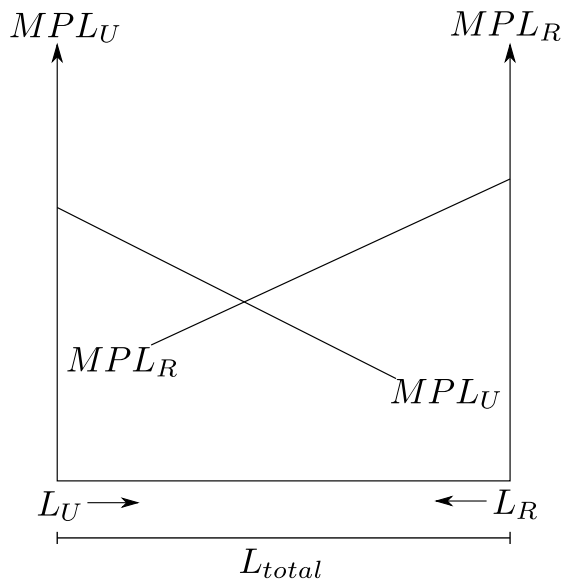# Final Exam

You have until 3:30pm to complete the exam, be certain to use your time wisely. Answer all questions directly on the exam. Calculators may not be used. Remember to put your name on the exam. Good luck!

Name: **ID Number:**

1. (15 points) Suppose that the United States had severely restricted immigration beginning in the 1870s rather than in the early 20th century. How would you expect the growth of the American economy in the late 19th and early 20th century to differ with these strict immigration restrictions relative to the actual experience of the economy? Be certain to fully explain your answer.

2. (25 points) The graph below shows the marginal product of labor in urban areas (MPL_U) as a function of the number of workers in urban areas (L_U) and the marginal product of labor in rural areas (MPL_R) as a function of the number of workers in rural areas (L_R). The total number of workers in the economy is given by L_{total}, the width of the horizontal axis. Use the graph to answer the following questions.

   (a) Show the initial equilibrium distribution of workers between the urban and rural areas. Label the equilibrium number of workers in urban areas L_U^a and the equilibrium number of workers in rural areas L_R^a. You can assume that labor markets are competitive and people can move freely between urban and rural areas.

   (b) Now suppose that because of technological innovations, workers in manufacturing become more productive. If manufacturing is concentrated in urban areas, show the effects this will have on the equilibrium distribution of workers by labeling the new equilibrium number of workers in urban areas L_U^b and the new equilibrium number of workers in rural areas L_R^b. Be certain to show any relevant changes to the marginal product of labor curves.

   (c) Briefly explain what effect this increase in manufacturing technology will have on wages in urban and rural areas.

   (d) Assume that these changes in manufacturing technology are occuring in the mid-19th century. Explain what you would expect to happen to average life expectancy as a result of the changes you identified in parts (b) and (c).

3. (10 points) We discussed in class the Industrious Revolution and the associated increase in the female labor force participation rate. Explain the effects that this increase in the labor force participation rate of females had on both the supply of manufactured goods and the demand for manufactured goods during the early industrialization period.

4. (10 points) Discuss two different reasons that the health outcomes of slave children were significantly worse that the health outcomes of white children living in the same areas.

5. (15 points) Recall our discussion of changes in the human capital stock over the 20th century. One way we looked at measuring the human capital stock was by measuring the labor force as the number of workers (L) multplied by the efficiency of a unit of labor (E).

   (a) How does accounting for the efficiency of labor affect the interpretation of the sources of economic growth over the 20th century? In particular, if we use $E \cdot L$ to measure labor input in our growth accounting equations, which sources of growth look more important and which look less important in accounting for growth in income and income per person than when using just L as the measure of labor input? Be certain to explain your answer (you may use equations in your answer but they are not necessary).

   (b) What sorts of data do we have available to us for estimating how the human capital stock was changing over the 20th century? What aspects of the human capital stock do these data fail to capture?

6. (10 points) One of the debates about slavery was whether it was still profitable to raise additional slaves from birth on the eve of the Civil War; in other words, whether there would have been an economic incentive to continue to raise future generations of slaves in the absence of the Civil War. Suppose that you had data on the auction prices of male and female adult slaves for the decades leading up to the Civil War. What patterns in the data would convince you that it was becoming more or less profitable to own adult slaves on the eve of the Civil War? What patterns would convince you that it was becoming more or less profitable to raise a slave from birth? Note that the data is for adult slaves, not slave children.

7. (15 points) What are two possible reasons for the decline in American birth rates over the 19th century? Be certain to clearly explain the logic underlying each reason.