Instructions

• Answer a total of **FOUR** out of the six questions.

• Identify yourself by code letter, not name, on all pages.

• Start each answer at the top of a new page.

• Number the pages of your answers.

• You have four hours to complete the examination.

• This is a closed book exam. No notes, articles, books or other sources may be used other than the copy of the article that is provided with this exam.

• Always identify your assumptions and define any notation used. Some questions intentionally do not fully specify assumptions or methods. You should make appropriate choices to complete your answers. Explain your choices carefully.

• Citing specific *relevant* literature is beneficial.
1. Directly or indirectly, parts (a) - (c) concern the paper by Meer and West (MW), distributed in advance.

   a. MW take an different position about state- or county-level trends than most other papers about minimum wages. Explain the argument that motivates state- or county-level trends in other research and why MW take a different stance.

   b. Explain the point made by MW’s Figure 3.

   c. MW find that minimum wages have a negative employment effect. Probably the most prominent paper finding essentially no effect is that of Dube, Lester, and Reich. Critically contrast their empirical approaches and interpretation of results.

   The prelim committee will be especially impressed if you spotted the subtle mistake made by MW in the regression specifications in their Table 3 (you need to read the notes).

   Dube, Lester, and Reich’s main results table is attached for your reference.

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2. The workers’ compensation system in the U.S. provides income replacement for workers who were injured on the job. Benefits are scaled to the worker’s earnings up to some maximum, which varies from state to state. In 1982, Michigan raised the maximum benefit by more than 50 percent. They did not change the benefit levels for lower-income workers whose benefits would not be at the maximum.

Injured workers have some flexibility about when they return to work, though they must resume work once their recovery has been certified by a doctor. Meyer, Viscusi, and Durbin (MVD) studied whether raising the maximum benefit had incentive effects for labor supply.

MVD had data on the following variables for individuals who began receiving benefits during the year before and the year after the policy change: (i) total time receiving benefits, (ii) previous earnings, (iii) an indicator for whether the worker’s earnings were high enough to be affected by the policy change, (iv) age, (v) sex, (vi) medical costs associated with the injury, and (vii) whether the injury resulted in hospitalization.

a. Use a static labor supply model to illustrate how increasing the maximum benefit would affect workers’ decision to return to work. Explain how your static model connects to weeks receiving benefits.

b. Based on the data described above, formulate and explain a regression model for ln(weeks of benefits) that could be used to test the predictions of the labor supply model (a linear model, not a duration/hazard model). In particular, be sure to explain what feature(s) of the econometric model tests the labor supply predictions.
3. Martha Bailey argues that availability of the first oral contraceptive allowed women to effectively determine the timing of their fertility.²

a. From a life-cycle perspective, discuss the theoretical implications of the ability to control fertility for human capital accumulation, labor supply, and total fertility.

b. Discuss three examples of empirical evidence from Bailey and/or others about the effects you discussed in part (a).

4. A large (hypothetical) employer in St. Louis hires an outside firm to develop an algorithm to help screen potential employees. For simplicity we’ll assume that the algorithm outputs either a high (good) score or a low (bad) score. The algorithm is based on performance (productivity) and demographic data including home zip code for existing and previous employees. The firm’s human resources department makes decisions based on this score and other information; they do not automatically screen out applicants with bad scores.

Investigation reveals that applicants from East St. Louis nearly always receive bad scores. East St. Louis is a predominantly black city (more so than the rest of the metropolitan area), but the algorithm does not use race.

a. Use an explicit model (i.e., write out the model) of statistical discrimination to predict the effect of using the algorithm on East St. Louis applicants and on other applicants.

You may consider either hiring or wage offers as your outcome variable. (Your model will need different assumptions in these two cases.)

