Economics 202A　　　　　**Fall 2007**　　　　　**Lecture I**

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I will teach the first half of the course and then Maury Obstfeld will teach the second half.

I am told that the course is being rationed.　I know that this is very unfortunate. Everyone who wants to take the course who is not already enrolled should give me your name and e-mail after the class.

Let me make various announcements and notices about the arrangements of the course:

1.　　Section Times and Places are:

　　　M 4-6P, 385 LECONTE　and also
　　　W 4-6P, B56 HILDEBRAND

2.　　Next Monday is Labor Day holiday.　Since there is a section scheduled for Monday that poses a problem.　Especially since that section is so important, we are going to do the following.
　　　Max will give a section this Thursday evening, August 30, from 6:10 to 8 in 145 McCone Hall.
　　　He will do a review of time series processes in section.
　　　That will be the section for this week.
　　　There will be no section next week.

　　　Second, unfortunately and unavoidably, I have to be in Washington to give a Brookings Paper next Thursday.

George Perry, who is a very good friend of mine is retiring. There is a meeting in his honor and I had no choice about this.

I think this is a bad time to miss a class, so I will give a replacement class next Tuesday from 6:10 to 7:30. It will be in Room 150 of the Goldman School of Public Policy, which is across the street.

You are to do the first problem set and hand it in next Tuesday. The problems are on the Course Website.

3.   *Four* notes about organization and grades:

1. There will be a mid-term. It will take place 2/3's of the way through the term so as not to take place at the same time as your other midterms. It will be two or three weeks after your other midterms.
2. There will be a final examination.
3. The problem sets are to be handed in.
4. The major incentive for doing the homework is that we will model some exam questions after homework problems.

4.   I wish to emphasize that you are welcome to visit my office at any time. I will be delighted to talk to you at any time.

5.   The textbook is by David Romer and is entitled *Advanced Macroeconomics, Third Edition.* Let me know if you have any trouble getting a copy of the textbook.

If they have run out of the textbook at the ASUC book store please ask them to get you a copy or get one quickly yourself.

The textbook and my own thinking are in close agreement about the material, but I think that it is my obligation to teach you how I think about macroeconomics. So I will follow the textbook, but I will not follow it *exactly.*

The marginal cost of the textbook is 0 for anyone who is planning to take 202B since this will probably also be the textbook for that course.

In addition to the textbook there is a Reader of articles.
You *absolutely* need to purchase the Reader.
It is as important, if not more so than the Textbook.
It is available at Copy Central at 2560 Bancroft Way.
If they have run out they will make you a copy within 24 hours. I want you to take care of that as soon as possible.

I was told that you can also order online or you can call, so that a copy is reserved for you.
I have been assured that the reader is ready and so there should be no difficulties.
I have made the reader for this half of the course, and Maury will make a second volume of the reader available when he takes over.

6.   In past years I have made copies of my lecture notes available after the lecture has been given. I will send them to Eleanor Lee to post on the web. In the past there has been some problem with my Greek letters not being duplicated. Please let me know if that has occurred. The lectures will have the typescript of the lectures, but not the diagrams.
Also Max will put materials on his website, and the course website has a connecting link.

7.   There is considerable reading, and this is a hard course. So please get to work immediately. The work you do in this first week of class is especially important because the concepts that I am going to teach you now are used over and over again.

8.   For those of you who were not, or are not currently undergraduate economics majors, if you do not feel comfortable with macroeconomics at the level of

Blanchard
Dornbusch and Fischer
Gordon
Hall and Taylor
Mankiw

or any other standard intermediate macroeconomics text, I would suggest that you take the course *next year, not this year.*

Let me give you a good test for yourself of whether or not you are ready to take this course.
In order to be ready to take this course you have to have a model of the macroeconomy in mind.
This should be a model that you would use to look at the effect of changes in taxes, the money supply, and wages on different parts of the economy.
If such a model is not natural to you, then you need to do some *serious* preparation for the course by reviewing a good macroeconomics text book.

