Whitman College
Econ 308
Final Exam
May 15, 2010

Write all answers in your blue book. Show **all** of your work. The exam ends at 4:30.

1. Use the Solow Growth Model with labor-augmenting technology to work the following problems. Read all of parts (a)-(e) below before you work any of them. Make one large graph and draw it carefully.

(a) (5pts) Draw a graph in which you put capital per effective worker on the horizontal axis, and output per effective worker on the vertical axis.

(b) (10pts) On your graph, indicate the golden-rule steady state level of capital per effective worker and of output per effective worker. Label these quantities k^*_{gr} and y^*_{gr}.

For parts (c)-(e), suppose that this economy has a savings rate that is below its golden rule savings rate.

(c) (10pts) On your graph, indicate this economy's steady-state level of capital per effective worker and of output per effective worker. Label these quantities k^* and y^*.

For parts (d) and (e), suppose that this economy has a current level of capital per effective worker that is below the steady-state level you found in part (c).

(d) (10pts) On your graph, indicate this economy's current level of capital per effective worker and of output per effective worker. Label these quantities k_1 and y_1. On your graph, indicate the current amount of consumption per effective worker. Call this amount c_1.

(e) (5pts) Suppose that this economy's savings rate immediately rose to the golden-rule savings rate. On your graph, indicate what is now the current amount of consumption per effective worker. Call this amount c_1'.

2. Consider the excerpts from the Wall Street Journal article below to answer questions (a)-(c).

Moment of Truth for Productivity Boom
Wall Street Journal, May 6, 2010, p. A1, by Justin Lahart

GREENSBORO, N.C.—As the long recession lifts, American businesses are grappling with a big question: Are we working smarter, or simply working harder? The answer will say a lot about the strength of the economy in the coming years.

Fearing for their jobs, American workers are scrambling to produce more for every hour of work. Call it the hustle factor. At the same time, new machinery and new ways of doing things are boosting productivity. Call it the brain factor.

Both forces are at work. Unlike recent downturns, when productivity shrank and then rebounded, it kept growing throughout most of the past recession. Now the question is whether the biggest gains have come from hustle or brains.

Most economists think it will be harder to sustain gains built on working harder. If productivity slows over the coming quarters— say, falling back closer to its 50-year average growth rate of 2.1%—it has big implications.

One reason the U.S. enjoys a high standard of living is that its workers have historically been among the world's most productive. They make more goods and services per hour than workers in most other countries—and get higher wages in return. If productivity growth slows here, wage growth is likely to be anemic.

[Productivity in the fourth quarter 2009 rose 6.3% from a year earlier. Productivity in the first quarter of 2010 rose 3.6% from a year earlier.] "I think that most of this [productivity increase] is temporary and it's particularly dramatic because a lot of people were scared," says Dale Jorgenson, a Harvard University economist who expects productivity growth to slow to 2% over the next year.
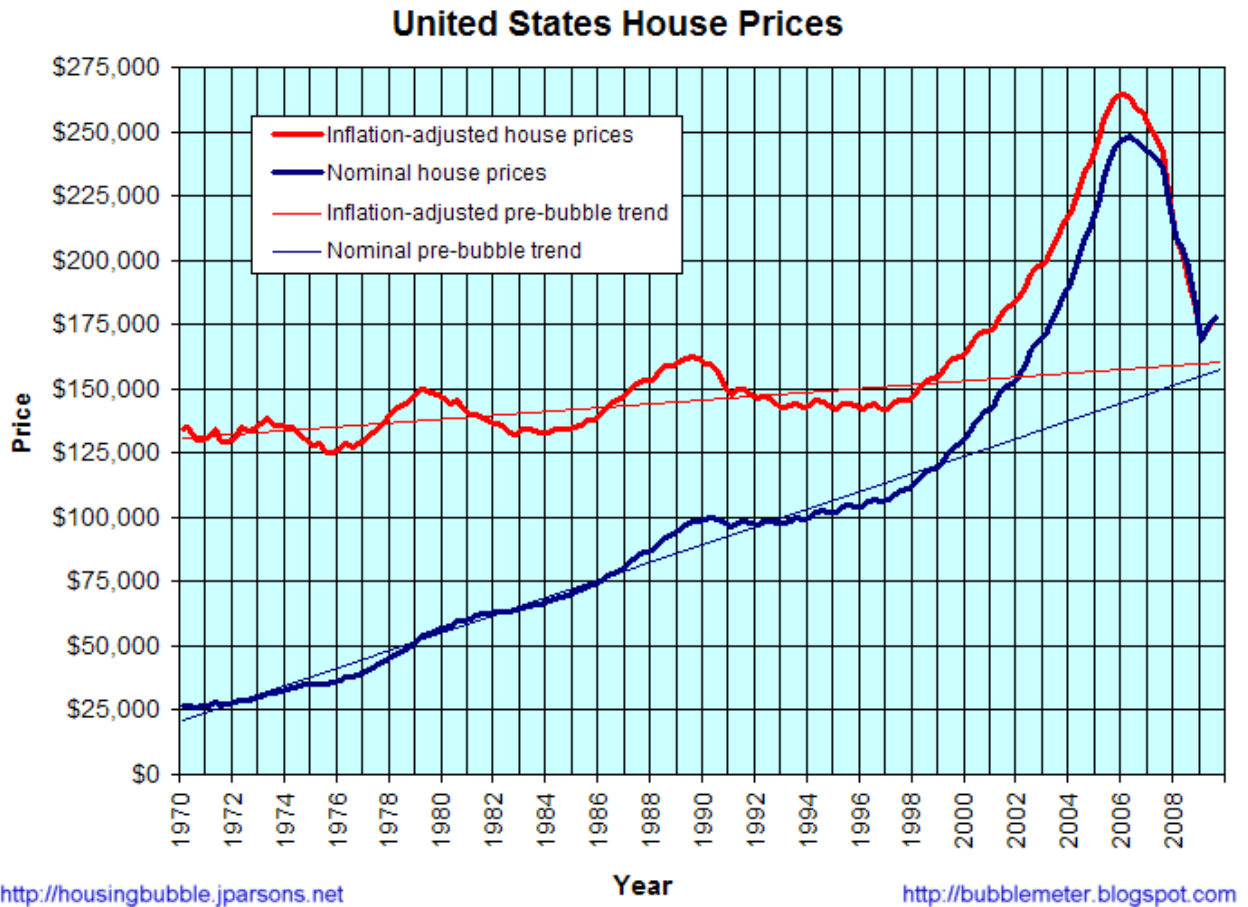
To answer parts (a) and (b), use the Solow Growth Model with labor-augmenting technology.

