Group 2</i> <i>Coef. (SE)</i>	<i>Group 3</i> <i>Coef. (SE)</i>	<i>Group 4</i> <i>Coef. (SE)</i>
Received RCT	.11** (.04)	.10** (.04)	-.09* (.05)	.01 (.05)
Associate's Degree				
Female (male)	.02 (.03)	.03 (.03)	.02 (.04)	.05** (.03)
Race/Ethnicity (White)				
Amer. Ind./Alas. Nat.	.10 (.16)	-.16 (.23)	-.33 (.11)	-.30 (.20)
Asian	.04 (.07)	-.11 (.08)	.01 (.08)	-.07 (.11)
Black	-.05 (.06)	-.06 (.07)	.01 (.808)	-.27** (.13)
Nat. Haw./Pac. Isl.	--	--	--	--
Hispanic/Latino	-.08 (.09)	-.10 (.10)	.02 (.11)	.05 (.12)
Two or more races	.06 (.10)	-.14 (.10)	.04 (.09)	.07 (.10)
Unknown race/ethnicity	-.17 (.19)	--	-.21 (.33)	--
Nonresident	.07 (.24)	--	--	.13 (.15)
Age: Over 24 (18–24)	-.10** (.05)	-.27*** (.06)	-.15*** (.05)	-.10 (.10)
Pell Recipient	-.07** (.03)	-.03 (.03)	-.05 (.04)	-.05 (.03)
(Non-Recipient)				
Transfer GPA	.14*** (.03)	.07** (.02)	.11*** (.04)	.16*** (.02)
Number of Transfer	.00*** (.00)	.00*** (.00)	.00 (.00)	.00* (.00)
Credits				
Remediation Participant	-.02 (.03)	-.03 (.04)	.00** (.04)	.02 (.05)
(Non-Participant)				
<i>n</i> Sending Institutions (1)				
2	-.01 (.04)	.12*** (.03)	.05 (.04)	.05 (.04)
3	.07 (.05)	.08* (.05)	-.02 (.05)	-.02 (.08)
4	.04 (.09)	-.02 (.09)	.12* (.07)	.18 (.11)
5	-.13 (.19)	-.09 (.21)	-.45 (.28)	--
6	--	-.20 (.32)	--	--
Completed Certificate	-.09* (.06)	.04 (.07)	.09 (.06)	-.10 (.18)
Completed Transfer	.04 (.06)	.07 (.13)	.02 (.10)	
Associate				
Completed Applied	.06 (.06)	.09 (.09)	.00 (.11)	.08 (.15)
Associate				
University Fixed Effects (MSUMankato)				
Bemidji State	.03 (.07)	.13*** (.05)	.06 (.06)	.09 (.05)
Metropolitan State	.06 (.05)	.07 (.06)	.05 (.05)	.00 (.09)
MSU Moorhead	.11** (.06)	.12** (.05)	.08 (.06)	.01 (.06)
Southwest MSU	.05 (.09)	.12 (.08)	.05 (.09)	.01 (.07)
St Cloud	-.02 (.05)	-.047 (.04)	.06 (.05)	-.06 (.04)
Winona State	.12** (.05)	.06 (.05)	.09 (.06)	.08* (.04)
Model Statistics				
Total N	940	923	568	765
Log Likelihood	-576.54	-543.67	-286.89	-423.41
Pseudo	0.07	0.10	0.07	0.10