I would recommend Blanchard. First, since growth does not come first in his book, you do not need to wade through 200 pages before you get to

what is interesting and relevant. Second it is the book whose view of macro is closest to what I consider the baseline for this course.

David Romer's Chapter 5 gives an excellent review.

9. Previous students in this course suggested that the following is a useful message:

This is a *difficult* course. However, it is difficult in the way that economics is difficult, not the way that *math* is difficult.

Math is hard because it is hard to figure out.

But economics is hard in the sense that a large number of steps are taken. Each of these steps is obvious and easy, but at the end of the sequence something emerges that is surprising, and not quite obvious.

It is difficult to know exactly where the biting, identifying assumption has been made, and therefore it is often surprisingly difficult to retrace the logic.

Students who have done well in the past have taken the readings and the lectures quite seriously, and have *actively* worked on them.

I remember always when I was taking economics classes, and to this day, I always thought that I understood everything perfectly until I discovered later that I had missed a great deal.

The implication of this is that this is unlike math where you know if you understand it or not. Here you have a special responsibility to be careful.

This is a very important note. Students underestimate the difficulty of this course. You think that 201A is hard, because you know it is hard. And therefore you spend more than enough time on it.

I think this is like *rum*. You drink a lot of rum, and you think it has had no effect whatsoever, and then the next minute you are out like a light.
Here you think that you understand every word, but it turns out that you cannot reproduce the argument.
(Disclaimer: I personally have not passed out on rum recently.)

Good economics is often like that. Somehow, like rum, it sneaks up on you and you do not quite understand how you got there.

10. In this course I want you to learn a more sophisticated version of

macroeconomics than what you learned as an undergraduate. This will be the macroeconomics that makes you able to think more deeply about the subject.

I will also give you what is, I think, an interesting basis for macroeconomics. I am going to try to teach both the classical macroeconomics and the corresponding behavioral macroeconomic version.

The second thing that I want you to learn in this course will be some *modeling techniques.*
Especially, this course is mainly about economic dynamics.
We are able, with varying degrees of success, to model many dynamic processes in economics.
Almost all such models are solved by methods of *recursion*.
Beyond some time t, in some way or another the system repeats itself.
We are then able to solve.
A very large amount of this course involves one method or another of using recursion and thereby getting solutions to what would otherwise be intractable problems.
It may be useful for you at some point to appreciate that this is one of the useful goals of the course: to teach these methods.

What do I expect you to know?

We are going to go over many models.
I expect you to know all these models.
I expect you to know them as if they were old friends.

These models and their techniques are a major part of the message of the course.

11.   Finally, there is a second part of *my part* of the course, an informal part that I will now tell you about.

I am quite worried that the First Year Graduate Classes in Economics are much too narrow and carry the wrong message about what economists tend to do.
I think that economics is a much more eclectic and opportunistic field than what would be indicated by the standard Graduate Curriculum.
What further, and especially, worries me is that we do not give you sufficient opportunity and encouragement to come up with your own ideas and opinions.
So there will be an informal section of my part of the course that is devoted to your own ideas and opinions.

First, I want each of you to keep a log of your opinions about economics and about economic issues that you find interesting.
I want you to make at least one log entry per week. It should typically be about one page.
This is to be handed in every week.
They will be due on the following Tuesdays: September 4, 11, 18, 25, and October 2.

Second, in the week of September 24 there will be no discussion section, and I will schedule you to give one of your first three or four logs in special sections where you will make short presentations.
I will schedule the assignments for that some time soon.
In return for the work that you do on the logs and also in return for attendance at the special sections there will be two free classes.
There will be no class on Thursday, September 20. And there will also be no class on Thursday October 11, which is just before your other midterms.

Third, any advanced PhD student who wishes to opt out of this aspect of the course may ask for my special permission to do so.
I should add that I particularly urge advanced ARE students to do this assignment because traditionally you have done so well at it.

Fourth, before you panic, that I have suggested that you re-write *The General Theory* in your first term of graduate school, let me give you four ways in which you can fulfill this assignment. I think that every one of you can do an excellent job at this.

