

Measuring Determinants of Student Return vs. Transfer vs. Dropout vs. Stopout: A First-to-Second Year Analysis of New Freshmen

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Study based on enrollment at public university with a liberal admissions policy in a medium-size urban area.

Focus of Inquiry driven by:

- Institutional need to be better understand enrollment choices of first-year students into the second year, when most attrition happens
- Demographic changes in high school graduate pool in primary service area
- Strategic planning goal to enhance both quality and access
- Impact of new state-funded scholarship program (Millennium) for in-state high school graduates
- Significant rise in new freshmen enrollment since 2000

What identifiable attributes (determinants) have a significant impact on second-year enrollment choices of new freshmen?

Research Approach

- Measure the effect of
 - Student background
 - High school preparation
 - First-semester college experience
 - Financial aid ...
- ... on second-year enrollment outcome, including
 - re-enrollment (return)
 - transfer out
 - stopout
 - dropout

- Measure Millennium scholarship effect pre-/post introduction
 - Two models: combined fall term cohorts 2000-02 (without stopout) and fall term cohorts 1996-99 (with stopout)
 - Emphasis on 2000-02 model

Statistical Method

- Multinomial (polytomous) logistic regression
- Data reliability via regression diagnostics (centered leverage, Mahalanobis distance, studentized residual, Cook's D, DFBetas); asymptotic correlation matrix, cross tabulation on outcome, variable design/reconstruction to stabilize coefficients
- Impact on enrollment outcome expressed in terms of the logarithm of the odds of transferring out (or dropping out, stopping out) versus returning the following fall semester (the reference outcome). For example, a transfer odds ratio of 1.5 indicates the student is one-and-a-half times as likely to transfer compared to the reference student (as listed in tables with model parameter estimates); negative log odds are inverted to ease interpretation, i.e. 1/log odds). For regressors measured on a continuous scale, the relationship is multiplicative.

Data Sources

- Student Information System
- Payroll System
- ACT Student Profile Section
- National Student Clearinghouse

Model Specification

Four sets of determinants:

- Student Demographics (Age, Gender, Ethnicity, Residency, Parent Income)
- High school preparation (Weighted index based on bivariate odds ratio of ACT/SAT and cumulative GPA; see "Academic Resources" index by Adelman, 1999)
- First-semester experience (On campus living, campus employment, concurrent enrollment, credit load, Calculus 1 in major, passing first year math, enrolled in remedial English/math, first semester GPA, peer challenge, class selection, cohort)
- Financial aid offered (package, dollar amount, source, eligibility)

Tested but not included in model due to statistical insignificance:

- Pre-major status, % of I/W grades, attempted/earned credits, net tuition charges (tuition minus aid), on-campus dining, AP credits, campus employment hours, educational aspiration, local-area unemployment

Limitation of Study

- Examined determinants not (yet) complemented with survey-based social/academic integration variables (e.g., NSSE data)
- Determination of transfer, stopout, dropout event is ‘right-censored’ after 2 semesters (2000-02 model), 7 semesters (1996-99 model)

Improvement Over Typical Retention Studies

- Measures relative impact of determinants vis-à-vis multiple (instead of dichotomous) enrollment outcomes, i.e., disaggregation of non-returners into transfer-out, stopout, and dropout students
- Effect of financial support measured on basis of aid *offered*, not awarded/received
- More extensive analysis of financial aid variables by type, source, eligibility, and dollar amount
- Parent income derived from two sources (FAFSA, ACT SPS) to minimize missing data

How Does Analysis Differ from Noel-Levitz Retention Data (fall 2002 cohort):

- Noel-Levitz *describes* retained versus non-retained students across different factors/student attributes, thus measuring *two* at the same time, without considering transfer or stopout behavior.
- This study attempts to identify which factors/student attributes *explain* student re-enrollment behavior, including transfer-out and stop-out enrollment, through simultaneously measuring *multiple* factors/attributes found to be significantly correlated with (or of clinical interest to) re-enrollment behavior. Secondly, the analysis helps *predict* future enrollment of matriculated students.

