An Uncertain Future: How Prediction Intervals Help Researchers Express the Unknown

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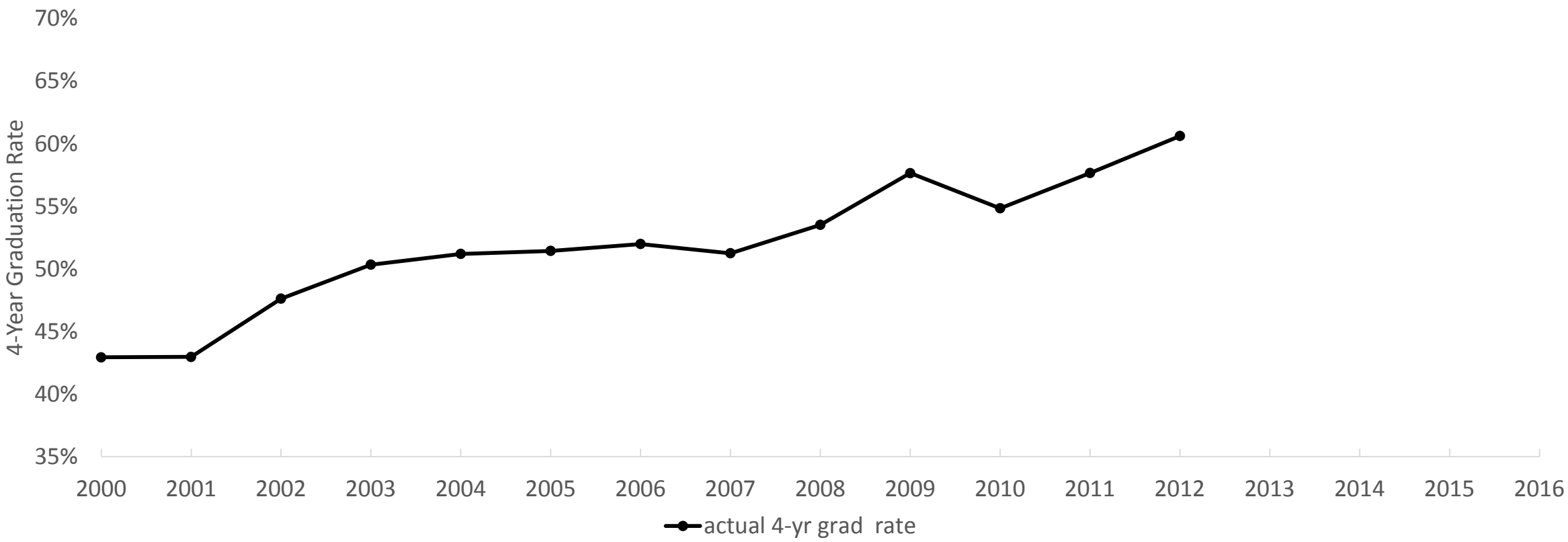
Two Examples

Usage	Input	Method	Interval Captures
Enrollment Projection	Applicant Characteristics	Historical Error	Observed + Historical Unobserved
Graduation Rate Projection	Student Characteristics	Korn and Graubard	Observed