> First, you can find a theoretical idea that you like, or that you dislike. Explain why you like it or dislike it. If you like it, you can explain how it could be used further. If you dislike it, you can explain how it is abused. You might further explain how you could do better.

> Second, you can look through the economics literature or elsewhere and try to find an interesting use of data. You can say what makes that use of data interesting. I do not want you to take something from another class unless you *personally* have something original to say.

> Third, you could look through some data and see whether anything interesting is happening in that data. If so, then you can explain why that data is interesting.

> Fourth, you could engage in a very hard task. Try to think of an ideal

data set that you would like to have, and explain how you would use it to answer some question.

What I want to encourage in all of you is that you should have your own opinions and your own subjects of interest, and that as students you should not let the Faculty be setting your agenda. I want you to have an agenda, or to develop, an agenda of your own.

I want you to write the logs for six separate reasons.

First, I think that this will make this a better course.
I want to erase the opinion in your minds that a good program for economic research is one that attempts to re-write *The General Theory*, as Robert Lucas and Tom Sargent claim to have done in one of the first major articles on our reading list.

Second, insofar as I can, I want to develop in your mind a critical aspect. I would be very happy if everyone here developed into a Paul Krugman or Robert Barro.

Third, pragmatically, the major problem in the PhD program is that people find the courses so daunting that they fail to apply themselves to the development of ideas. And they find it difficult later to find a thesis topic. I want to develop in you habits of mind that will make it easier to find a thesis topic. I want you to be thinking about what is and what is not a good idea for a research paper.

Fourth, I view it my duty to try to indicate to you how I personally think about economics and research in economics. This is in fact how I work. I always have a list of possible projects that I might work on. And my major intellectual activity is to actively work on generating this list. I want you to have *your* list of the ten ideas that you would work on. The reason that you need ten is that you will decide you do not like five of them and the other 4 have probably already been done, so you need to generate a lot of different ideas.

Fifth, I think that it is important that economists adopt a methodology that is much closer to the natural sciences.

That is that we should derive our theories more from careful observation.
I think that the best work is that which begins by observing the real world, and then constructing theories that explain how it works.
Good logs report such observations.

Sixth, the graduate economics program is in many ways an attempt to alter your

identity. I do not think that you can do very good research in economics unless you also have your own identity. I want you to preserve and also to actively construct your own identity.

The other ingredient of this course is the models.
The typical economics paper makes a model of some phenomenon, which may also be empirically simulated or tested.
By going over in some detail the key models of macroeconomics, and also by having you generate your own ideas, this course duplicates *in toto* what is needed to be a research economist.
I am not sure that I know much more about economic modeling than will be presented in the two halves of this course.
So the modeling that is presented here can be of some use as a starter for being a research economist.

To fit the notion that you are supposed to be *observers* you should have as large a tool-kit of models as possible.
That way you can make your observations fit the facts.

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With these preliminary remarks out of the way let's begin the course.

Because the course builds on the standard macroeconomic model from intermediate economics, I thought that I would present such a model.
This will be my version of David Romer's Chapter 5.

What kinds of questions does *macroeconomics* ask?
And, most important of all, how does it answer them?

Traditionally, the most important questions in macroeconomics (outside of growth theory) have been the following three:

1. What is the *level* of aggregate demand?
2. What is the *level* of interest rates?
3. What is the *level* of aggregate prices?

> And, how do these variables change *if there is a change in the environment, or in government policy?*

Government policy traditionally can be characterized by

1. levels of spending and taxation
2. levels of the money supply, which is under the control of the Central Bank

The natural way to answer these questions is to set up a macro model that describes the equilibrium values of the three variables:
income, the interest rate, and the aggregate price level.

To see how government policy affects these variables we can do a comparative static analysis.

Accordingly, let's review the standard intermediate macro model just to plug ourselves in.

This model gives the equilibrium conditions for the determination of:

income, interest and prices.

This model is summarizable by three *equations.*

These equations are:

(1) an IS curve
(2) an LM curve

Together the IS curve and the LM curve determine aggregate demand.

And there is also (3): an aggregate supply curve.

