

Example of How a Projection Model Contributed to a Planning Effort

Bruce Beck

University of Wisconsin-Madison

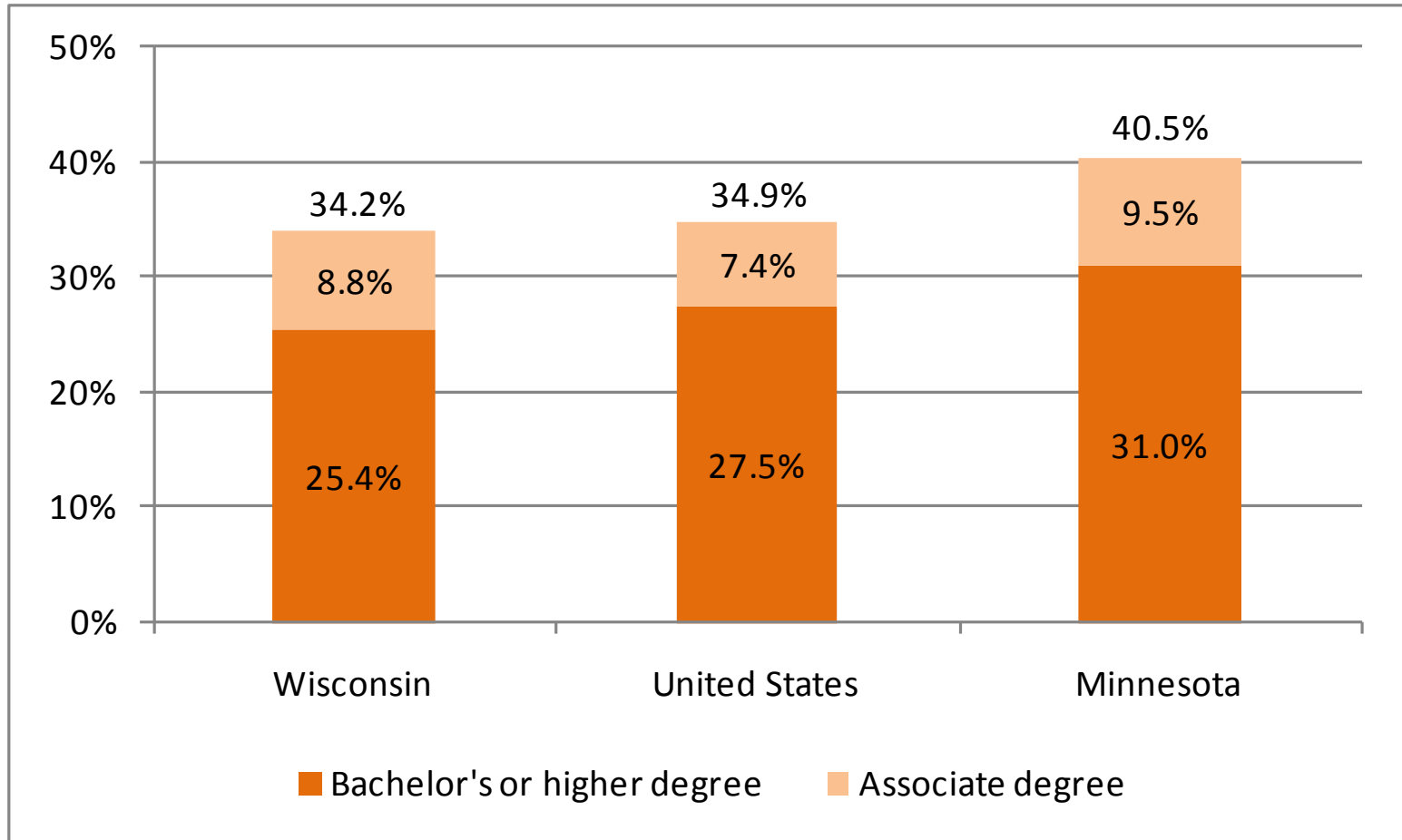
2010 AIRUM Conference

Post-Secondary Educational Attainment of the Workforce

- The University of Wisconsin System is developing a “**More Graduates**” budget proposal for $\approx 30\%$ increase in annual degrees awarded, by the 2025-26 academic year.
- Obama Administration’s goal is for U.S. workforce to have highest post-secondary attainment level
- The Organization for Economic Cooperation and Development (OECD) statistics: in 2005, 39% of those aged 25-34 in the United States had a post-secondary degree, compared to 53% in Japan and 54% in Canada.
- Each sector of Wisconsin’s educational system can take steps toward a 55% attainment level:
 - High School Graduation Rates
 - College-Going Rates of Recent High School Graduates
 - Graduation Rates of New Freshmen, Transfer Students, Non-Traditional Students, Students of Color, Low-income Students
- How is UW-Madison defining its contribution?

Degree Attainment

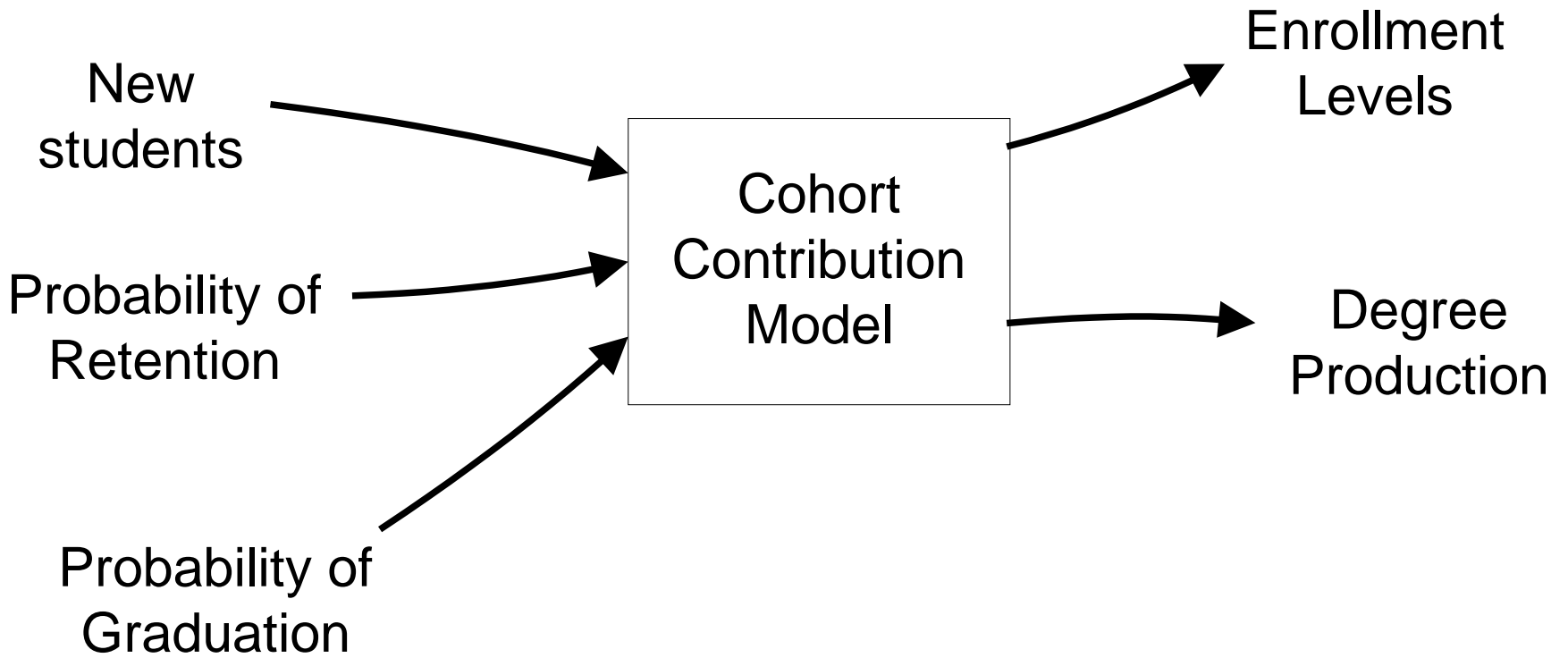
Persons 25 years and over, 2007



Source: U.S. Census Bureau American Community Survey

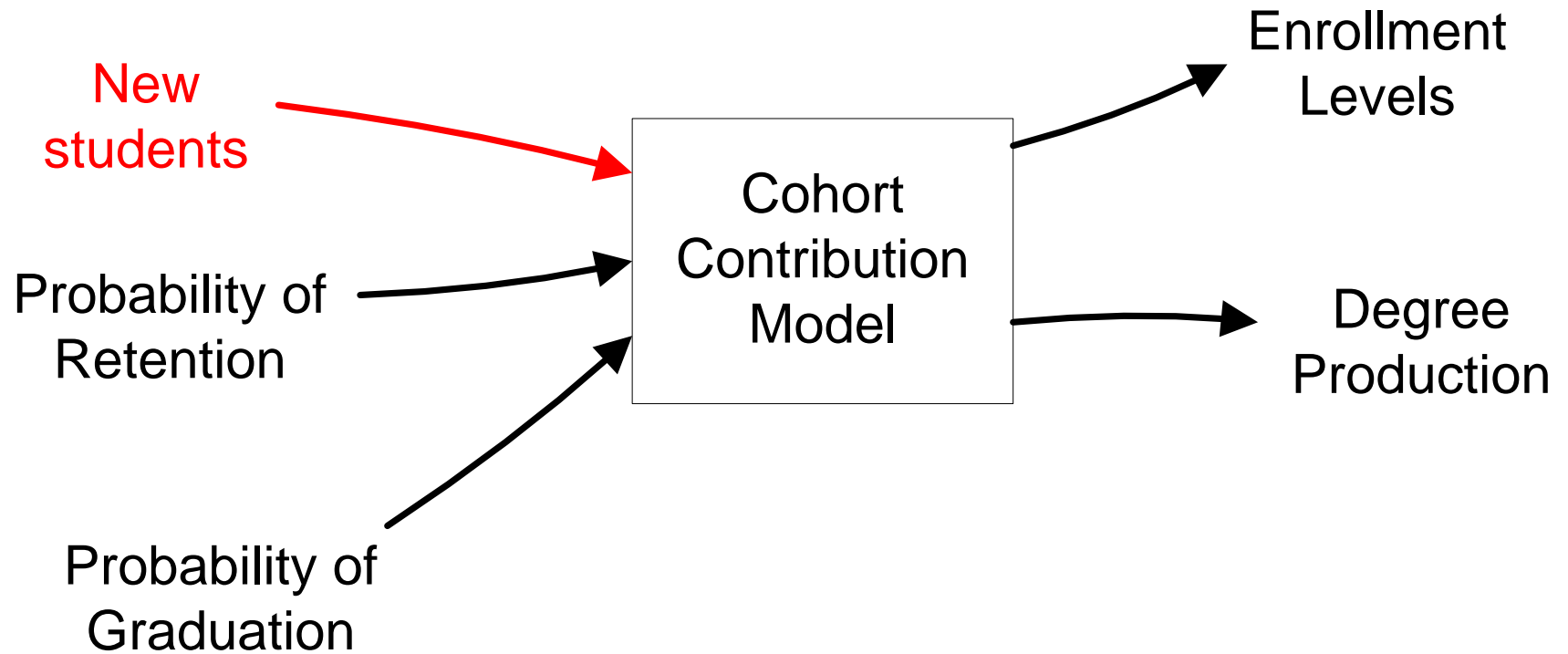
“Back of the Envelope” Model

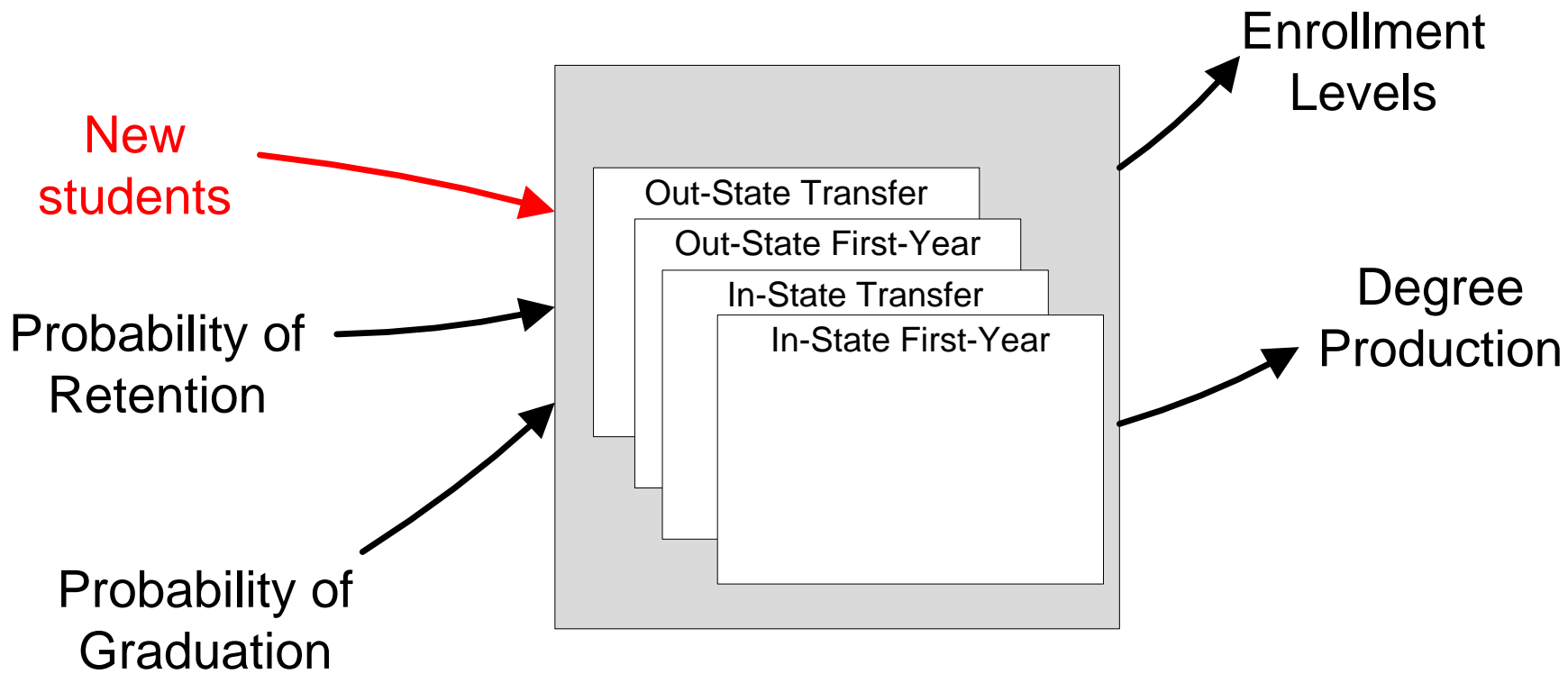
- To increase Bachelor’s degrees by X percent, increase the number of undergraduates by same X percent.
- Degree goal will probably be reached 6 to 8 years later.
- Undergraduate tuition revenue will increase about the same X percent.
- Expenditures for undergraduate instruction and supporting services will increase about the same X percent.
- Capital improvements....especially urgent where current utilization of existing capacity is near 100%.



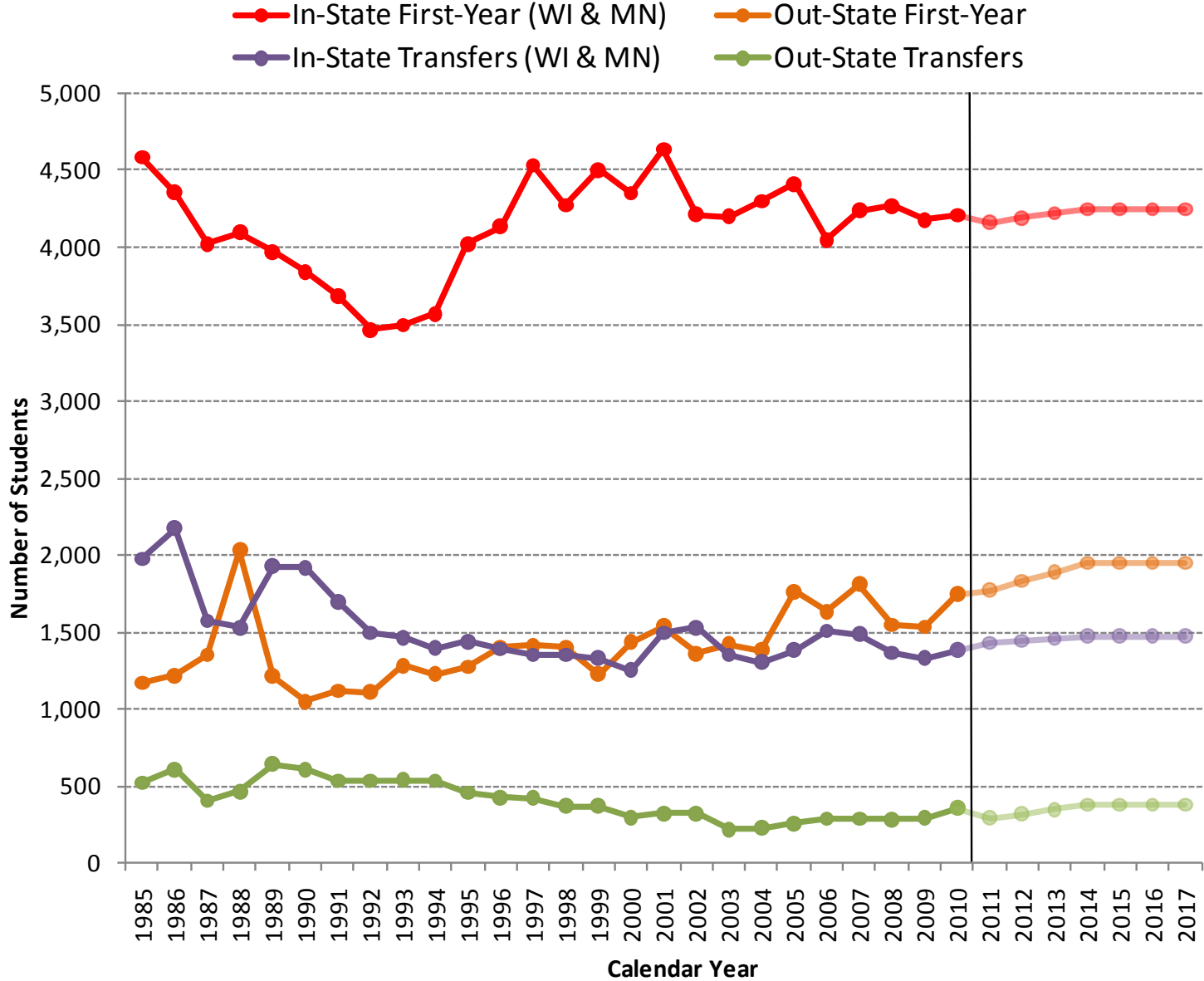
Why Build a Cohort Contribution Model?

