Harper Enrollment Projections

Dean's Council Presentation

Dr. John Zhang

Dr. Laura Crane

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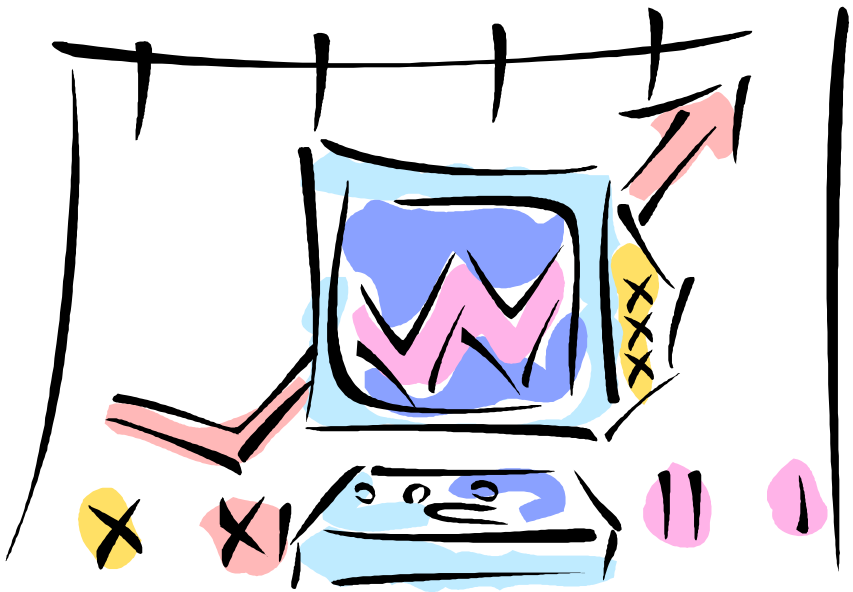
Three Types of Projections

- Institutional
  - FTE
  - Head count
- Prefix
  - FTE
  - Seat count
- Student demographic

Preliminaries



Before discussing Prefix Projections we have a brief discussion of the statistical model used.

Institutional FTE Projection will be shown to illustrate the model.

Statistical Model for End of Semester Projections

- Autoregressive Integrated Moving Average, or ARIMA is the model currently used for end of semester projections.
- ARIMA modeling provides confidence intervals for projected values.
- ARIMA modeling allows for projections that incorporate trend, seasonality, and cycles.

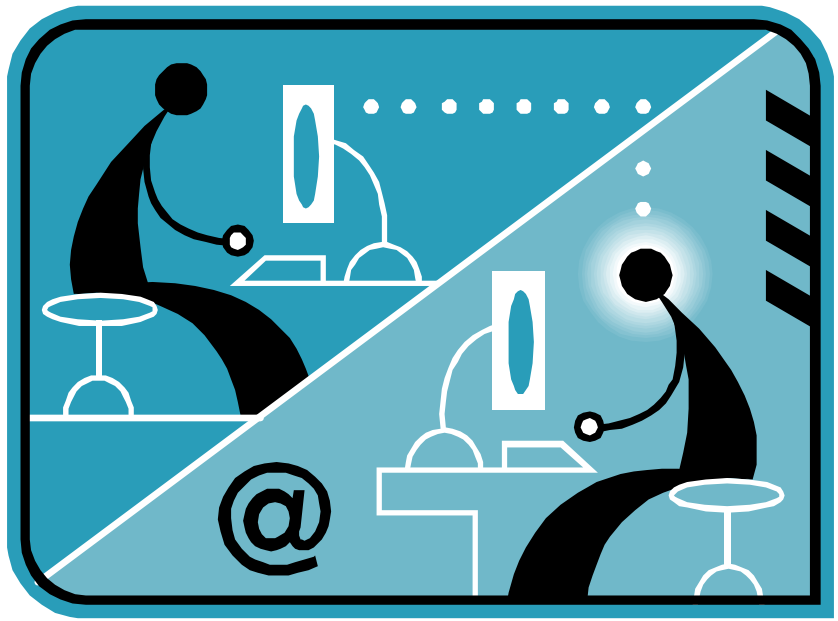
Definitions

- Trend: steady increase (or decrease) over time.
- Seasonality: regular change in data values occurring at the same time in a particular period. Example – Summer FTE drop compared to Fall.
- Cycle: long-term patterns of rising and falling data values over time.

