Academic Performance and Persistence: The Role of Math Gateway Courses

Office of Institutional Research

April 2007

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Objectives

- Specify a baseline model of persistence for FT/FT freshmen over time
- Assess the relationship between academic performance and persistence

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Objectives

- Examine the role of 1st semester performance in Math gateway courses on semester retention.

- Assess if enrolling in the advised Mathematics course is related to 1st semester academic success and retention.

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Methodology

- Dependent Variables
  - Retention
    - Semester
    - 1-year
    - 2-year
  - Graduation
    - 6-year

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Methodology

- Population
  - For retention models:
    - 2000 to 2004 cohorts of FT/FT freshmen (n=6,883)
    - Deceased and duplicate cases excluded (n=5)
  - For 6-year graduation model:
    - 1995 to 1999 cohorts of FT/FT freshmen (n=5,748)
    - Deceased and duplicate cases excluded (n=7)

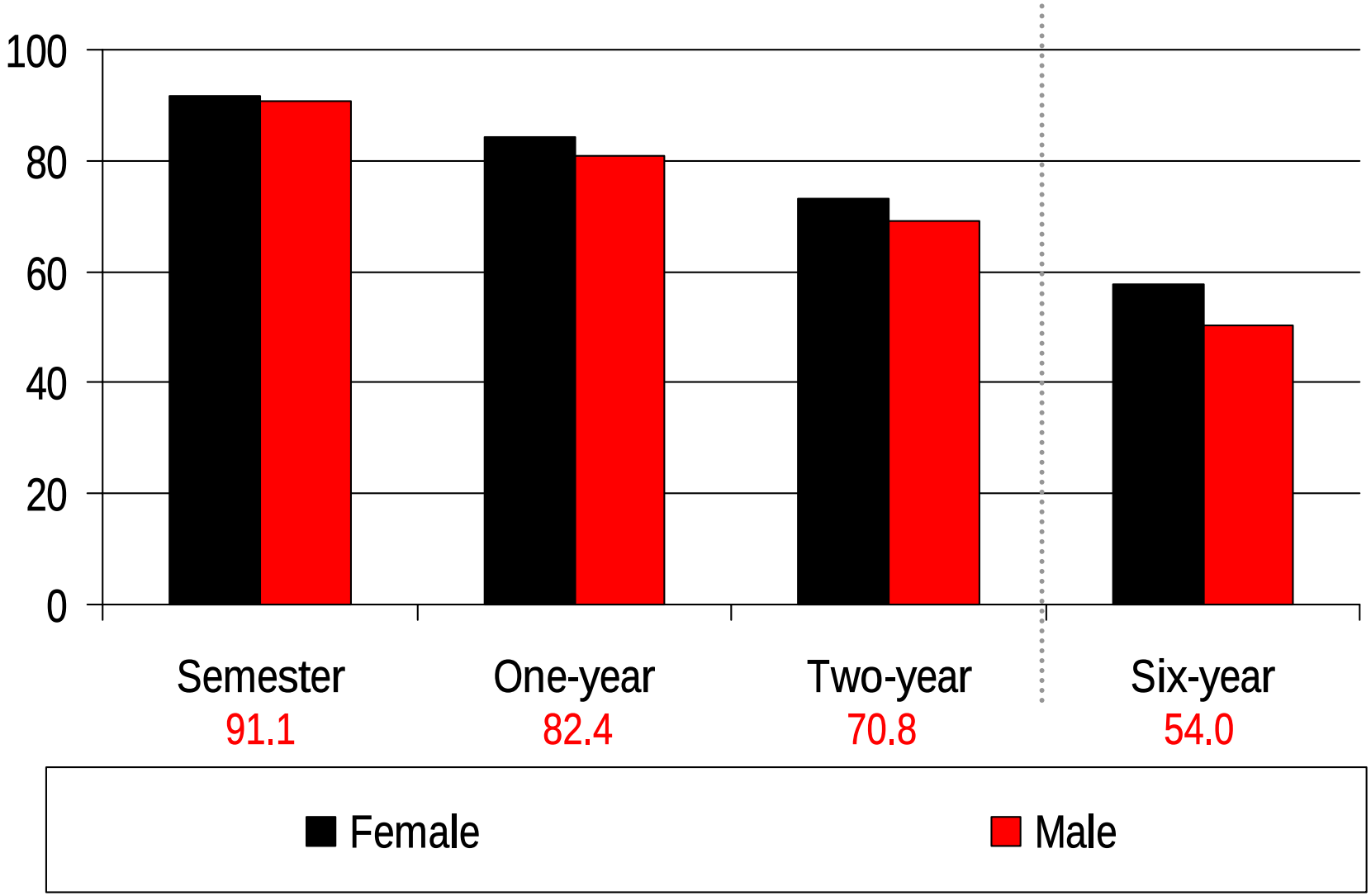
Methodology

- Independent Variables of Interest:
  - 1st semester academic performance
  - Academic Performance in 1st semester Math gateway course
    - Math 106: Algebra & Elementary Functions
    - Math 150: Pre-Calc
    - Math 151: Calc for STEM majors

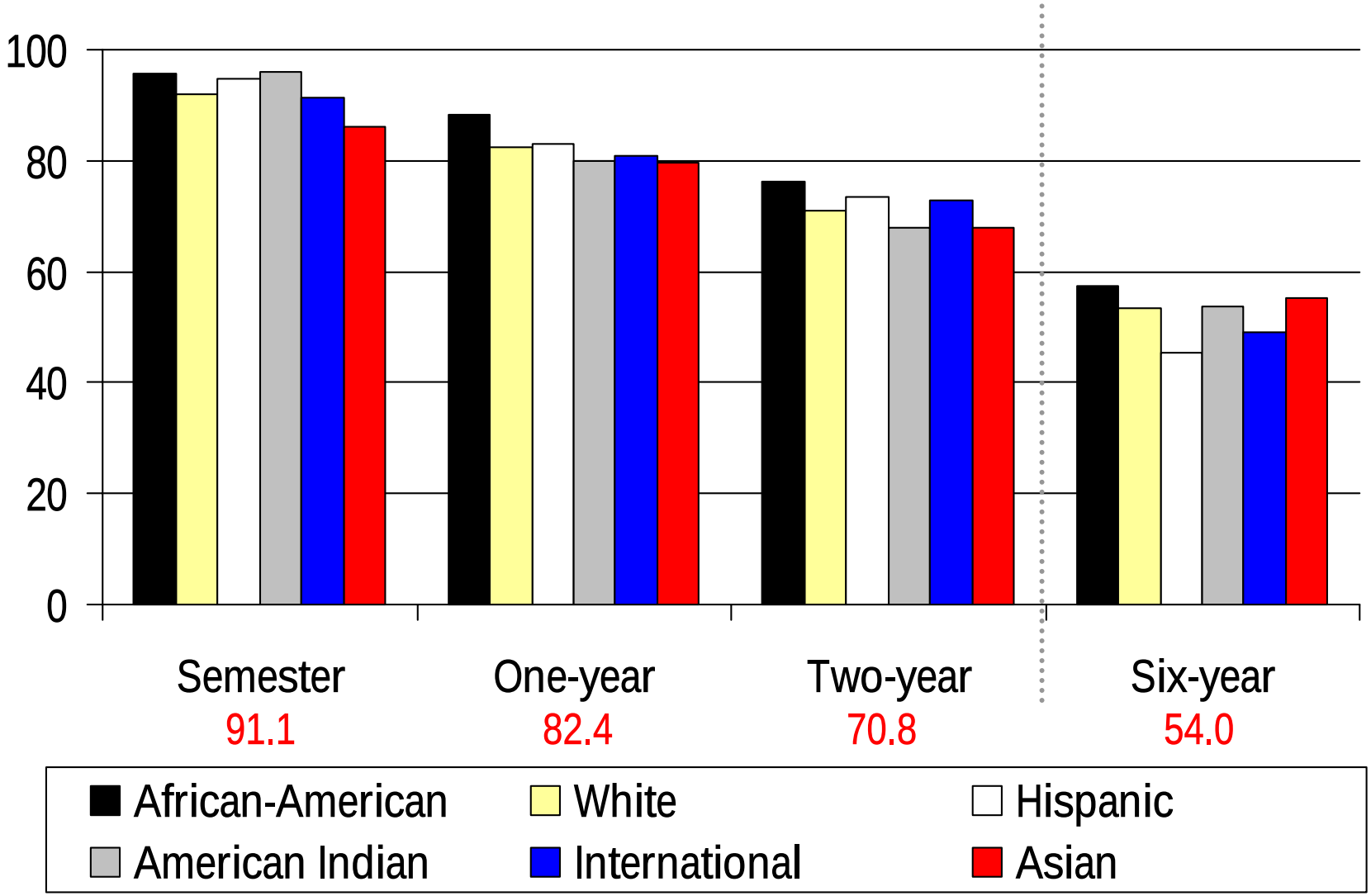
Methodology

- Control Variables
  - Term
  - Sex
  - Race
  - Geographic origin
  - HS G.P.A.
  - SAT scores
  - AP credit
  - Math placement
  - Major area @ matriculation
  - Dorm status
  - Affiliated
  - UMBC scholarship
  - Applied for financial aid
  - Estimate family contribution
  - Cancel/withdrew 1st semester