- Take account of **recent past** fluctuations in the number and mix of new students
- Estimate impact of gradual **trends** in retention and graduation rates
- Compare impact of alternative **management actions**
- Track **multiple events/actions** over time





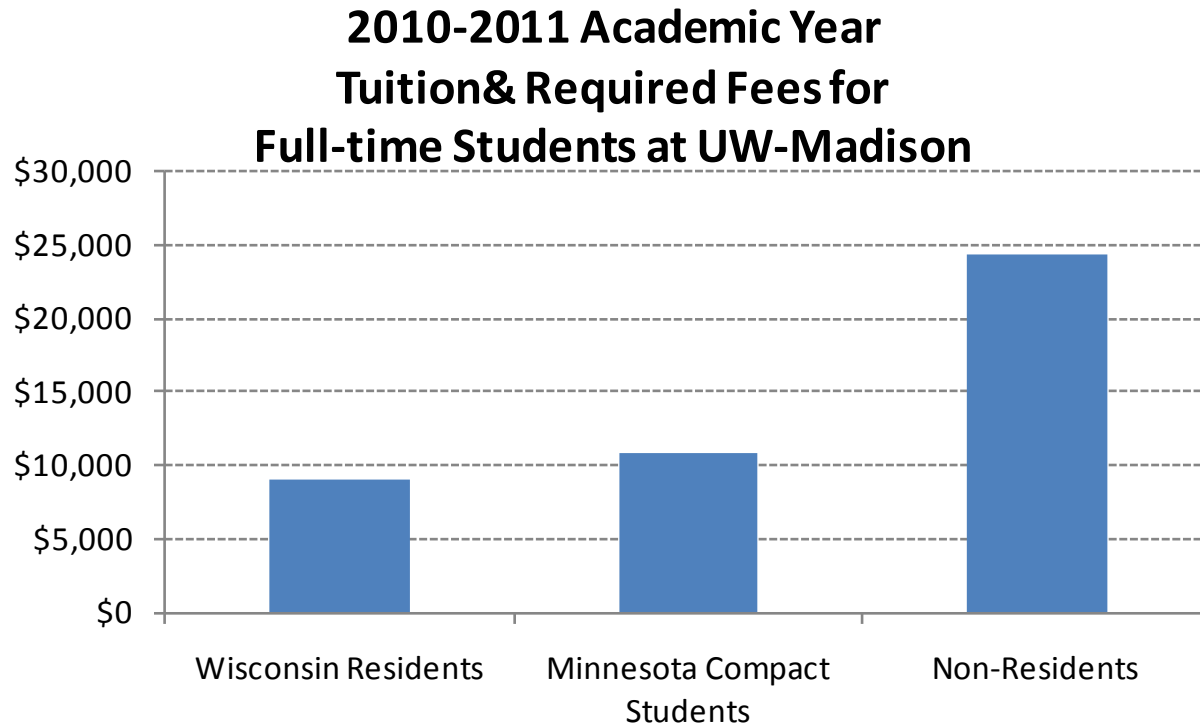
New Undergraduates Entering UW-Madison



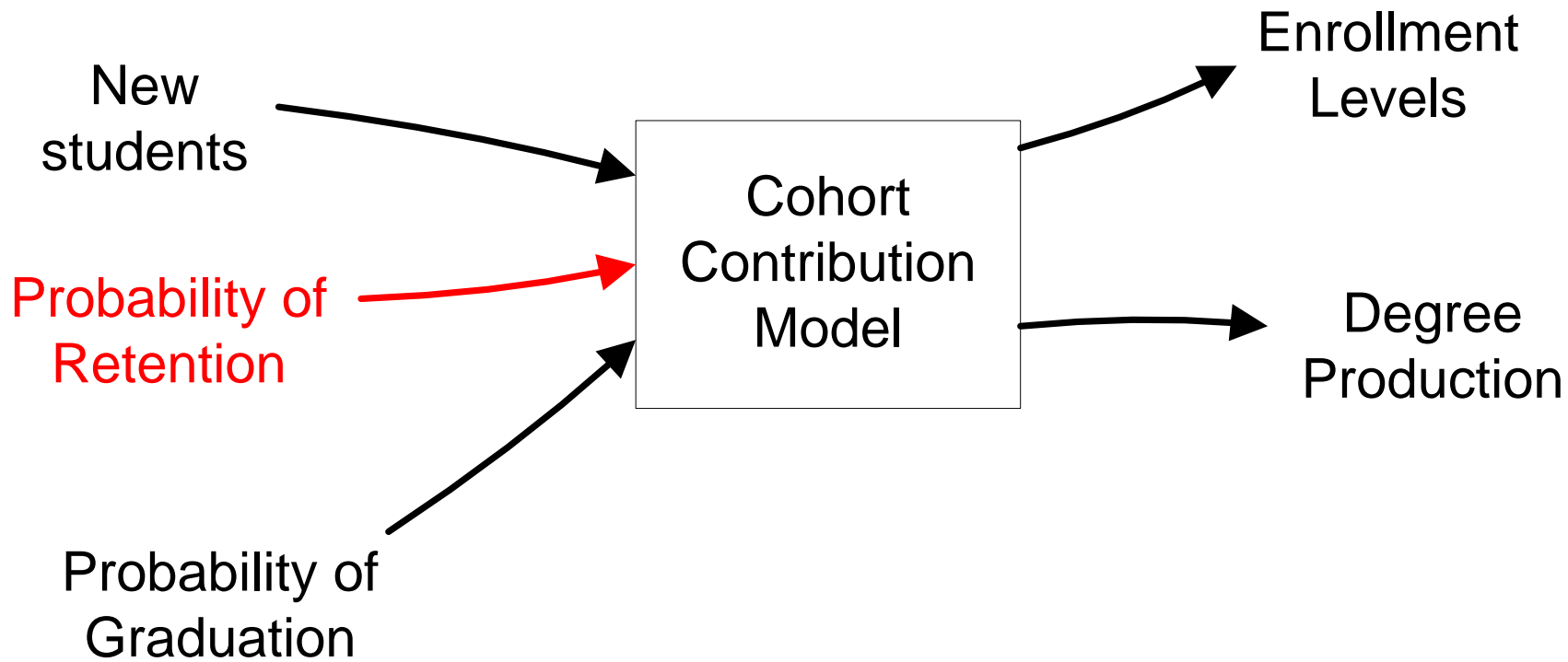
Why Track In-State vs. Out-State Undergraduates Separately?

- **Revenue implications** of out-state enrollment levels are significant
- **25% limit** on out-state undergraduates
- University has some **control** over number of new in-state vs. out-state students
- In-state and out-state students have **different retention and graduation** patterns

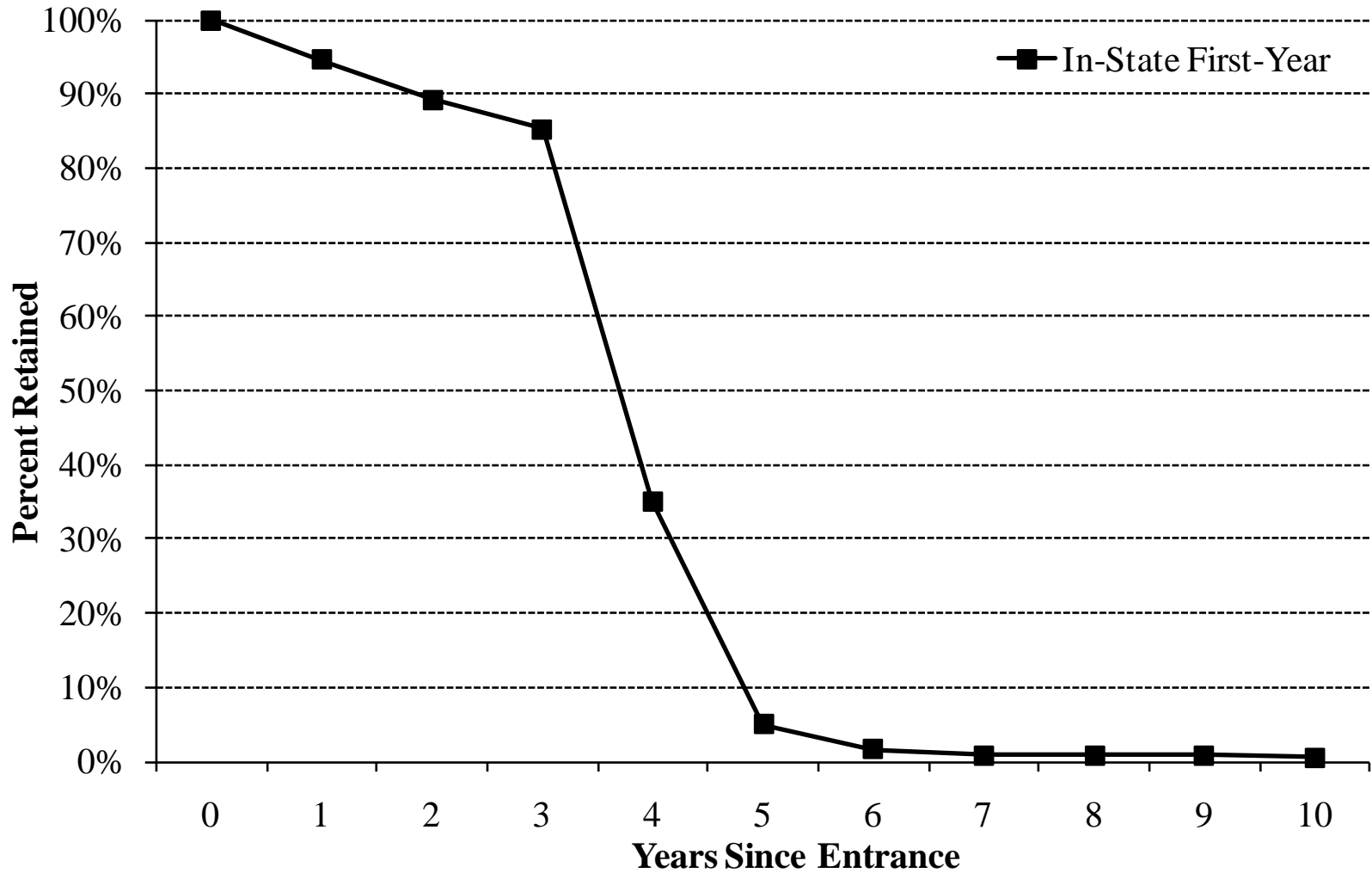
Why group Wisconsin and Minnesota Students together?



- Tuition rates are similar
- Tuition revenue received by the university is the same
- Admissions process/criteria are similar
- Minnesota students do not count toward the 25% limit on out-state students



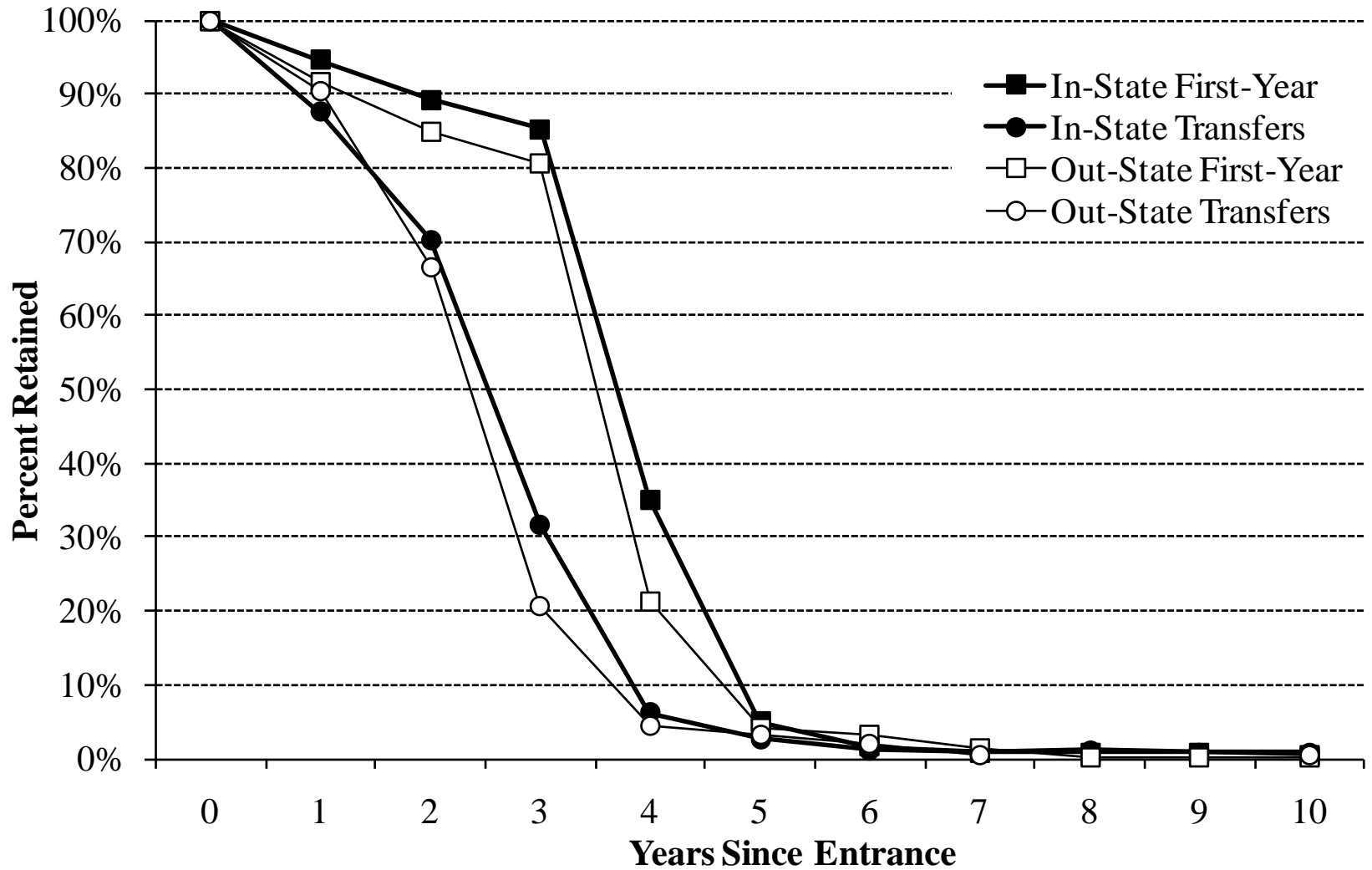
Retention Rates for UW-Madison Undergraduates Who Entered in Fall Terms, By Years Since Entrance



Notes on Retention Rates

- Always as of the Fall Term
- Based on current fall term undergraduates:
 1. Which entrance cohorts do the students belong to?
 2. What was the size of those cohorts?
 3. What percentage of those cohorts are still enrolled?
- Includes all/only students currently enrolled as undergraduates, regardless of whether they received a degree
- Includes students who left and then returned
- Retention pattern actually extends for 23 years following original entrance

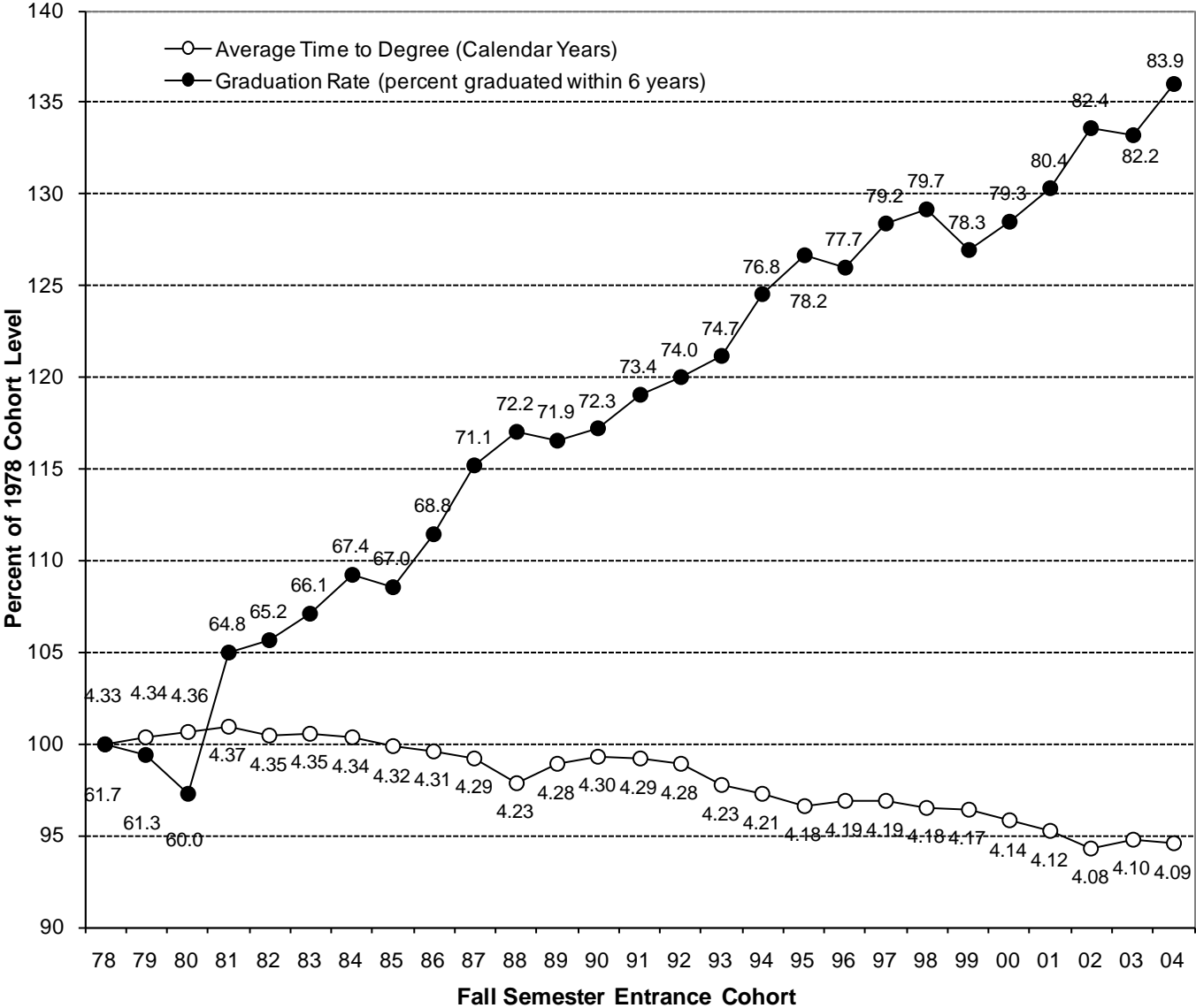
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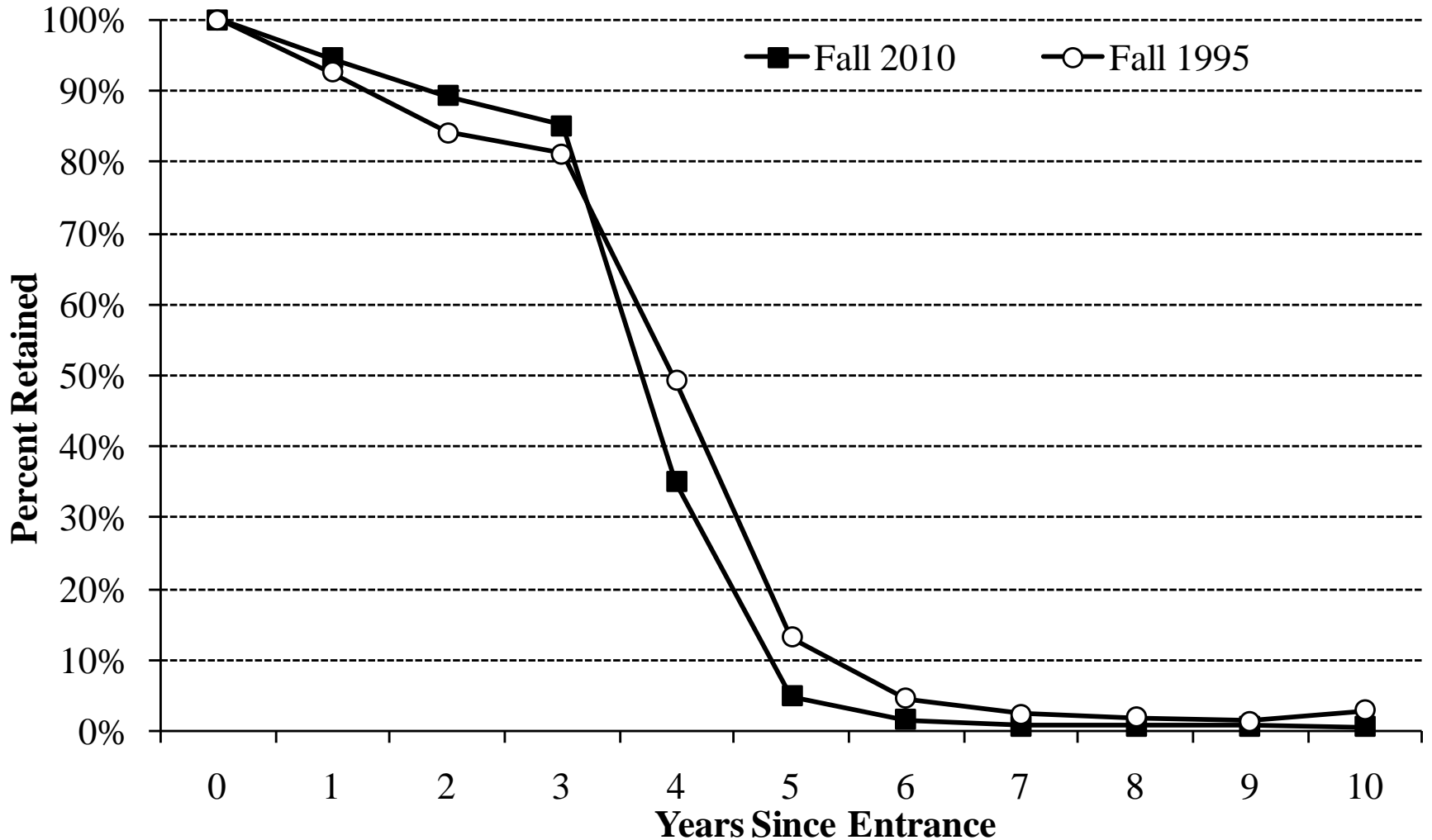
Retention Rates for In-State Transfer Undergraduates Who Entered in Summer Terms, By Years Since Entrance