Predicting Graduation Rates

Actual 4 Year Graduation Rates at UC Davis



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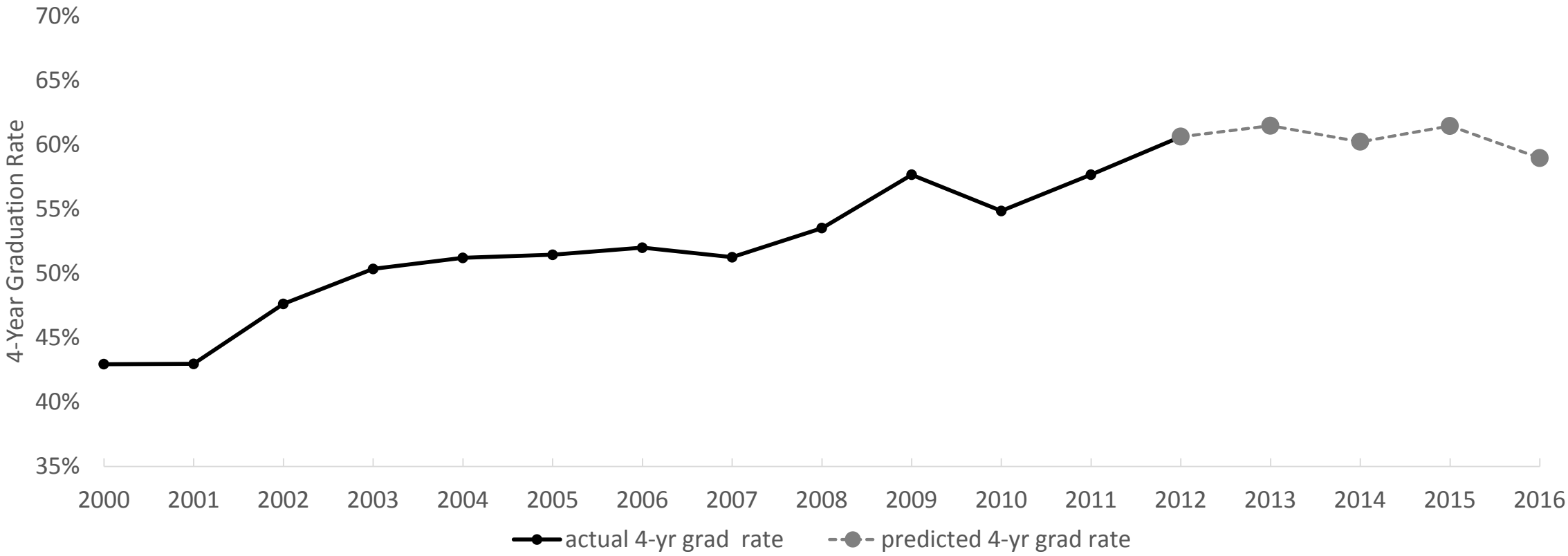
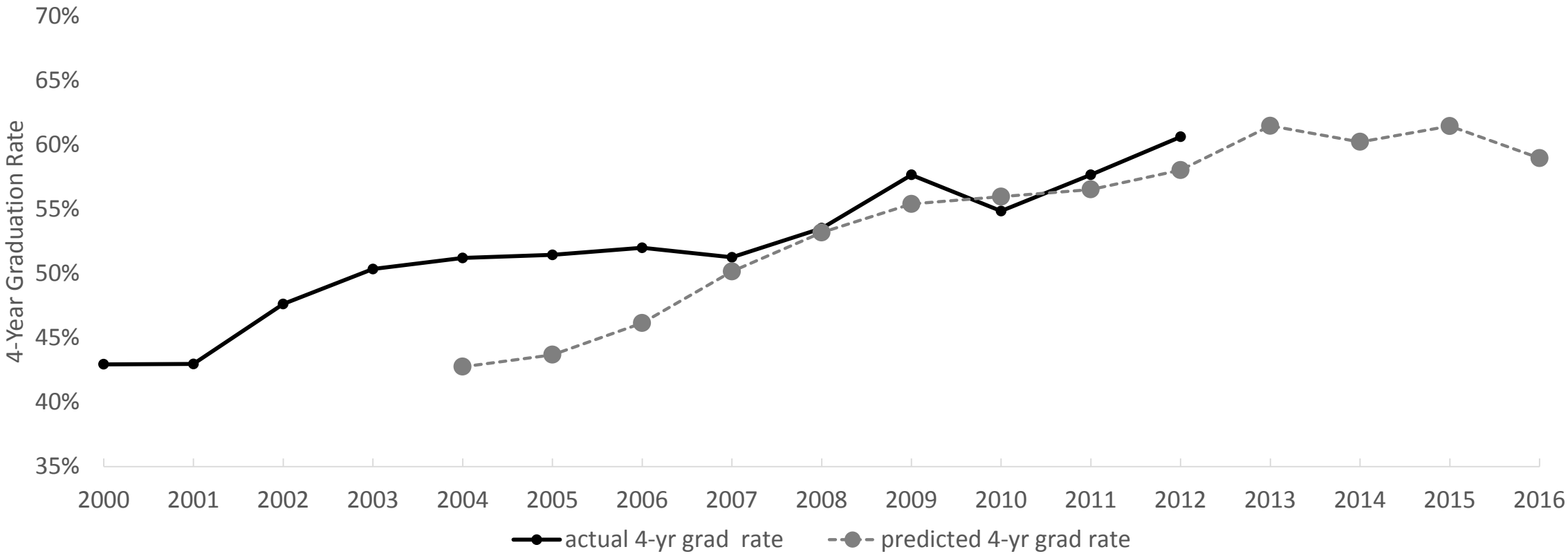
Actual versus Predicted Graduation Rates