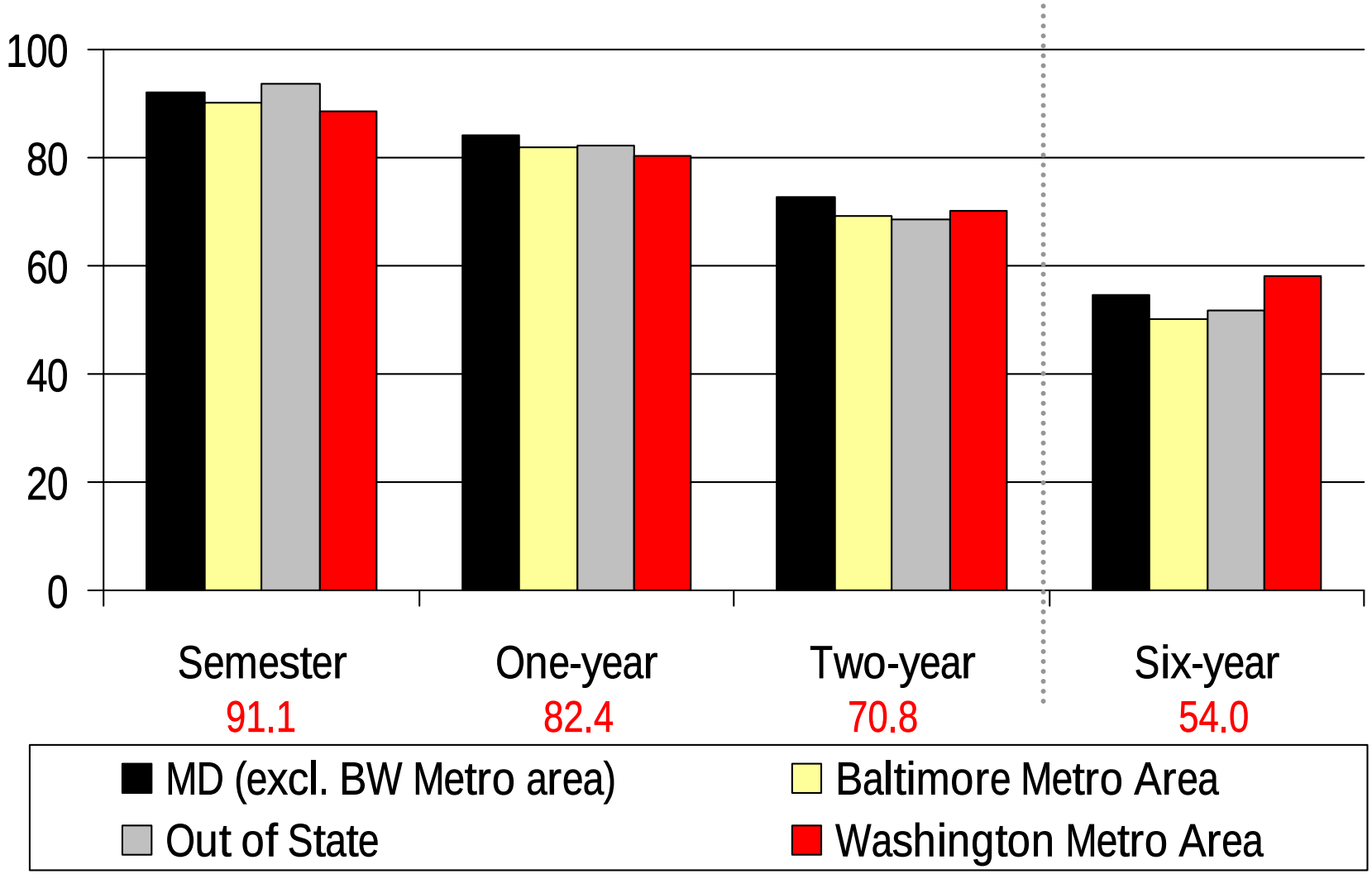
Retention & Graduation Rates by Gender



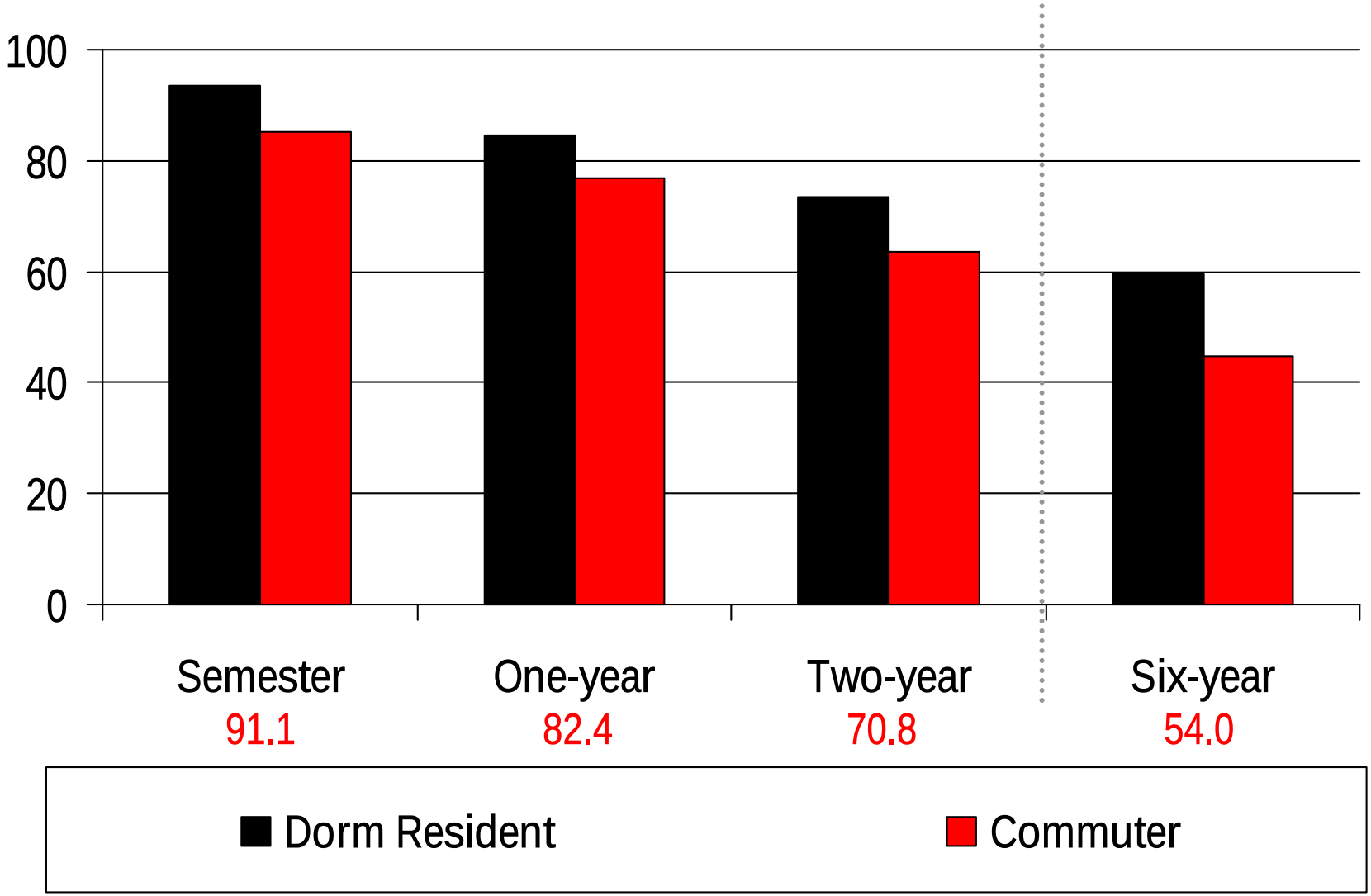
Retention & Graduation Rates by Race