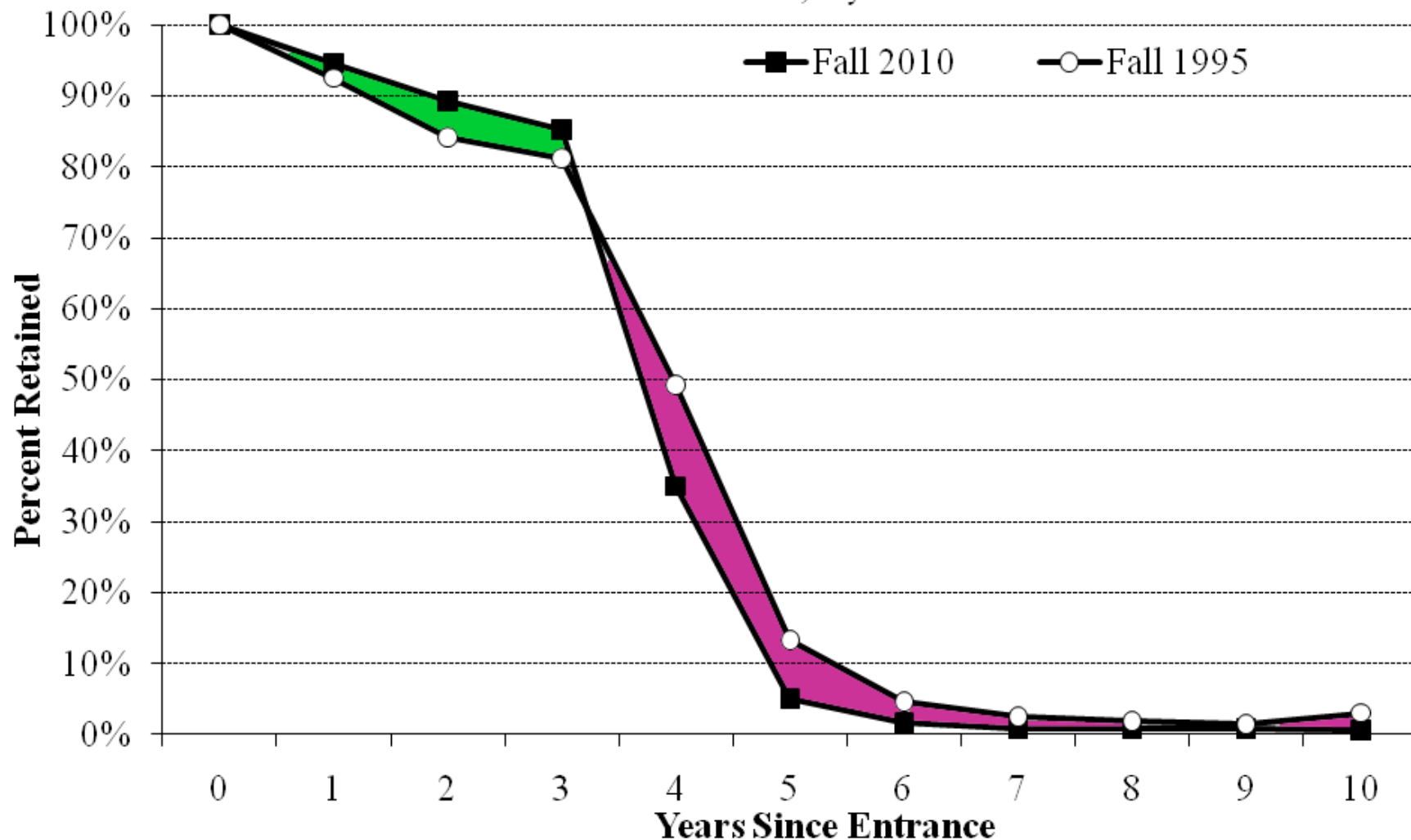
Trend in Average Time to Degree and Graduation Rates Within Six Years After Entering as New Freshmen at UW-Madison



Retention Rates for In-State First-Year Undergraduates Who Entered in Fall Terms, By Years Since Entrance

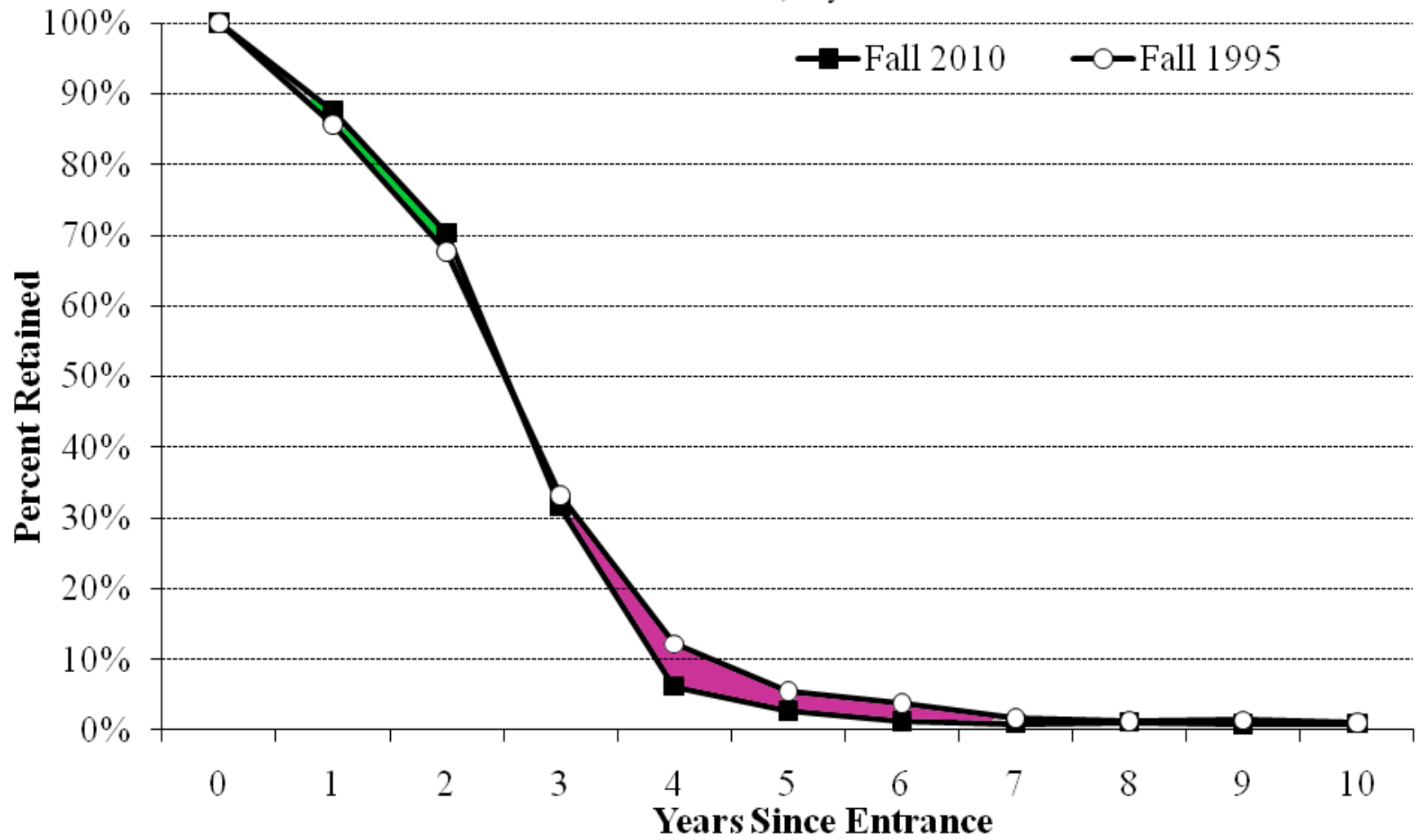


Retention Rates for In-State First-Year Undergraduates Who Entered in Fall Terms, By Years Since Entrance



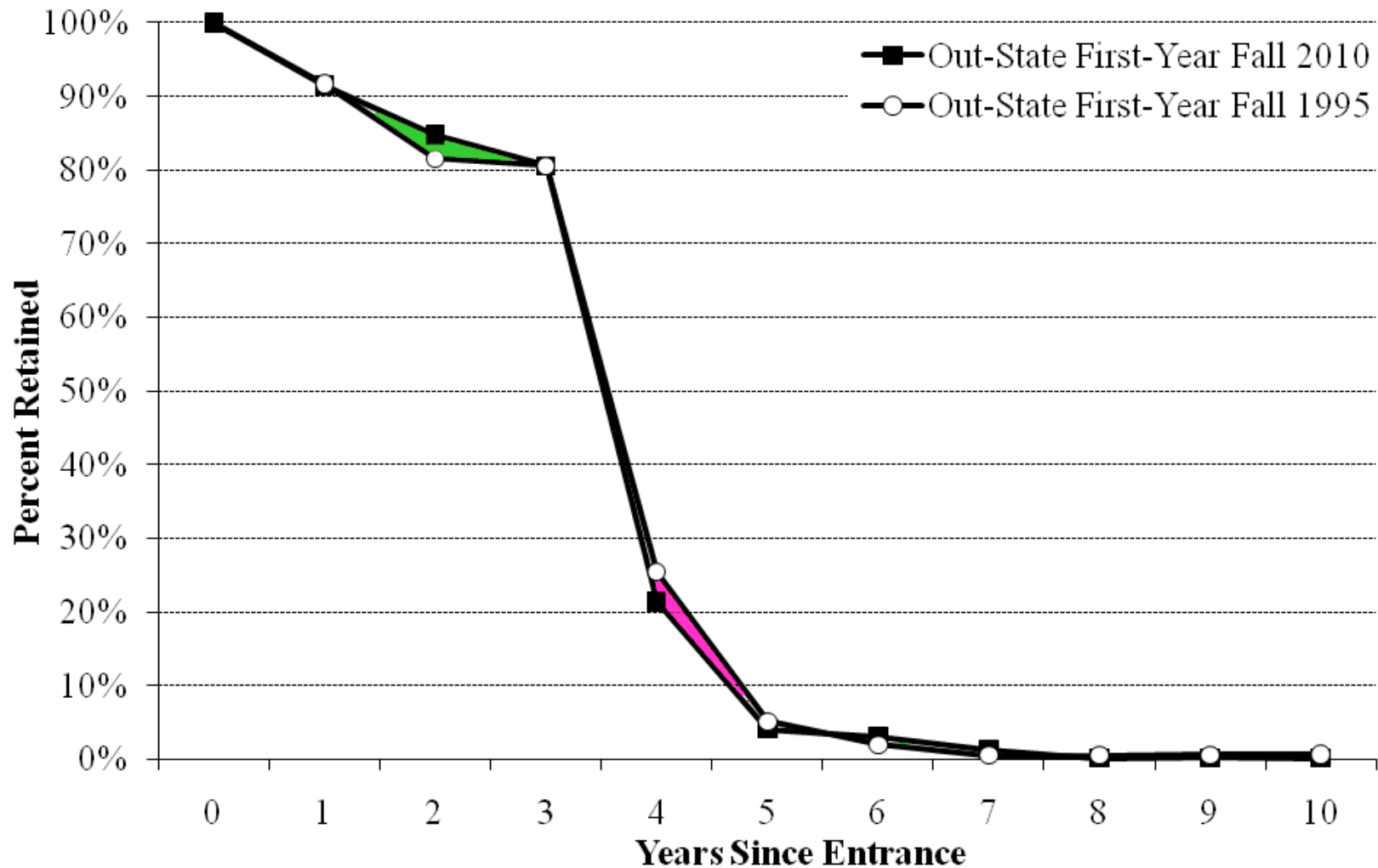
Retention Rates for In-State Transfer Undergraduates

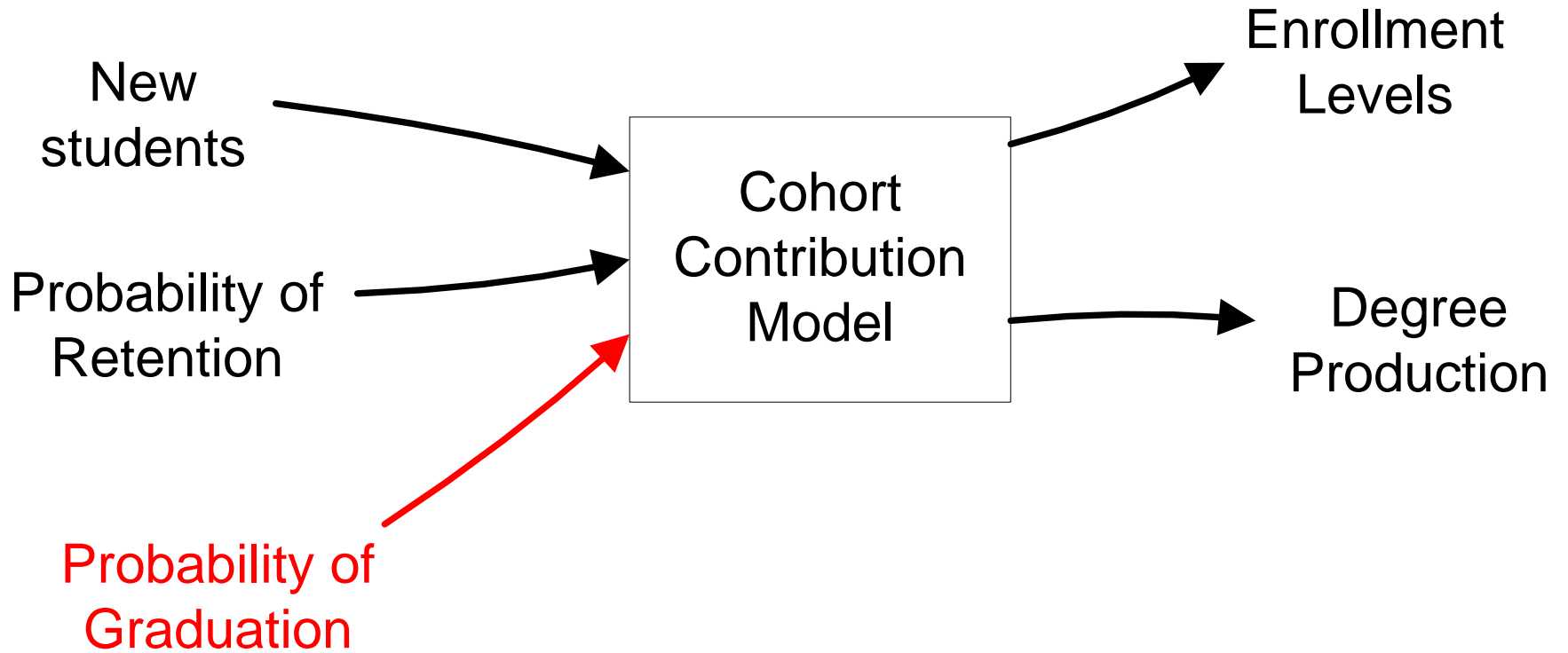
Who Entered in Fall Terms, By Years Since Entrance



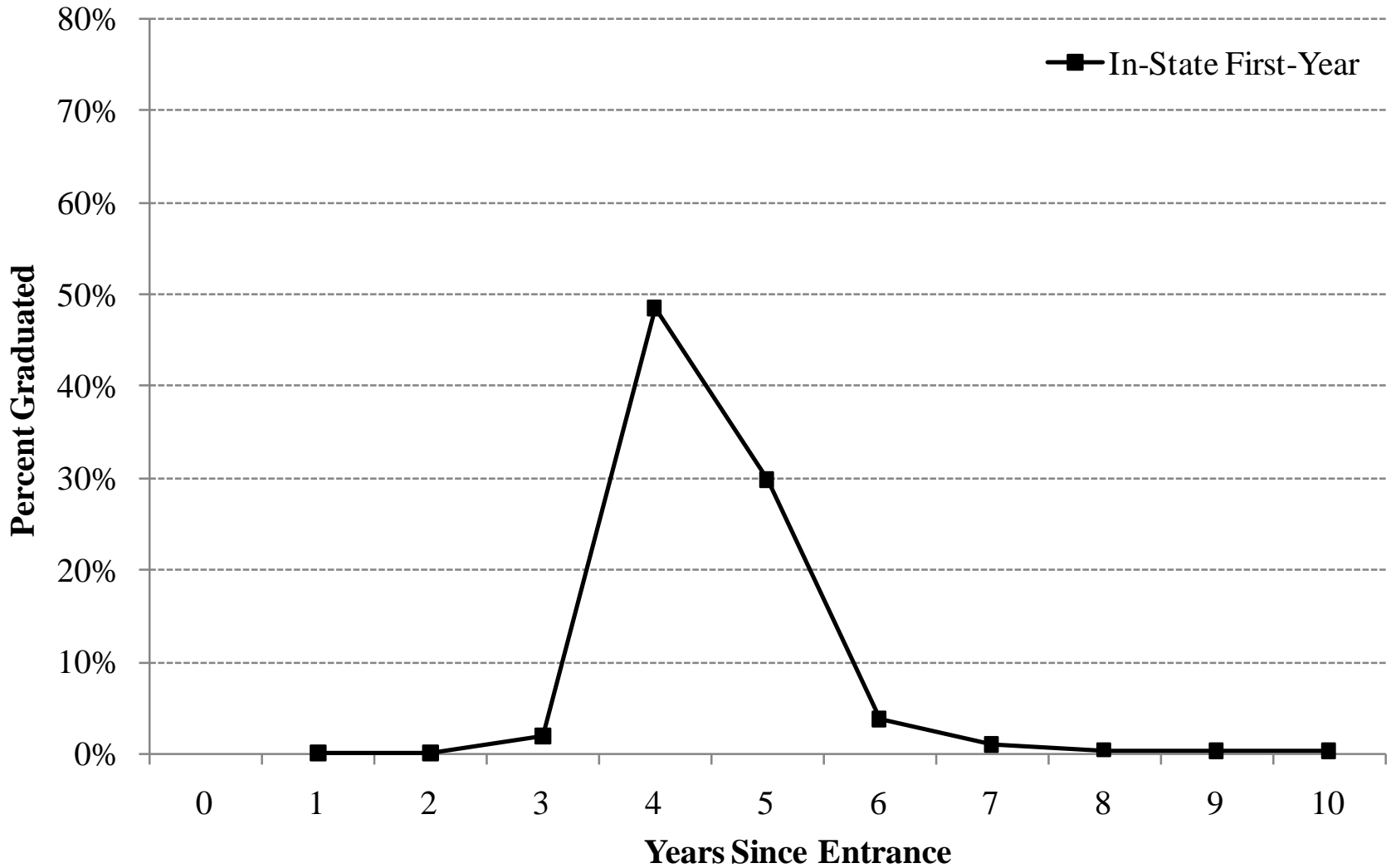
Retention Rates for Out-State First-Year Undergraduates

Who Entered in Fall Terms, By Years Since Entrance





Probability of Graduation for In-State First-Year Students Who Entered in Fall Terms, By Years Since Entrance

