Economics preparatory readings and exercises for the summer

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Dear PPE and HECO students,

Welcome to Somerville and congratulations on your offer!

Please find below the reading list and the mathematics exercises that we would like you to go through over the summer. The reading list part gives you some references that you can explore based on your interests, to help you for the tutorials and essays. It is suggested that you (1) read at least three journal articles and (2) go over <u>Chapter 1</u> and <u>Chapter 2</u> of the CORE Economics textbook and (3) *optional* read at least one of the "Popular" books. Please note that the popular books are not 'required' reading and you do not have to purchase these books. Readings from the journal and the CORE textbook are freely available and we will discuss both units and two readings at the beginning of the year.

The mathematics part summarises the main mathematics concepts that you should have seen by the end of your A-levels (or equivalent study). We will build on them in your first year. The exercises should help you identify what are your strengths and weaknesses, so please use the summer break to work through them and bridge any gap you may have in your knowledge. This will allow you to start the year on solid mathematical foundations and will free more time for you to focus on the new economics concepts that we will introduce in our weekly tutorials, rather than struggle with calculations. If you would like to submit these assignments, you can write down the solutions and hand them in for feedback when we meet in October.

Best wishes,

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¹ I would like to thank Juliette Caucheteux for developing most of this material.

1. Suggested Readings in Economics

1.1 Journal Articles

Prendergast, Canice. 2017. "How Food Banks Use Markets to Feed the Poor." Journal of Economic Perspectives 31 (4): 145–62.

https://www.aeaweb.org/articles?id=10.1257/jep.31.4.145

- Oates, Wallace E., and Robert M. Schwab. 2015. "The Window Tax: A Case Study in Excess Burden." *Journal of Economic Perspectives* 29 (1): 163–80. https://www.aeaweb.org/articles?id=10.1257/jep.29.1.163
- Dragusanu, Raluca, Daniele Giovannucci, and Nathan Nunn. 2014. "The Economics of Fair Trade." *Journal of Economic Perspectives* 28 (3): 217–36. https://www.aeaweb.org/articles?id=10.1257/jep.28.3.217
- Slonim, Robert, Carmen Wang, and Ellen Garbarino. 2014. "The Market for Blood." *Journal of Economic Perspectives* 28 (2): 177–96. https://www.aeaweb.org/articles?id=10.1257/jep.28.2.177
- Bernanke, Ben S. 2013. "A Century of US Central Banking: Goals, Frameworks, Accountability." *Journal of Economic Perspectives* 27 (4): 3–16. https://www.aeaweb.org/articles?id=10.1257/jep.27.4.3
- Sandel, Michael J. 2013. "Market Reasoning as Moral Reasoning: Why Economists Should Re-engage with Political Philosophy." *Journal of Economic Perspectives* 27 (4): 121–40. https://www.aeaweb.org/articles?id=10.1257/jep.27.4.121
- Mankiw, N. Gregory. 2013. "Defending the One Percent." *Journal of Economic Perspectives* 27 (3): 21–34. <u>https://www.aeaweb.org/articles?id=10.1257/JEP.27.3.21</u>
- Auerbach, Alan J., William G. Gale, and Benjamin H. Harris. 2010. "Activist Fiscal Policy." *Journal of Economic Perspectives* 24 (4): 141–64. https://www.aeaweb.org/articles?id=10.1257/jep.24.4.141
- Moore, Tyler, Richard Clayton, and Ross Anderson. 2009. "The Economics of Online Crime." *Journal of Economic Perspectives* 23 (3): 3–20.
- https://www.aeaweb.org/articles?id=10.1257/jep.23.3.3
- Backhouse, Roger E., and Steven G. Medema. 2009. "Retrospectives: On the Definition of Economics." *Journal of Economic Perspectives* 23 (1): 221–33. https://www.aeaweb.org/articles?id=10.1257/jep.23.1.221
- Leape, Jonathan. 2006. "The London Congestion Charge." *Journal of Economic Perspectives* 20 (4): 157–76. <u>https://www.aeaweb.org/articles?id=10.1257/jep.20.4.157</u>
- Einav, Liran, and Leeat Yariv. 2006. "What's in a Surname? The Effects of Surname Initials on Academic Success." *Journal of Economic Perspectives* 20 (1): 175–87. https://www.aeaweb.org/articles?id=10.1257/089533006776526085
- Siegel, Jeremy J., and Richard H. Thaler. 1997. "Anomalies: The Equity Premium Puzzle." *Journal of Economic Perspectives* 11 (1): 191–200. https://www.aeaweb.org/articles?id=10.1257/jep.11.1.191

1.2 Principal Reading and Textbooks

Chapters 1 and 2 of the CORE textbook are the required reading while the remaining textbooks are given for reference and will be a part of your regular reading list for the Introductory Economics paper. You are not required to purchase these additional textbooks and multiple copies are held in the college and university libraries.

