FINAL EXAM FOR FIRST HALF

This exam is due at noon Friday, October 27. I prefer that the submissions be in electronic form, by email. If your answers are handwritten, stick them under my office door, or give them to me if I am there, and send me an email saying you have done so.

You are not to discuss the exam with anyone else between noon Thursday and noon Friday, when it is due.

(1) Consider a farmer who grows wheat. He uses some of it to make bread for himself, and he sells the rest in a competitive market at price P for apples, which he eats. $\bar{W}$ is the amount of wheat he has grown, W is the amount of wheat he eats, and A is the amount of apples he eats. His utility is

$$U(W,A) = \sqrt{W} + \sqrt{A}$$

and his budget constraint is of course

$$A = P \cdot (\bar{W} - W) .$$

He knows $\bar{W}$ but is uncertain about P, and has an initial distribution for it with density

$$g(P) = Pe^{-P} ,$$

i.e. a Gamma(2) pdf. He has a cost of information of θ units of utility per nat and wishes to choose W and his information to maximize expected utility minus information costs.

(a) Write down the objective function and constraints for this problem.
(b) Display the first order conditions for an optimum for the problem.
(c) Find the pdf of W in the case when the cost of information θ is zero. What is its support?
(d) See if you can prove that the distribution of W cannot have the full support of the $\theta = 0$ solution when $\theta > 0$. [Note that, unless you decide you want to prove it's discretely distributed, this argument should not require invoking properties of analytic functions. You will get some credit for describing a reasonable attempt at a proof, even if you can't fully complete it.]

Date: October 26, 2017.

(2) In the Davig and Leeper long run Taylor principle paper, they work out a condition on the inflation coefficients α_1 and α_2 and the transition probabilities that they call the long run Taylor principle. But at the start of the theorem they rule out $\alpha_i < p_{ii}$ for either regime. They say that this is to "restrict the α's to the space containing the economically interesting portion of the hyperbola, in which monetary policy seeks to stabilize, rather than destabilize, the economy". Can there in fact be stable solutions when $\alpha_i < p_{ii}$ for some i? If so, what is unreasonable about them? What do Davig and Leeper mean by saying these cases imply the monetary authority is trying to destabilize the economy?