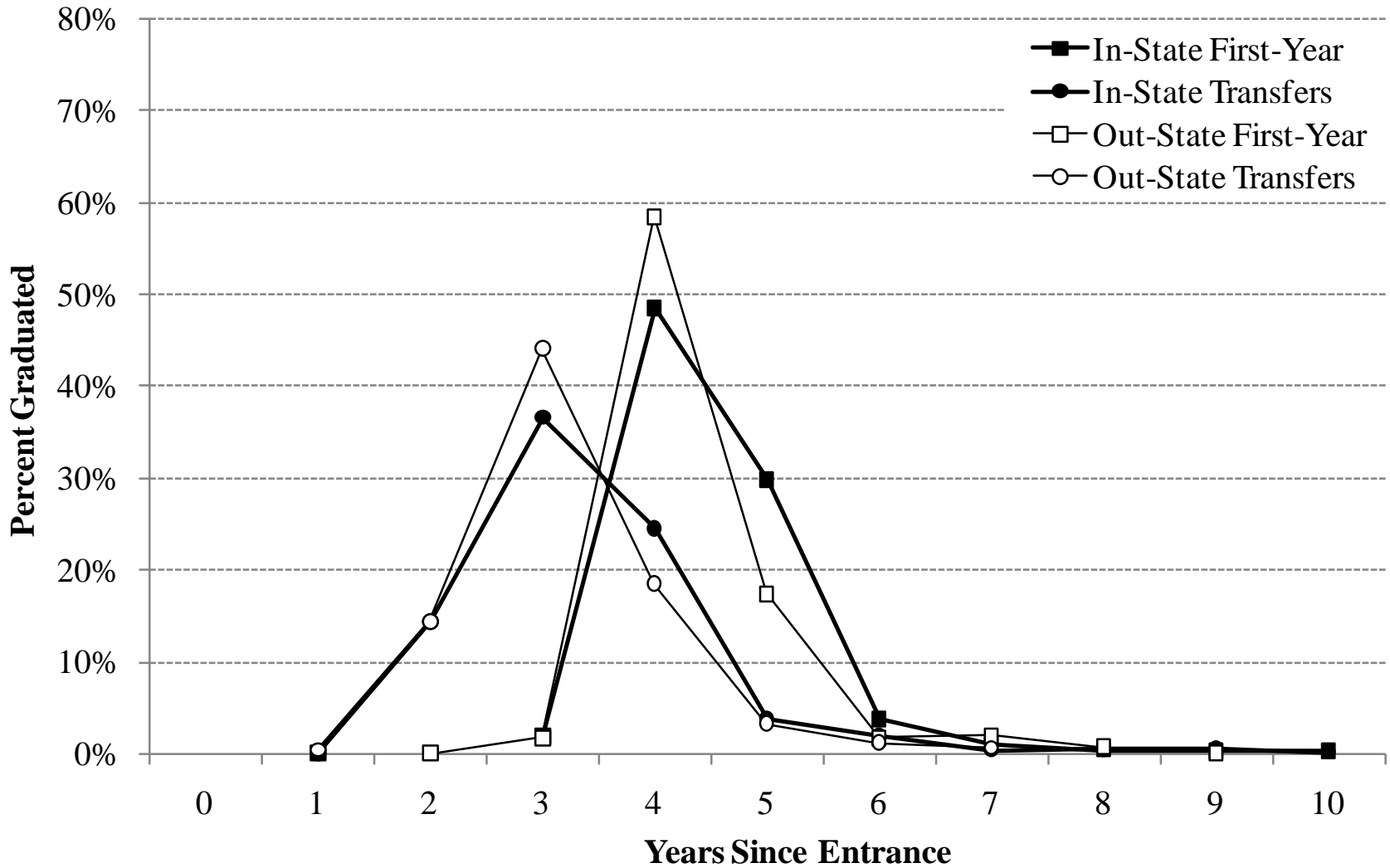


Notes on Graduation Rates

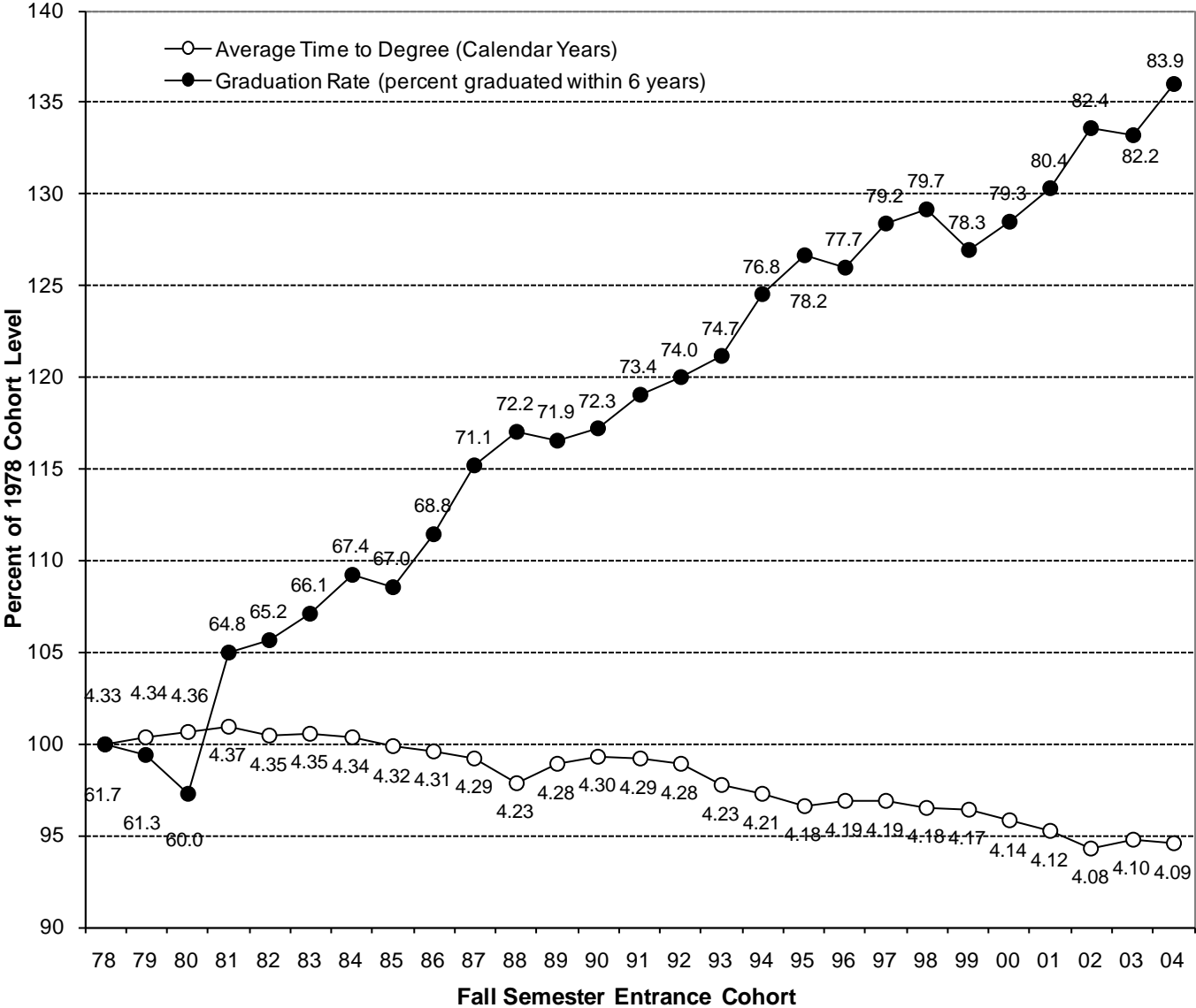
- Based on all bachelor's degrees awarded during the one-year period ending before the current fall term
- Based these degrees,
 1. Which entrance cohorts do the degree recipients belong to?
 2. What was the size of those cohorts?
 3. What is the ratio of degrees per cohort member?
- Includes multiple degrees awarded to the same students
- Includes students who left and then returned
- Graduation pattern extends for 23 years following original entrance

Probability of Graduation for Undergraduates

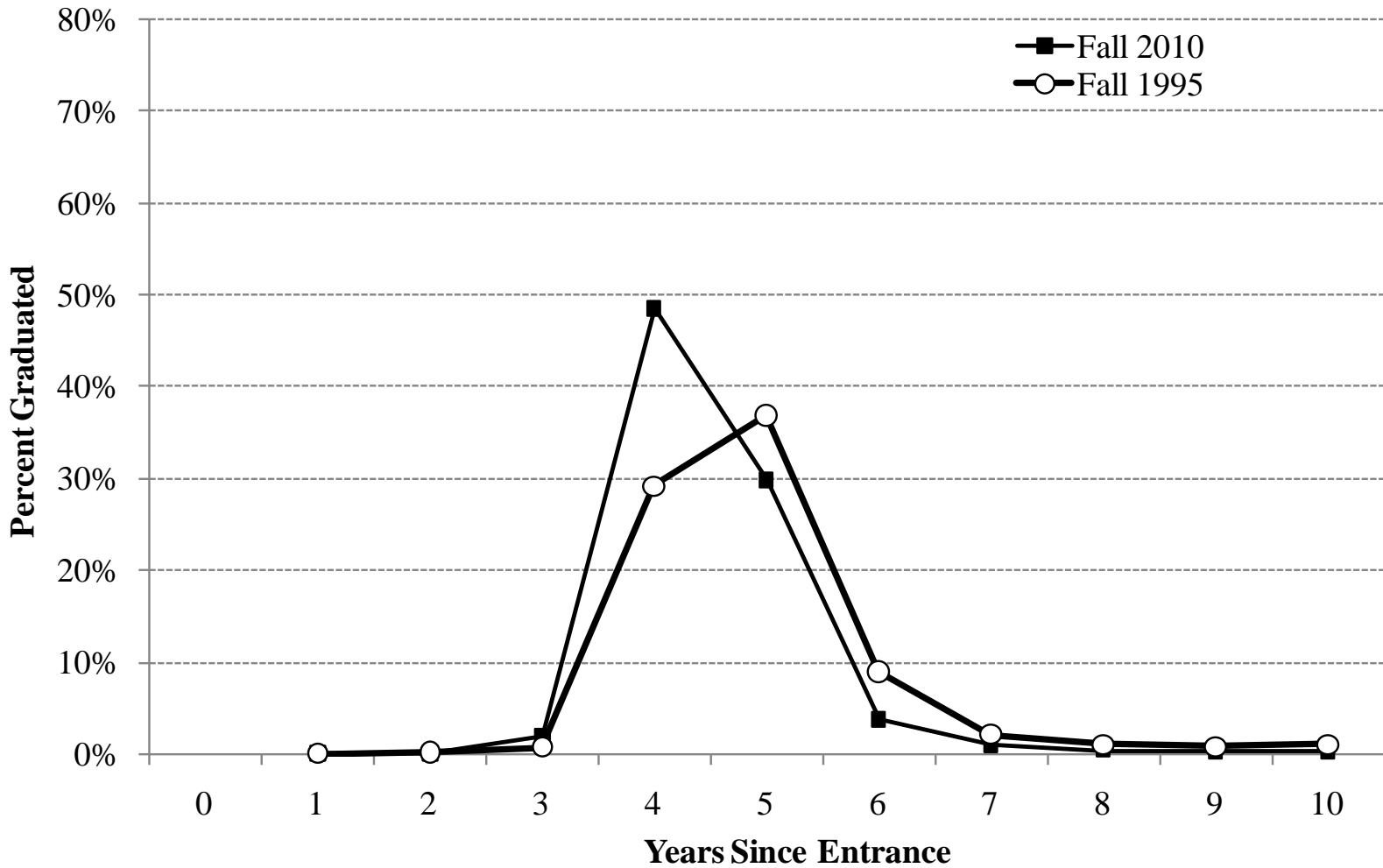
Who Entered in Fall Terms, By Years Since Entrance



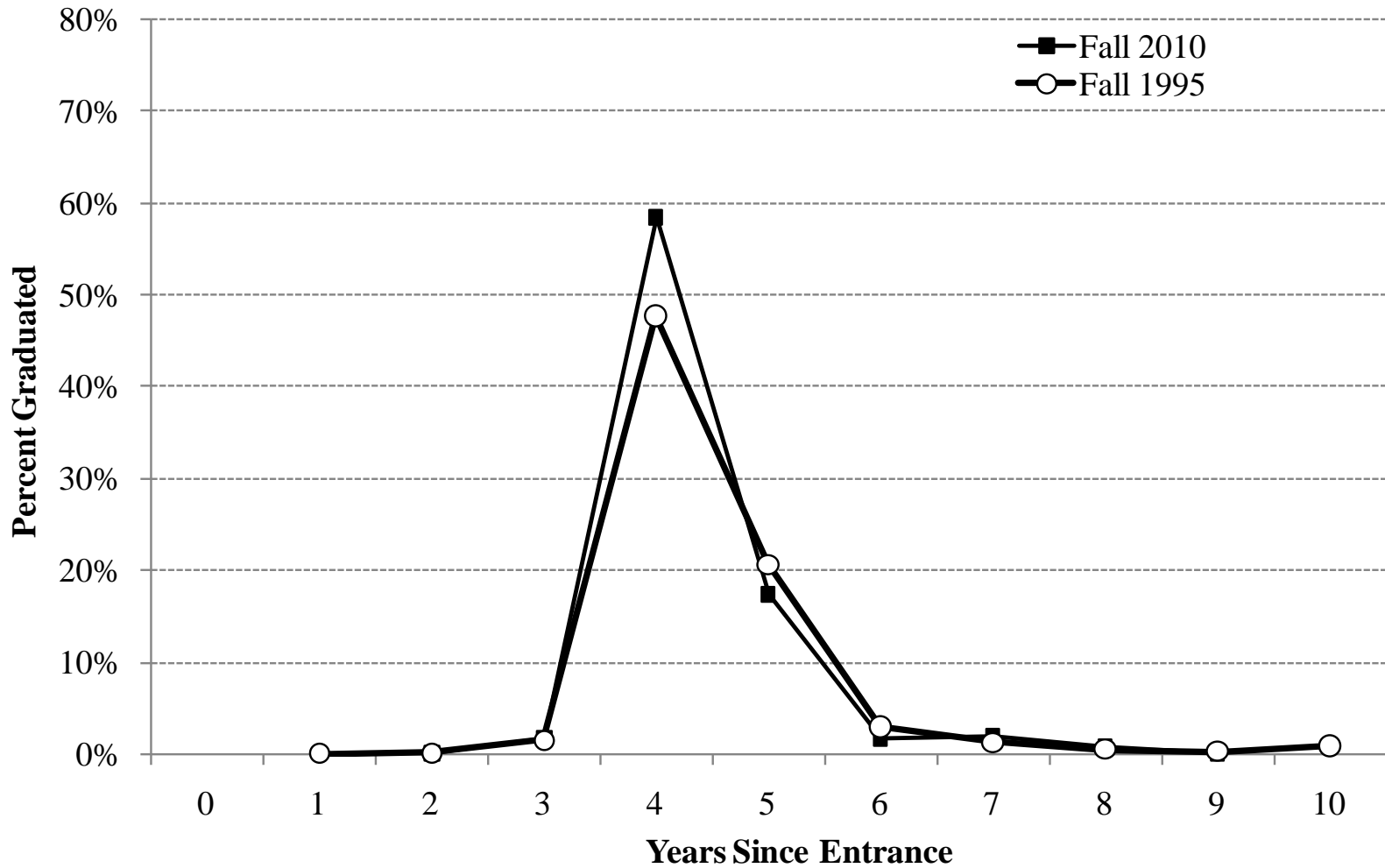
Trend in Average Time to Degree and Graduation Rates Within Six Years After Entering as New Freshmen at UW-Madison



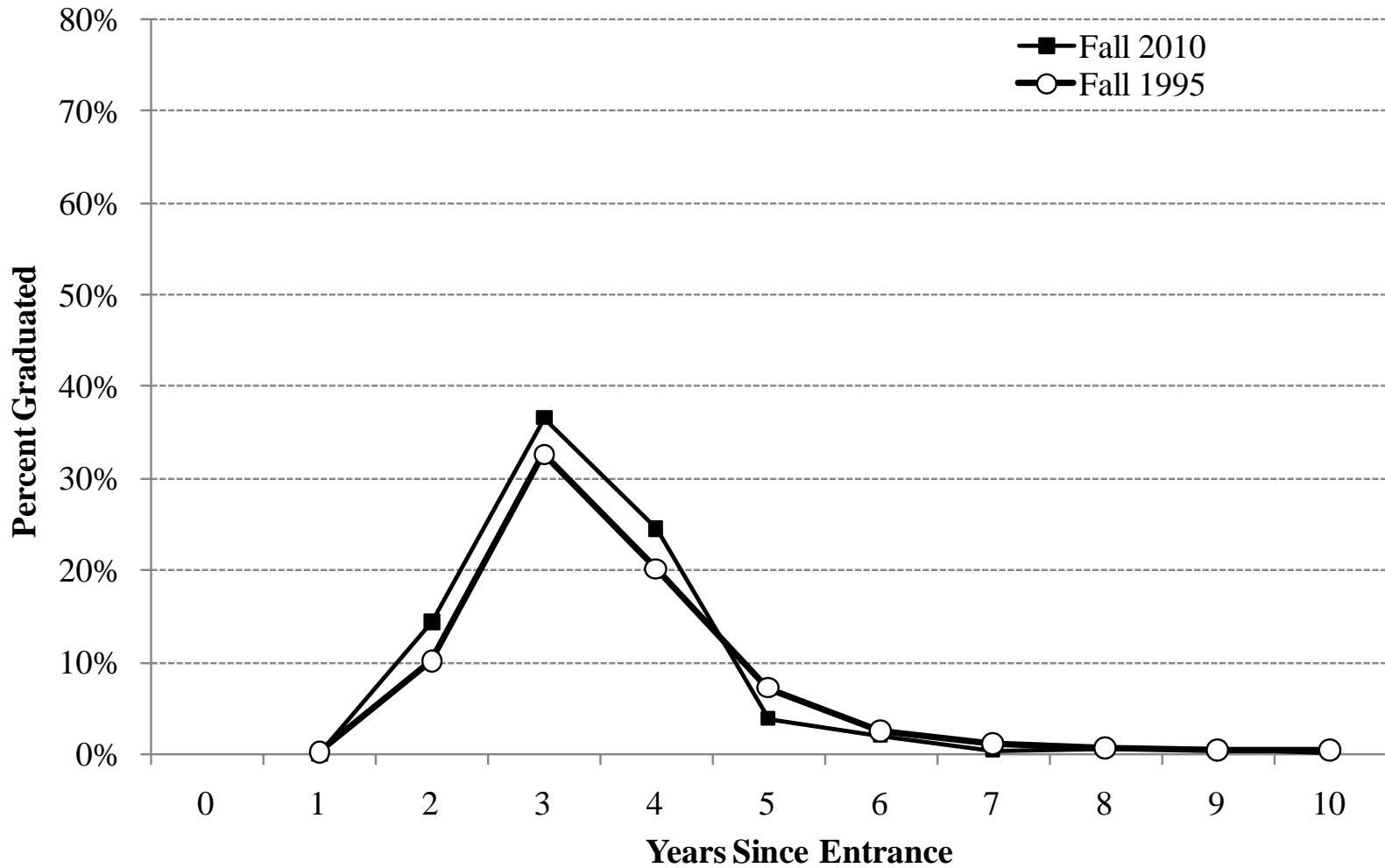
Probability of Graduation for In-State First-Year Students Who Entered in Fall Terms, By Years Since Entrance