It is useful, by way of review, to remind you of what the IS curve is.

There is a demand for consumption, investment, government purchases and net exports.

Let Y be real income.
Let r be the interest rate.

Since this is a static model with fixed inflationary expectations I need not distinguish between the *nominal* and the *real* rate of interest.

Let's suppose that consumption depends on Y and r:

LHBB

$C = C(Y, r)$

Investment depends on Y and r:

$$I = I(Y,r)$$

Government spending is exogenous:

$$G = \overline{G}$$

Exports are exogenous

$$Ex = \overline{X}$$

Imports depend on Y and r:

$$Im = Im(Y, r)$$

There is then an equilibrium condition.

The total amount of goods that people are buying at a given level of income Y and at interest rate r is:

$$C(Y,r) + I(Y,r) + \overline{G} + \overline{X} - Im(Y,r).$$

The amount of goods being produced is Y.

The most important equilibrium condition in macroeconomics is:

$$C(Y,r) + I(Y,r) + \overline{G} + \overline{X} - Im(Y,r) = Y$$

This equation says that equilibrium income occurs where production equals what people want to buy.

If production *exceeds* what people are buying, then inventories are rising and producers will then *decrease* their production.

***Correspondingly,* if *production* is *less than* what people are currently buying, inventories are being drawn down. In that case producers will *increase* their production.**

This equation is only common sense.
Let me give an historical example.

If Macy's runs a store in San Francisco and people buy their shirts, depleting their inventories, then Macy's will order more shirts, and the shirt factories will turn out more shirts.

If Macy's fails to sell shirts, and its inventories build up, then they stop their orders for shirts, and the shirt-makers must decrease production.

What is true of Macy's is true of every other business. So there is *strong reason, very strong reason* to believe that an equilibrium level of output will occur where

   production = sales,

or, where

(1) $C(Y,r) + I(Y,r) + \overline{G} + \overline{X} - Im(Y,r) = Y$

WRITE ON RHBB
ERASE LHBB

The locus of points of Y and r that satisfy this equilibrium condition is called the IS Curve.

For reasons that you may understand from a previous macro course, this curve is called the IS Curve because Keynes argued that planned savings would equal planned investment at such points.

FOOTNOTE: *unplanned* investment was unintended inventory accumulation, which would equal zero if planned saving equaled planned investment. So the condition that planned saving equaled planned investment was equivalent to the condition of no accumulation of inventories. **END FOOTNOTE**

I will leave a footnote as to why this equilibrium condition is equivalent to planned saving = planned investment.

For many purposes, however, the planned savings/planned investment terminology is simply confusing. I myself always view this equilibrium condition as being where production is equal to sales.

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The second major equation in the standard equilibrium system is the LM curve. This curve reflects the fact that the *demand* for money in an equilibrium should equal the *supply* of money.

I should add parenthetically that many modern textbooks omit the LM curve. Instead they merely assert that the central bank sets the interest rate. Of course at this very moment that is what we want to know. *Does* the central

bank have the power, or *does it not*, to set the interest rate?
So for many purposes I think that we want an equation which indicates what the central bank does, and which indicates how it controls the interest rate. (That is, of course, insofar as it does control the interest rate.)

So we shall consider the LM curve.

Let's suppose that the supply of money is fixed, at $\overline{M}$.

The amount of money people want to hold is determined by three variables.

      (1) The first of these variables is real income Y.

      The higher is real income, the more money people will wish to hold to engage in transactions.

      (2) The second of these variables is the price level p.

            The higher is the price level, the more money people will need to conveniently transact Y worth of income.

      (3) The third variable is the nominal interest rate r.

            The higher the rate of interest the more people sacrifice by holding money rather than interest-bearing or yield-bearing securities, such as bonds, or stocks.

Thus we can view the amount of money that people wish to hold, L, as dependent on Y, p, and r,

      L(Y, p, r),

and in equilibrium:

      (2) $L(Y, p, r) = \overline{M}$.

            In this view, if people do not hold the amount of money they wish to hold, they will rapidly spend it. They will spend it for goods, which will raise p.