Actual versus Predicted Graduation Rates



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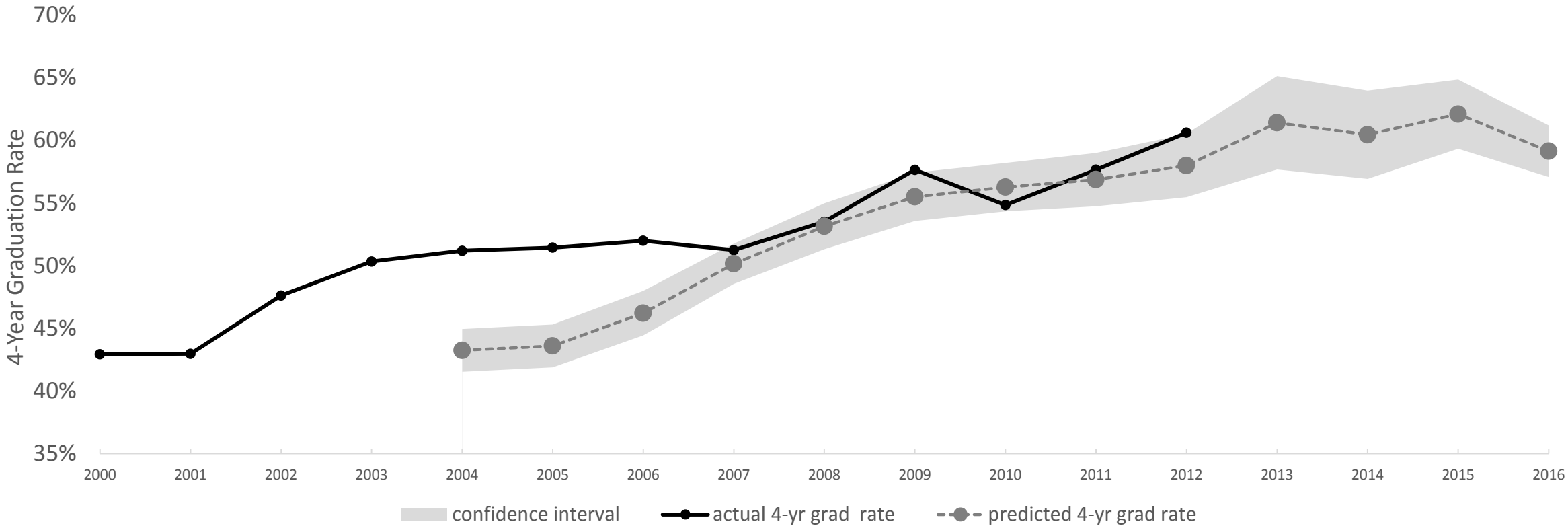
Korn and Graubard Method Predicted Interval



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Stata Example of Confidence Interval

```
. quietly logit grad4 satrt2 gpa2  AE BI EN HARCS MPS incomesq income2 income2_mis ///
> international national  i.fg2  male  i.race  if year_start==2012 ,vce(robust)

.
. margins  if year_start==2016, noesample  vce(unconditional) force

Predictive margins                                Number of obs     =      5,763

Expression   : Pr(grad4), predict()
```

	Margin	Unconditional Std. Err.	z	P>|z|	[95% Conf.	Interval]
_cons	.5913555	.0104905	56.37	0.000	.5707945	.6119165

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Predicting Enrollment Rates

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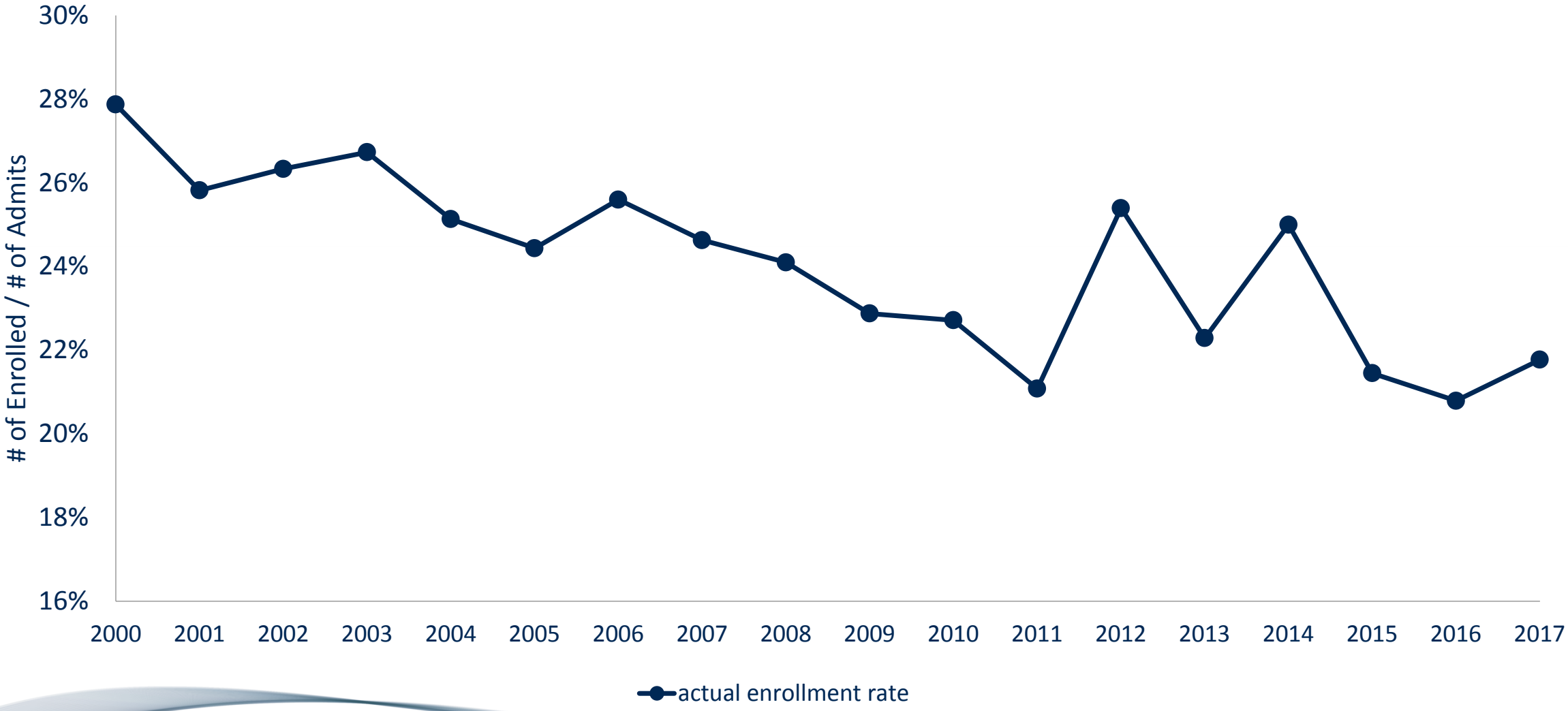
Enrollment Rates at UC Davis



