**ECON 503, Fall 2013, Test 1 (Please print a concise answer; I’m not looking for essays; if a question asks for an equation, and you do not know it, use a brief statement in its place)**

**Part I (12 points each)**

1. Write down the structure of Prescott’s growth model

(a) Households Preferences:

**E[∑Bt{log c(t) +α log(100-h(t)]**

(b) Household Constraints:

**(1+τc)c(t) + (1+τx)x = (1-τh)wh + (1 - τk)(r-δ)K(t) + Transfers**

(c) Production:

**Y(t) = A(t)Kθh1-θ  and dK(t) = X(t) + (1- δ)K(t-1)**

(d) Market Equilibrium:  **y(t) = c(t) + x(t) + g(t)**

2.(a) What are 3 endogenous variables in the Prescott model?

**consumption, labor hours, wages, rental rates, capital**

(b) What is a key exogenous variable in the model?

**Technology (A); tax rates**

(c) What are 2 important parameters (not variables) in the model that influence outcomes

**α = leisure preference; B = discount rates ; δ = depreciation rate for capital;**

(d) How does Prescott use this model to compare outcomes in the U.S. and Europe?

**estimates a simulation model built on these equations; computes labor tax rate differences in Europe and U.S., simulates labor hour differences, showing that the actual difference (US greater than Europe) is predicted by the simulation**

3. (a) How does the Solow Growth Model differ from the Prescott-type model?

**Y(t) = A(t)Kθ is Solow’s basic model; no household choices; labor growth exogenous**

**-- capital (and saving) determining rate of growth.**

**-- Increases in amount of labor reduce growth**

(b) What is the emphasis of the “new growth” theory and evidence?

**New growth theories emphasize general productivity (technology) aspect and ways of measuring contributors to it such as property rights and different kinds of property rights and other institutions such as democracy**

(c) What is the convergence hypothesis in a growth context, and what is the evidence concerning it?

**Convergence hypothesis is based on Solow growth model. It states that counties with high levels of gdp per capita and corresponding high levels of capital are expected to growth at slower rates than low gdp per capita (low capita) countries because of diminishing returns to capital. This higher growth by lower income countries leads to convergence in gdp per capita across countries. The evidence shows this does not hold unconditionally (across all countries), but it does show up across countries with similar institutions**

(d) What is the “identification problem” in the context of cross-country growth studies:

**frequently the problem is a “feedback” issue of separating the cause from the consequence; specifically, it appears in separating the effects of factors such as democratic institutions or protections of freedoms on growth from the effects of growth on these institutions or freedoms;  
it can also appear in trying to separate the effects of different causes from each other such as the effects of property rights institutions from contracting institutions as in Acemoglu’s “Unbundling Institutions”**

4. (a) Write down the four basic equations that form the basis of the simplest version of the widely used (Keynesian) ISLM model. Label each equation.

**(1) Basic GDP definition: Y = C + I + G**

**(2) Consumption Function: C = b0 + b1\*[Y- τ\*Y]**

**(3) Investment Function: I = b2\*r**

**(4) Money Demand Function: M = b31\*Y + b32\*r**

(b) What variables are exogenous in this model and what parameters (relationships) are important?

**Exogenous: taxes, autonomous consumption (b0)  
Key parameters/relationships: marginal propensity to consumer (b1), marginal effect of interest rates on investment (b2), marginal effects of income and interest rates on money demand (b31, b32)**

5. (a) How does a basic RBC (Neoclassical) Model relate to the Prescott model?

**They are the same except short-run focused RBC models add a stochastic (random shock) term to**

**the production function such as Y(t) = A(t)Kθh1-θ + ε or A(t) = A0 + ε**

(b) What variables are exogenous in this approach to explaining short run fluctuations?

**The random shock element to the production function or technology**

(c) Hamilton criticizes this approach using evidence from Unemployment Rate changes. What does Hamilton show and why does he take this as evidence against a simple RBC model?

**He shows that U(t) = a1\*U(t-1) + a2\*U(t-2) … during non-recession periods and**

**U(t) = c1 + c2+ a1\*U(t-1) + a2\*U(t-2) … during recession periods where c1 and c2 are fixed effects mild and moderate/severe recessions.  
  
His reasoning is that a simple RBC model predicts Unemployment (and other key outcomes) to follow the same statistical process in and out of recessions since it is only basic technology shocks that are causing fluctuations**

6. List 4 possible factors that may cause recessions and cite 2 pieces of evidence regarding factors that influence cycles:

**Possible factors**

**-- oil price shocks (supply shock)  
-- technology shocks (supply shock)  
-- structural shifts in employment (supply and demand shocks)  
-- financial bubbles, collapses, and panics  
-- unexplained consumption changes by households  
Evidence:  
-- Hamilton oil price shock data since 1950; Variable (stochastic) trends in gdp and structural shifts; Post WWII recession and structural shifts; early 1930s and 2008 with financial collapses; RBC simulation evidence matching gdp for technology shocks**

**Part II (6 points each)**

1. Provide the following data:

Latest U.S. unemployment rate (+/- 0.5%): **7.2%**

U.S. Real GDP growth rate for Q3 2013 (+/- 0.3%): **2.8%**

Current Level of (nominal) U.S. GDP (+/- 0.5 Trillion): **$16.9T**

Price of barrel of West Texas Intermediate Crude Oil (+/- $10): **100**

2. Show an equation for computing percent changes in GDP:

**[GDP(t) – GDP(t-1)]/GDP(t-1) or d[log(gdp(t)/gdp(t-1))]**

3. What are the last 4 years with recessions in the U.S.?

**2007-09; 2001; 1990-91; 1981-82**

4. Using words or a graphic illustration the difference in a deterministic trend for GDP and a stochastic trend:

**Deterministic trend is an increasing straight line (for example, at 3% per year)  
Stochastic trend moves up and down over time around that deterministic trend**

5. Answer either (a) or (b)  
(a) Why is the Personal Saving Rate as reported by the NIPA almost certainly an understatement of the true saving rate? (b) What is the dilemma in trying to assess the role of housing price changes in inflation measures?

**Saving Rate = Y – C; NIPA data under reports Y by excluding unrealized increases in asset values such as real estate and stocks; It over-reports consumption by including consumer durables   
  
Housing prices are valued at the implicit rental value to owner occupied houses, not at the sales price. This values the home at its consumption value to owners. Using sales prices would value homes at the asset (investment) value. In reality, housing contains some of both values.**