Economics 101A (Lecture 1)

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January 20, 2014

Outline

- 1. Who are we?
- 2. Prerequisites for the course
- 3. A test in maths
- 4. The economics of discrimination
- 5. Optimization with 1 variable

1 Who are we?

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- Professor of Economics
- Bocconi (Italy) undergraduate (Econ.), Harvard PhD (Econ.)
- Psychology and Economics, Economics of Media, Behavioral Finance
- Evans 515, OH Tu 11-1

Anne Karing (2 Sections)

- Graduate Student, Department of Economics
- Psychology and Economics
- Office Hours: Tu 1-2, Th 1-2

Ivan Balbuzanov (1 Section)

- Graduate Student, Department of Economics
- Economic Theory
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2 Prerequisites

- Mathematics
 - Good knowledge of multivariate calculus Maths
 1A or 1B and 53
 - Basic knowledge of probability theory and matrix algebra

- Economics
 - Knowledge of fundamentals Ec1 or 2 or 3
 - High interest!

3 A Test in Maths

- 1. Can you differentiate the following functions with respect to x?
 - (a) $y = \exp(x)$

(b)
$$y = a + bx + cx^2$$

(c)
$$y = \frac{\exp(x)}{b^x}$$

- 2. Can you partially differentiate these functions with respect to x and w?
 - (a) $y = axw + bx c\frac{x}{w} + d\sqrt{xw}$
 - (b) $y = \exp(x/w)$
 - (c) $y = \int_0^1 (x + aw^2 + xs) ds$

3. Can you plot the following functions of one variable?

(a)
$$y = \exp(x)$$

(b)
$$y = -x^2$$

(c)
$$y = \exp(-x^2)$$

4. Are the following functions concave, convex or neither?

(a)
$$y = x^3$$

(b)
$$y = -\exp(x)$$

(c) $y = x^{.5}y^{.5}$ for x > 0, y > 0

- 5. Consider an urn with 20 red and 40 black balls?
 - (a) What is the probability of drawing a red ball?
 - (b) What is the probability of drawing a black ball?

6. What is the determinant of the following matrices?

(a)
$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

(b) $A = \begin{bmatrix} 10 & 10 \\ 20 & 20 \end{bmatrix}$

4 The economics of discrimination

- What do economists know about discrimination?
 - Model of discrimination in workplace (inspired by Becker, *Economics of Discrimination*, 1957)
- Workers:
 - -A and B. They produce 1 widget per day
 - Both have reservation wage $ar{u}$
- Firm:
 - sells widgets at price $p > \overline{u}$ (assume p given)
 - dislikes worker B
 - Maximizes profits (p* no of widgets cost of labor) disutility d if employs B

- Wages and employment in this industry?
- Employment
 - Net surplus from employing $A:\ p-\bar{u}$
 - Net surplus from employing $B{:}~p-\bar{u}-d$
 - If $\bar{u} , Firm employs <math>A$ but not B
 - If $\bar{u} + d < p$, Firm employs both

• What about wages?

- Case I. Firm monopolist/monopsonist and no union
 - Firm maximizes profits and gets all the net surplus
 - Wages of A and B equal \bar{u}
- Case II. Firm monopolist/monopsonist and union
 - Firm and worker get half of the net surplus each

- Wage of A equals
$$\overline{u} + .5 * (p - \overline{u})$$

- Wage of B equals $\bar{u} + .5 * (p \bar{u} d)$
- Case III. Perfect competition among firms that discriminate (d > 0)
 - Prices are lowered to the cost of production
 - Wage of A equals $p \ (= \bar{u})$
 - -B is not employed

- The magic of competition
- Case IIIb. Perfect competition + At least one firm does not discriminate (d = 0)
 - This firm offers wage p to both workers
 - What happens to worker B?
 - She goes to the firm with d = 0!
 - In equilibrium now:
 - \ast Wage of A equals p
 - * Wage of B equals p as well!
- Competition eliminates the pay and employment differential between men and women

- Is this true? Any evidence?
- S. Black and P. Strahan, *American Economic Review*, 2001.
 - Local monopolies in banking industry until mid
 70s
 - Mid 70s: deregulation
 - From local monopolies to perfect competition.
 - Wages?
 - * Wages fall by 6.1 percent
 - Discrimination?
 - * Wages fall by 12.5 percent for men
 - * Wages fall by 2.9 percent for women
 - Employment of women as managers increases by 10 percent

	Simple sp	pecifications	Specifications with unit banking interactions	
Post-M&A branching deregulation	-0.061* (0.011)	_	-0.051^{*} (0.014)	
Post-interstate banking	-0.0002 (0.015)	-0.002 (0.015)	-0.0001 (0.015)	-0.002 (0.017)
Branching deregulation index	_	-0.030*	_	-0.022*
Unit banking*post-M&A branching deregulation	_	_	-0.018 (0.016)	
Unit banking*branching deregulation index	_	_	_	-0.018* (0.007)
Ν	809,367	790,565	809,367	790,565
$F(H_0: \text{ all regulatory variables} = 0)$	14.1*	13.1*	9.6*	10.5*
R^2	0.38	0.38	0.38	0.38

TABLE 4-THE MARGINAL IMPACT OF DEREGULATION ON THE WAGES OF BANKING EMPLOYEES (CPS DATA)

Notes: Standard errors are in parentheses. The dependent variable equals the log weekly wage for all full-time employees in the March Current Population Survey (CPS). The log wage equation also allows for time-varying returns to worker

TABLE 5—THE MARGINAL IMPACT OF DEREGULATION ON THE WAGES OF BANKING EMPLOYEES DIFFERENTIAL EFFECTS FOR MEN AND WOMEN (CPS DATA)

