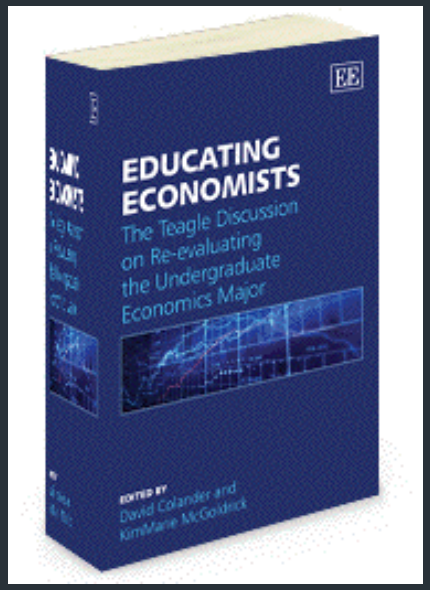
Quantitative Reasoning in the Social Sciences

Diego Mendez-Carbajo
Illinois Wesleyan University, Economics Department
October 2014

Outline

- Introduction
- Problem
- Response
- Hands-on Examples
- Conclusions

Student Learning Goals



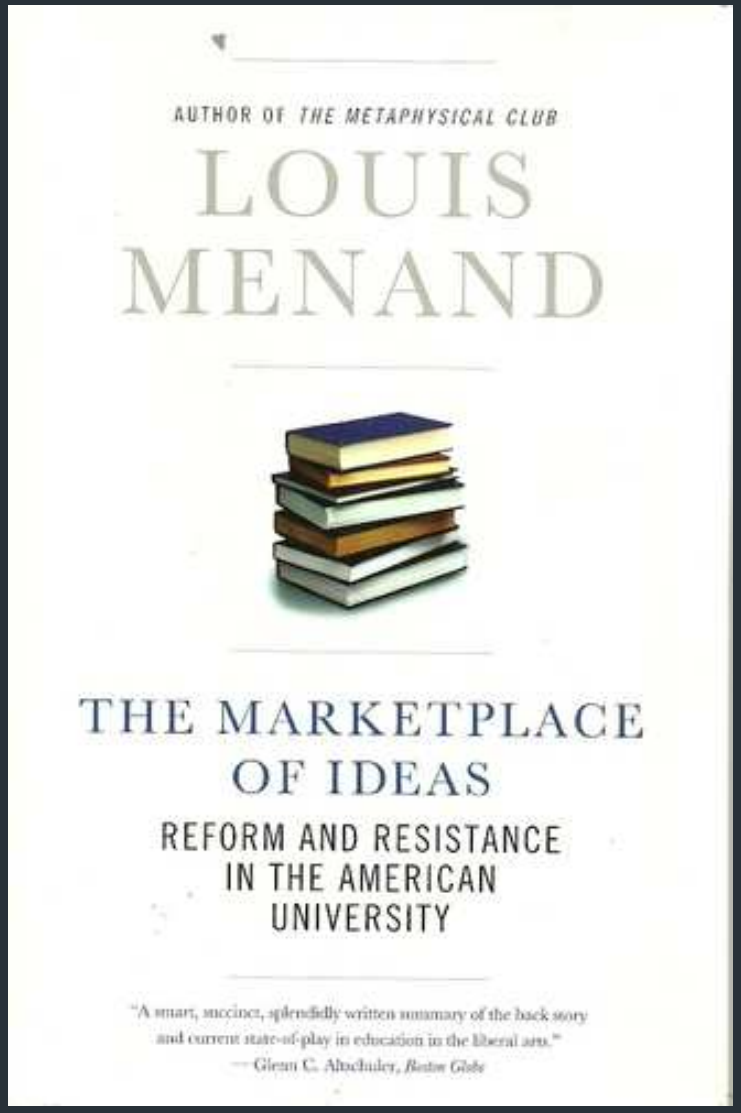
"Thinking like an economist"

Siegfried, J., Bartlett, R., Hansen, L., (1991), The Status and Prospects of the Economics Major. Journal of Economic Education Vol. 251, No. 3, pp. 197-224