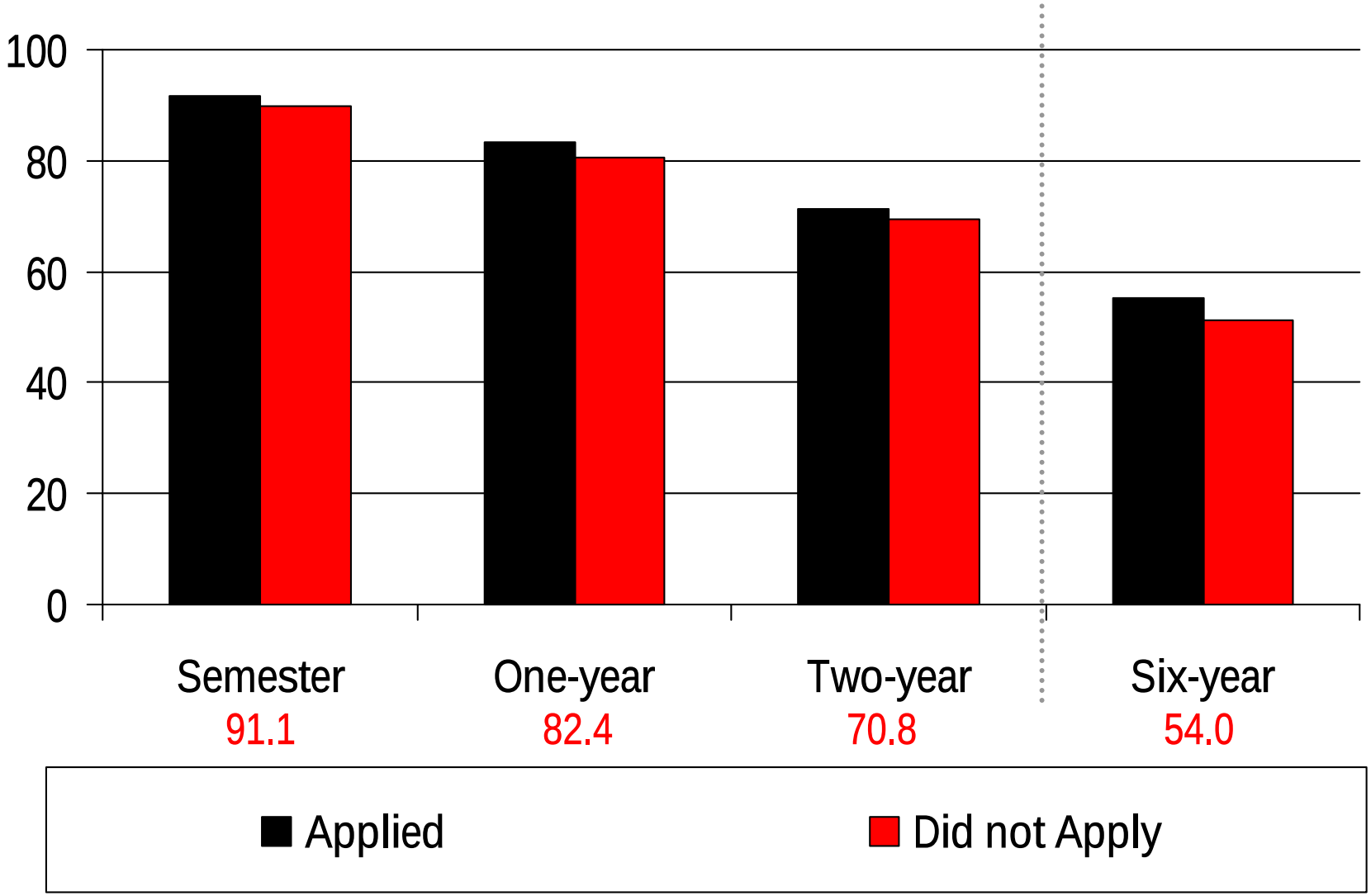
Retention & Graduation Rates by Geographic Area



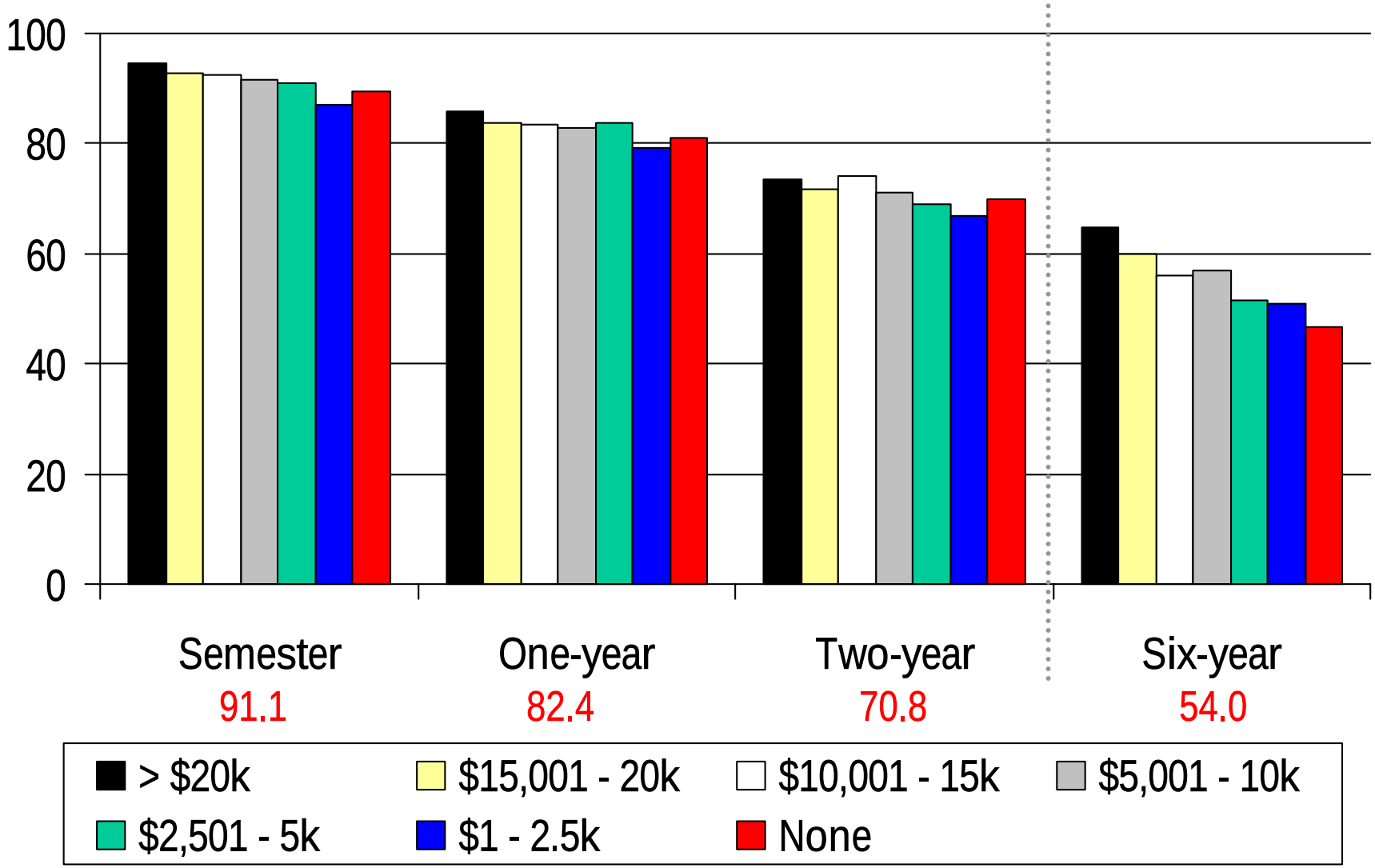
Retention & Graduation Rates by Dorm Status