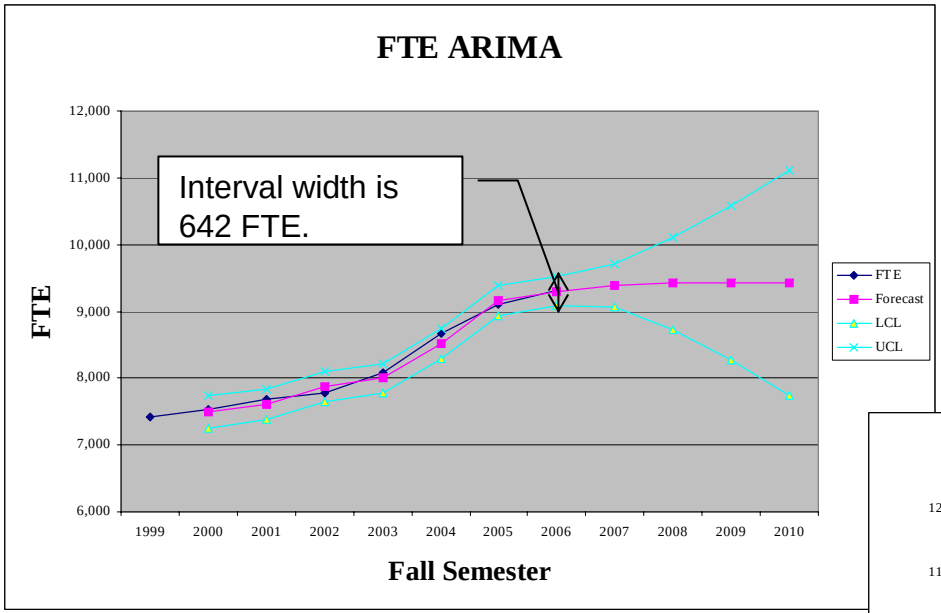
Building an ARIMA Forecasting Model

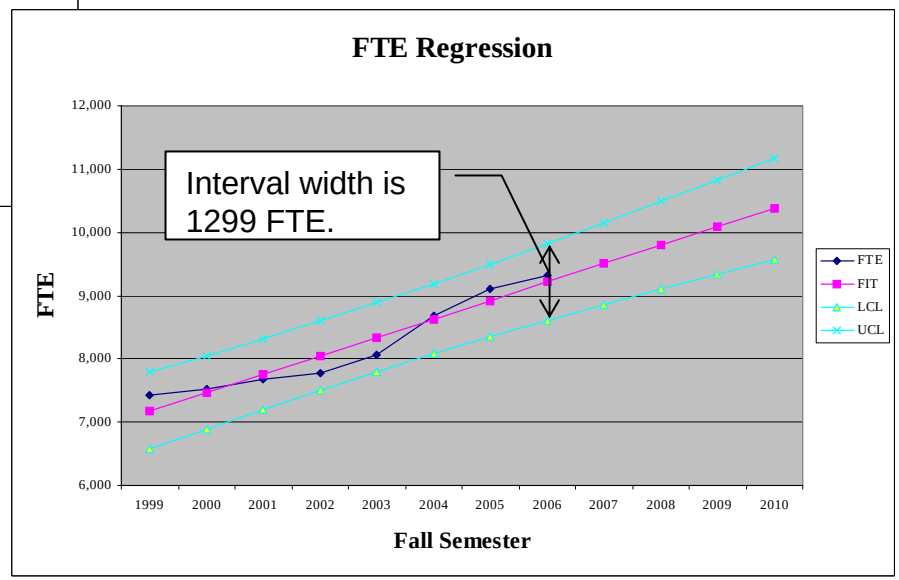
ARIMA models are built in two phases:

- Identification phase
  - "Remove" trend component(s).
  - Determine autoregressive (lag) component.
  - Set seasonal and non-seasonal parameters.
  - Build model and test for "accuracy" using existing data.
- Forecasting phase
  - Project future cycles using model developed from the identification phase.