Problem

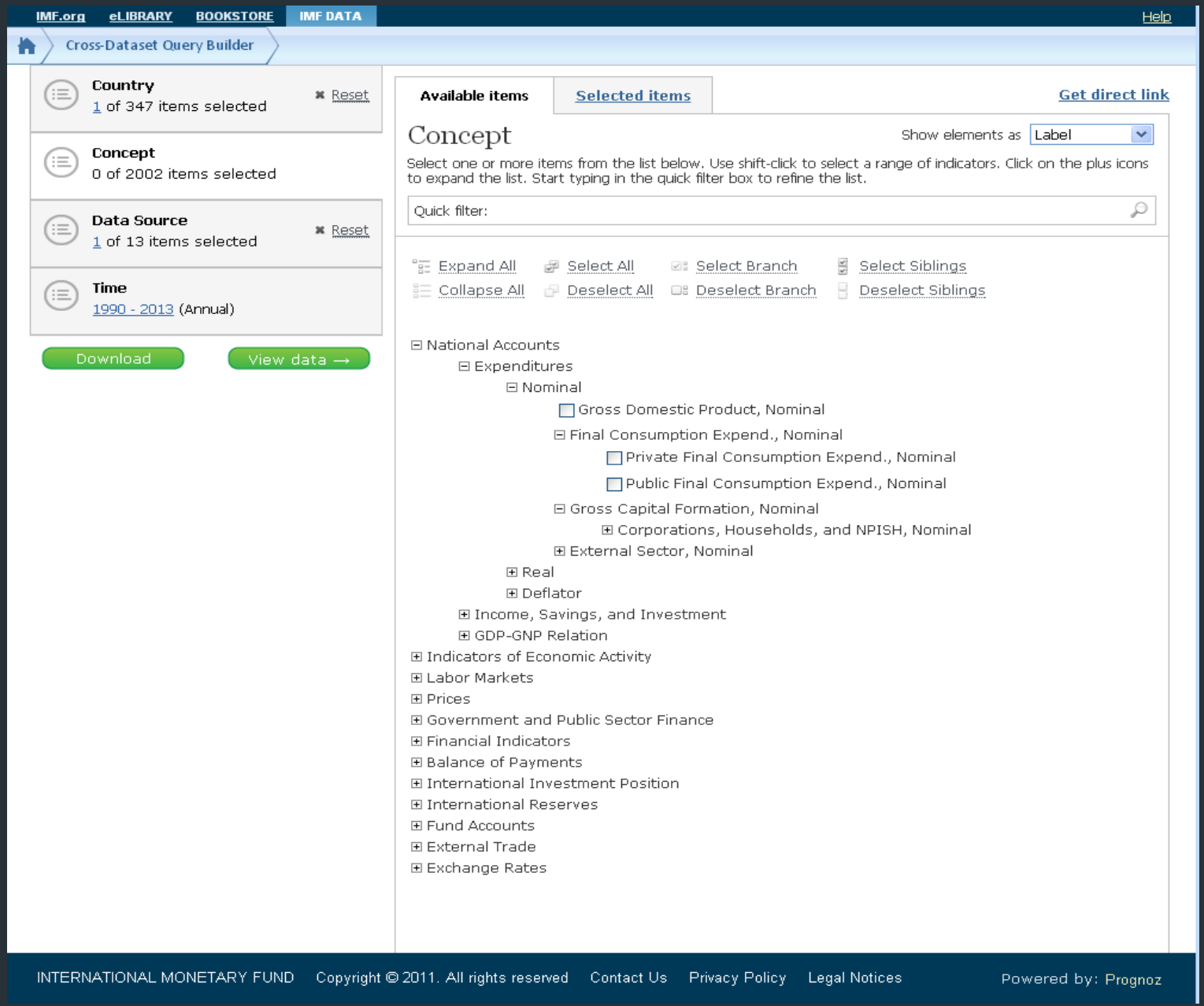
Standard Curriculum

- Sequencing the Curriculum
  - Introductory course (x2)
  - Intermediate theory course (x2)
  - Upper division elective courses
  - Methods course
  - Capstone experience