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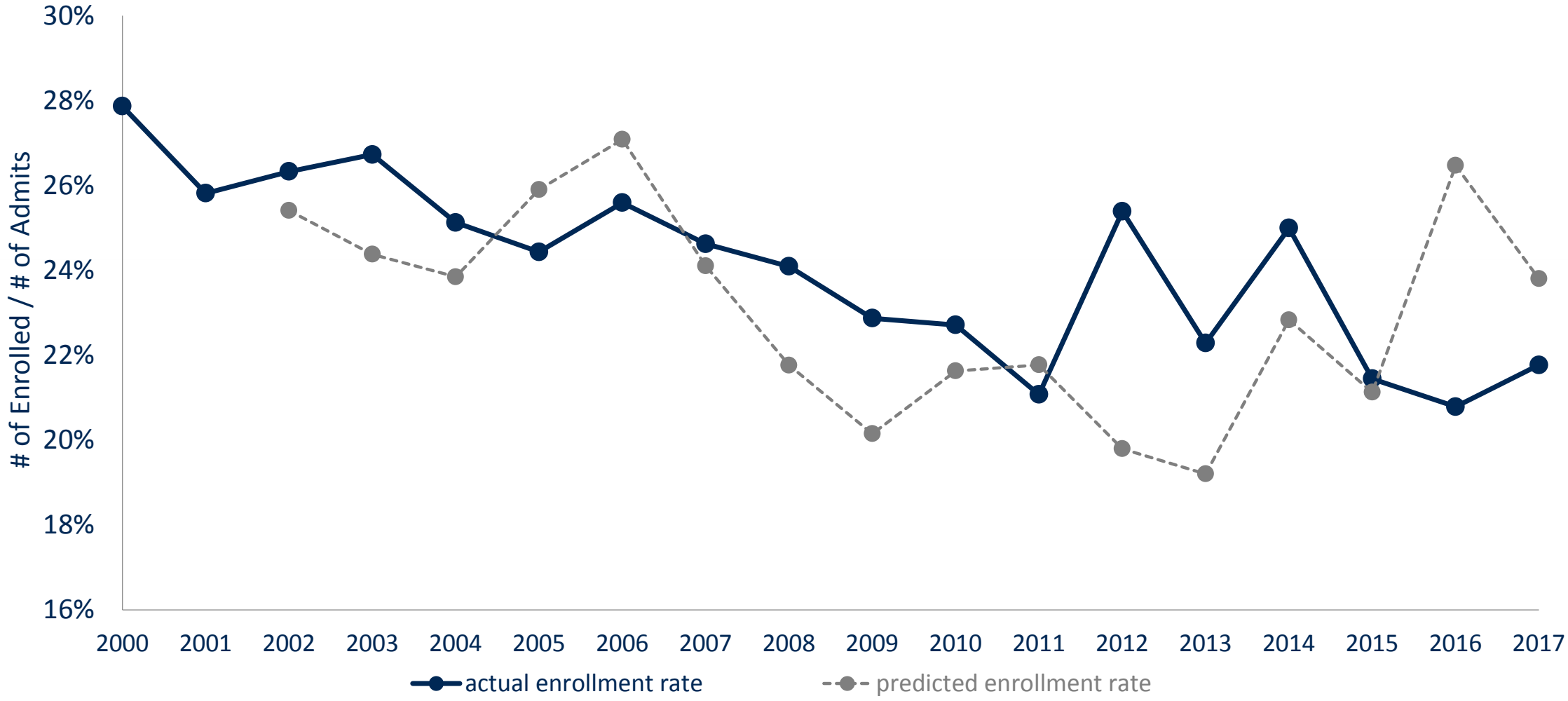
Actual versus Predicted Enrollment Rates