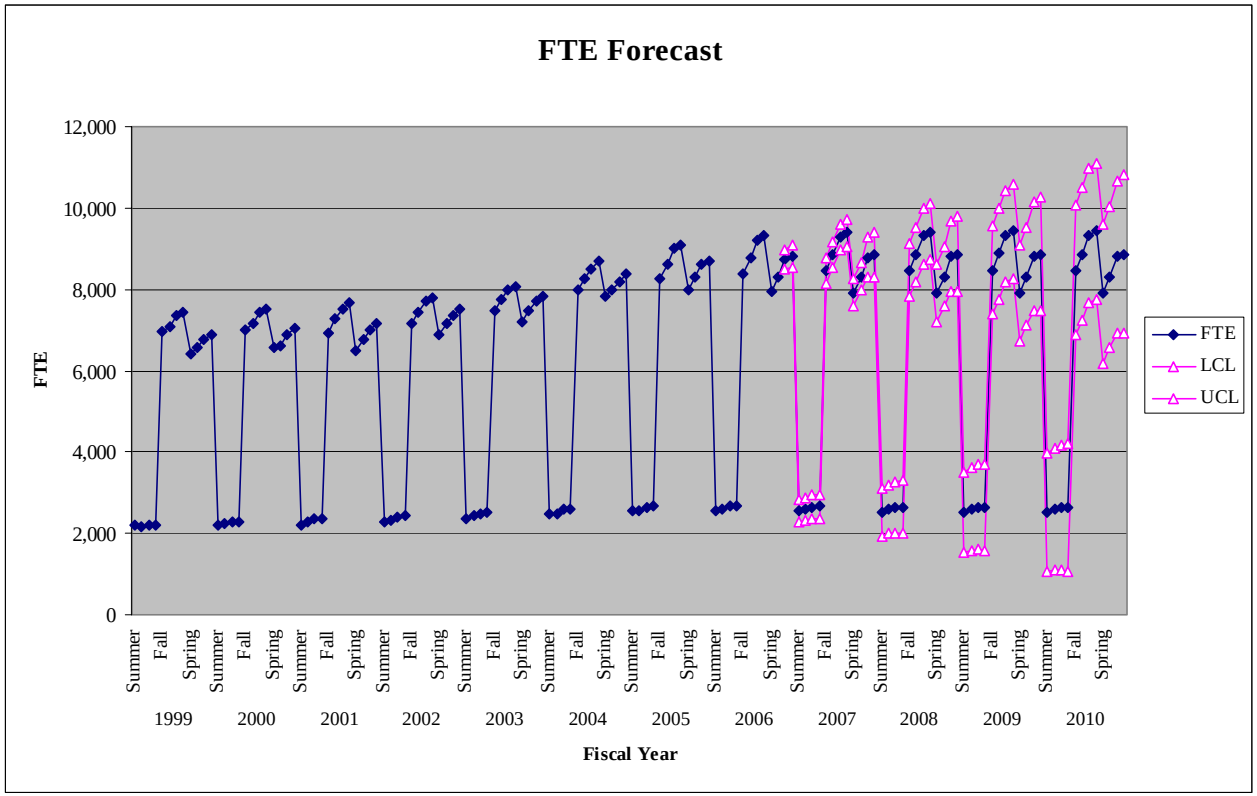


ARIMA Compared to Linear Regression





End of Semester FTE Projections



- Done after final fall enrollment counts reported (February) and after final spring enrollment counts reported (August).
- Uses four points reported by Enrollment Services each semester (first day of classes, 10th-day, midterm, and end of semester).