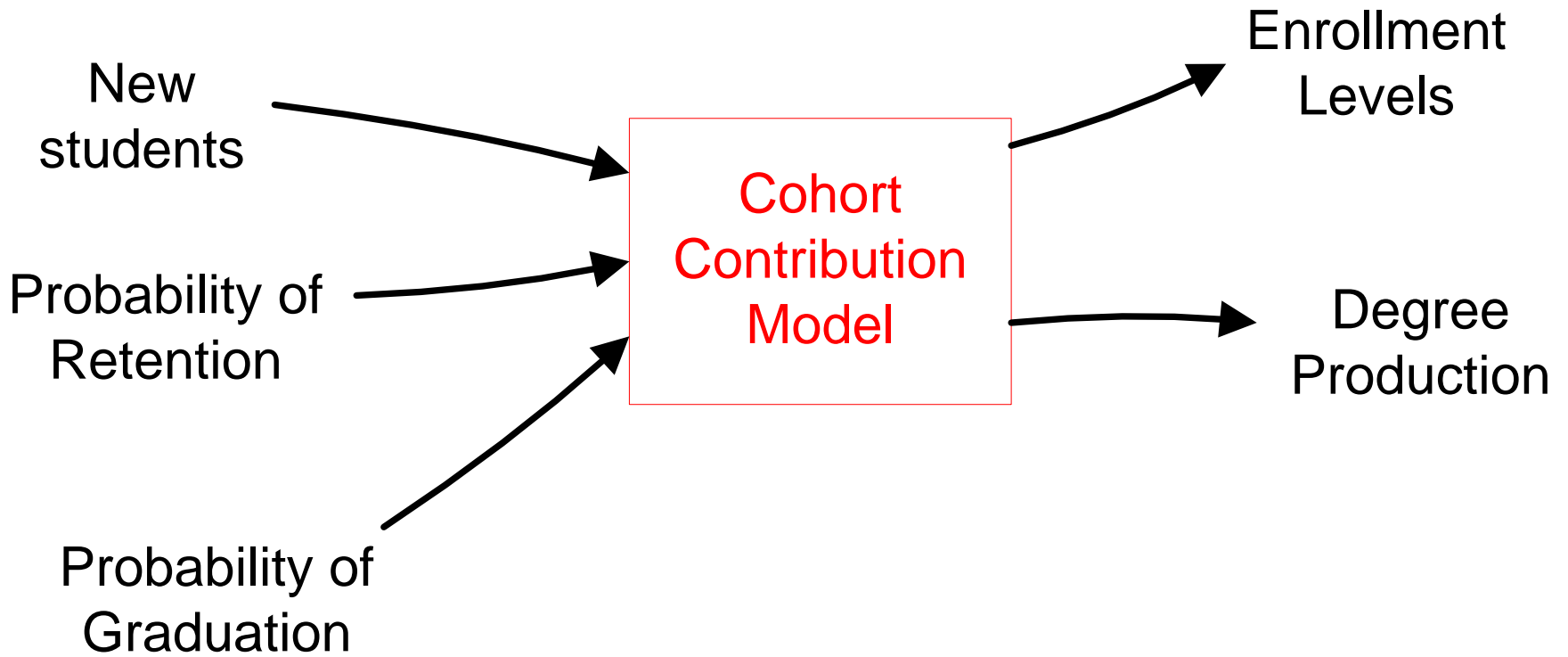


Probability of Graduation for Out-State First-Year Students Who Entered in Fall Terms, By Years Since Entrance



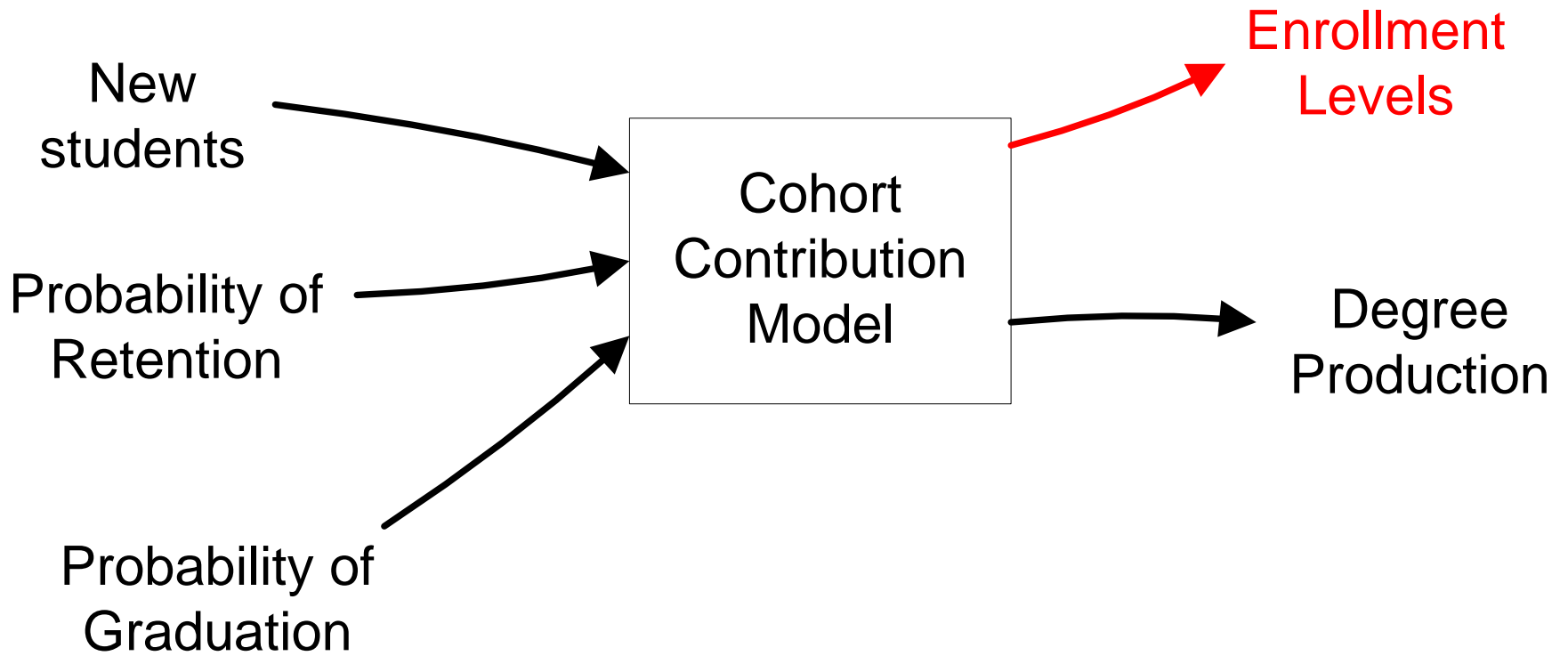
Probability of Graduation for In-State Transfer Students Who Entered in Fall Terms, By Years Since Entrance



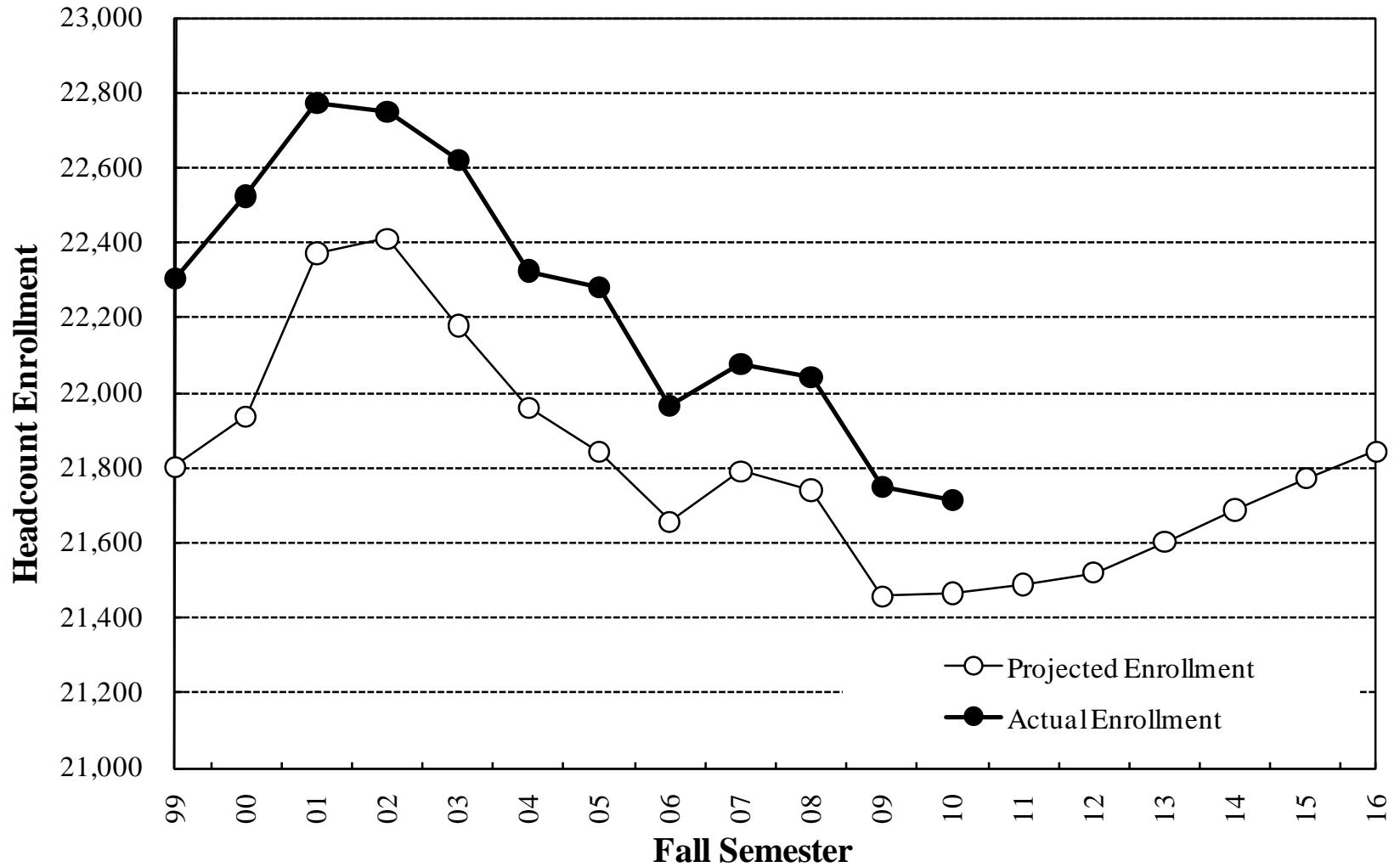


Cohort Contribution Model for Forecasting Enrollment Levels

Fall Enrollment		Annual Entrance Cohort Headcounts										Retention Rate	
		Recent Past Years						Future Years				Pattern	
Year	Model Estimate	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Yrs Since Entrance	Percent Retained
Future Past	2005	4,533	4,533									0	100.0
	2006	8,500	4,289	4,211								1	94.6
	2007	16,032	4,047	3,985	8,000							2	89.3
	2008	18,392	3,862	3,760	7,570	3,200						3	85.2
	2009	18,301	1,587	3,588	7,142	3,028	2,956					4	35.0
	2010	17,172	228	1,475	6,816	2,857	2,797	3,000				5	5.0
Future	2011	15,293	76	211	2,801	2,726	2,639	2,839	4,000			6	1.7
	2012	14,863	38	71	402	1,121	2,518	2,678	3,785	4,250		7	0.8
	2013	16,048	36	33	134	161	1,035	2,556	3,571	4,022	4,500	8	0.8
	2014	17,570	27	33	47	54	148	1,051	3,408	3,794	4,258	4,750	9

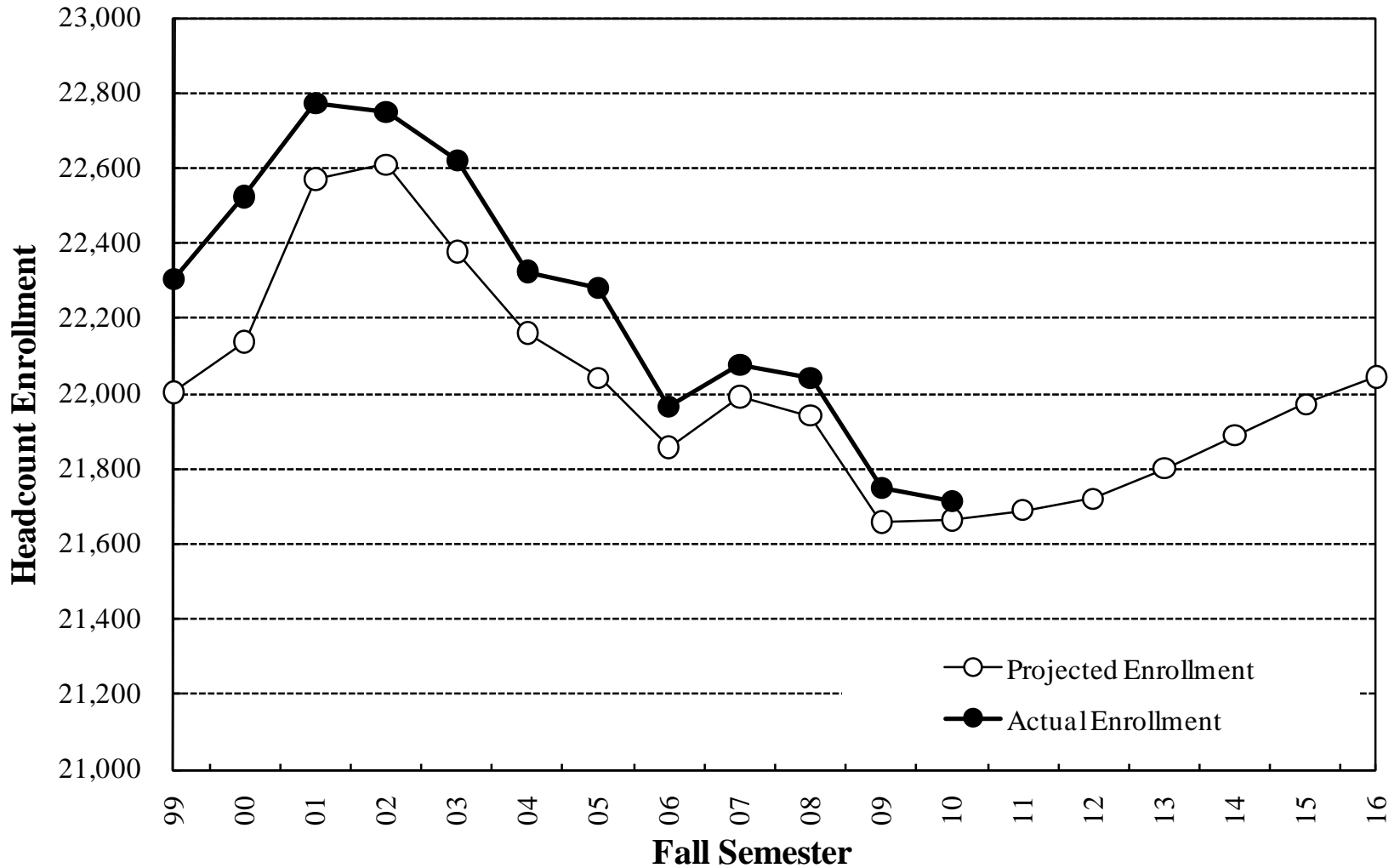


UW-Madison Resident & Minnesota Undergraduate Enrollment



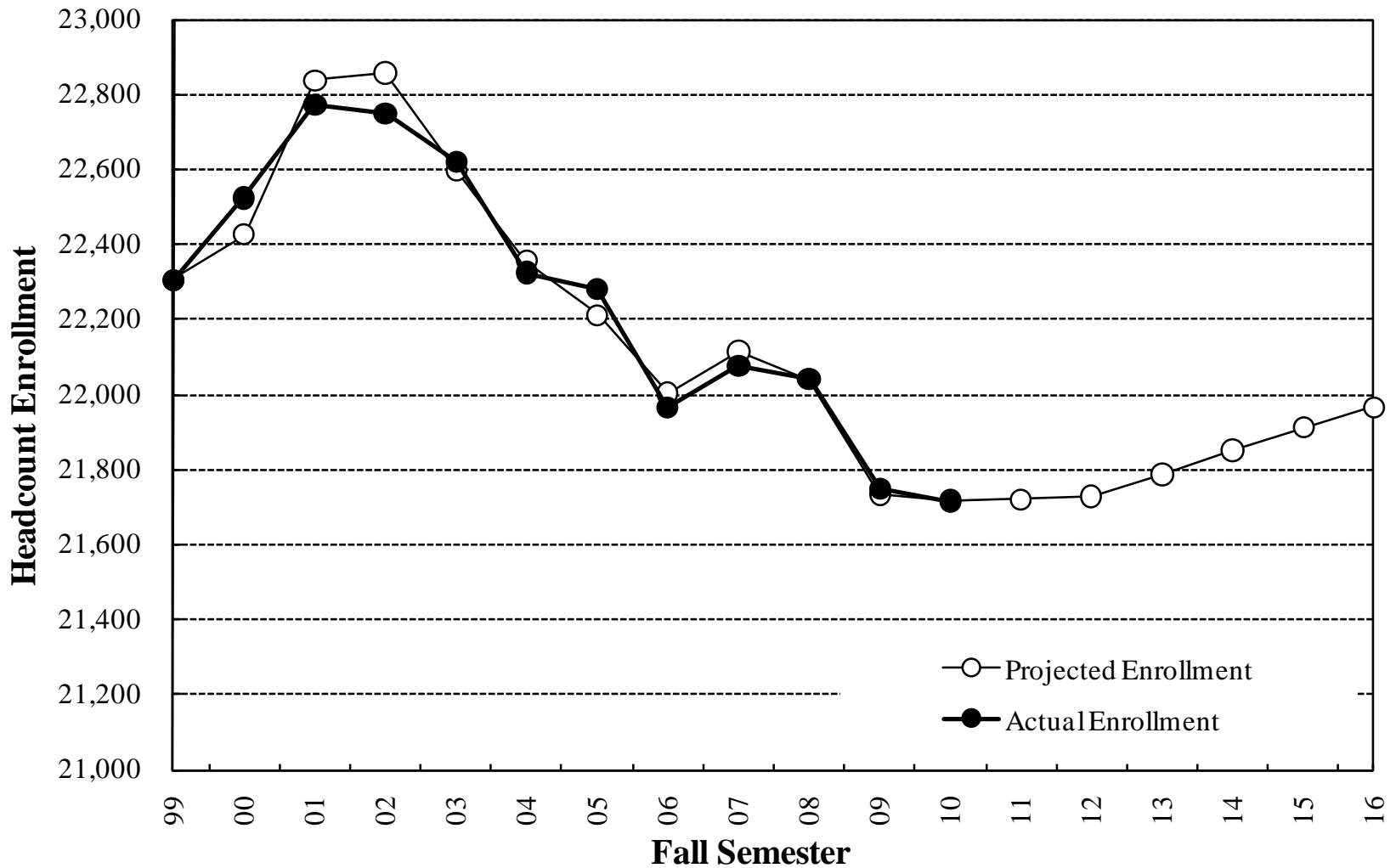
1. Add 200 students to each year's total