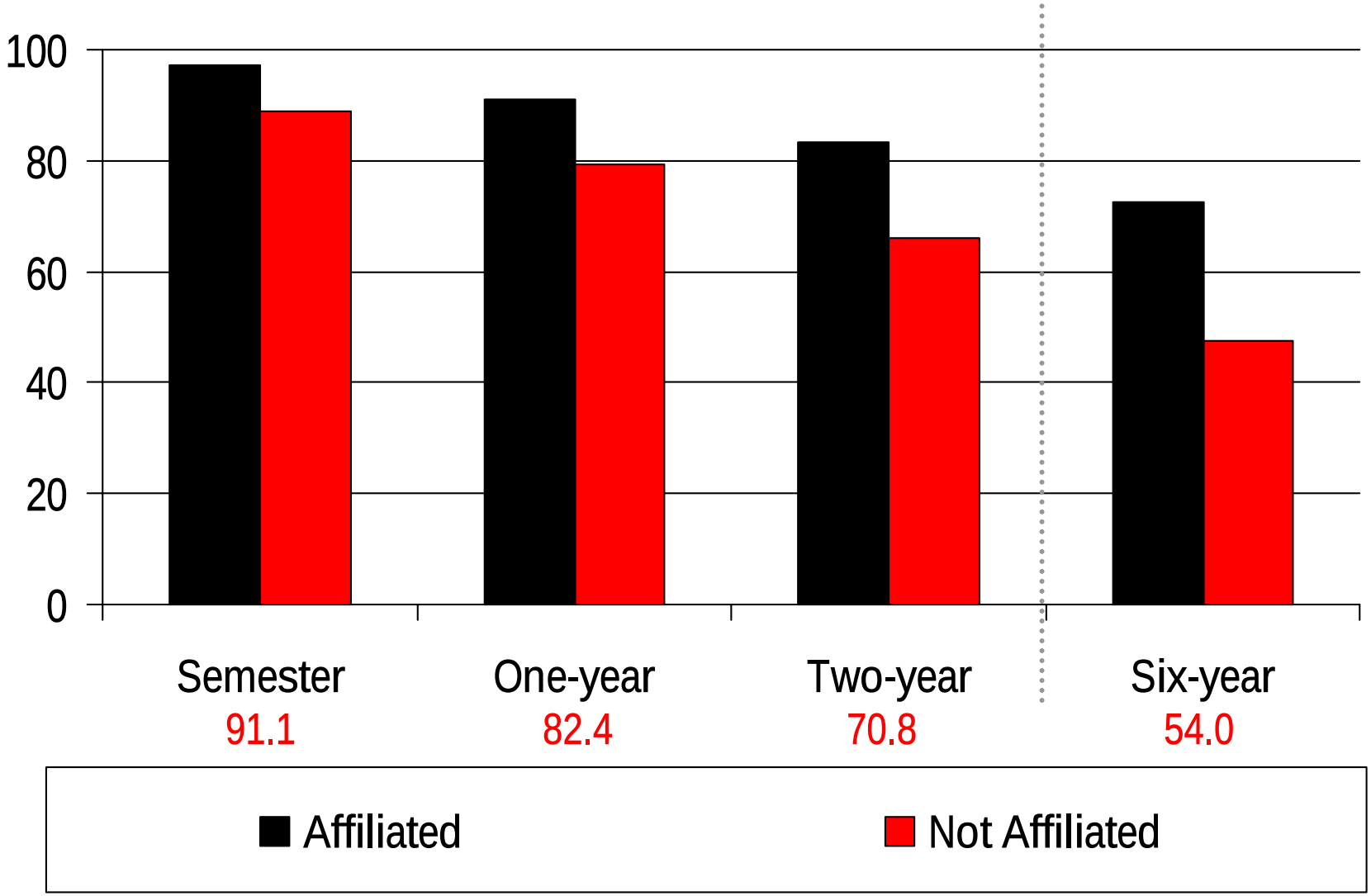
Retention & Graduation Rates by Applied for Financial Aid



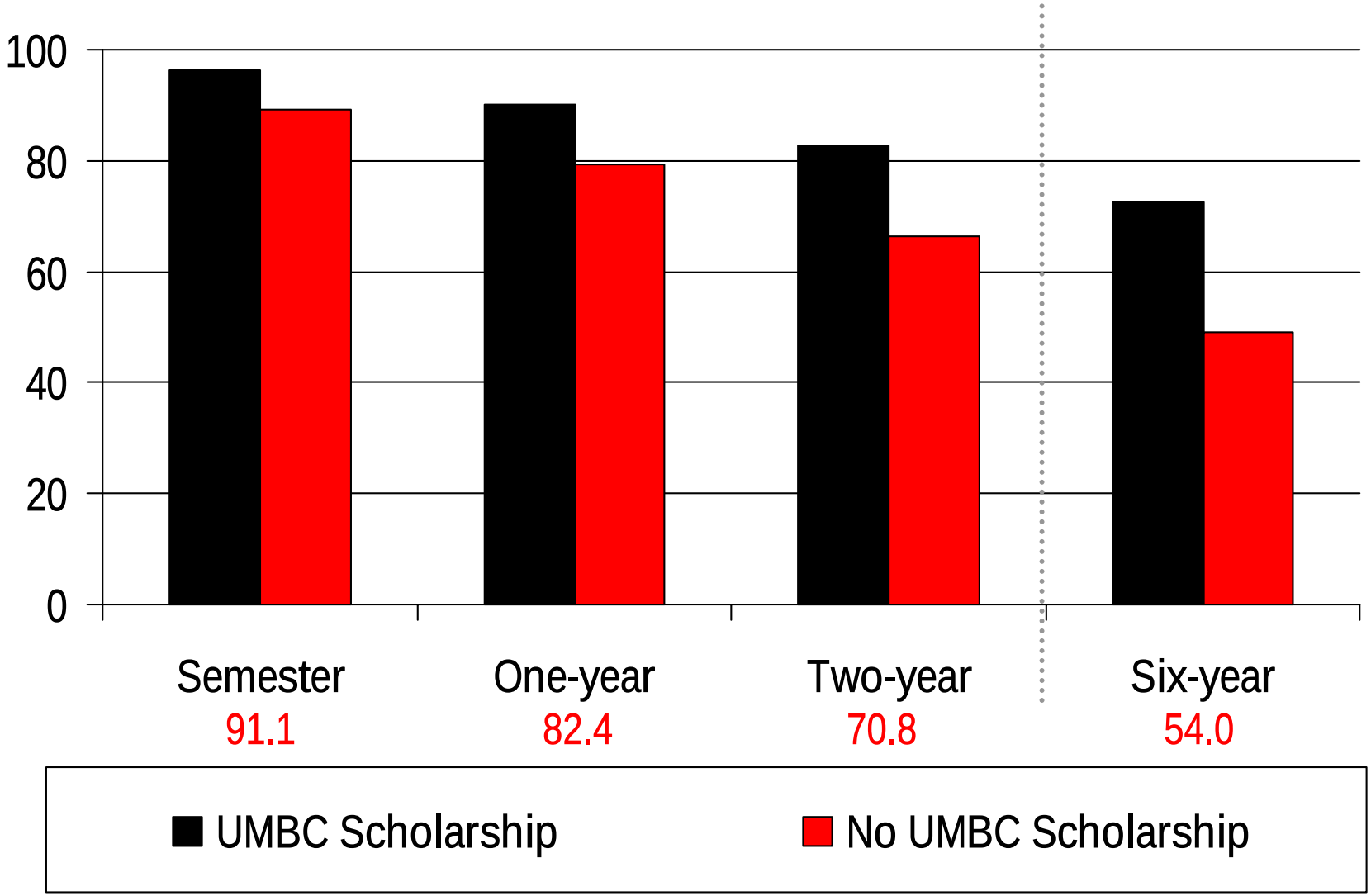
Retention & Graduation Rates by Estimated Family Contribution