Descriptive Summary

- 5,261 cases (4,298 for 1996-99 cohorts), 96 % of population (excl. athletes, part-time, foreign, non-degree-seeking students)
- Trends from 1996-99 to 2000-02: (\$ amounts are 1996-adjusted)
 - % of new freshmen with second-year financial aid offers up, from 44 to 69, driven by Millennium scholarship
 - % of new freshmen with scholarship-only offers up from 19 to 47
 - % of new freshmen with combination offers (grants/loans/scholarships/work study) down from 25 to 22
 - number and average \$-amount for all types of aid offers up, except subsidized and unsubsidized loans (2,774 down to 2,565 and 5,115 down to 4,646)
 - % of new freshmen with second-year institutional aid offers down from 33 to 27 (average \$-amount down from 2,667 to 2,293)
 - % of new freshmen with second-year federal/state aid offers up from 22 to 68 (average \$-amount down from 5,238 to 2,959) => Millennium \$ replacing fed/state loans
 - % of new freshmen with Pell grant offers slightly up from 9 to 10 (average \$-amount up from 1,786 to 2,096)
 - 7 % rise in in-state students from outside local area (e.g., Las Vegas)
 - 7% drop in proportion of students declaring math-intensive major
 - 10% rise in remedial English enrollment (math likely contained by supply)

FINDINGS & IMPLICATIONS (OR = Odds Ratio)

- ❖ Ethnic minority students (African/Hispanic/Native Am.) with low (bottom third) first-semester grades are more likely to transfer out (OR = 1.6 based on interaction effect), mostly to community colleges.
 - Results suggest aid offered to minorities might be insufficient to mitigate transfer rate (due to post-control effect, i.e., once aid offers are controlled for). No difference in odds to drop out or stop out compared to Caucasian/Asian American students.
- ❖ Caucasian/Asian American students with high first-semester grades (top third) are twice as likely to return (OR= 2.3 inverse interaction effect) compared to African/Hispanic/Native American students
 - Results suggest first-semester grades have a differential effect on retention based on ethnicity and level of grades.
- ❖ Out-of-state and in-state students from outside the local area are more likely to transfer out and more likely to drop out compared to local residents.
 - Results suggest Millennium scholarships helped attract out-of-area students, but did not change the departure odds of these students (e.g., transfer OR = 2.6 for 1996-99 Clark students versus 3.97 in 2000-02)

- ❖ Students from higher-income backgrounds have on average 1.7 times the odds of re-enrolling compared to those from low-income background.
 - Results suggest that, given model control, higher income (i.e., parental education; bivariate correlation = .95) is conducive to student persistence/focus on education. Need to examine first-generation students (e.g., TRIO).

- ❖ Well prepared high school grads are twice as likely to transfer or drop out since the start of the Millennium program (no significance found in 1996-99 cohorts).
 - Results suggest that augmenting institutional offers to these students might keep them (based on interaction effect; OR 7.8/2.1, respectively comb. Aid/Scholarship), but could compromise aid to others with fewer enrollment choices.
 - Issue must be addressed amid efforts by institution to enhance both access and quality: Access is up as new freshmen class grew by 50% from '99 to '02-- average new freshmen ACT/SAT up, but top students less likely to return. Likely reason: Millennium support attracts well prepared high school grads who, prior to the state-funded scholarship program, would not consider UNR (in-state) attendance. They are now getting free tuition for the first, maybe second, year before transferring to out-of-state institutions.

- ❖ Concurrent enrollment at other institutions (mostly two local community colleges) improves the odds of *not* dropping out, and has an even greater effect on *not* transferring out
 - Results suggest complementary enrollment choices at other institutions may enhance retention as students seek scheduling flexibility to balance college attendance with other responsibilities (e.g, work, family). Supports the 'student consumer' model.

- ❖ Passing a first-year math course or enrolling in a math-intensive major raises the odds of retention, while remedial math students are more likely to transfer (mostly to CCs). Conversely, remedial English students are less likely to transfer.
 - Results suggest that the first-semester math experience for new freshmen is central to their progress (see Cliff Adelman, *Answers in the Tool Box*, USDE, 1999) and, unlike remedial English, identifies them as at-risk students.

- ❖ Financial aid offers have strongest positive impact on re-enrollment.
 - a. Impact of aid offers stronger since '99
 - b. Scholarship offers twice as effective as loan offers in keeping students enrolled
 - c. Loans more effective than grants, which in general do not influence re-enrollment
 - d. Prestige, payback obligation, relative availability of dollars (grants vs. loans) likely explains differential impact (e.g., odds against dropping out greater for subsidized compared to unsubsidized loans; but no difference in transfer odds)

- e. Positive retention effect greater for federal/state offers than for institutional offers (likely due to the need proportion covered by Millennium aid versus more limited institutional support)
 - f. Millennium scholarship has greater effect than other types of scholarships (again, likely due to mitigating the need for multiple-source assistance)
 - g. Pell grants improve odds of return for low-income students (though grants in general do not)
- ❖ The following factors incorporated in the model did not influence re-enrollment odds:
 - a. Average class size of first-semester courses taken
 - b. Difficulty in getting into first-semester courses
 - c. On-campus employment (likely due to ‘commuter’ environment, off-campus jobs)
 - d. Tendency for transfer if not peer-challenged ($\alpha = .13/.034$), but not supported by 1996-99 cohort model, which shows neutral challenge raise odds of returning
 - Results suggest that the significant growth in new freshmen since fall 2000 has not (yet) impacted the average class size and availability of freshmen courses to where they could negatively affect retention. Similarly, relative academic performance of students in a rapidly growing enrollment pool does not appear to affect a student’s re-enrollment odds.

