

# New for Spring 2014: Four or Five Beautiful Results in Micro Theory, With Proofs

A mini-course taught by Dan Quint

## Background

Most undergrad micro is about learning basic tools, and maybe hearing about some of the punchlines that follow from those tools. In grad school, on the other hand, every result is taught with the proof – that is, you actually see the result demonstrated mathematically, rather than just being told it's true. But many surprising, “classic” results in micro theory have proofs that aren't rocket science – they're just basic calculus, algebra, and some cleverness. Which means there's no reason they can't be taught to smart undergraduates. So I thought I'd try.

## Why learn microeconomics with proofs?

Three reasons come to mind:

- ***You'll understand the results better.*** They won't be words you memorize, they'll be concepts that you actually internalize and understand. And the results aren't all “Alice and Bob buying beer and pizza” – some of them are pretty profound statements about the world.
- ***You'll understand the limitations of the results.*** That is, you'll learn what assumptions are implicitly (or explicitly) behind each result, and why the result hinges on each assumption. So aside from learning the results, you'll build up a healthy skepticism about applying them in a “real world” that may or may not satisfy those assumptions.
- ***Let's face it, proofs are sexy.*** If you disagree, you probably shouldn't take this class. And speaking of which...

## Who is this class for?

It's open to **undergraduates only**, and is meant for people who satisfy three criteria:

- ***You took game theory and did well.*** You got an A; or you got an AB and were pissed off because you felt you should have done better.
- ***You're good at math.*** You don't freak out when you see a double-integral. You understand the logic of proofs. You tend to like your economics to come with more math, not less math.
- ***The idea*** of spending one evening a week sitting around a conference room learning mathematical proofs of economic theorems ***actually appeals to you.***

## How will this work?

You'll register for an ungraded, two-credit Directed Study course (Econ 698). We'll meet one evening a week, most likely either Mondays or Tuesdays, from 6 to about 7:30 or 8, for as many weeks as it takes to cover the material. There won't be any homework or a test, but I expect you to be there, be prepared, and be engaged. Since we'll meet in the evening, there will most likely be pizza.

## What will we cover?

We will set up, state, prove, and discuss the following results:

- ***The First Welfare Theorem***: general equilibrium is always Pareto-efficient.
- ***Arrow's Impossibility Theorem***: if we want to take individuals' preferences over different policies and aggregate them up to societal preferences in a coherent way that satisfies certain reasonable-sounding requirements, the only way to do it is to pick one guy and make him dictator.
- ***A No Trade Theorem***: if an economy starts out in a Pareto-optimal allocation and traders are risk-averse and have rational expectations, then the arrival of new information shouldn't lead to any additional trading.
- ***Revenue equivalence and the optimal auction***: at least to me, the highlight of the course. We will show that all "standard" auction formats are equally good for the auctioneer, and derive the best possible auction out of *all* possible formats. Along the way, you'll learn some mechanism design and the revelation principle.
- Time and interest permitting, the negative result of ***Myerson and Satterthwaite***: that if a buyer and seller both have private information, there is no voluntary mechanism that leads to fully efficient trade.

## Disclaimer

I've never taught this material to undergrads before, so you guys will be guinea pigs. I don't know if there will even be enough interest to make it worthwhile; I don't know how many meetings it will take, or how it will go. I think it's a cool idea, but I might be wrong. But I hope I'm right!

**If you're interested in possibly taking this course**, please email me directly by Friday, December 6. See you (hopefully) in the spring!

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