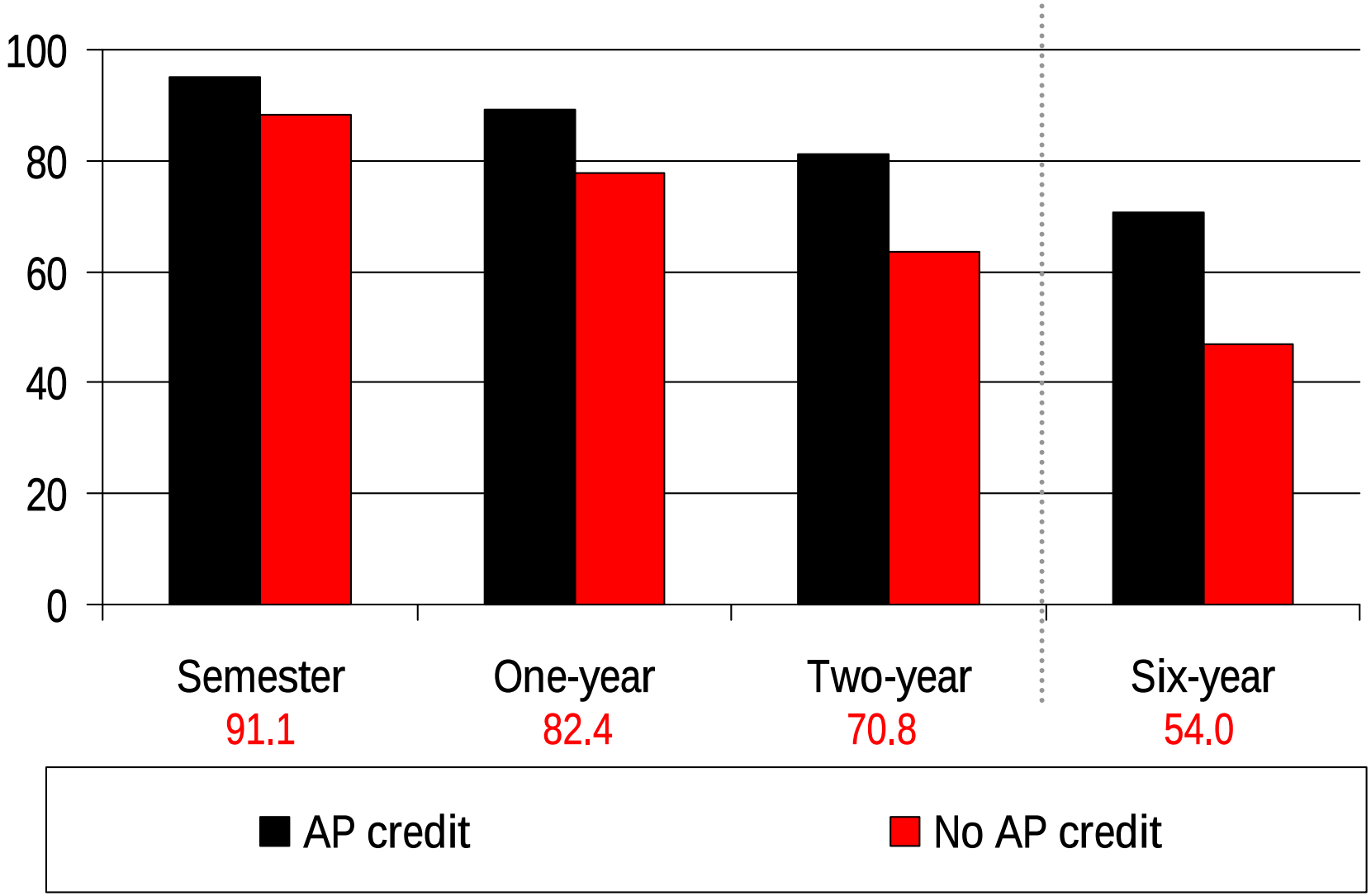
Retention & Graduation Rates by Affiliated at Matriculation



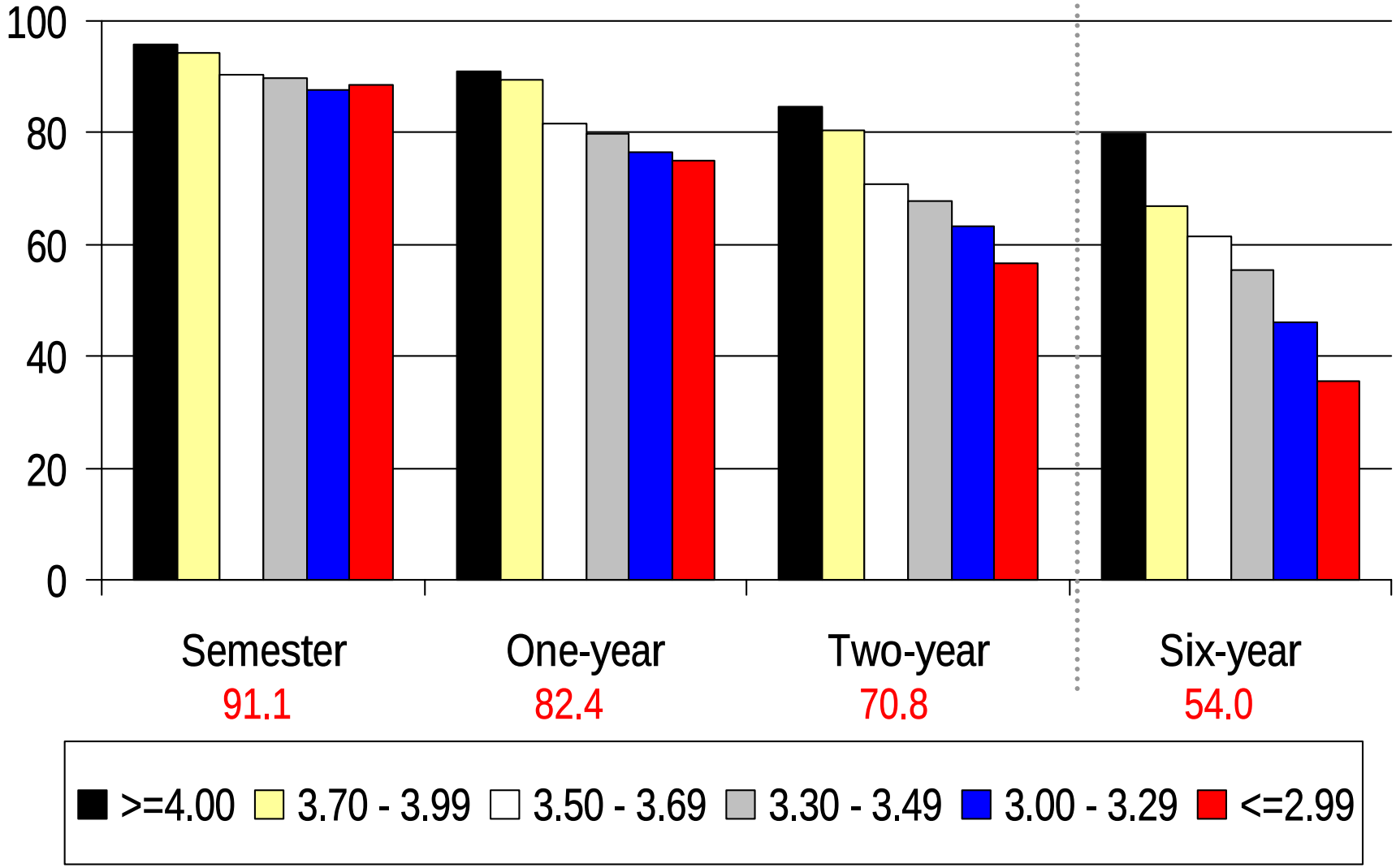
Retention & Graduation Rates by UMBC Scholarship