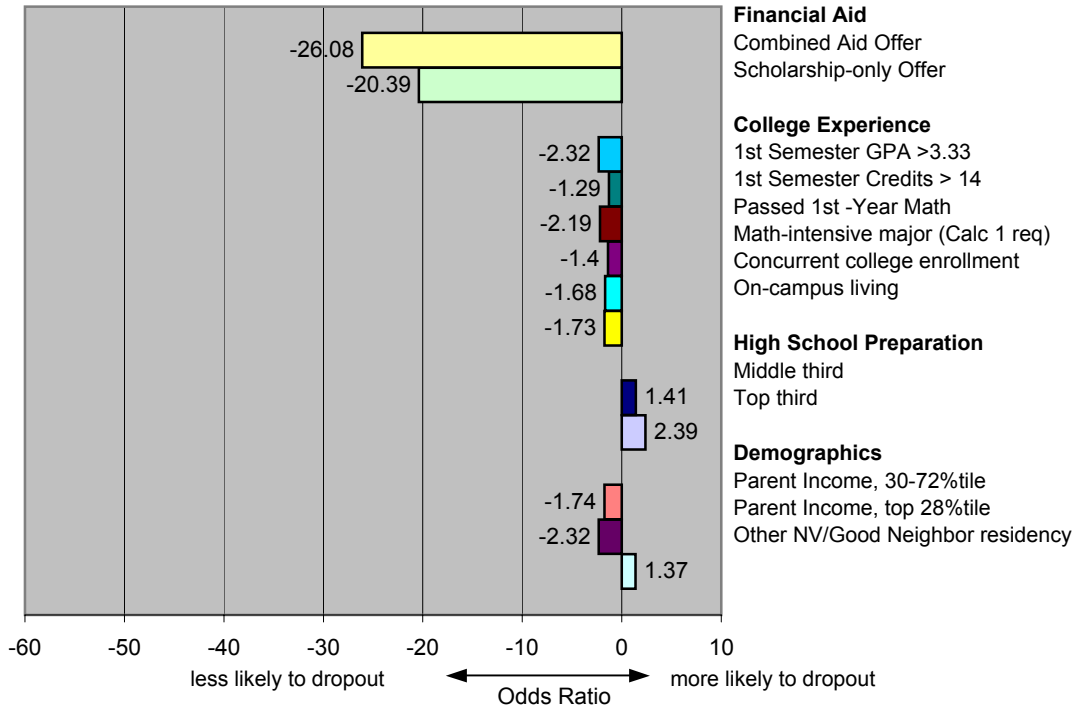
Next Steps in Retention Analysis:

- ❖ Measure impact of time-varying determinants in subsequent years
- ❖ Inclusion of ‘unmet’ need measure in financial aid cluster as part of ‘price-elasticity’ model (amount of institutional \$ to maximize return odds)
- ❖ Incorporation of NSSE survey data to enhance control over social/academic integration factors
- ❖ Expand high school background attributes (HS profile data for in-state students, ACT SDQ data for ACT-tested students)
- ❖ Development of alternative models using Structural Equation Analysis, Event History Analysis (to measure longitudinal attrition).