Or, alternatively, they will spend it for financial assets, which will reduce the return on those assets, or will reduce r.

Together we could think of the IS Curve and the LM curve as together determining at each level of prices, p, how much people want to buy.

At each level of p, that is the level of demand *where* inventories are being neither built up, nor being drawn down, and *also where* people are neither *increasing* nor *decreasing* their money holdings.

That can be summarized as the *aggregate demand curve,* which is that $Y^D = Y^D$ (p).

FOOTNOTE: Take equations (1) and (2). With the price level, p fixed, there are two equations with two unknowns, which are Y and r. The level of Y that satisfies these equations for each level p, is considered $Y^D(p)$. END FOOTNOTE

ERASE LHBB if not erased.

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This takes us to the final equation of the macro-system, which is the *Supply of Goods.*

In the traditional Keynesian model, it is said that the *money wage* is fixed at $\bar{w}_m$.

Firms can produce goods according to a production function

$$Y = F(N),$$

where N is the level of employment,

with $F'(N) > 0$, (which means that there are positive marginal products),

`   and $F''(N) < 0$, (which means that these marginal products decline as employment
                rises).

Employers hire labor up to the point where the MPL is the real wage:

$$F'(N) = \bar{w}_m /p.$$

As the price level goes up, the real wage goes down and thus it pays firms to hire more labor.
And as they hire more labor they produce more output.

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This is summarized by an aggregate supply function:

(3) $Y^s = Y^s (p; \overline{w}_m)$

LINE THIS UP ON RHBB

We now have a system of 3 equations and 3 endogenous variables.

POINT TO THEM, or if the BB is very MESSY ERASE AND REWRITE THEM

(1) $\qquad C(Y,r) + I(Y,r) + \overline{G} + \overline{X} - Im(Y,r) = Y$

(2) $\qquad L(Y, p, r) = \overline{M}$

(3) $\qquad Y = Y^s (p; \overline{w}_m)$

This is the exact model that Hicks used to summarize Keynes' *General Theory* in his article, "Mr. Keynes and the Classics," in 1936.

With three equations and three endogenous variables we can ask of this system how the *endogenous* variables will change as the *exogenous* variables change.

For example, we could differentiate and calculate the elements of the following matrix:

$$dY/d\overline{G} \qquad dY/d\overline{M} \qquad dY/d\overline{w}_m$$

$$dr/d\overline{G} \qquad dr/d\overline{M} \qquad dr/d\overline{w}_m$$

$$dp/d\overline{G} \qquad dp/d\overline{M} \qquad dp/d\overline{w}_m$$

To a great extent the values and signs of these comparative static results are the topic of macroeconomics.
A good intermediate macroeconomics class should give you a good feeling as to why these comparative static results turn out as they do.

The Keynesian model gives the first, and probably the *best*, answer to these questions:

What is:

$$dY/d\overline{G}, \ dY/d\overline{M}, \ dY/d\overline{w}_m, \ dr/d\overline{G}, \ dr/d\overline{M}, \ dr/d\overline{w}_m,$$

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$dp/d\overline{G}$, $dp/d\overline{M}$, $dp/d\overline{w}_m$.

Every one of the signs in these comparative static results is sensible.

For example, $dr/d\overline{G}$ is positive.

Here would be my story as to why that makes sense.

That says that as the government spends more interest rates go up.

    This certainly makes sense.
    As the government spends more it will be borrowing more.
    As it borrows more, it must bid up interest rates to get people to hold its bonds.

    If you go back to the signs you get out of the Keynesian model, every one of the nine comparative static results makes intuitive sense. There is a simple story that explains each sign.

There is a second sense in which this is a good model.

Everything is included in this model.

(1) Demand for goods
(2) Demand for money
(3) Supply of goods
(4) Demand for Labor
(5) Supply of labor

    This occurs through the fixed money wage in the model.
    In models of later vintage the wage level is given by a Phillips Curve.

Also included in the model is:

(6) the Demand and Supply of financial assets.

    I will say more about that later.