Note: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$

**TABLE 7.**  
**AVERAGE MARGINAL EFFECTS ON RETENTION AND BACHELOR'S**  
**DEGREE ATTAINMENT (MINNESOTA)**

	<i>Group 1</i> <i>Coef. (SE)</i>	<i>Group 2</i> <i>Coef. (SE)</i>	<i>Group 3</i> <i>Coef. (SE)</i>	<i>Group 4</i> <i>Coef. (SE)</i>
Received RCT	.03 (.03)	.05** (.02)	-.03 (.04)	.01 (.03)
Associate's Degree				
Female (male)	-.03 (.02)	.02 (.02)	.00 (.03)	.02 (.02)
Race/Ethnicity (White)				
Amer. Ind./Alas. Nat.		--	-.26 (.19)	-.01 (.11)
Asian	.04 (.04)	.01 (.05)	.04 (.05)	-.08 (.09)
Black	.04 (.03)	-.07 (.06)	.05 (.04)	-.05 (.09)
Nat. Haw./Pac. Isl.	--	--	--	--
Hispanic/Latino	.04 (.05)	-.01 (.07)		-.01 (.08)
Two or more races	-.01 (.06)	-.15* (.09)	-.03 (.07)	.03 (.06)
Unknown race/ethnicity	-.19 (.18)		-.33 (.30)	--
Nonresident	-.17 (.24)	--	--	.01 (.08)
Age: Over 24 (18–24)	-.05 (.04)	-.09* (.05)	-.04 (.03)	-.02 (.06)
Pell Recipient (Non-Recipient)	.00 (.02)	-.01 (.02)	-.05* (.03)	.01 (.02)
Transfer GPA (.02)	.06*** (.02)	.02 (.01)	.06** (.03)	.046***
Number of Transfer Credits	.00* (.00)	.00 (.00)	.00* (.00)	.00 (.00)
Remediation Participant (Non-Participant)	-.03* (.02)	-.03 (.03)	-.02 (.03)	-.02 (.04)
<i>n</i> Sending Institutions (1)				
2	.01 (.02)	.03 (.02)	-.02 (.03)	-.02 (.03)
3	.03 (.03)	.04 (.03)	-.03 (.04)	-.04 (.06)
4	.06 (.05)	.00 (.06)	.01 (.06)	-.03 (.12)
5	.05 (.07)	-.24 (.21)	-.74*** (.19)	--
6	--	-.32 (.34)	--	--
Completed Certificate	-.07 (.04)	-.03 (.06)	.10 (.02)	.02 (.08)
Completed Transfer Associate	.02 (.03)	.06 (.04)	.01 (.06)	--
Completed Applied Associate	.04 (.03)	.06 (.04)	-.05 (.10)	--
University Fixed Effects (MSUMankato)				
Bemidji State	-.02 (.05)	.09*** (.02)	.02 (.04)	.01 (.04)
Metropolitan State	.04 (.03)	.07** (.03)	.06** (.03)	.03 (.04)
MSU Moorhead	.01 (.04)	.04 (.03)	.05 (.04)	.02 (.03)
Southwest MSU	.04 (.05)	.10*** (.03)	.06** (.04)	-.04 (.06)
St Cloud	.01 (.03)	.03 (.03)	.08*** (.02)	.01 (.03)
Winona State	.07** (.03)	.05** (.03)	.05 (.04)	.05 (.02)
Model Statistics				
Total N	938	916	552	756
Log Likelihood	-321.38	-315.50	-157.50	-213.8223
Pseudo	0.06	0.06	0.13	0.05

Note: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$

implementation relative to students' progress toward the bachelor's degree may be an important factor when examining the influence of receiving the degree. For example, if students make retention/persistence decisions immediately after transfer, then students who are further away from transfer may be less influenced by reverse credit transfer compared to recent transfers; inclusion of them in the sample would lead to underestimates. Similarly, inclusion of these students might lead to overestimates of the significant effects on bachelor's degree completion because many of these students may be close to completion. Another implementation factor that could influence the results is the type of associate's degree conferred. Both states conferred transfer associate's degrees via reverse credit transfer, and if different degree types would have been conferred (e.g., applied associate's degrees), the results might have been different given what prior literature shows about the relationship between type of associate's degree and bachelor's degree attainment (Crook, Chellman, & Holod, 2012; Crosta & Kopko, 2014).

Second, the descriptive evidence suggests that approximately 10% of the students who received a reverse credit transfer associate's degree stopped out within two years of receiving it but approximately 90% were still enrolled. Human capital theory and the financial nexus model (Becker, 1993; Paulsen, 2001; Paulsen and St. John, 2002) suggest that students make decisions in terms of the perceived costs and benefits, which may provide potential explanations for the results of this study. Competing hypotheses suggest that on the one hand, students might seek to maximize the benefits of their reverse credit transfer associate's degree and seek employment, or on the other hand, students might capitalize on the motivational benefits of the reverse credit transfer associate's degree and continue their progress toward the bachelor's degree. However, if the relationship between the reverse credit transfer associate's degree and bachelor's degree retention and completion is mediated by students' perceptions of the associate's degree, and students do not know the potential economic value of the associate's degree, we would not expect students to stop out and seek employment. All things considered, these data show that the vast majority (90%) of reverse credit transfer degree recipients continue to make progress toward the bachelor's degree. Further, the regression models show mostly positive and some null effects, and suggest that after controlling for other factors, reverse credit transfer does not *negatively* influence students' retention or bachelor's degree completion. This may be because students believe the benefits of stopping out are less than the costs, or they do not understand the value of the associate's degree. Because the outcome observation period is relatively small (two years), the results of this study should be interpreted with caution until longer-term outcomes are available. However, based on these results, the evidence suggests that the large majority of reverse credit transfer recipients do not immediately stop out of

the bachelor's degree. Rather, the results suggest that reverse credit transfer likely helps students maintain their momentum toward the bachelor's degree.

