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## Midterm Exam

You have until 3:20pm to complete the exam, be certain to use your time wisely. Answer all questions directly on the exam. You may use printouts of the required readings with any notes you have written on those printouts. No other materials may be used during the exam. Answer questions completely but concisely. Including additional incorrect information in an otherwise correct answer may result in a loss of points. Remember to put your name on the exam. Good luck!

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**Name:**

1. (15 points) We argued in class that in the Malthusian world, technology shocks like various new agricultural technologies tended to increase population density but not income per capita. Focusing on the arguments made by North and Thomas, explain why these technology shocks in the Malthusian world may have been essential to achieve the sustained technological innovation and steady income growth beginning with the Industrial Revolution.

2. (30 points) Among the key assumptions underlying our simple Malthusian model are that birth rates rise as income per capita increases and death rates fall as income per capita increases.
- (a) Briefly explain why we expected births to be positively correlated with income and deaths to be negatively correlated with income in the Malthusian world.
  - (b) We have seen that in the modern world, the relationship between births and deaths is nearly flat. Suppose that this were also the case in the pre-industrial world. How would this change the impact of a positive technology shock on income per capita in the short run and in the long run compared to a society with an upward sloping birth rate curve? Fully explain your answer. Use clearly labeled graphs if helpful.
  - (c) Still assuming there is a flat birth rate curve as in part (b), think about a society in which the wealthy can afford unhealthy vices (cigars, whisky, etc.) that decrease life expectancy but the poor cannot, leading to higher death rates among wealthy individuals than poor individuals. What would the short term and long term effects of a positive technology shock be on income per capita and population? Fully explain your answer. Use clearly labeled graphs if helpful.

3. (25 points) In ‘The Colonial Origins of Comparative Development’ Acemoglu, Johnson and Robinson measure institutions using the following variables:
- An index measuring the level of protection against expropriation.
  - An index measuring the level of constraints on the executive.
  - An index measuring the level of democracy.
- (a) For each of these three measures, explain why you would expect higher values of the measure to be associated with greater economic growth.
- (b) Provide examples of two institutions that are important for economic growth but not captured by these measures. For each example, explain why the institution is beneficial for economic growth.
- (c) Would you expect the modern day presence of the institutions you described in part (b) to be correlated with European settler mortality rates? Fully explain your answer.

4. (30 points) Recall our growth accounting equation in per capita terms:

$$g_y = g_A + a \cdot g_k + c \cdot g_z \quad (1)$$

where  $g_y$  is the growth rate of output per worker,  $g_k$  is the growth rate of capital per worker and  $g_z$  is the growth rate of land per worker. The share of total payments going to capital is  $a$  and the share of total payments going to land is  $c$ . Suppose we had access to all data necessary to calculate each of these parameters in the century before Britain's industrialization and during industrialization. For each component of the growth accounting equation above ( $g_y$ ,  $g_A$ ,  $g_k$ ,  $g_z$ ,  $a$  and  $c$ ), explain how and why its value would differ from the century before industrialization to the period during industrialization.