UW-Madison Resident & Minnesota Undergraduate Enrollment



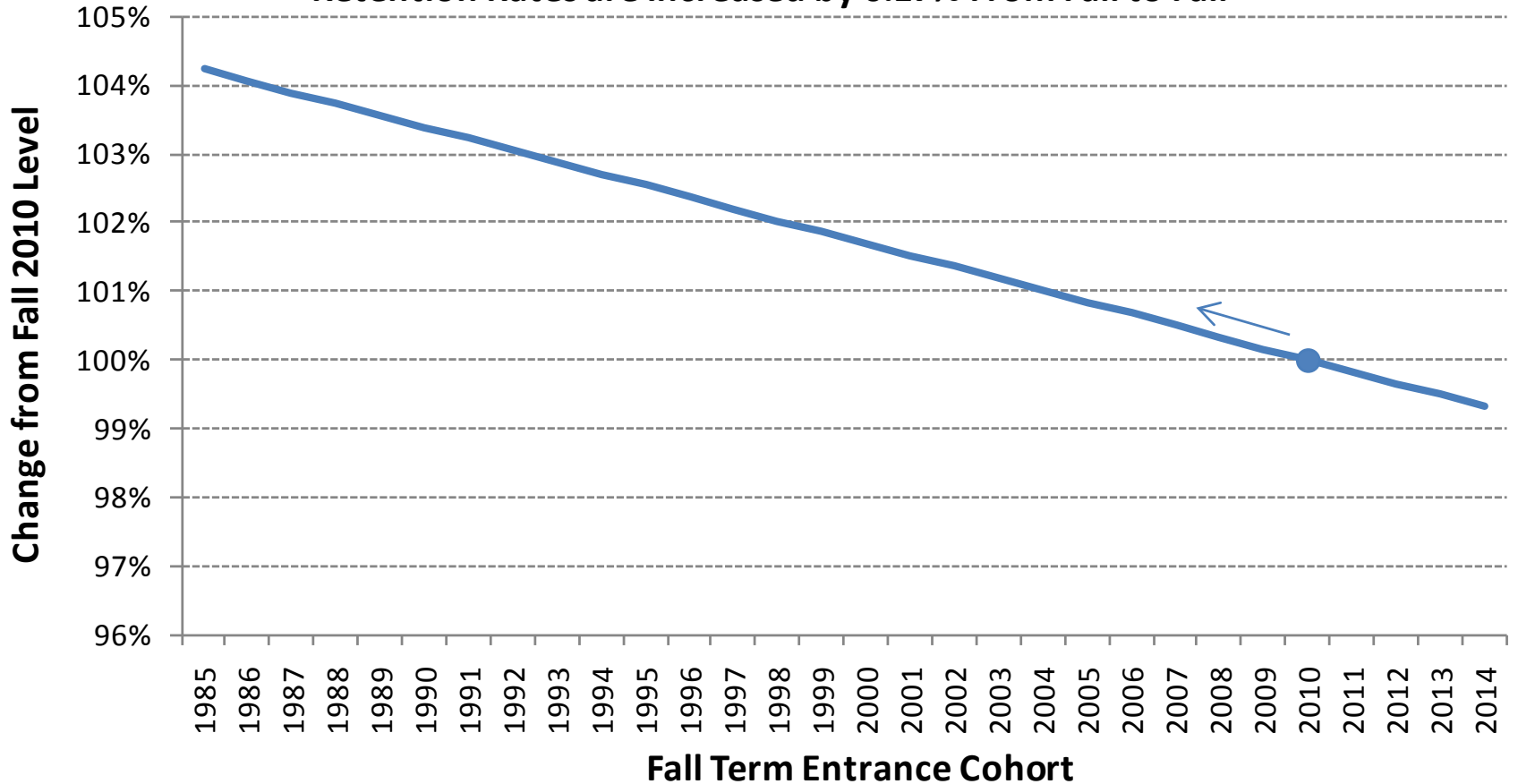
2. Build In a Negative Trend in Retention

UW-Madison Resident & Minnesota Undergraduate Enrollment



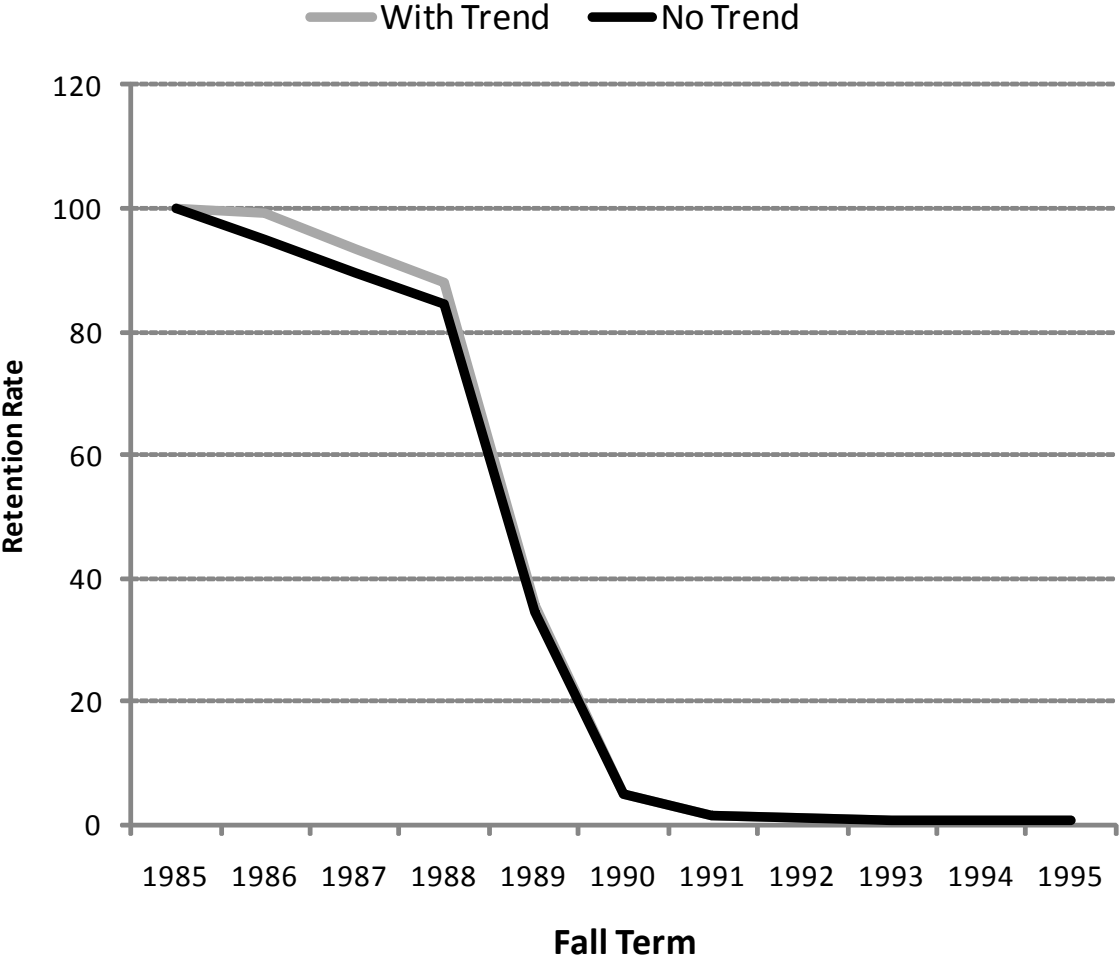
Retention Model Trend For In-State Undergraduates

Retention Rates are Increased by 0.17% From Fall to Fall



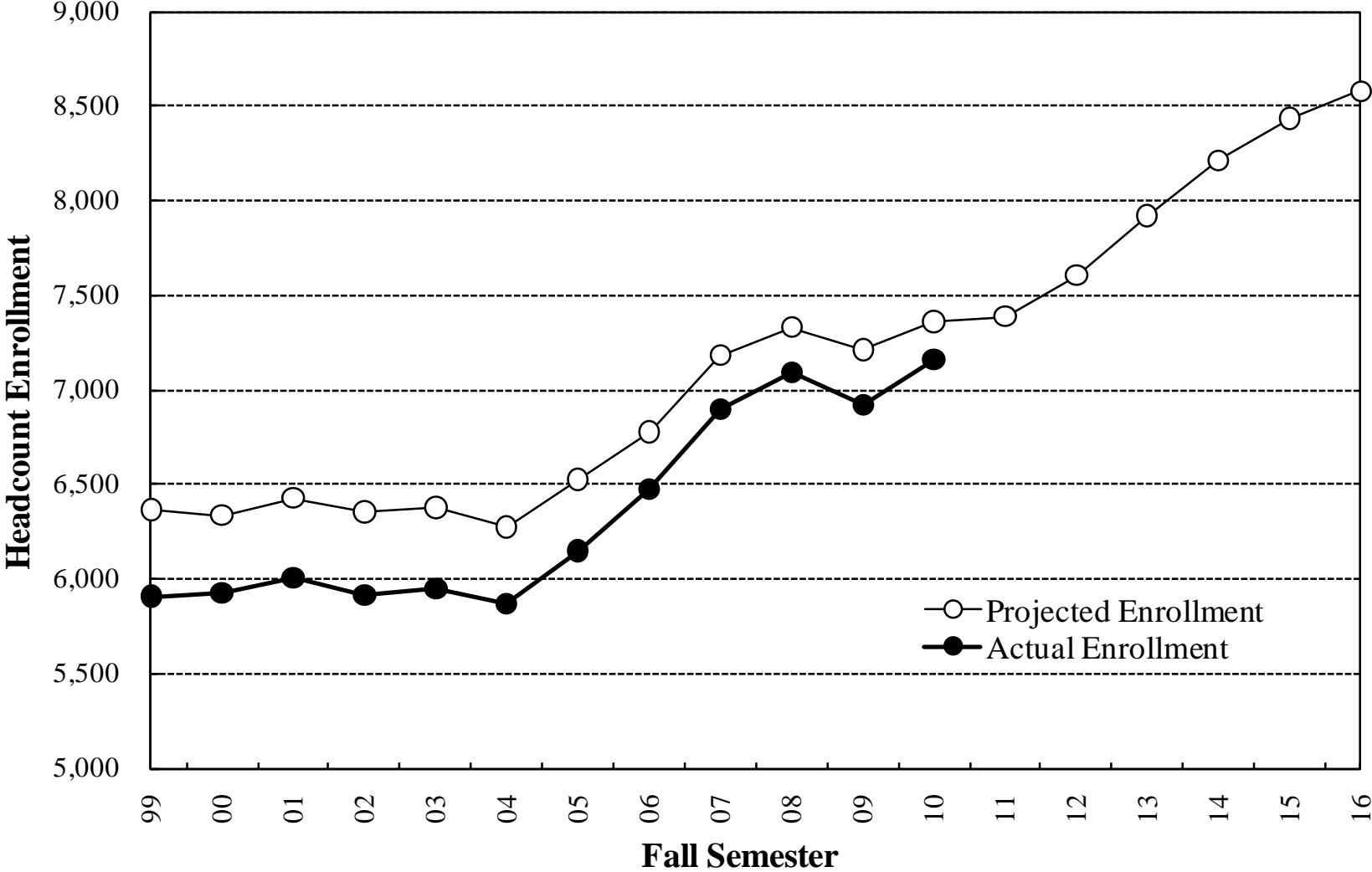
Trend Adjustment to Retention Rates

For An Early Cohort: Fall 1985 In-State Undergraduates



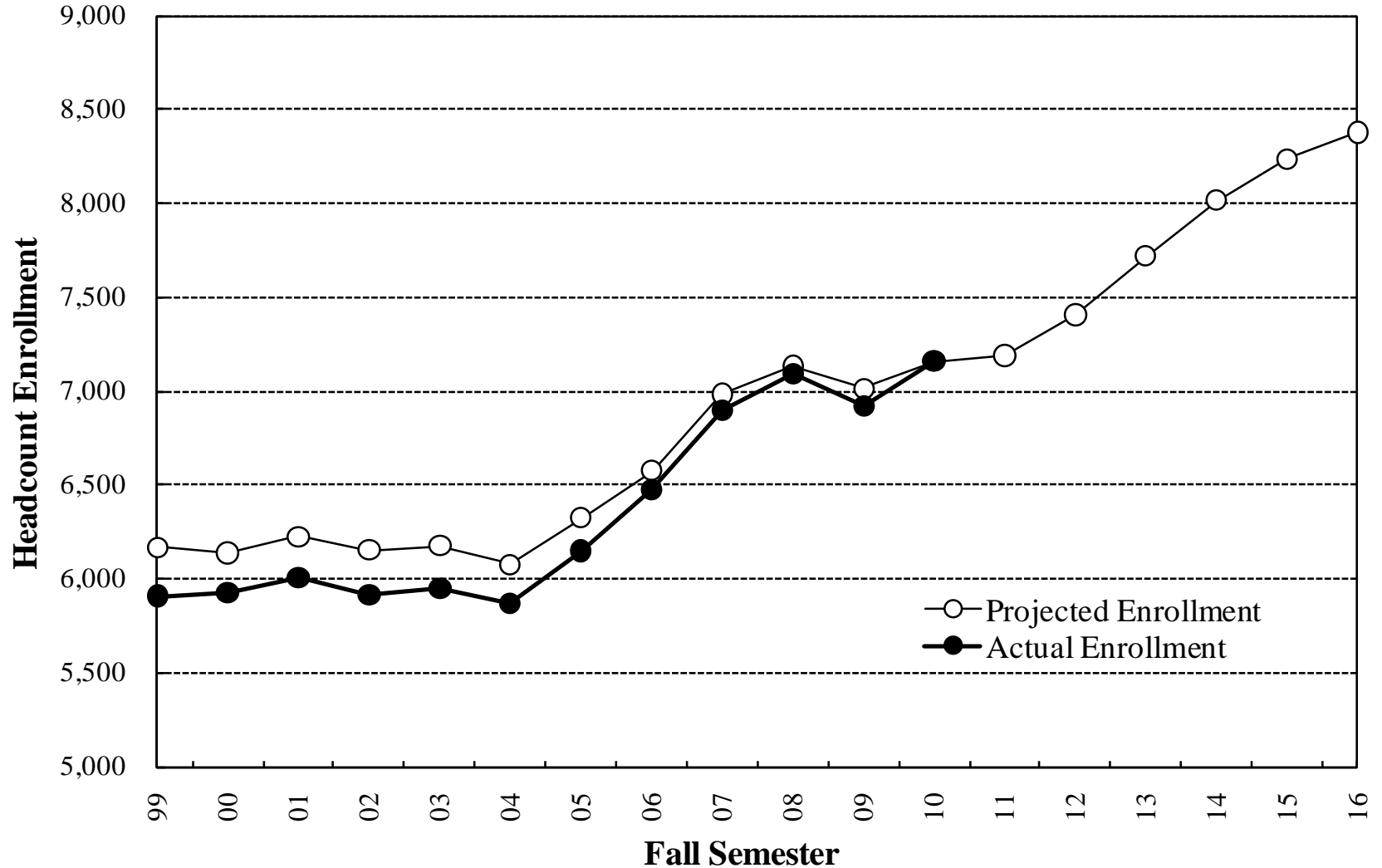
Fall Term	Retention Rate		
	No Trend	With Trend	Percent Difference
1985	100.0	100.0	0.0%
1986	95.1	99.1	4.2%
1987	89.6	93.4	4.2%
1988	84.5	88.1	4.2%
1989	34.3	35.7	4.2%
1990	4.8	5.0	4.2%
1991	1.5	1.6	4.2%
1992	0.8	0.9	4.2%
1993	0.5	0.6	4.2%
1994	0.6	0.6	4.2%
1995	0.5	0.6	4.2%

UW-Madison Non-Resident Undergraduate Enrollment

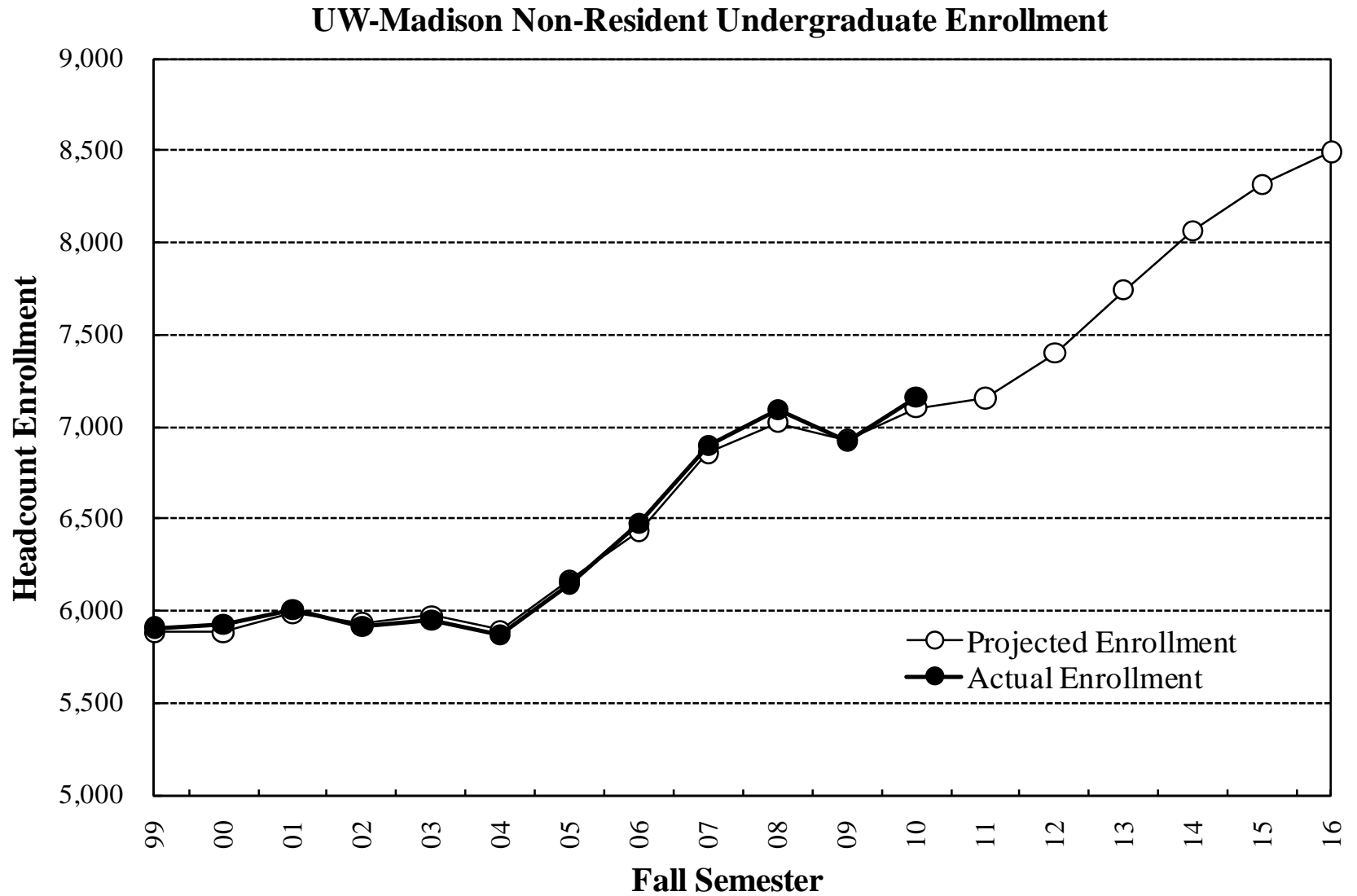


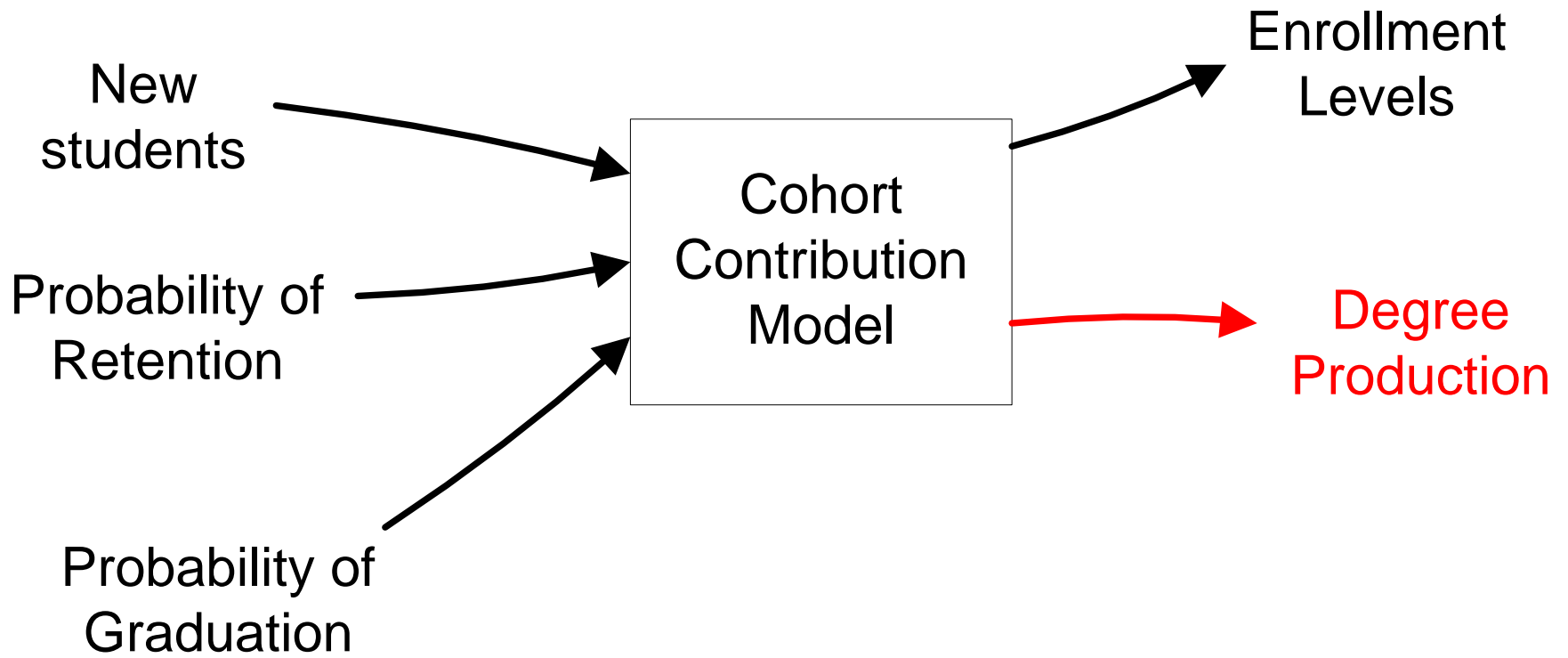
1. Subtract 200 Students from each year's total