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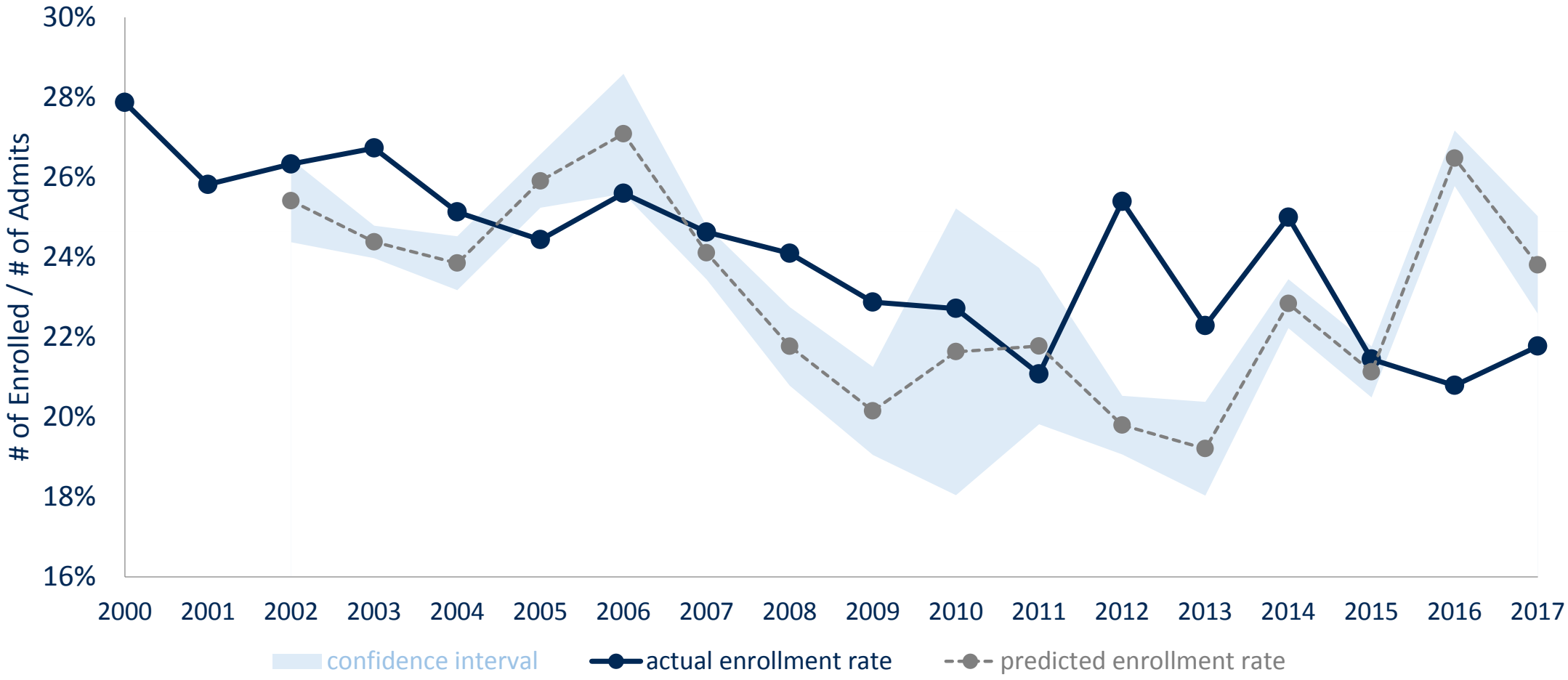
Korn and Graubard Method Predictive Interval



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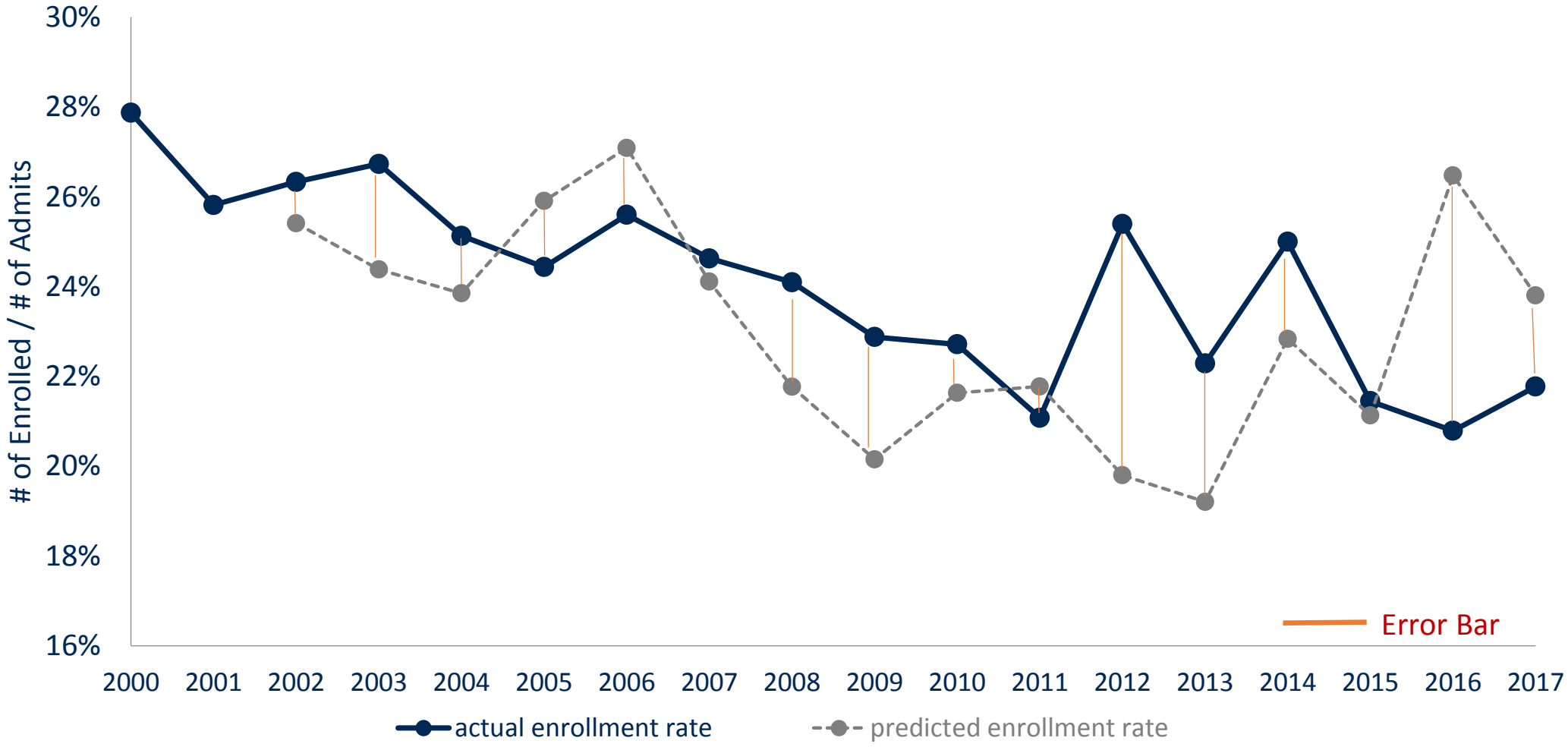
Historical Errors