*Clearly state any additional assumptions and define your notation.*

b. Will the algorithm have a disproportionate impact for black applicants despite the fact that it does not explicitly incorporate race? Explain briefly how your answer follows from your model.
5. One of the core questions in personnel economics is how employers can induce optimal performance from their employees. Among the strategies that employers use (according to economists) are piece rates, promotion tournaments, subjective performance evaluation, and efficiency wages.

a. Describe the key characteristics of each of these, especially the aspects that distinguish them from one another. Pay special attention to the information employers must have and the characteristics of that information (e.g., who can observe it?).

b. Describe at least one drawback or limitation of each strategy relative to the others.
6. In his 2009 paper Lazear proposed a new way of thinking about specific and general human capital. Imagine Lazear’s idea embedded in a search model of the labor market with the following characteristics.

- Two skills are used in the economy. Skill A is used by all employers. Skill B is used only by a fraction $\alpha$ of employers. Training to acquire skill $j$ costs $C_j$.
- When worker and employer meet, they bargain over the wage and the cost of training if needed. Assume that workers are not liquidity constrained; they can pay for training.
- Exogenous separations occur at rate $\lambda$. There are no productivity shocks to cause endogenous separations.
- Workers exit the labor force at a constant exogenous rate and are immediately replaced by new workers who have no skills. (This is not important for the questions below except that it means there are always workers who need to acquire skills.)

You do not need to put together a search model for this question. Instead you should rely on Lazear’s insights from and insights from search theory.

a. How would you expect the costs of acquiring skill A to be distributed between worker and employer? What about skill B? Explain briefly.

b. How would the sharing of training costs change as $\alpha$ changes? As $\lambda$ changes? Briefly explain each answer.

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**Table 2. Minimum Wage Effects on Earnings and Employment**

<table>
<thead>
<tr>
<th></th>
<th>All-County Sample</th>
<th></th>
<th>Contiguous Border County-Pair Sample</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
<td><strong>In Earnings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnMWt</td>
<td>0.224***</td>
<td>0.217***</td>
<td>0.204***</td>
<td>0.195***</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.028)</td>
<td>(0.038)</td>
<td>(0.034)</td>
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<tr>
<td>lnMWt</td>
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<tr>
<td></td>
<td>-0.211**</td>
<td>-0.176**</td>
<td>-0.028**</td>
<td>0.054**</td>
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<td></td>
<td>(0.095)</td>
<td>(0.096)</td>
<td>(0.066)</td>
<td>(0.068)</td>
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<tr>
<td>lnpop or lnpop+lnat.pr.s</td>
<td></td>
<td>1.04***</td>
<td>1.05***</td>
<td>1.07***</td>
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<tr>
<td></td>
<td>(0.060)</td>
<td>(0.058)</td>
<td>(0.048)</td>
<td>(0.043)</td>
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<tr>
<td>Census division × period dummies</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>State linear trends</td>
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<tr>
<td>MSA × period dummies</td>
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<td>Y</td>
<td>Y</td>
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<tr>
<td>Total private sector</td>
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Sample size equals 99,880 for specifications 1, 2, and 3 of the all-county sample and 48,348 for specification 4 (which is limited to MSA counties) and 70,620 for the border county-pair sample. All of the employment regressions control for the log of annual county-level population. Total private-sector controls refer to logs of average total private-sector earnings or log of employment. All samples and specifications include county fixed effects. Specifications 1, 3, and 5 include period fixed effects. Specification 3 also includes state-level linear trends. For specifications 2, 4, and 6, period fixed effects are interacted with each census division, metropolitan area, and county-pair, respectively. Robust standard errors, in parentheses, are clustered at the state level for the all-county samples (specifications 1–4) and on the state and border segment levels for the border pair sample (specifications 5 and 6). Probability values are reported for tests under the null hypothesis that the minimum wage coefficients are equal across specification 1 and specifications 2, 3, and 4 and between specifications 5 and 6. For the labor demand elasticity, we jointly estimate the earnings and employment equations using seemingly unrelated regression, and the labor demand elasticity is computed as the ratio of the employment effect divided by the earnings effect. The standard errors for the SUR are clustered at the same level as indicated before. Significance levels: **0.1%, ***0.5%, ****1%.

Source: Dube, Lester, and Reich (2010).