UW-Madison Non-Resident Undergraduate Enrollment

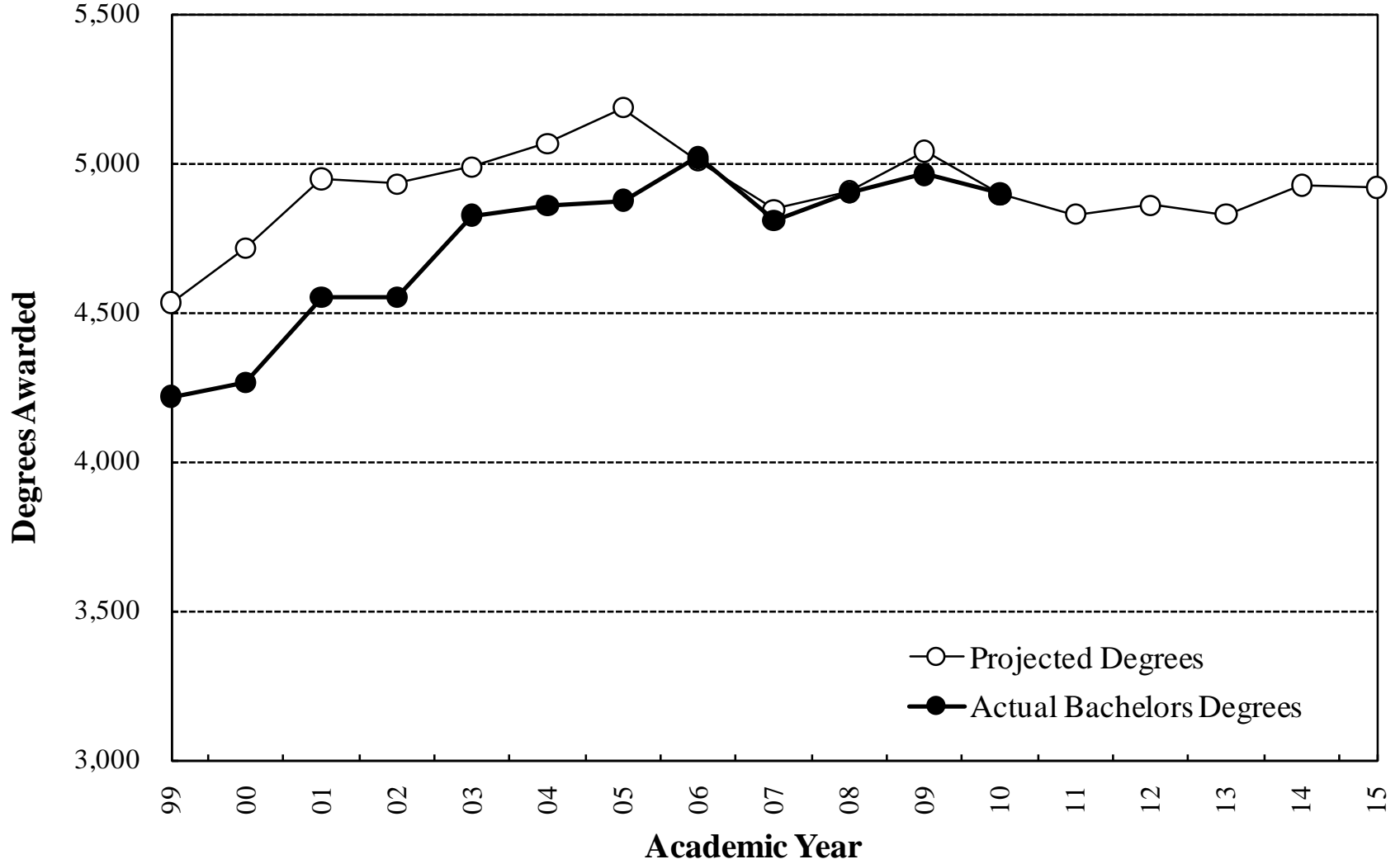


2. Build in a Positive Trend in Retention



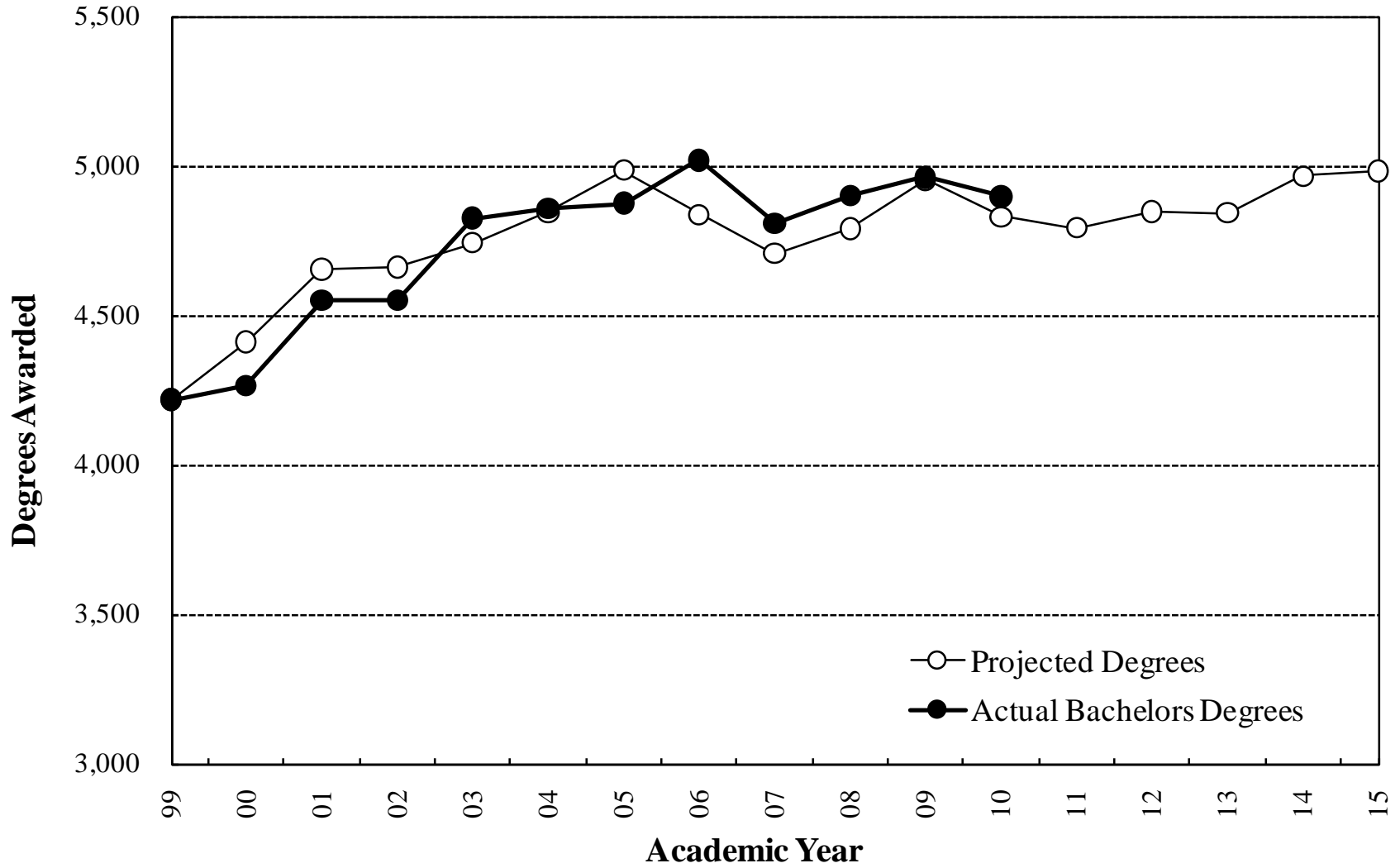


UW-Madison Bachelors Degrees Awarded to Wisc & Minn Residents

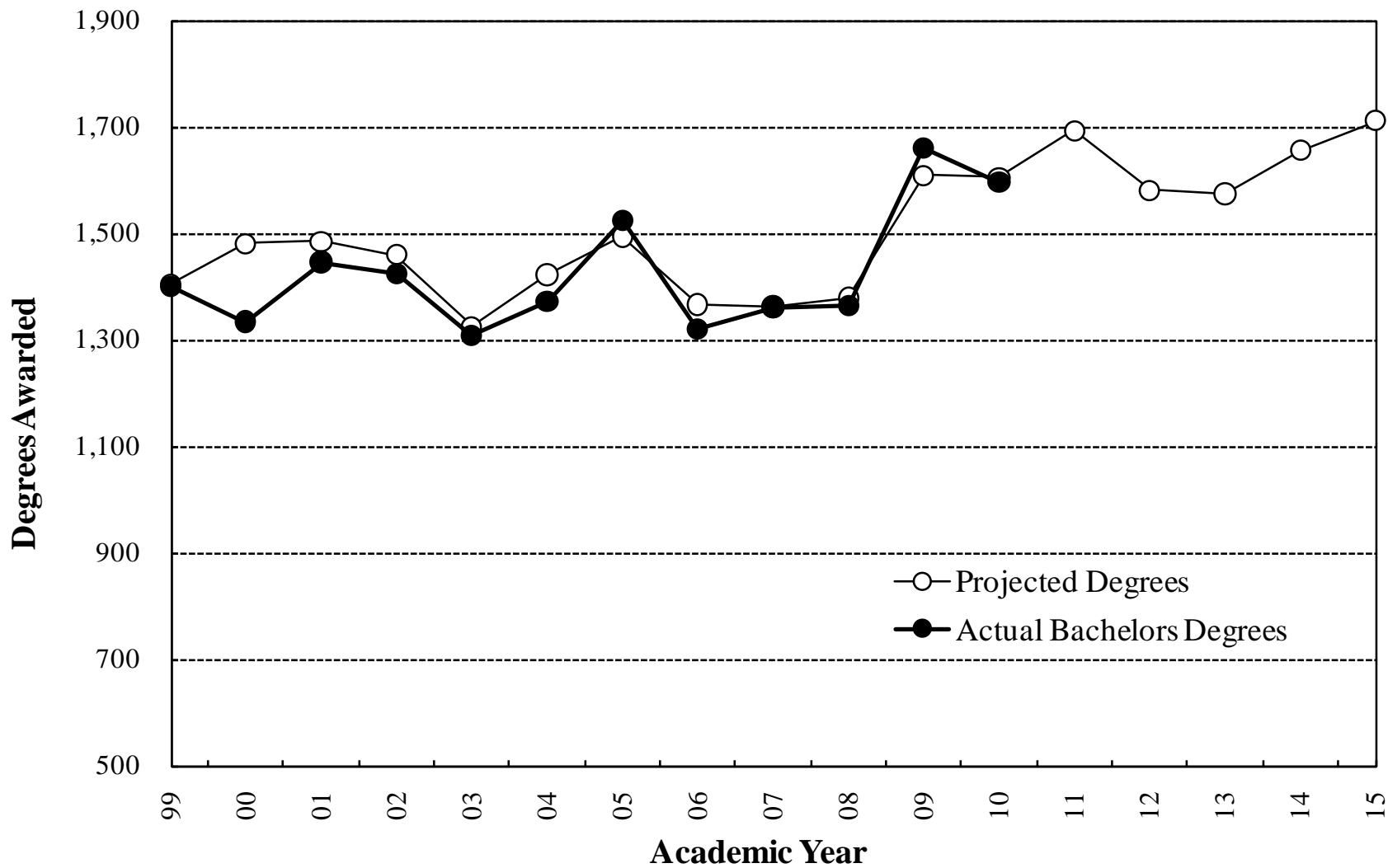


1. Build In a Positive Trend in Graduation Rates

UW-Madison Bachelors Degrees Awarded to Wisc & Minn Residents

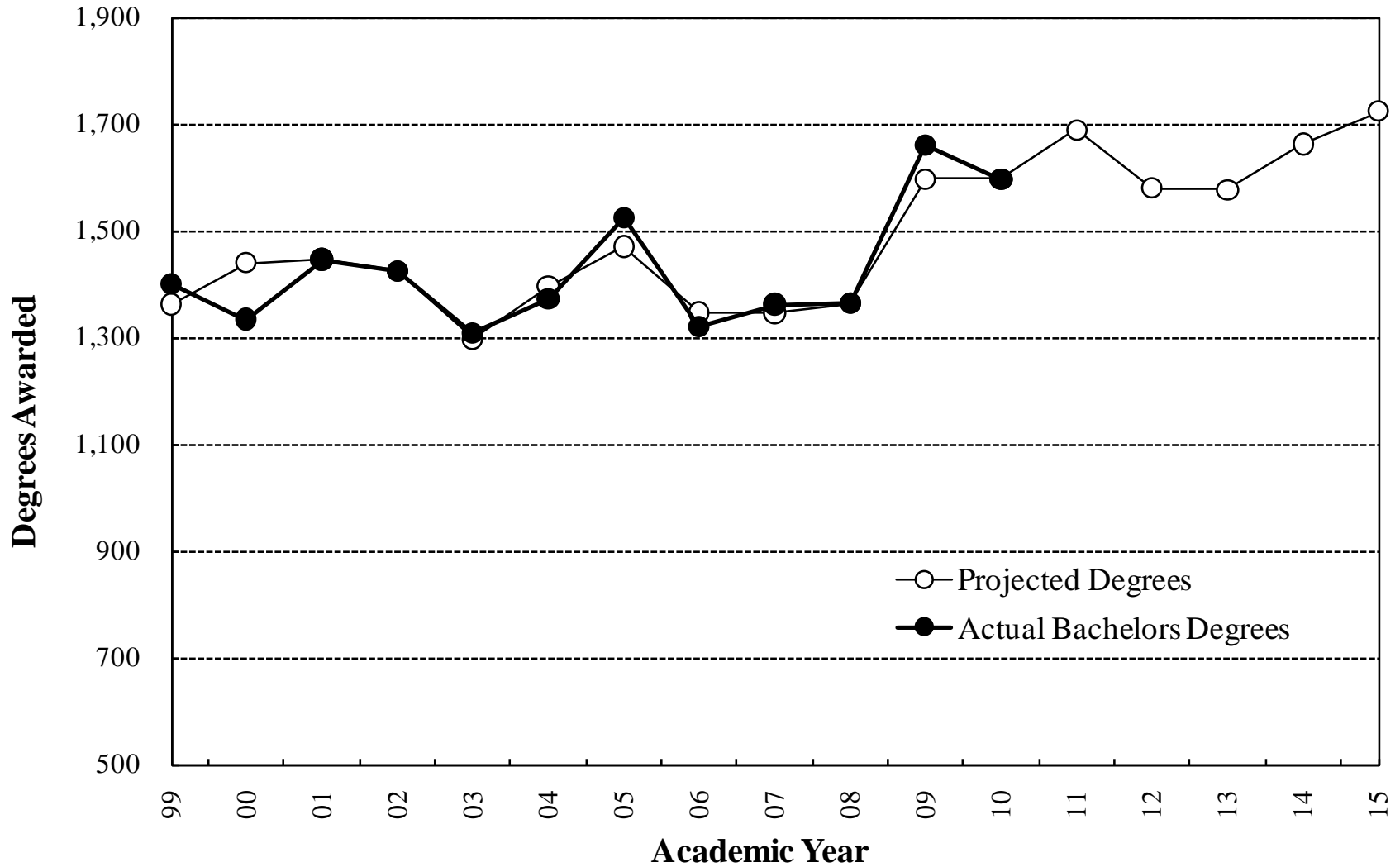


UW-Madison Bachelors Degrees Awarded to Non-Residents



1. Build In a Positive Trend in Graduation Rates

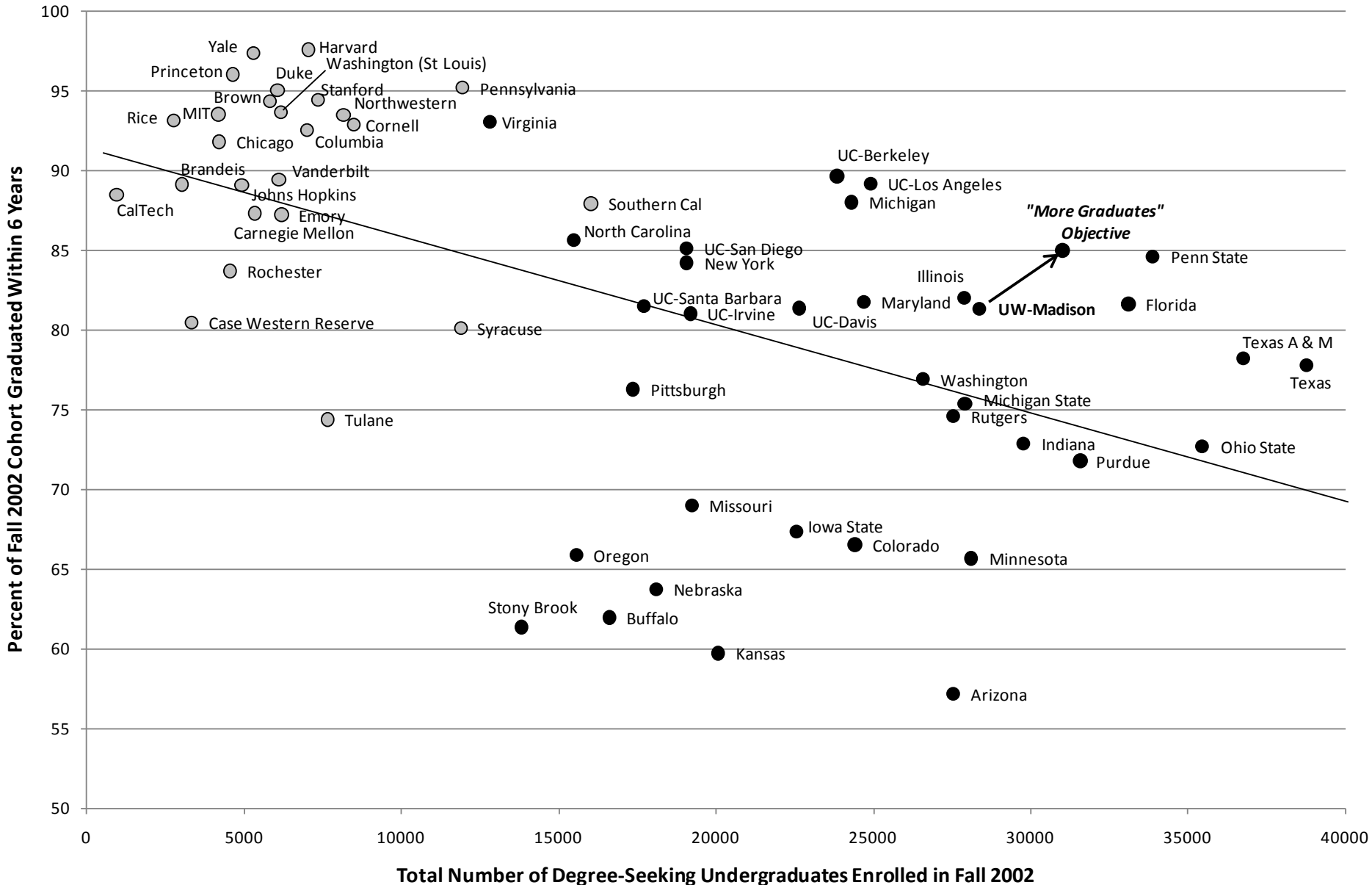
UW-Madison Bachelors Degrees Awarded to Non-Residents