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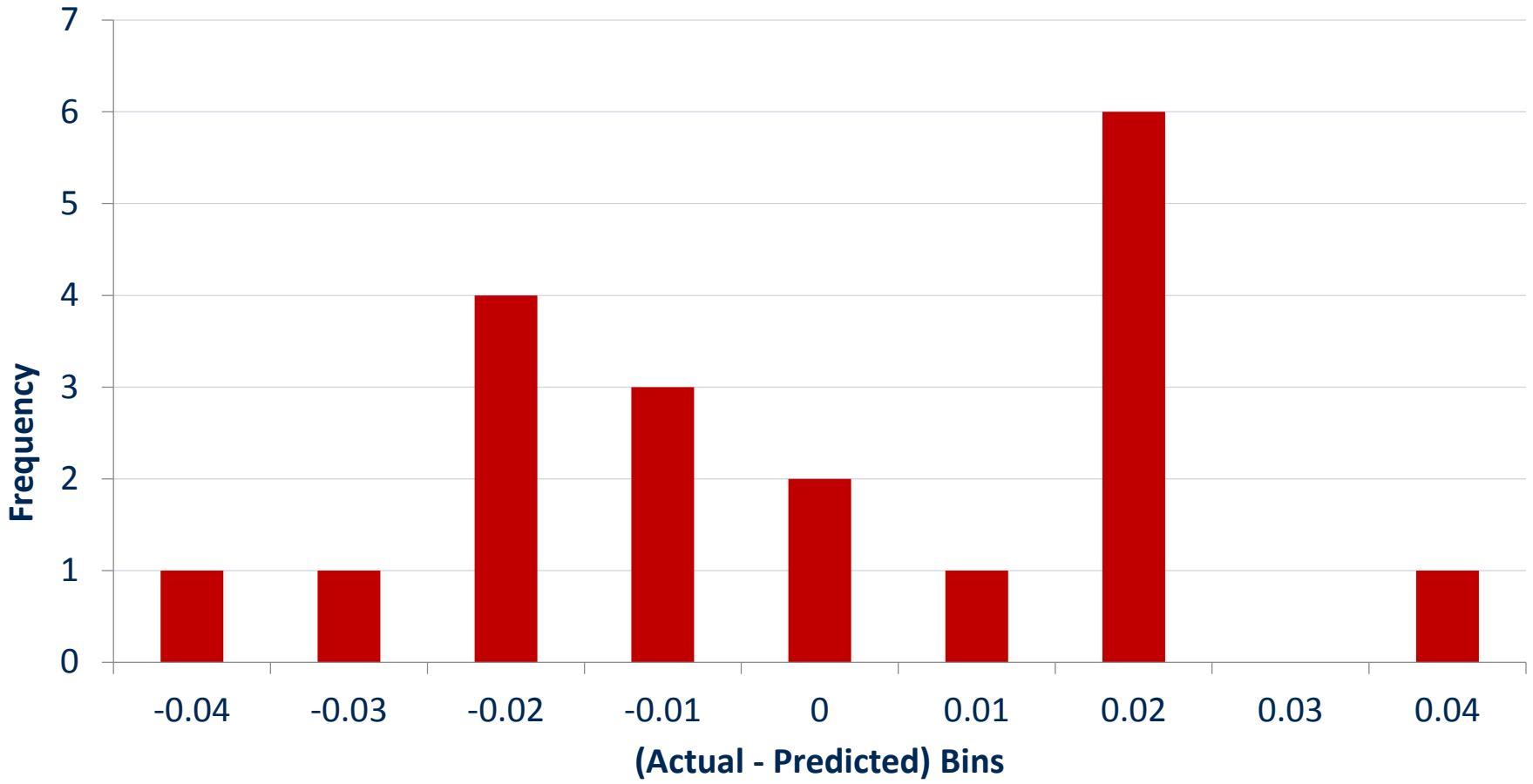
Histogram of Error