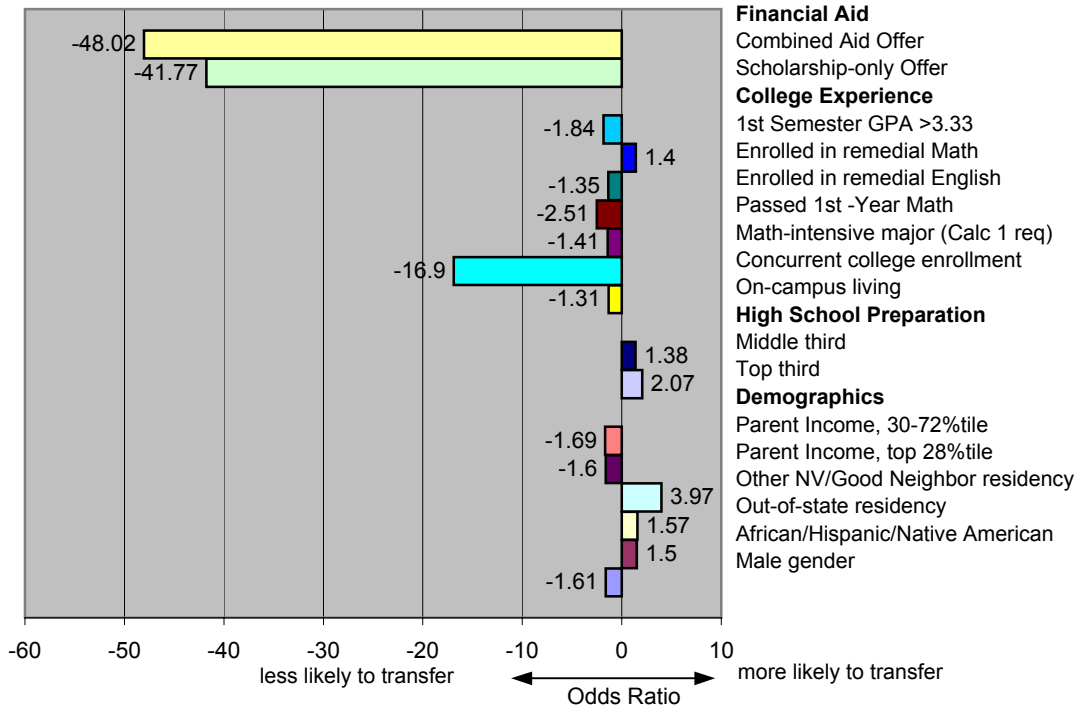
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<http://www.unr.edu/ia/RetentionStudy.pdf>

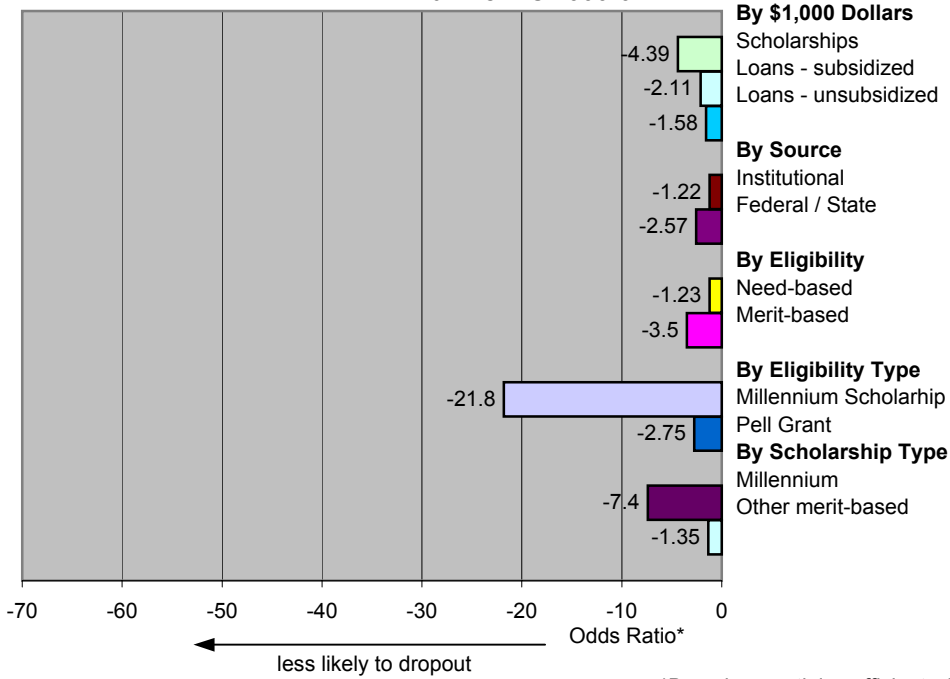
Factors Influencing the Dropout of New Freshmen Fall Terms 2000-02