Microeconomics and Macroeconomics

- CORE Economics, *The Economy 2.0: Microeconomics*, Oxford University Press, and freely available online at <u>https://www.core-econ.org/the-economy/microeconomics:</u>

Microeconomics

- Frank, R., Microeconomics and Behaviour, McGraw-Hill
- Varian, H. R., Intermediate Microeconomics: A Modern Approach, Norton
- Morgan, W., Katz, M. L. and Rosen, H. S., Microeconomics, McGraw-Hill

Macroeconomics

- Jones, C.I., Macroeconomics, 5th International Student Edition, Norton

Maths

- Ian Jacques, Mathematics for Economics and Business, Pearson (introductory)
- Malcolm Pemberton and Nicholas Rao, *Mathematics for Economists: An Introductory Textbook,* Manchester University Press (more advanced)

1.3 "Popular" introductions to economics:

- o Why Nations Fail by D. Acemoglu and J. Robinson (Profile, 2013)
- *The Undercover Economist* by Tim Harford (Abacus, 2006)
- Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty by A. Banerjee, and D. Duflo, (Penguin, 2011)
- o Freakonomics by S. Levitt and S. J. Dubner (Penguin, 2005)
- End this Depression Now by Paul Krugman (Norton, 2012)
- *The Price of Inequality* by Joseph Stiglitz (Norton, 2012)
- *Thinking, Fast and Slow* by Daniel Kahneman (Penguin, 2012)
- o A Random Walk Down Wall Street by Burton Malkiel (Norton, 2016)
- What Money Can't Buy by Michael Sandel (Penguin, 2013)
- *Naked Statistics* by Charles Wheelan (2011, Norton) Chapters 1-5 & 7-10 (not economics, but will be helpful in your statistics course).

2. Mathematics review

This mathematics review lists the topics that you have seen in your school that you should understand and master, as we will build on them in our economics tutorials. Please make sure that your mathematics foundations are solid before term starts, as you will be able to dedicate more time to economics intuition, rather than spend time on sometimes tedious calculations.

You have taken mathematics for GCSEs or A-levels (or the equivalent) therefore, you should be able to do basic calculations and algebra, find a derivative or plug in numbers in an equation, without spending too much time. Over the summer, try to get as much practice as you can on these things for them to become second nature. The exercises below serve as a guide on what to review but if you see that you struggle with some of them, feel free to find additional resources in A-levels textbooks to practice more.

One very useful tool you might have seen is *Geogebra*. You can plot curves, find the intersection of two lines, compute areas, etc. For most of the exercises below you can check your answers with this tool, and maybe you'll find it useful to use in your economics courses as well!

So that you see where we are going with all this maths, there is a short set of exercises at the end that link these concepts with economics. We'll also discuss what you thought of these exercises and any questions you might have.

2.1 Geometry concepts to review:

- What is a plane, what is the *x*-axis and the *y*-axis (traditionally)?
- How do you plot a point A given by the coordinates (2,1) in the *x*-*y*-plane?
- How do you relate the slope of a line and the gradient? How do you compute the slope of a line if I give you (i) the equation of the line (ii) two points through which the line passes?
- What's the gradient of a horizontal line in a plane? Of a vertical line?

2.2 Algebra

- 2.2.1 Calculus concepts to review:
 - Simplification
 - Factorisation
 - Binomial expansion more generally
 - The standard formulas:

$$(a+b)^{2} = a^{2} + 2ab + b^{2}$$
$$(a-b)^{2} = a^{2} - 2ab + b^{2}$$
$$(a+b)(a-b) = a^{2} - b^{2}$$

2.2.2 Roots concepts to review:

- Solve a linear equation of the type ax + b = 0. How do you usually check your answer?
- Solve a quadratic equation of the type $ax^2 + bx + c = 0$, either by factorising, by spotting an obvious root or by computing the discriminant. When should we use one relative to the other?

2.2.3 Functions

No matter what your mathematics background is, you should know the following concepts:

- What is a function? Especially, understand that x in the formula f(x) = ax + b is a mute variable and that we can replace it with any other variable we want!
- Linear function: what is the definition? What is the meaning of the slope? In the graph with *x* labelling the horizontal axis and *y* labelling the vertical axis, how do you find the *y*-intercept and the *x*-intercept? How do you determine the equation for a linear function knowing that it goes through two points? How do you know whether it is increasing or decreasing? What is usually the interpretation?
- Quadratic function: Can you give me the definition? How do you plot them? How do you find the roots? How do you differentiate them? What is the domain and what is the range?
- Do you know the domain and the range of the following functions: linear, quadratic?
- Can you plot these functions in the *x*-*y* plane?
- Can you differentiate these functions?
- Can you integrate these functions over a specific interval?
- Can you find the interval over which these functions are positive, negative, or above whatever constant I give you?
- For linear functions of the type f(x) = ax+b, can you tell me what happens if (i) *a* increases or decreases while keeping *b* constant (ii) *b* increases or decreases while keeping *a* constant?
- For quadratic functions of the type $f(x) = ax^2 + bx + c$, what happens if *c* increase.

Please attempt the following exercises from the Maths Workbook (sent separately):

Chapter. Review of Algebra (1) Exercises 1.7; Exercises 1.11 and Exercises 1.13 Chapter. Lines and Graphs (1) Exercises 2.1 and Exercises 2.4. Chapter. Sequences, Series and Limits; the Economics of Finance (2)Exercises 3.1, Exercises 3.5 and Exercises 3.6 (3) Chapter. Functions Exercises 4.2 and Exercises 4.5. Chapter. Differentiation (4) Exercises 5.1, Exercises 5.2 and Exercises 5.4 Chapter. More Differentiation, and Optimisation (5) Exercises 6.1 and Exercises 6.2 (6) Chapter. Integration Exercises 10.1, Exercises 10.2 and Exercises 10.5

The subsequent topics below will be new to most people and we will cover them during term – however you are welcome to read ahead and attempt the exercises.

(7) Chapter. Partial Differentiation
Exercises 7.4
(8) Chapter. Unconstrained Optimisation Problems with One or More Variables
Exercises 8.1 and Exercises 8.3
(9) Chapter. Constrained Optimisation
Exercises 9.4