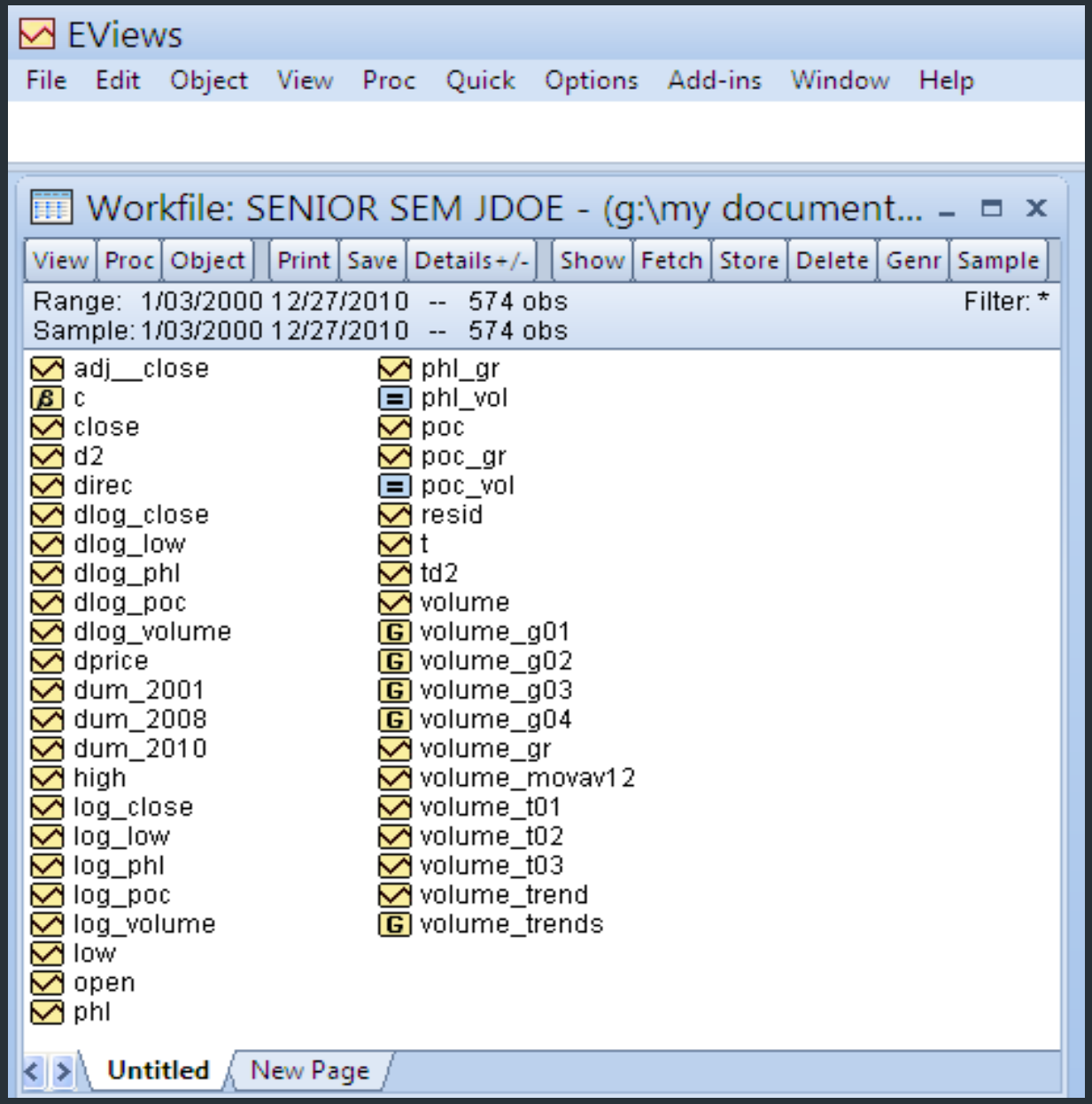


Menand, L. (2001 and 2010) *The Marketplace of Ideas: Reform and Resistance in the American University.* W. W. Norton & Company, NY.

Traditional View of Data



Traditional Work with Data



Weak Output

Data Description

	Unemployment	Interest rates	Growth Rate	Exp/GDP	FDI/GDP
Estonia	33.219(.957)	6.710(.473)	-2.830(.125)	5.424(.377)	.465(-.017)
Latvia	-1.765(.041)	.310(-.019)	-2.559(.102)	16.891(.858)	-.371(-.018)
Lithuania	23.355(.917)	9.518(.646)	-1.845(.048)	2.776(.123)	1.367(.017)

Data Analysis

Model 2: Top 5% income share:

Variable	**Unstandardized Coefficient**	**Significance Level**
Lagged top 5% income share	.842	.000***
Top marginal tax rate	-.013	.047**
GDP Growth	-.006	.868
GDP (2000$)	2.455E-013	.074*
Export + Imports	.018	.105
Private credit	.002	.535
R square: .96		
Level of significance: *** 1% , ** 5% , * 10%		