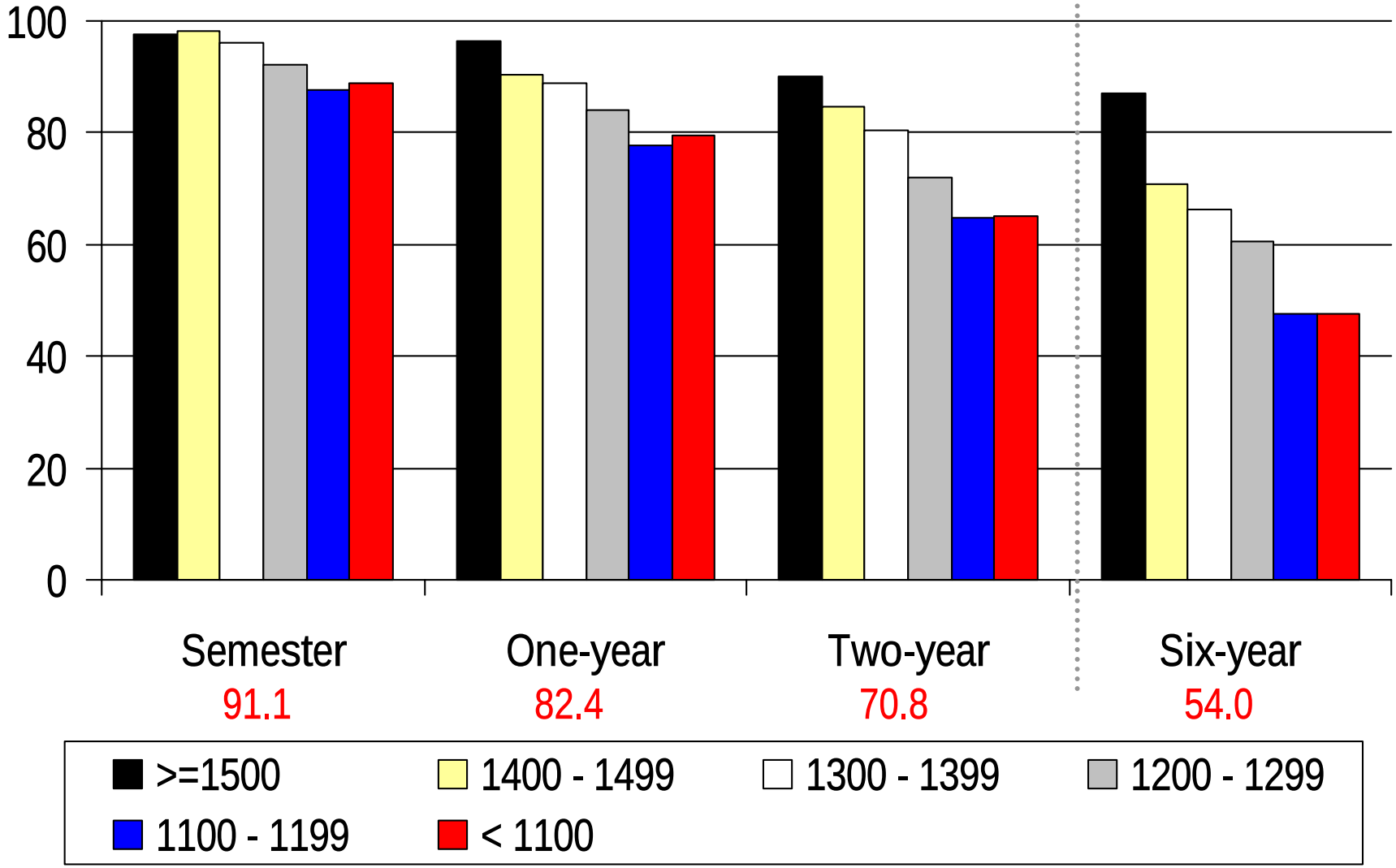
Retention & Graduation Rates by Transferred in AP Credit



Retention & Graduation Rates by High School GPA



Retention & Graduation Rates by SAT (combined)



Six-year Graduation: High School GPA by SAT Scores

(2000 – 2004 cohorts of FT/FT Freshmen)

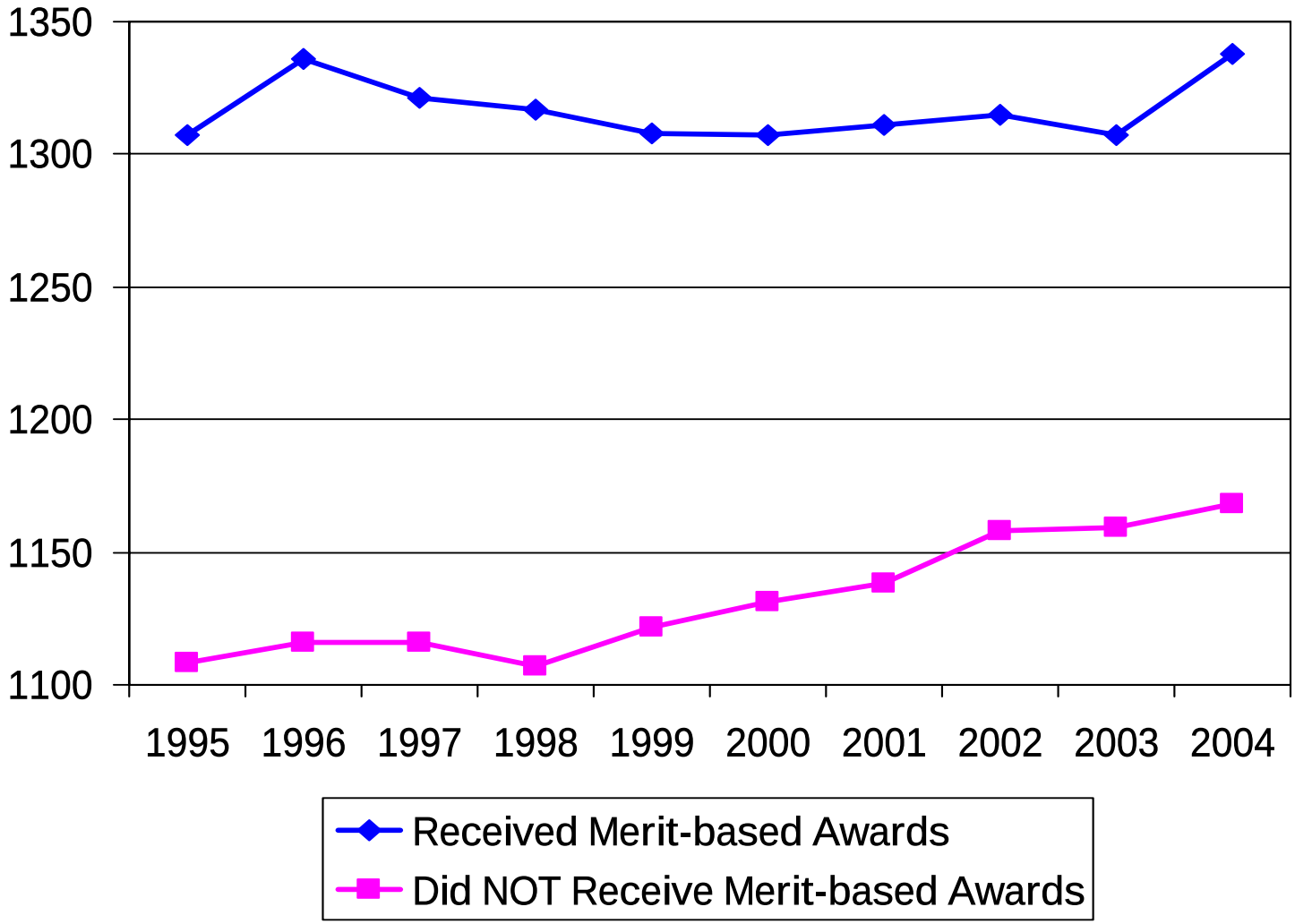
Total

	<=1099	1100-1199	1200-1299	1300-1399	1400-1499	>=1500	Total
<=2.99	36.5%	36.9%	37.7%	24.4%	13.6%	0.0%	35.6%
3.00 – 3.29	46.2%	44.4%	48.7%	53.5%	34.8%	33.3%	46.2%
3.30 – 3.49	56.1%	50.2%	56.3%	60.2%	73.9%	100.0%	55.6%
3.50 – 3.69	55.2%	50.8%	70.6%	77.0%	60.0%	66.7%	61.5%
3.70 – 3.99	56.8%	61.7%	69.5%	72.7%	79.3%	94.4%	67.2%
>=4.00	61.4%	70.2%	81.9%	79.4%	88.8%	90.9%	79.8%
Total	47.8%	47.6%	60.9%	66.2%	71.4%	87.1%	54.6%

Note: Missing values on high school GPA and SAT combined were not mean substituted in this case. They were mean substituted in the multivariate models.

