Final Exam

You have three hours to complete the exam, be certain to watch the clock and use your time wisely. Answer questions completely but concisely. Including additional incorrect information in an otherwise correct answer may result in a loss of points. As a rough rule of thumb, five points typically take two well-crafted sentences to answer correctly and completely. So a 10-point question typically requires four concise sentences to answer. Note that the exam is written to take one and a half hours, so if you find yourself writing for far longer than that, you are likely including too much in your answers. You may refer to hard copies of your notes, the lectures slides, and the readings. Good luck!

Name:

ID Number:

1. (20 points) Many of the different theories we discussed regarding the Industrial Revolution and the transition to our world of modern growth related to changing institutions. Underlying many of these arguments was that certain institutions promote the steady innovation that allows for continued economic growth in the modern world.

    (a) Identify two different specific institutions that promote innovation. For each, provide an explanation of why that institution promotes innovation.

    (b) Explain why each of these institutions was either absent or ineffective at promoting innovation in the pre-industrial world.

    (c) While sustained innovation is associated with steadily increasing income per capita, those gains in income may be distributed very unevenly. For one of your two institutions, explain whether you think the institution tends to promote greater or lesser income inequality in a society.

2. (25 points) When working through possible explanations for the Great Divergence, we thought about stories of managerial inefficiency and worker quality. These stories were motivated by observing that less developed countries used similar amounts of capital yet more workers to produce textiles compared to Britain.

   (a) Explain why, in the absence of differences in manager or worker quality, we would expect less developed countries to use more labor and less capital to produce textiles compared to Britain.

   (b) One argument against a managerial inefficiency story is that Britain was exporting managers to countries like India. The reasoning is that they are the same managers and therefore should be equally competent in Britain and in India. Explain one reason that this might not be the case. In other words, explain why the same manager might run a factory more efficiently in Britain than in India.

   (c) Describe one type of data you could use to test whether your hypothesized reason in part (b) is in fact taking place.

   (d) For the worker quality story, we spent most of our time thinking about worker health as a source of cross-country differences in worker productivity. Give an example of one other source of differences in textile worker quality across countries.

   (e) Describe one type of data that you could use to measure differences across countries in the source of worker quality you discussed in part (d).

3. (25 points) Below is a copy of Table 1 from Goldin and Katz (1998). The table summarizes the predicted effects on workers of three major technological changes: the shift from artisanal or hand trades to factory production, the shift from factory production to assembly-line production, and the shift from assembly-line to continuous process methods.

TABLE I
PREDICTIONS OF THE FRAMEWORK

Technological change	K/Q	$K/(L_s + L_u)$	$L_s/(L_s + L_u)$
(a) Shift from artisanal or hand trades (H) to factory production (F)	↑a	?b	↓c
(b) Shift from factory (F) to assembly-line (A) production (Hicks-neutral technical change)	↓	→	→
(c) Shift from assembly-line (A) to continuous-process (or batch) methods (C)	↑	↑	↑

K = capital stock.
L_s = skilled or more-educated labor.
L_u = unskilled or less-educated labor.
  a. The prediction is obtained when $(\lambda_F^k/\lambda_H^k) < [(1 - \alpha_F)/(1 - \alpha_H)] \cdot (r_H^*/r_F^*)$. That is, considering the restrictive case discussed in the text of equal r^* for H and F, the prediction is correct only if the higher K^*-intensity for the H technology is outweighed by the greater use of K in the creation of K^* in the F technology.
  b. The impact of (a) on $[K/(L_s + L_u)]$ is ambiguous in the case when $[L_s/(L_s + L_u)]$ declines.
  c. The prediction holds in the restrictive case of equal r^* for H and F. When the r^*s differ, the condition is $(r_H^1/r_F^1) < [(\alpha_F/\alpha_H)] \cdot [(1 - \alpha_H)/(1 - \alpha_F)] \cdot (\lambda_F^1/\lambda_H^1)$.

Let's consider two more recent (potentially) massive technological changes: the introduction of the internet in the 1990s and early 2000s and the introduction of artificial intelligence tools such as ChatGPT in just the past couple of years. In the table below, show your predictions for the direction of the change in the capital-output ratio, the capital-labor ratio, and the skilled share of workers for both of these technological changes. For each of your arrows, provide a one- to three-sentence explanation of why you expect the effect to go in the direction you chose.

Technological change	K/Q	$K/(L_S + L_U)$	$L_S/(L_S + L_U)$
(4) Introduction of the internet			
(5) Introduction of AI tools			

4. (20 points) We have looked at several papers that use *natural experiments* to attempt to establish the mechanisms behind certain features of economic development. These papers use some sort of sharp variation in the explanatory variable of interest driven by a quasi-random shock to estimate a causal impact of that variable on the outcome of interest. If the shock is sufficiently random, this can be a highly effective way to make a convincing argument for a causal relationship. However, if that shock is driven by other variables related to the outcome of interest, we cannot disentangle the effects of those other variables from the effect of the explanatory variable we care about.

   (a) Think about a reading, either required or non-required, that used a natural experiment that you found particularly convincing. Explain what the explanatory variable and outcome variable of interest were in the reading as well as what the shock generating variation in the independent variable was. Explain why you consider this a particularly convincing natural experiment.

   (b) Now think about a reading, either required or non-required, that used a natural experiment that you found particularly unconvincing. Explain what the explanatory variable and outcome variable of interest were in the reading as well as what the shock generating variation in the explanatory variable was. Explain why you consider this a poor natural experiment.

5. (10 points) The five assignments you completed were intended to give you experience finding data, interpreting it, and understanding its limitations in ways that complemented our lecture material. This was the first version of all five assignments and clearly there is room for improvement. This question is designed to get your feedback on those assignments to help revise them for future semesters. Full credit will be given for any reasonable responses.

   (a) Which assignment do you think you gained the most from? What aspect of the assignment's design made it effective and what is one key takeaway from completing the assignment? Your answer can be as short as two sentences.

   (b) Explain a change you would make to one of the five assignments to make it more effective. This could be adding a component, dropping a component, changing the instructions or something else. In two sentences explain what the change is and why you think it would be useful.