Student Work Suffers

Scores by Student Learning Goal and Subheading
***N* = 22**

Subheading	Area	Assessment	Average Score	S.D.
3.1	Literature Review		5.05	1.21
3.2	Use of Theories		5.11	1.31
3.3	Empirical Methods	*Strong*	5.59	1.33
3.4	Figures and Tables		4.91	1.51
3.5	Interpretation		4.68	1.49
4.1	Organization		5.41	1.26
4.2	Oral Skills	*Strong*	N.A.	N.A.
4.3	Writing Skills		5.64	1.29
5.1	Research Question		5.45	1.41
5.2a	Mastery of Data	*Strong*	5.30	1.53
5.2b	Mastery of Methods		5.36	1.29
5.3	Conclusions		4.32	1.32

Response

The Activity

- Quantitative case studies
  - Data collection and analysis guided through discussion questions
  - Topics related to theoretical concepts and theories

Theoretical Foundation

- Bloom's (1956) educational taxomomy
- Easton (1983) and Erskin *et al.* (1998) case method teaching pedagogy

Information Literacy Strategy

- Goad (2002):
  - Formulating a question
  - Pinpointing what you want to know
  - Organizing information
  - Planning a search
  - Evaluating the materials

Information Literacy Goals

- Shapiro and Hughes (1996):
  - Tool literacy
  - Resource literacy
  - Social-structure literacy
  - Research literacy
  - Publishing literacy
  - Emerging technology literacy
  - Critical literacy

Hands-On Example (I)

Money & Banking Topics (I)

- Stock Prices
- Bond Prices
  - Corporate Bond Risk Premium
  - Inflation Expectations
  - Nominal vs Real Interest Rates
- Interest Rates
  - The Term Spread
  - Sovereign Debt Risk Premiums

Money & Banking Topics (and II)

- Exchange Rates
  - Nominal vs. Real Exchange Rates
  - PPP Theory of ER Determination
- Financial Derivatives
  - The Interest Rate Swap Spread

Setup – Information Session

Setup – Theoretical Concept

- The Fisher Equation: $i = r + \pi$
  - i, nominal interest rate
  - r, real interest rate
  - π, inflation rate

    - It follows: $r = i - \pi$

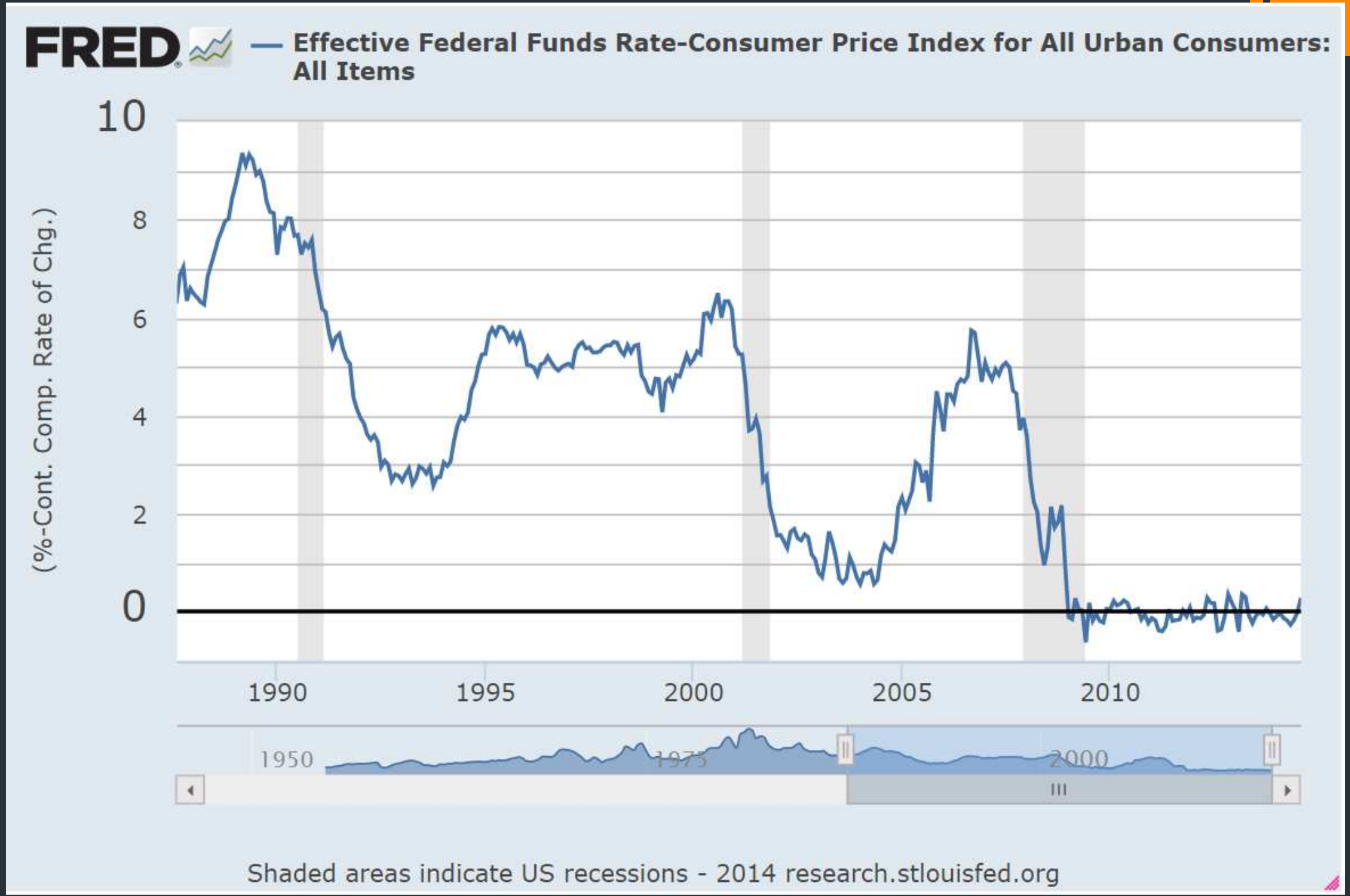
Fisher I. 1930. *The Theory of Interest*. New York: A. M. Kelly