Average SAT (combined) Score by Received Merit-based Award

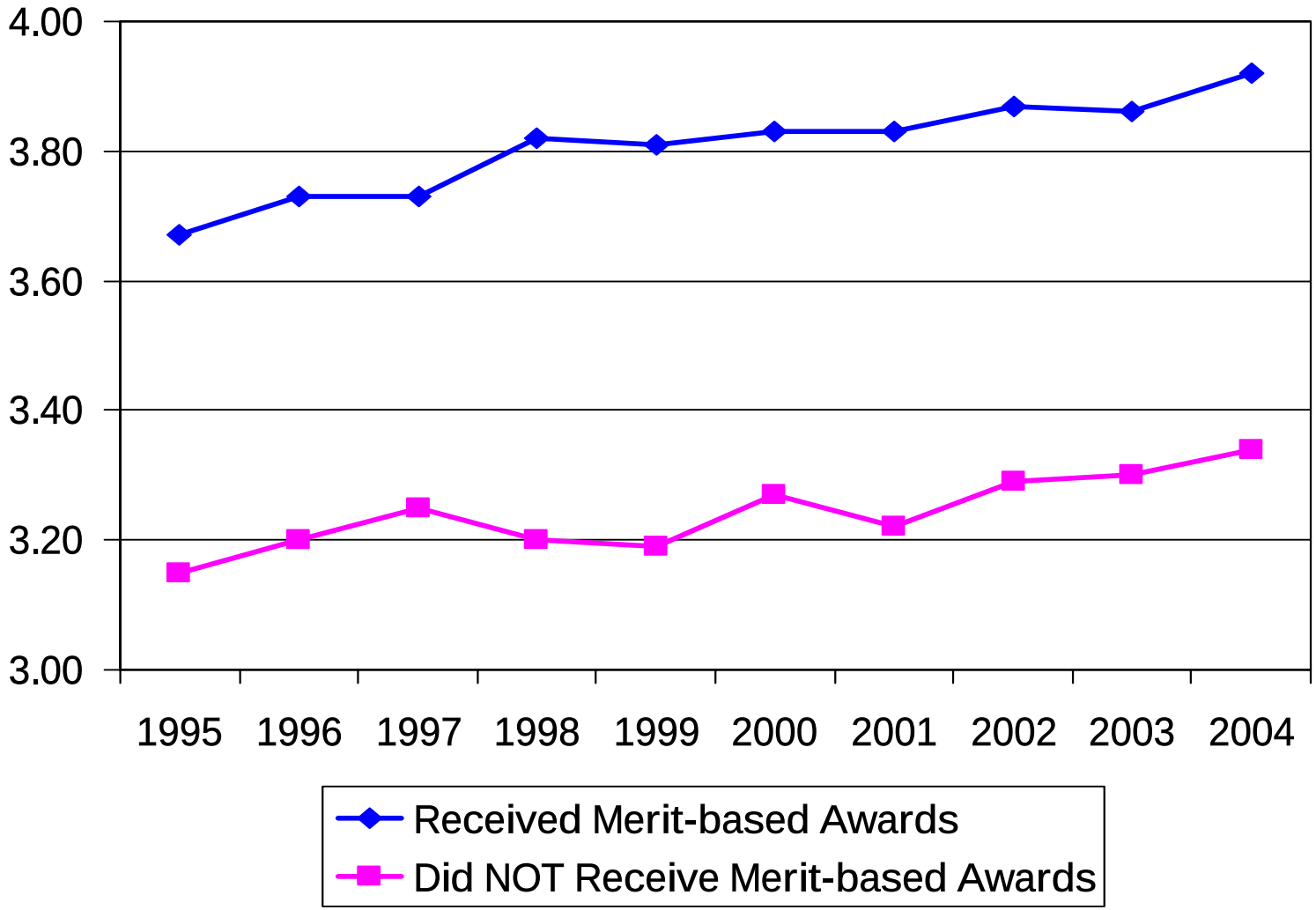
(1995 – 2004 Cohorts of FT/FT Freshmen)



Notes: Re-centered SATC was not mean substituted for missing cases. Merit awards include Scholars' programs and UMBC merit scholarships.

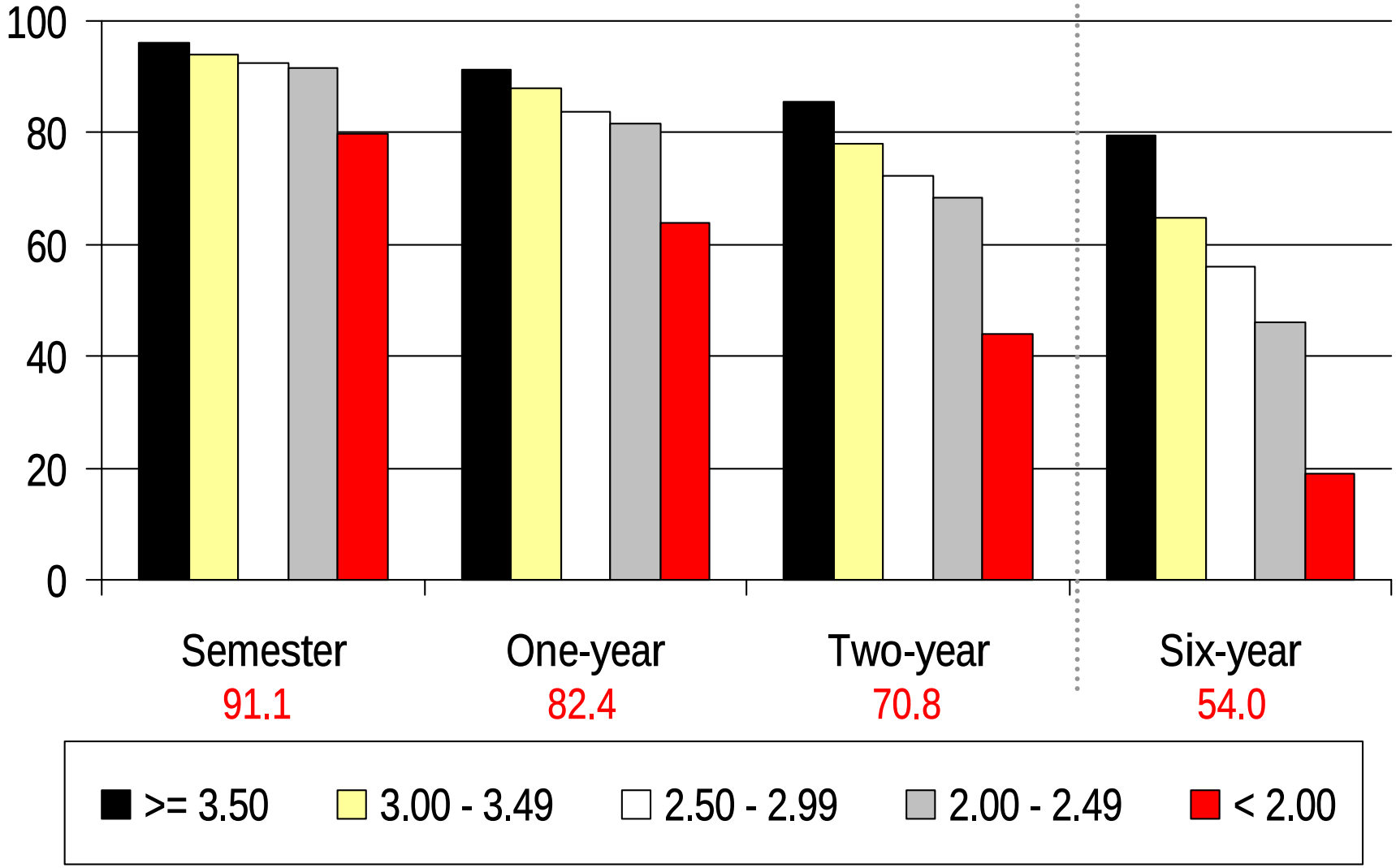
Average High School GPA by Received Merit-based Award

(1995 – 2004 Cohorts of FT/FT Freshmen)



Notes: High school GPA was not mean substituted for missing cases. Merit awards include Scholars' programs and UMBC merit scholarships.