Factors Influencing the Transfer-Out of New Freshmen Fall Terms 2000-02

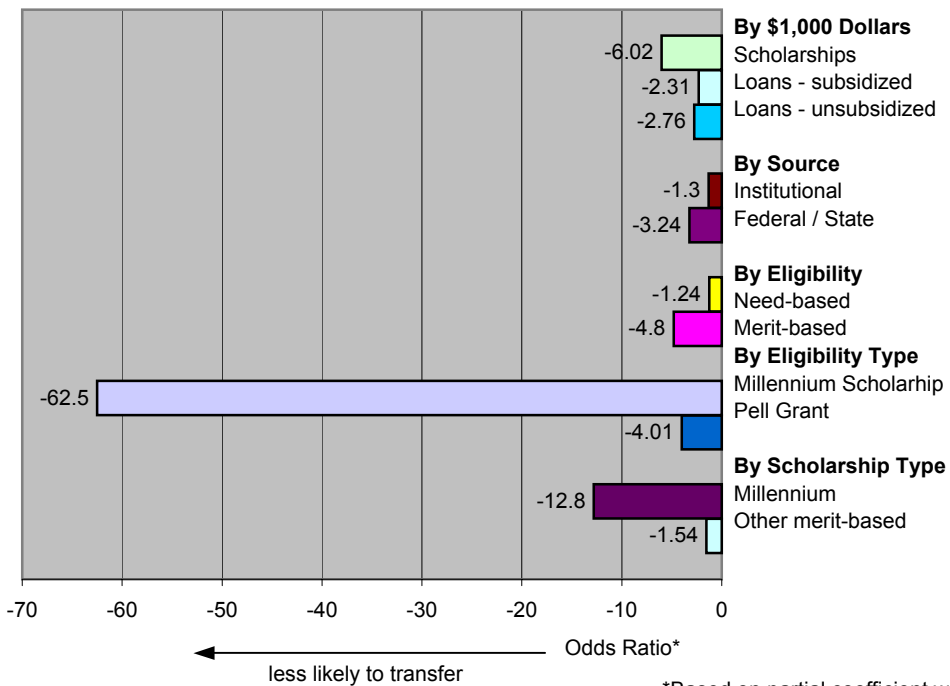


Financial Aid Offers Influencing the Dropout of New Freshmen Fall Terms 2000-02



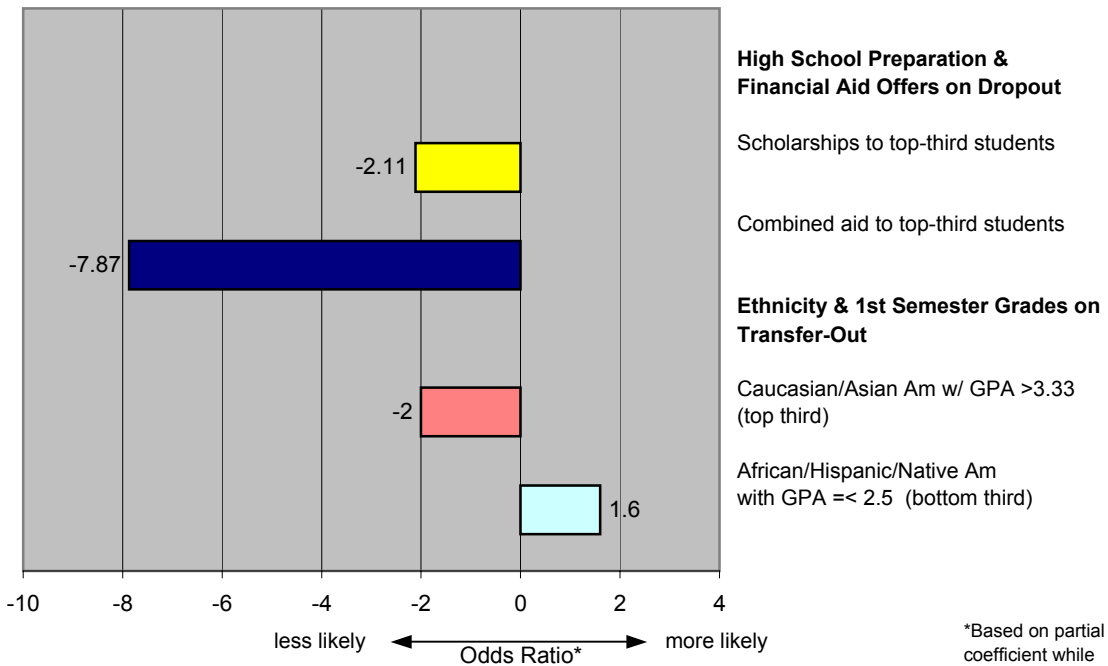
*Based on partial coefficient while controlling for demographic, high school, college factors

Financial Aid Offers Influencing the Transfer-Out of New Freshmen Fall Terms 2000-02



*Based on partial coefficient while controlling for demographic, high school, college factors

Significant Interactions Influencing Transfer-Out or Dropout of New Freshmen, Fall Terms 2000-02



*Based on partial coefficient while controlling for main effects