Setup – FRED Database

- https://research.stlouisfed.org/fred2/
  - Graph: FEDFUNDS
  - Add Data Series > Modify Existing Series
  - Type: CPI
  - Units: Continuously Compounded Rate of Change
  - Create Your Own Data Transformation:

    Formula : a-b > Apply

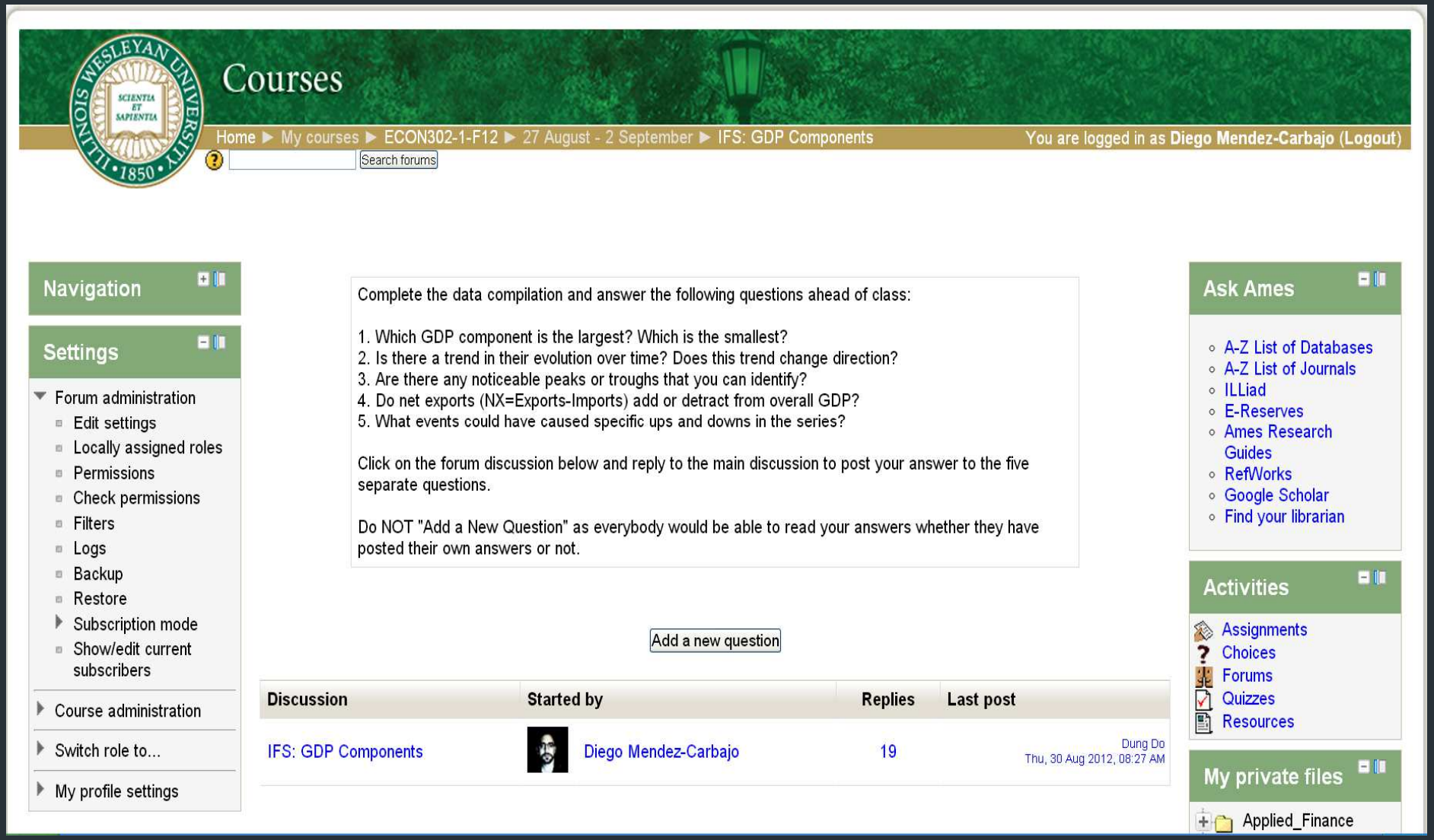

FRED
Effective Federal Funds Rate-Consumer Price Index for All Urban Consumers: All Items
(%-Cont. Comp. Rate of Chg.)
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
1960
1970
1980
1990
2000
2010
1950
1975
2000
Shaded areas indicate US recessions - 2014 research.stlouisfed.org


FRED
Effective Federal Funds Rate-Consumer Price Index for All Urban Consumers: All Items
(%-Cont. Comp. Rate of Chg.)
10
8
6
4
2
0
1990
1995
2000
2005
2010
1950
1975
2000
Shaded areas indicate US recessions - 2014 research.stlouisfed.org

Setup – Discussion Questions

- Real Interest Rates
  - How does the real Federal Funds rate change in value during expansions? Why?
  - How does the real Federal Funds rate change in value during contractions? Why?
  - What does a negative real Federal Funds rate *mean*?

Setup – Discussion Questions



Setup – Class Discussion

Hands-On Example (II)

Setup – Information Session

Intermediate Macro Topics (I)

- GDP Components
- Uses of Saving Identity
- Productivity and Unemployment
- Growth and Productivity
- Money Supply and Inflation
- Real Interest Rates
- The Phillips Curve

Setup – Theoretical Concept

- The Phillips Curve: $\pi = f(u)$
  - π, inflation rate
  - u, unemployment rate

Phillips (1958). “The Relation Between Unemployment and the Rate of Change of Money Wages in the United Kingdom, 1861-1957” Economica 25(100), pp. 283-99.

Samuelson and Solow (1960). “Analytical Aspects of Anti-Inflation Policy” American Economic Review Papers and Proceedings 50(2), pp. 177-94.