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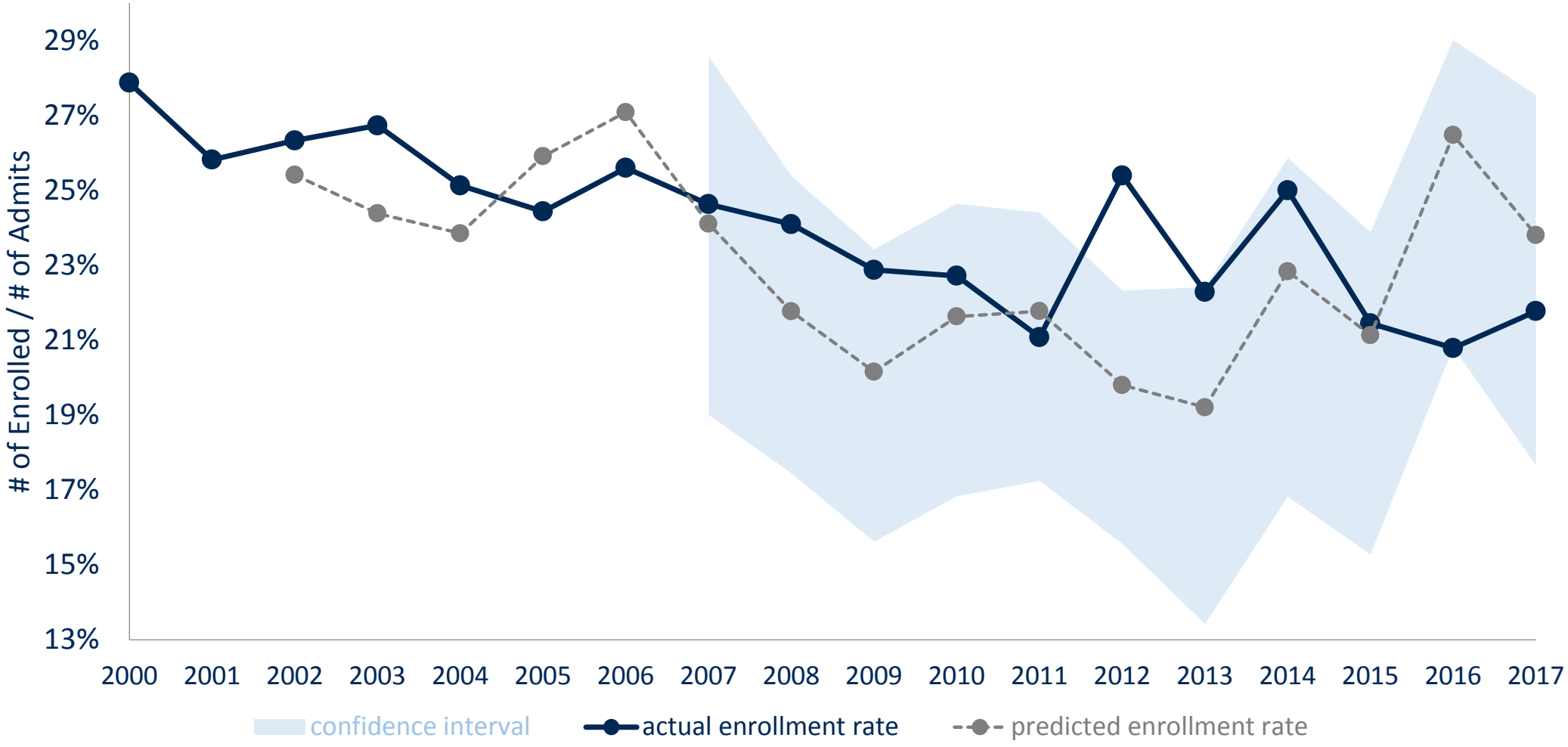
Historical Error Predicted Interval