Retention & Graduation Rates by 1st Term GPA



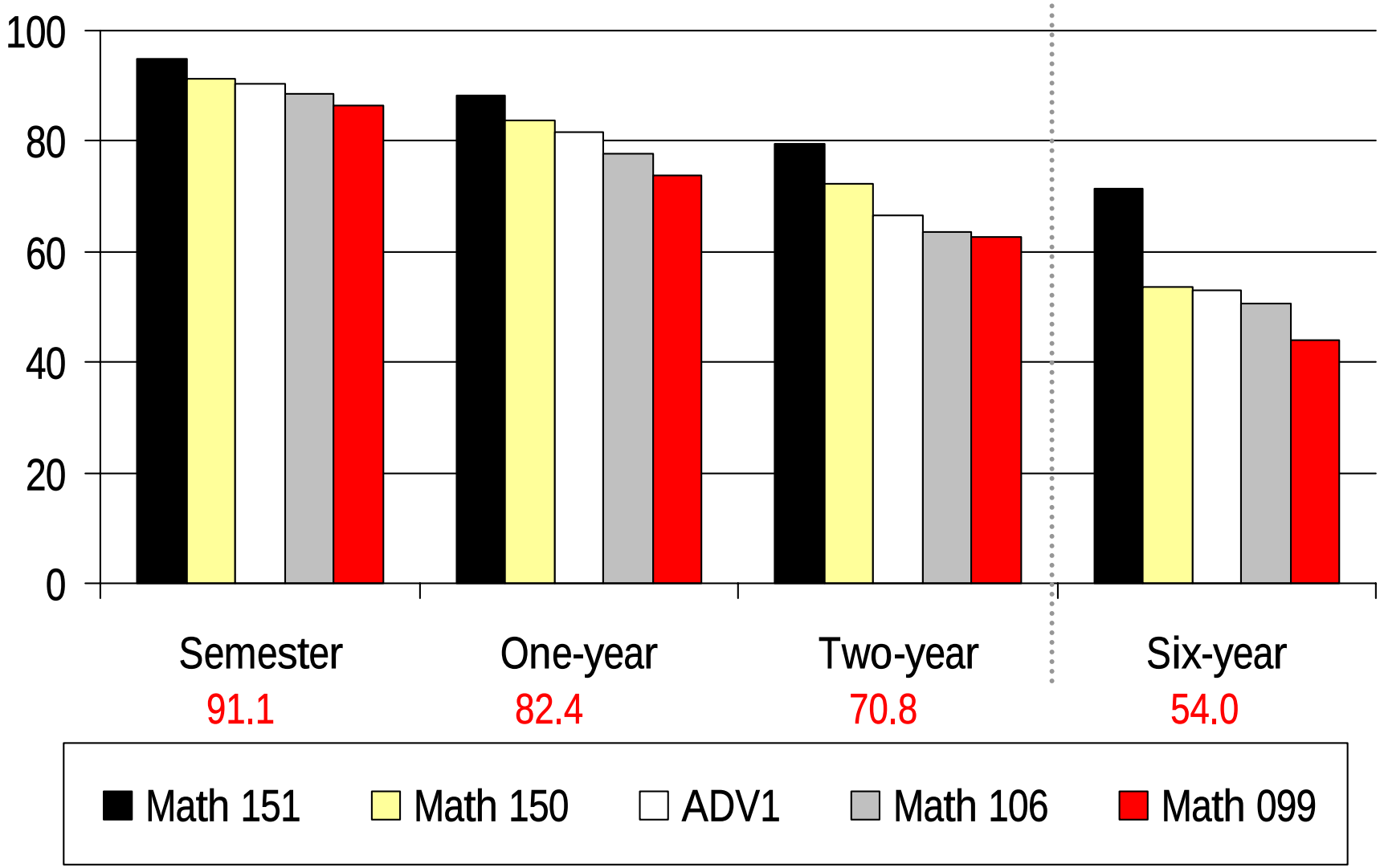
Placement by Enrolled in the Recommended Math Course the 1st Semester (2000 – 2004 FT/FT Freshman Cohorts)

Placement/ Course	N	% Followed Recommendation	% Lower-level Course	% Higher-level Course	% No Math
MATH 099	233	56%	N/A	9%	35%
MATH 106	2,036	73%	< 0.1%	4%	23%
ADV1 MATH 100 MATH 115 MATH 131 STAT 121 MATH 106 *	550	58%	0%	20%	22%
MATH 150 MATH 150 MATH 155	1,628	64%	5%	11%	20%
MATH 151	2,024	61%	3%	12%	25%

•Students who place into ADV1 & plan to take MATH 150 (Pre-Calc) must first complete MATH 106.

Note: Totals may not add to 100% due to rounding.

Retention & Graduation Rates by Math Placement



1st Semester Enrollment in a Recommended Math Course, Performance, and Persistence

	2000-2004 Cohorts (n=6,883)			1995-1999 Cohorts (n=5,748)	
	N	Retention		N	Graduation
		Semester	1-year		6-year
FT/FT Freshmen		91.1%	82.4%		54.0%
Placed into MATH 106 & Took…	2,036			1,654	
Recommended Course	1,483	88.7%	77.6%	886	50.7%
A, B, C	1,056	91.3%	82.3%	701	56.8%
D or F	351	84.3%	67.2%	153	28.1%
Withdrew (W or WX)	71	71.8%	59.2%	31	25.8%
Lower-level Course	3	100.0%	33.3%	2	50.0%
Higher-level Course	86	84.9%	79.1%	186	57.0%
No Math	467	89.3%	77.7%	581	48.0%

1st Semester Enrollment in a Recommended Math Course, Performance, and Persistence

	2000-2004 Cohorts (n=6,883)			1995-1999 Cohorts (n=5,748)	
	N	Retention		N	Graduation
		Semester	1-year		6-year
FT/FT Freshmen		91.1%	82.4%		54.0%
Placed into MATH 150 & Took…	1,628			1,002	
Recommended Course	1,049	90.7%	83.3%	611	53.2%
A, B, C	865	91.9%	86.0%	478	61.9%
D or F	158	88.0%	72.2%	112	21.4%
Withdrew (W or WX)	23	60.9%	60.9%	21	23.8%
Lower-level Course	74	90.5%	82.4%	45	60.0%
Higher-level Course	185	93.0%	84.3%	87	57.5%
No Math	324	92.6%	84.3%	259	51.7%

1st Semester Enrollment in a Recommended Math Course, Performance, and Persistence

	2000-2004 Cohorts (n=6,883)			1995-1999 Cohorts (n=5,748)	
	N	Retention		N	Graduation
		Semester	1-year		6-year
FT/FT Freshmen		91.1%	82.4%		54.0%
Placed into MATH 151 & Took…	2,024			1,106	
Recommended Course	1,228	94.5%	87.8%	626	71.2%
A, B, C	1,051	96.0%	90.2%	555	76.8%
D or F	137	86.1%	70.8%	56	25.0%
Withdrew (W or WX)	38	84.2%	81.6%	15	40.0%
Lower-level Course	50	96.0%	70.0%	48	58.3%
Higher-level Course	240	93.8%	88.8%	125	77.6%
No Math	509	96.7%	89.6%	308	71.1%

Conclusions

- Most students who take Math their 1st semester take the advised Math course (~84%).
- Few students who perform poorly in a Math gateway course persist.
- Even among our academically prepared students, more than 20% don't graduate.

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Next Steps

- Analyze the role of other gateway courses?
- Re-evaluate the role of first-year experiences in FT/FT freshman retention.
- Develop a transfer student baseline retention and graduation model, including the role of first-year experiences.
- Examine the role of student behavior after the 1st semester (course-taking, major switching) on persistence.
- Evaluate placement testing methods: paper & pencil vs. computer-based module.