	Fema	les only	Males only	
Post-M&A branching deregulation	-0.029* (0.012)	_	-0.125^{*} (0.024)	_
Post-interstate banking	0.012	0.009	-0.026 (0.027)	-0.027 (0.029)
Branching deregulation index	_	-0.017*	_	-0.056*
N F (H_0 : all regulatory variables = 0) R^2	336,121 3.42* 0.28	328,208 4.23* 0.28	473,246 14.33* 0.34	462,357 10.14* 0.34

Notes: Standard errors are in parentheses. The dependent variable equals the log weekly wage for all male or female full-time employees in the March Current Population Survey (CPS). The log wage equation also allows for time-varying

- Summary: Competition is not great for workers (wages go down)
- BUT: Drives away the gender gap

- More evidence on discrimination: Does black-white and male-female wage back derive from discrimination?
- Field experiment (Bertrand and Mullainathan, American Economic Review, 2004)
- Send real CV with randomly picked names:
 - Male/Female
 - White/African American

Appendix Table 1 First Names Used in Experiment ^a					
White Female		African American Female			
Name	$\frac{L(W)}{L(B)}$	Perception White	Name	$\frac{L(B)}{L(W)}$	Perception Black
Allison	∞	0.926	Aisha	209	0.97
Anne	∞	0.962	Ebony	∞	0.9
Carrie	∞	0.923	Keisha	116	0.93
Emily	∞	0.925	Kenya	∞	0.967
Jill	∞	0.889	Lakisha	∞	0.967
Laurie	∞	0.963	Latonya	∞	1
Kristen	∞	0.963	Latoya	∞	1
Meredith	∞	0.926	Tamika	284	1
Sarah	∞	0.852	Tanisha	∞	1

- Measure call-back rate from interview
 - Results (Table 1):
 - * Call-back rates 50 percent higher for Whites!
 - * No effect for Male-Female call back rates

	Callback Rate for White Names	Callback Rate for African American Names	Ratio	Difference (p-value)
Sample:				
All sent resumes	9.65 % [2435]	6.45% [2435]	1.50	3.20% (0.0000)
Chicago	8.06% [1352]	5.40 % [1352]	1.49	2.66% (0.0057)
Boston	11.63 % [1083]	7.76% [1083]	1.50	4.05% (0.0023)
Females	9.89 % [1860]	6.63 % [1886]	1.49	3.26% (0.0003)
Females in administrative jobs	10.46 % [1358]	6.55% [1359]	1.60	3.91% (0.0003)
Females in sales jobs	8.37% [502]	6.83% [527]	1.22	1.54% (0.3523)
Males	8.87% [575]	5.83% [549]	1.52	3.04% (0.0513)

^aNotes:

Column 4 also reports the p-value for a test of proportion testing the null hypothesis that the callback rates are equal across racial groups.

^{1.} The table reports, for the entire sample and different subsamples of sent resumes, the callback rates for applicants with a White sounding name (column 1) and an African American sounding name (column 2), as well as the ratio (column 3) and difference (column 4) of these callback rates. In brackets in each cell is the number of resumes sent in that cell.

- Strong evidence of discrimination against African Americans
 - Did Obama change this? Interesting question
- Example of Applied Microeconomics
 - Not covered in this class: See Ec140-141-142 (Econometrics and Applied Metrics) and 131 (Public), 157 (Health), and 172 (Development)
 - Also: URAP Get involved in a professor's research
 - If curious: read Steven Levitt and Stephen Dubner, *Freakonomics*
- At end of semester, more examples

5 Optimization with 1 variable

- Nicholson, Ch.2, pp. 20-23
- Example. Function $y = -x^2$
- What is the maximum?

- Maximum is at 0
- General method?

- Sure! Use derivatives
- Derivative is slope of the function at a point:

$$\frac{\partial f(x)}{\partial x} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

• Necessary condition for maximum x^* is

$$\frac{\partial f(x^*)}{\partial x} = 0 \tag{1}$$

• Try with $y = -x^2$.

•
$$\frac{\partial f(x)}{\partial x} = 0 \Longrightarrow x^* =$$

- Does this guarantee a maximum? No!
- Consider the function $y = x^3$

•
$$\frac{\partial f(x)}{\partial x} = 0 \Longrightarrow x^* =$$

• Plot
$$y = x^3$$
.

• Sufficient condition for a (local) maximum:

$$\frac{\partial f(x^*)}{\partial x} = 0 \text{ and } \left. \frac{\partial^2 f(x)}{\partial^2 x} \right|_{x^*} < 0 \qquad (2)$$

- Proof: At a maximum, $f(x^* + h) f(x^*) < 0$ for all h.
- Taylor Rule: $f(x^*+h) f(x^*) = \frac{\partial f(x^*)}{\partial x}h + \frac{1}{2}\frac{\partial^2 f(x^*)}{\partial^2 x}h^2 + higher order terms.$

• Notice:
$$\frac{\partial f(x^*)}{\partial x} = 0.$$

•
$$f(x^* + h) - f(x^*) < 0$$
 for all $h \Longrightarrow \frac{\partial^2 f(x^*)}{\partial^2 x} h^2 < 0$
 $0 \Longrightarrow \frac{\partial^2 f(x^*)}{\partial^2 x} < 0$

• Careful: Maximum may not exist: $y = \exp(x)$

• Tricky examples:

– Minimum.
$$y = x^2$$

- No maximum.
$$y = \exp(x)$$
 for $x \in (-\infty, +\infty)$

- Corner solution.
$$y = x$$
 for $x \in [0, 1]$

6 Next Class

- Multivariate Maximization
- Comparative Statics
- Implicit Function Theorem
- Envelope Theorem

- Going toward:
 - Preferences
 - Utility Maximization (where we get to apply maximization techniques the first time)