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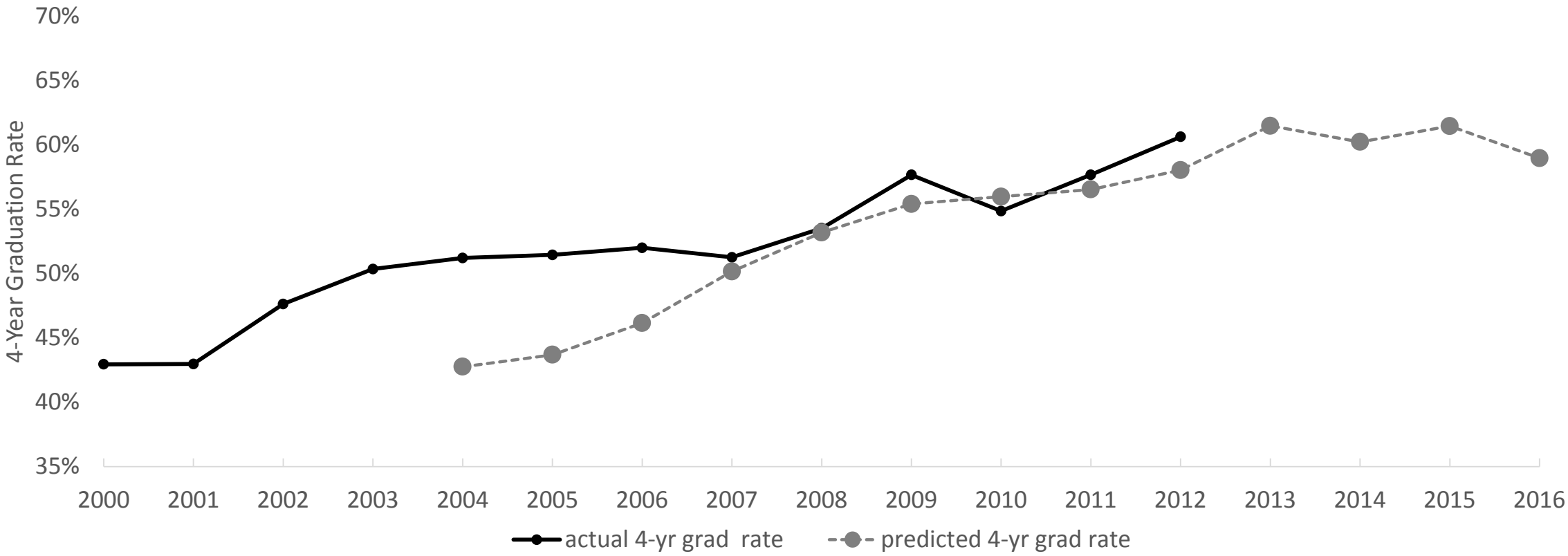
Actual versus Predicted Graduation Rates



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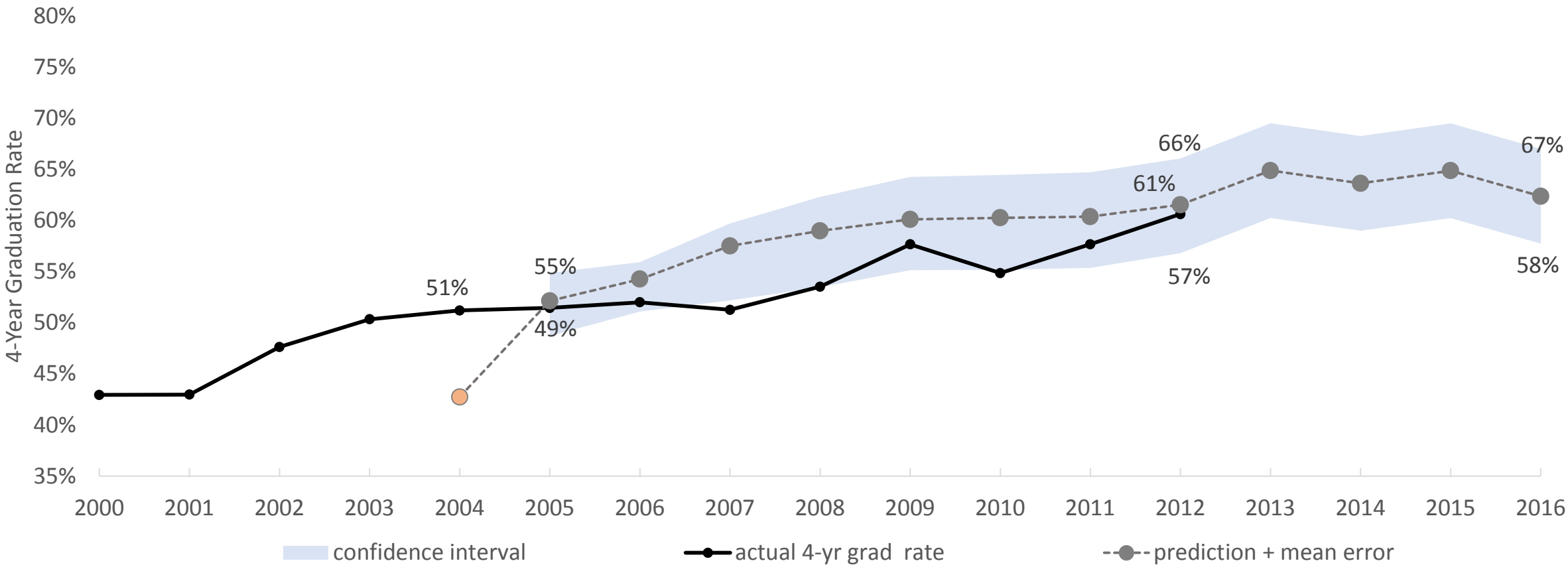
Historical Error Predicted Interval



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Which method should I use?

- Use the **Korn and Graubard method** when the only error you want to capture is that which is from observed variability.

- Use the **historical method** when you want to incorporate all historical sources of error - both observed and historical.