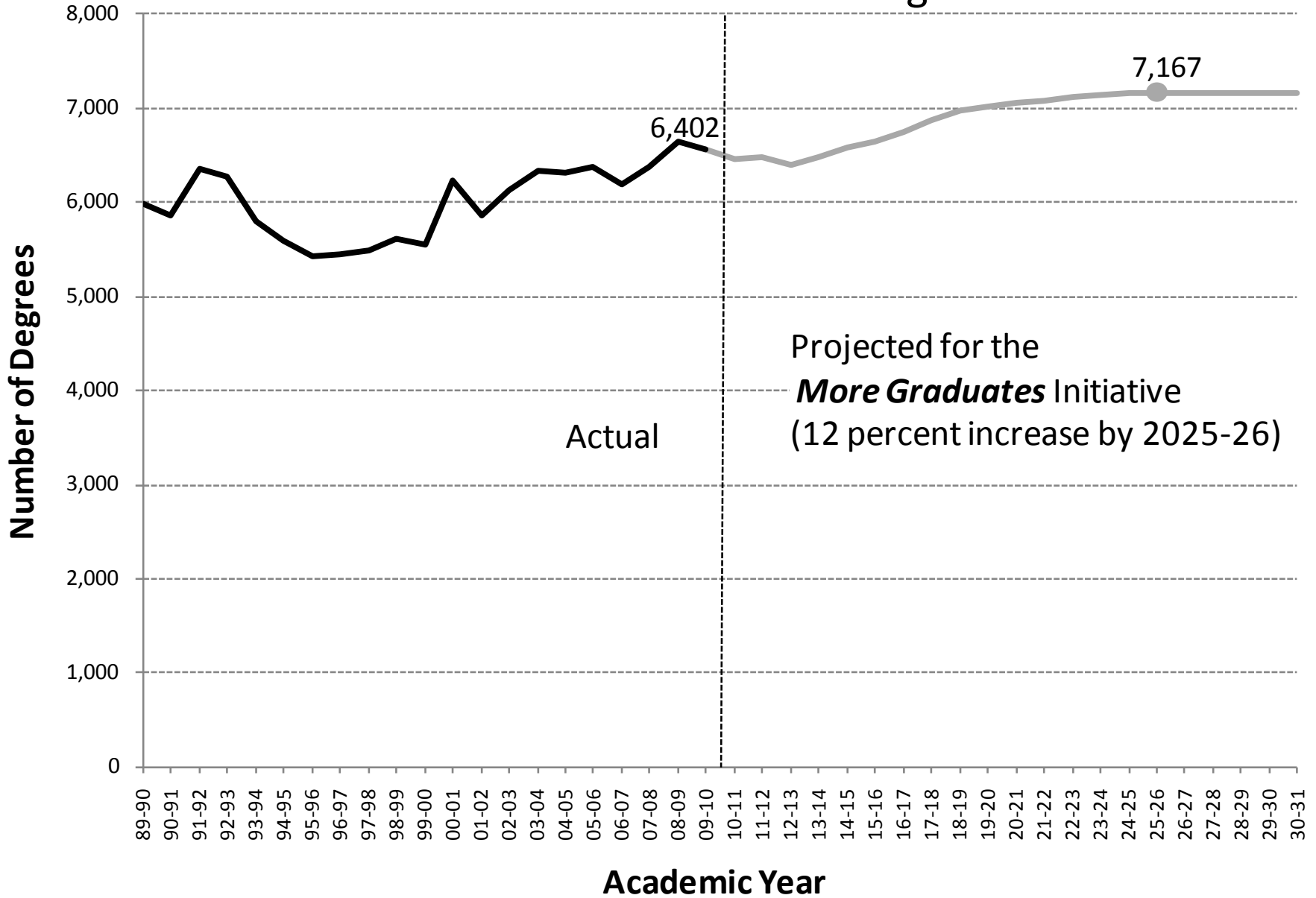
Size of Undergraduate Programs and Graduation Rates at AAU Institutions

Black data point = Public University

Gray data point = Private University

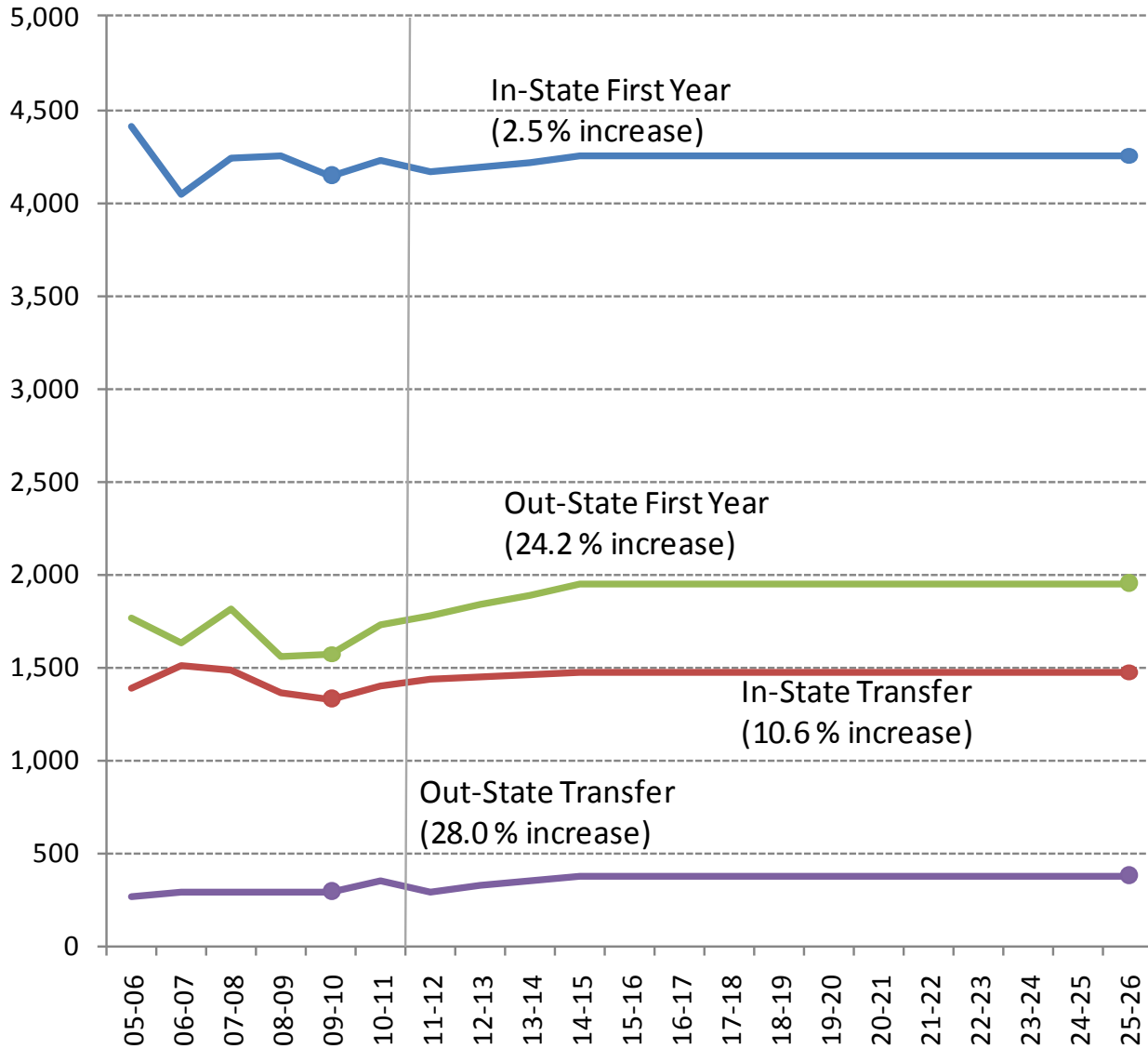


Annual UW-Madison Bachelor's Degrees Awarded



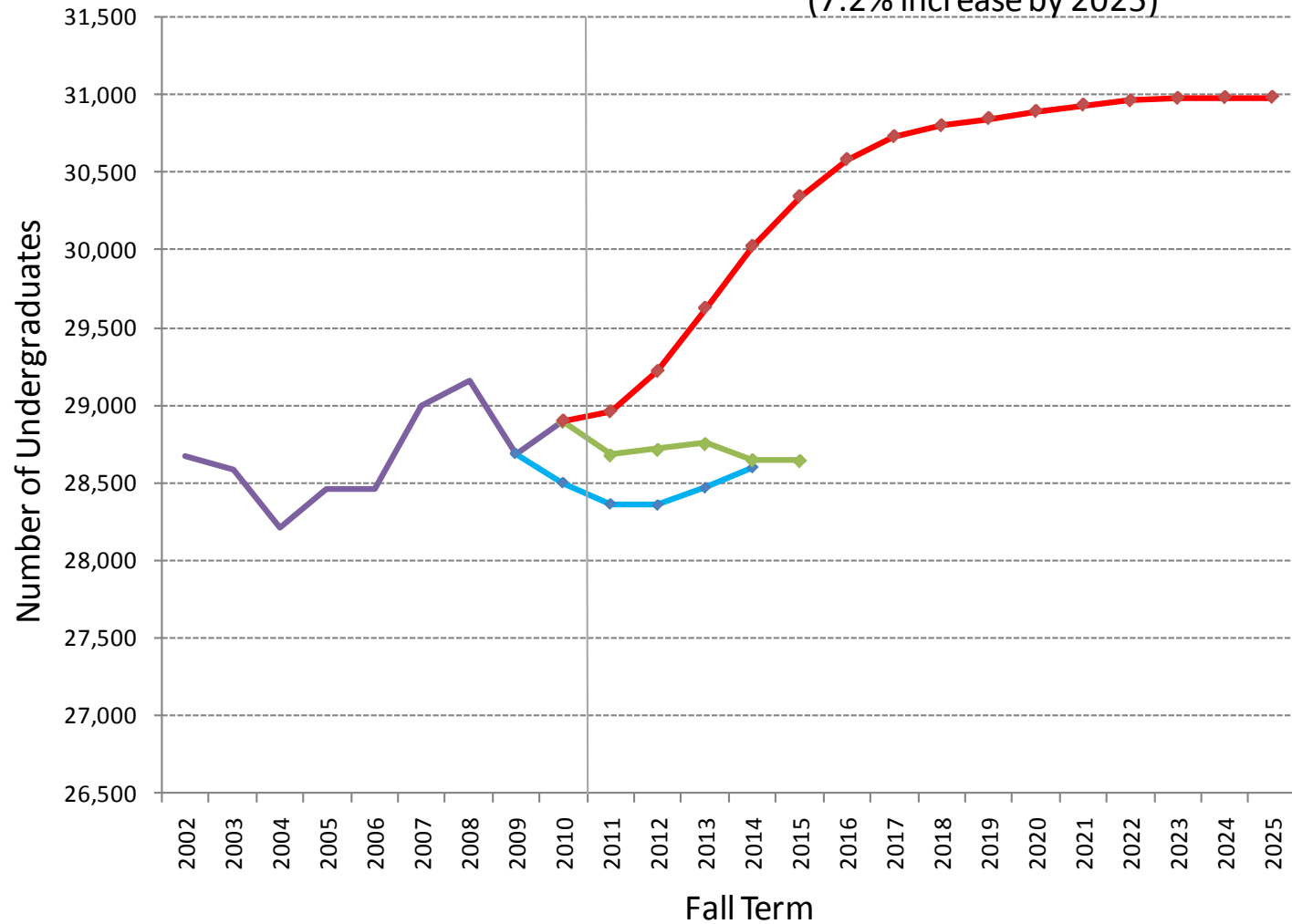
New Undergraduates

Under "More Graduates" Plan (10% increase)

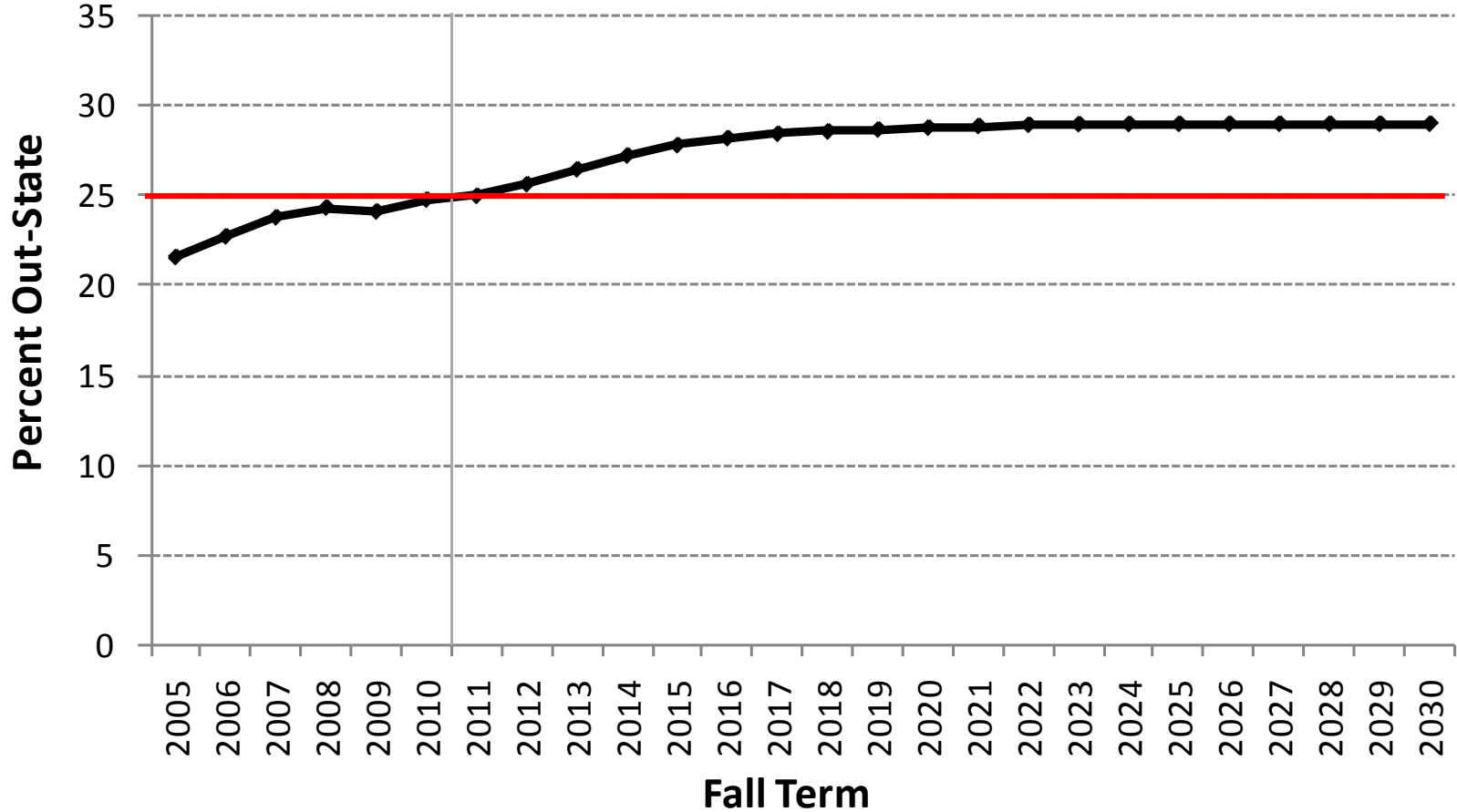


Total Fall Term Undergraduate Enrollment

- Actual Enrollment
- 5700 NF Plan Last Year
- 5700 NF Plan for This Year
- "More Graduates" Plan (7.2% increase by 2025)



Out-State Students as a Percentage Of Fall Term Undergraduates Under "More Graduates" Plan



UW-Madison Plan for "More Graduates"

First-Year Rise to 6,200 and Transfers Rise to 1,850, Annually

Additional New Students are 1 WI or MN student per 2 Non-Resident Students

Graduation Rates are Projected to Continue Increasing Until Reaching a 85% Graduation Rate

Year	New Students in Calendar Year										Bachelor's Degrees Reported to UW System			Annual Increment Over Base Level
	First-Year			Transfer			Undergraduate Enrollments in Fall Term				Wisc & Minn	Non-Res	Total	
	Wisc & Minn	Non-Res	Total	Wisc & Minn	Non-Res	Total	Wisc & Minn	Non-Res	Total	% Non-Res				
2005-06	4,411	1,765	6,176	1,382	260	1,642	22,308	6,150	28,458	21.6	5,131	1,252	6,383	
2006-07	4,047	1,633	5,680	1,509	287	1,796	21,986	6,476	28,462	22.8	4,918	1,276	6,194	
2007-08	4,237	1,810	6,047	1,487	290	1,777	22,096	6,903	28,999	23.8	5,037	1,339	6,376	
2008-09	4,250	1,563	5,813	1,358	292	1,650	22,056	7,097	29,153	24.3	5,041	1,596	6,637	
Baseline													6,402	
2009-10	4,144	1,571	5,715	1,331	295	1,626	21,768	6,922	28,690	24.1	4,973	1,585	6,558	156
2010-11	4,231	1,724	5,955	1,399	354	1,753	21,736	7,161	28,897	24.8	4,780	1,689	6,451	49
2011-12	4,160	1,775	5,935	1,431	295	1,726	21,720	7,236	28,957	25.0	4,818	1,652	6,471	69
2012-13	4,190	1,832	6,021	1,445	320	1,765	21,728	7,488	29,217	25.6	4,821	1,574	6,395	0
2013-14	4,219	1,890	6,110	1,458	348	1,806	21,787	7,837	29,624	26.5	4,904	1,569	6,473	71
2014-15	4,249	1,951	6,200	1,472	378	1,850	21,851	8,171	30,022	27.2	4,939	1,644	6,583	181
2015-16	4,249	1,951	6,200	1,472	378	1,850	21,911	8,432	30,343	27.8	4,933	1,711	6,643	241
2016-17	4,249	1,951	6,200	1,472	378	1,850	21,965	8,616	30,581	28.2	4,975	1,783	6,759	357
2017-18	4,249	1,951	6,200	1,472	378	1,850	21,996	8,732	30,729	28.4	5,022	1,855	6,878	476
2018-19	4,249	1,951	6,200	1,472	378	1,850	22,007	8,793	30,799	28.5	5,057	1,915	6,972	570
2019-20	4,249	1,951	6,200	1,472	378	1,850	22,007	8,839	30,846	28.7	5,080	1,939	7,019	617
2020-21	4,249	1,951	6,200	1,472	378	1,850	22,008	8,883	30,891	28.8	5,102	1,952	7,054	652
2021-22	4,249	1,951	6,200	1,472	378	1,850	22,008	8,924	30,933	28.9	5,123	1,963	7,086	684
2022-23	4,249	1,951	6,200	1,472	378	1,850	22,007	8,952	30,959	28.9	5,143	1,972	7,116	714
2023-24	4,249	1,951	6,200	1,472	378	1,850	22,007	8,968	30,975	29.0	5,162	1,982	7,143	741
2024-25	4,249	1,951	6,200	1,472	378	1,850	22,008	8,973	30,981	29.0	5,171	1,990	7,161	759
2025-26	4,249	1,951	6,200	1,472	378	1,850	22,007	8,975	30,982	29.0	5,174	1,993	7,167	765
2026-27	4,249	1,951	6,200	1,472	378	1,850	22,007	8,976	30,983	29.0	5,175	1,993	7,168	766
2027-28	4,249	1,951	6,200	1,472	378	1,850	22,008	8,977	30,985	29.0	5,176	1,994	7,169	767