Third, an unexpected but interesting result is that the bachelor's degree completion rate and retention rate for students who did not transfer from a public 2-year institution within the state (Group 4) are among the lowest in Hawaii. This population of lateral transfers, out-of-state transfers, and transfers from private institutions is arguably the most at-risk of ending up in an "all or nothing" situation where they have amassed a larger number of credits and have no college degree (Bragg et al., 2011). This group of transfer students is rarely included in reverse credit transfer efforts (Taylor & Bragg, 2015).

Finally, it is important to emphasize that these results are correlational rather than causal. One interpretation of the findings is that receiving the associate's degree through reverse credit transfer increases the likelihood that students will complete the bachelor's degree in these two states. However, it is also possible that students who are more likely to complete the bachelor's degree are also more likely to receive the associate's degree. For example, if some students are pursuing more coherent course sequences or persisting in their major, they may be more likely to complete their bachelor's and may also be more likely to receive the associate's. Put differently, receiving the associate's degree could be the effect of other unobserved student behaviors that affect their likelihood of bachelor's degree attainment, rather than the cause of a higher propensity for bachelor's degree attainment. Nevertheless, the lack of negative relationships between receiving the associate's degree and retention/attainment suggests reverse credit transfer does not significantly increase the risk of stop out.

### ***Implications for Policy, Practice, and Research***

As reverse credit transfer policies and programs proliferate in states and institutions around the country (Education Commission of the States, 2018a; Garcia, 2015), the results of this study have several implications for policy and practice. First, some policymakers and institutional leaders, particularly institutional leaders at 4-year colleges and universities, are concerned that reverse credit transfer will negatively harm their bachelor's degree completion rates or their progress toward the bachelor's degree, yet the evidence in this study does not suggest this will occur in the short-term. Leaders at 2-year and 4-year colleges and universities should use these data to assuage the concerns of skeptical colleagues who are resistant to reverse credit transfer because of the potential negative effects on university retention.

Second, students who transfer from institutions that are not public 2-year institutions had the highest attrition rate in Hawaii and a lower rate in Minnesota, which suggests that 4-year colleges and universities need to direct greater resources toward supporting these students. Of the initial 15 states

that participated in the CWID initiative, most states are only engaging in-state public institutions, so students transferring from private institutions and out-of-state institutions are excluded from reverse credit transfer opportunities (Taylor, 2016; Taylor & Bragg, 2015). Similarly, most existing state policies on reverse credit transfer do not require institutions or systems to consider potentially eligible students outside of public 2-year colleges (Anderson, 2015b; Garcia, 2015). State policymakers should consider modifying these state policies to be inclusive of all transfer students. Inclusion of these students in reverse credit transfer policies could reduce the proportion of students with some college, no degree.

Future research is also needed on reverse credit transfer. One limitation of this study is that the post-implementation time period was only two years, so more research is needed to understand the distal effects of reverse credit transfer on students, including retention and bachelor's degree completion within three and four years after receiving an associate's degree. Given that students' experiences likely differ by race/ethnicity, gender, age, and income, future research should also examine heterogeneity in the outcomes by these student populations. Additionally, future qualitative research is needed to understand how students perceive and understand the associate's degree in the context of reverse credit transfer. It would be useful to analyze the 10% of students who received the associate's degree via reverse credit transfer and then stopped out of the 4-year university to understand why these students stopped out. For example, future research should assess if the potential of increased economic benefits related to the associate's degree prompted students to stop out or if factors unrelated to the associate's degree were more consequential. Similarly, future qualitative research should examine how receiving the associate's degree influences students' likelihood of staying enrolled and completing a bachelor's degree.

Finally, although qualitative research is needed to understand student perceptions of the value of the associate's degree and how valuations of the degree influence their persistence decisions, quantitative research is also needed to examine the economic benefits of receiving the associate's degree. A primary motivation for reverse credit transfer policies is to reduce the percentage of students with "some college, no degree" given that research shows that the benefits of postsecondary education accrue primarily upon receipt of a credential (Carnevale, Rose, & Cheah, 2011; de Alva & Schneider, 2013). However, although transfer-oriented associate's degrees may better equip students to transfer to a 4-year institution and complete a bachelor's degree compared to occupational associate's degrees, some research suggests that that occupational credentials and associate's degrees provide greater labor market value (Schneider & Columbus, 2017). The majority of states implementing reverse credit transfer are currently awarding students transfer

associate's degrees rather than occupational associate's degrees (Kauppila & Taylor, 2017). It is important for researchers to evaluate how these degrees provide labor market value to transfer students who do not complete a bachelor's degree before entering the workforce. Additional research would also be needed to determine if credentials with greater earnings benefits provide a stronger incentive for students to stop out.

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