    I do not know of many things that we might want in a macro model that do not appear either *explicitly* or *implicitly* here.

So let me begin this course with the following message.

If I were to know *one* thing about macroeconomics what I would want to know would be the Keynesian model.

I believe that almost every intermediate macro textbook uses this model or one that is quite similar as a benchmark model.

This model represents the *basic macroeconomic model* in the same way that simple Supply and Demand represents the basic benchmark model in microeconomics.

Indeed Keynes, who was a student of Marshall was explicitly copying Supply and Demand when he set up this model.

The key difference between this and a micro model is that wages here are fixed in the short-run and then income, rather than wages is what equilibrates the supply and the demand for goods. (In a micro model wages would not be fixed, since they are a price.)

In a micro problem the truth may be more complex than simple S and D, as in a game theory problem. *Still* S and D is probably the place to begin an analysis.

Similarly, in thinking about any macroeconomic question, or issue, this model is a very good place to start.

Probably this model was the basis for your earlier course in *macroeconomics.* At the same time it serves as the basis for the fundamental questions for this course.

Part of this course, some of it mine and some of it Maury's, will concern respectively:

      (1) the consumption function
      (2) the investment function and
      (3) the demand for money.

What we want to know about these functions is determined by the different multipliers that we have just seen.

Why?

Because the shapes of these functions determine the values of the various multipliers.

For example, they determine the values of $dY/d\overline{M}$ and $dY/d\overline{G}$, which are respectively the money multiplier and the government expenditure multiplier.

For example.

1. If the marginal propensity to consume is small, the government expenditure multiplier, $dY/d\overline{G}$ will also be small.

2. If neither consumption nor investment is sensitive to the rate of interest, the money multiplier, $dY/d\overline{M}$ will be small.

3. If there is no interest elasticity to the demand for money, $dY/d\overline{G}$ is zero, and only the money supply can be used to stabilize the economy.

In going over the reading list, some of the material will be concerned with these questions.

Other questions, however, will concern the nature of the model itself.

Does the model really make sense?

These questions are central to the development of the New Classical Economics of the 1970's.

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The second major problem with the model is that it does not tell us very well how financial changes will affect the equilibrium level of output.

Indeed, superficially, the model does not represent the financial system at all because there is no equation for the stock market or for the bond market.

That, in fact, is *false,* and I will tell you why.

Suppose we have an economy where there are just two goods: *peanuts* and *avocados.*

If I give you the *demand* and *supply* for peanuts, then I *have given* you the *supply* and the *demand* for *avocados.*

Why?

Because the *demand* for peanuts with *just* these two goods concerns the rate at which demanders would trade *peanuts* for *avocados.*

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And the *analogous* statement is true for peanuts.

So, knowing the Demand and Supply for Peanuts is equivalent to knowing, obversely, the Supply and Demand for Avocados.

Now let's use this analogy.

>**In this Keynesian model, if people have a portfolio of assets, they must divide it between *money* and *interest-bearing assets.***

>**Thus knowing the demand for money and the stock of other assets, you also know the *demand* and *supply of other assets.***

>**So it is *not true* that because there is no explicit Demand and Supply for nonmonetary assets *that the financial* system is ignored.**

>**Nevertheless, these equations may not be in sufficient detail to tell us many important things about the relation between the economy and the financial system.**
>>***For example,* they are not in sufficient detail to tell us how a credit crunch could affect the economy.**
>>>***Footnote:* it does not give sufficient detail because given r and M should be sufficient to know Y. A credit crunch says that the details of the financial system will also be a determinant of Y. *End Footnote.***

So that takes us beyond the review.

In terms of the readings in the syllabus.

For Thursday, I want you to have read the selections from Harvey on *Time Series Analysis.* Then Max and I will both go over it, in separate versions.

I think that you should then read the textbook review of Keynes. My review of Keynes corresponds to David's Review of it in Chapter 5 of the textbook. That should be a STARRED reading.

My presidential address to the AEA gives a justification for the Keynesian model that I have just reviewed. It also explanation of the structure of the course.

I will come back to do that when I do an overview of the course.