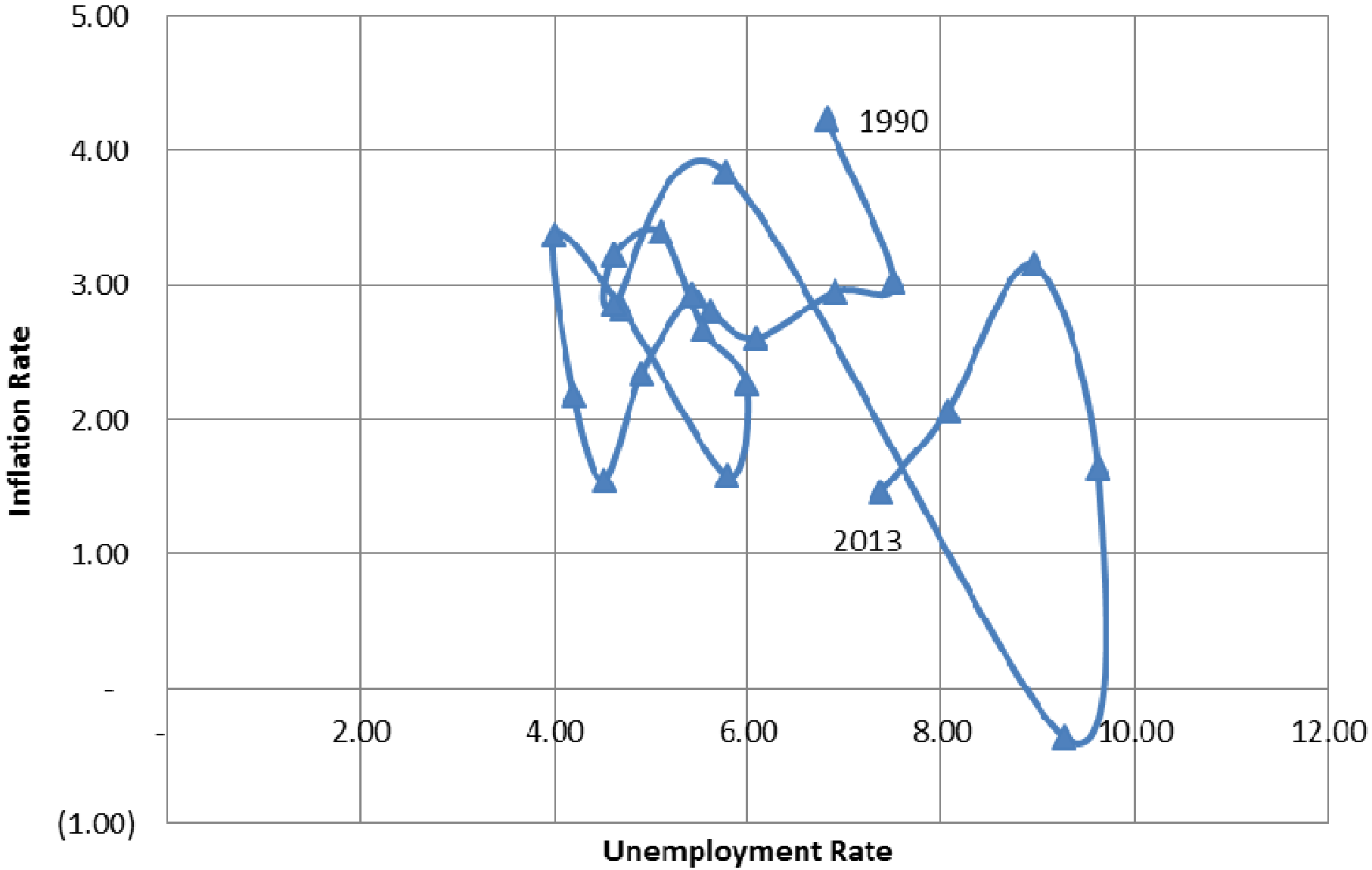
Setup – FRED Database

- https://research.stlouisfed.org/fred2/
  - Graph: UNRATE
  - Select dates: 1990-01-01 / 2014-01-01
  - Frequency: Annual
  - Add New Series > CPI
  - Units: Continuously Compounded Rate of Change
  - Download Data > Open *fedgraph.xls*

Setup – MS Excel

- Open fedgraph.xls
  - Select: data under UNRATE and CPIAUCSL_CCH
  - Insert > Charts > Scatter (with line)