Detail for Most Recent End of Semester FTE Projections

Fiscal Year	Semester	Projected FTE	Lower Confidence Limit (LCL)	Upper Confidence Limit (UCL)	Difference/2 (UCL - LCL)/2	+ or - %
2007	Summer	2545.3	2266.7	2823.8	278.5	10.9%
		2657.4	2356.5	2958.3	300.9	11.3%
	Fall	8449.8	8143.5	8756.1	306.3	3.6%
		9389.2	9068.1	9710.3	**321.1**	**3.4%**
	Spring	7922.5	7596.7	8248.3	325.8	4.1%
		8852.0	8296.4	9407.6	555.6	6.3%
2008	Summer	2533.8	1947.5	3120.2	586.3	23.1%
		2651.4	2011.6	3291.2	639.8	24.1%
	Fall	8467.3	7813.2	9121.3	654.1	7.7%
		9418.0	8724.2	10111.8	**693.8**	**7.4%**
	Spring	7909.9	7203.5	8616.4	706.5	8.9%
		8865.4	7929.4	9801.5	936.1	10.6%
2009	Summer	2525.3	1547.9	3502.6	977.3	38.7%
		2645.1	1585.2	3705.0	1059.9	40.1%
	Fall	8470.6	7387.4	9553.7	1083.2	12.8%
		9426.0	8277.2	10574.8	**1148.8**	**12.2%**
	Spring	7900.9	6731.1	9070.6	1169.7	14.8%
		8867.1	7465.7	10268.5	1401.4	15.8%
2010	Summer	2517.9	1067.2	3968.5	1450.7	57.6%
		2638.6	1080.3	4196.9	1558.3	59.1%
	Fall	8468.1	6878.4	10057.8	1589.7	18.8%
		9425.5	7746.4	11104.6	**1679.1**	**17.8%**
	Spring	7893.3	6185.5	9601.0	1707.7	21.6%
		8863.9	6920.0	10807.9	1943.9	21.9%

Note: 10th-day and midterm data points are not shown in the table.

- Projected FTE in blue are end of fall semester projections.
  - Difference/2 column can be used to express the confidence interval.
  - + or -% column can be used to express confidence interval as well.
- Note + or - % gets larger the further the projections are extended.

Forecast Accuracy

		May 5, 2005 (9th forecasted data point)		
Fall 2005 End of Semester	Actual	Forecast	+ or - %	Actual % difference from forecast
Headcount	16,260	16,533	2.7%	1.7%
FTE	9,310	9,517	6.2%	2.2%
		Nov. 1, 2004 (14th forecasted data point)		
Fall 2005 End of Semester	Actual	Forecast	+ or - %	Actual % difference from forcast
Headcount	16,260	16,896	5.2%	3.8%
FTE	9,310	9,454	9.0%	1.2%

The actual percent differences between actual end of semester values and forecasted values are well within the confidence intervals provided with the estimates.

Where to Find Institutional Semester Projections

- Institutional FTE and Headcount projections may be found on the Office of Research Web page.

- http://hip/strall/OffResearch/projections.pdf

Prefix Level Semester Projections

- ARIMA methodology still used.
- Presentation of projections is interactive. (This means pivot tables like the grade distributions.)
- Why prefix and not program projections?

- Accuracy of student program – program of record is what student wants, not necessarily what student is studying.

- Small programs are difficult to project accurately.

Interactive Prefix Level Semester Projections

- View of pivot tables (demonstration).
- Posted on Office of Research Web page

  http://hip/strall/OffResearch/prefix.xls

Interactive Student Demographic Semester Projections

- View of pivot tables (demonstration).
- Posted on Office of Research Web page

  http://hip/strall/OffResearch/demo.XLS

Schedule of Posting to Web

- Institutional projections – posted February and August (http://hip/strall/OffResearch/projections.pdf)
- Prefix projections – posted March and September (http://hip/strall/OffResearch/prefix.xls)
- Student demographic projections – posted June (http://hip/strall/OffResearch/demo.XLS)

Caveats

- Projected numbers are guides and should **not** be used too far in the future.
- Reported numbers should not be used as official enrollment numbers. Official numbers come from Enrollment Services.

- Division numbers reflect current prefix assignment and “actuals” could change from year-to-year.
  - BIO example
  - CIS example
- Use of projections is at the prefix, not division, level for planning purposes.

Putting Prefix Projections into Context

- Projections one aspect to consider in strategic planning.
- For discussion purposes, one analysis of prefix projection data considers projected increase.
  - Consider projected increase within three size classifications.
  - View an excel spreadsheet created from prefix projection data.

Questions?