(a) (10pts) Suppose that in the future the United States continues to have the productivity growth that it averaged over the past 50 years. Once the U.S. reaches its steady-state equilibrium, at what rate would real per capita Gross Domestic Product change?   Explain your work.

(b) (10pts) Suppose that in the future the United States continues to have the productivity growth that it averaged over the past two quarters. Once the U.S. reaches its steady-state equilibrium, at what rate would real per capita Gross Domestic Product change? Explain your work.

(c) (10pts) Suppose that United States has a 6.5% average annual rate of growth of the money supply in the future. Use the Quantity Theory of Money to predict the average U.S. inflation rate over these years. Explain your work, and any assumptions that you are using.

3. Consider the graph below, which estimates what the market value of today's median-priced American house would have been over the past 40 years, in inflation-adjusted terms and in nominal terms. The thin lines represent the pre-bubble (1970-1999) trend lines for each. The table below shows the nominal price of this house and the Consumer Price Index for the first quarter of 2005 and the first quarter of 2006. Use the data from this table to answer parts (a)-(c).

United States House Prices

http://housingbubble.jparsons.net   **Year**   http://bubblemeter.blogspot.com

Selected Data from 2005 and 2006

Date	Nominal Price of Today's Median-Priced House	Consumer Price Index
2005 Q1	$214,953	282.533
2006 Q1	$239,689	293.100

(a) (10pts) From the first quarter of 2005 to the first quarter of 2006, what was the annual inflation rate? Use the Consumer Price Index as your price level.

(b) (5pts) From the first quarter of 2005 to the first quarter of 2006, what was the percentage increase in the nominal value of today's median-priced home?

(c) (5pts) From the first quarter of 2005 to the first quarter of 2006, what was the percentage increase in the inflation-adjusted value of today's median-priced home?

4. On May 13, 2010, Federal Reserve Vice Chairman Donald Kohn said the following in remarks to a monetary conference at Carleton University in Ottawa, Canada, to explain why the Fed did not stop the housing price bubble of the early 2000s:

> "I can see situations where housing prices might be rising and creating a dangerous situation in the financial system, but what about business capital investment? [If] the monetary authority [were to] raise interest rates to damp a housing bubble, at the same time it would be damping business investment…"

(a) (5pts) Define investment.

(b) (10pts) How does the Federal Reserve raise interest rates?

(c) (20pts) Derive an IS curve.

(d) (15pts) On an IS-LM diagram, separate from the your diagram in part (c), show the effect of the Federal Reserve raising interest rates.

(e) (20pts) In what ways did the housing price bubble of the early 2000's create "a dangerous situation in the financial system"? Be as thorough as you can in your answer.

5. Consider the remarks Dr. Christina Romer, Chair of the President's Council of Economic Advisers, prepared for a conference at Princeton University held on April 17, 2010, and which we discussed in class. On page 7 of this speech, Dr. Romer, a macroeconomic history professor from United of California Berkeley, describes what she believes caused most of the recessions in the United States since World War II, and how policy-makers can end this type of recession:

> "The usual postwar recession has a fairly simple narrative. The groundwork is laid when for some reason policy is overly expansionary and so generates inflation. The recession occurs when the Federal Reserve realizes that things have gone awry. It raises interest rates, slows the economy, and so brings inflation down - at the cost of a recession. That type of recession is easy to end: once the Federal Reserve is satisfied with the behavior of inflation, it can slash interest rates and provide the economy with a large jolt of stimulus."

(a) (25pts) Use the fixed-nominal-wage-contracts version of the Aggregate Supply-Aggregate Demand model to help explain Dr. Romer's reasoning for what caused the typical recession in the post-World War II era. Refer to an AS-AD graph in your explanation. In your explanation, be sure to start with the laying of the "groundwork" for the recession.

(b) (15pts) Use the fixed-nominal-wage-contracts version of the Aggregate Supply-Aggregate Demand model to help explain Dr. Romer's reasoning for what policy-makers can do to end this typical post-WWII recession. Refer to a new AS-AD graph that picks up where your graph in part (a) ended.