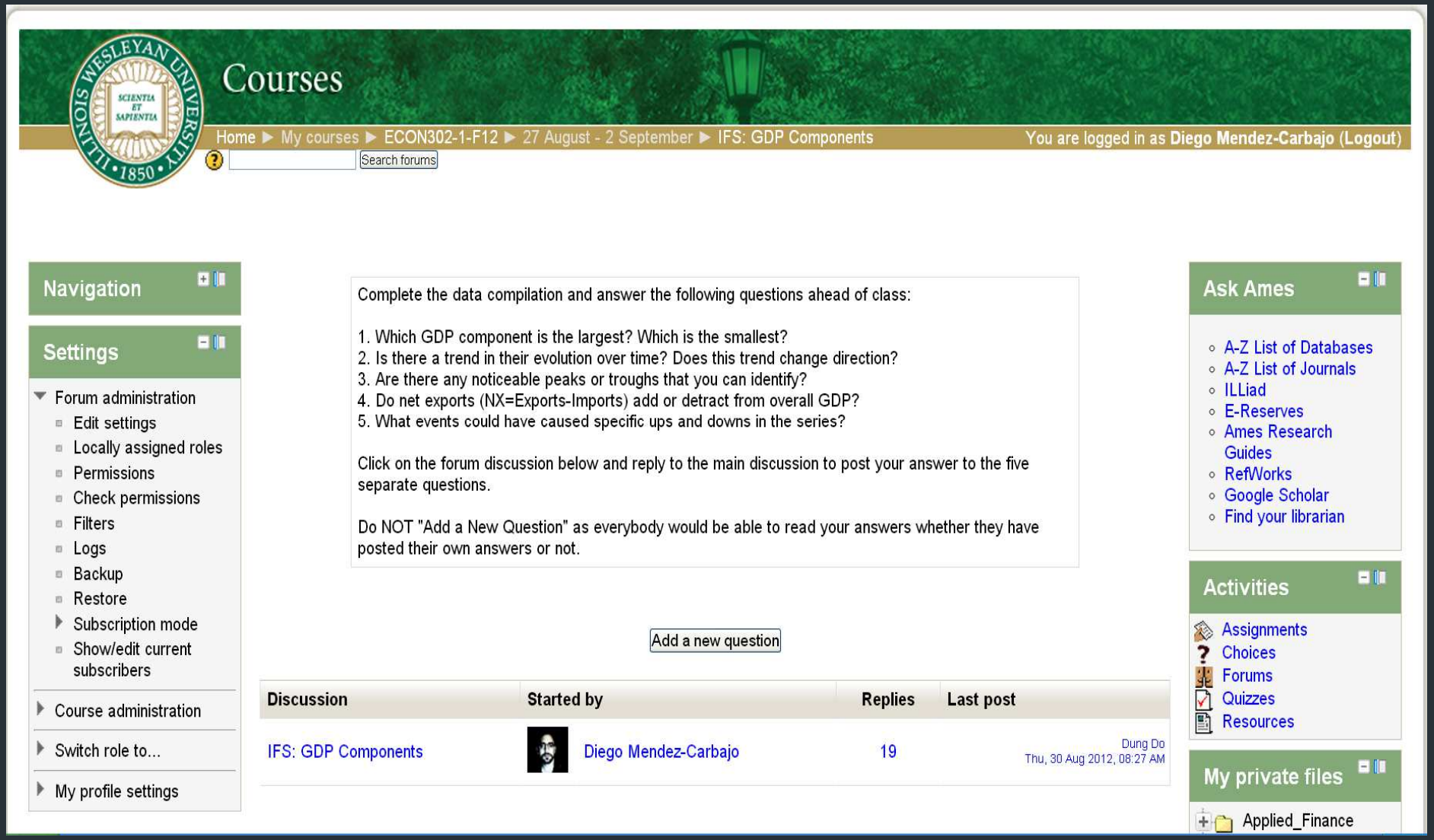
USA Phillips Curve



Setup – Discussion Questions

- The Phillips Curve
  - What is, generally speaking, the slope of the spaghetti line connecting all the data?
  - For which years does the Phillips Curve seem to "hold true"?
  - Why would the Phillips Curve *shift*?
  - What is the *natural rate of unemployment*?

Setup – Discussion Questions



Setup – Class Discussion

Additional Pedagogical Resources

Starting Point:
Teaching and Learning Economics

http://serc.carleton.edu/econ/index.html

Conclusions

Design Strategies

- Identify “quantifiable” topics
- Create out-of-class data retrieval and analysis exercises
- Involve librarians
- Create discussion questions based on the data
- Organize in-class open-ended discussions of student work

Student Reflections

- *"I feel using real data to help support economic theories was extremely useful"*
- *"Learning how to analyze graphs and data and how to properly interpret that data were valuable skills to learn"*
- *"I have a better perspective on actual Economics, I feel better informed"*

Instructor Reflections

- Student thinking becomes more sophisticated and context-rich
- More fluid application of economic theories and concepts
- More critical assessment of theories
- Topics and research ideas carry on to the capstone course

Thank You.
Questions?