14.773 Political Economy of Institutions and Development  
Problem Set 1  
Due February 25, 2003

1) Ellickson *Order without Law*

The following facts come from the Ellickson book, which you are highly recommended to read.

- Cattle in Shasta County, CA may graze on pastures located within either *open range* or *closed range* sections of the county. On a closed range pasture, a cattle owner is responsible for all damages his cattle do to a neighbor’s property, even if the cattle owner was not negligent. In an open range section, a cattle owner is not responsible for damage caused by her cattle to crops, pasture or other property of her neighbors, unless her neighbor has constructed a legal fence to protect his land.

- In the open range sections of Shasta County, residents do not know all the legal conditions ascribing rights for trespass damages. Cattle owners tend to attempt to keep their cattle off their neighbors’ lands, and trespass victims rarely sue in order to recover damages. When cattle trespass does occur, the cattle are usually rounded up by both their owner and the trespass victim within 48 hours.

- In the open range sections of Shasta County fence costs are usually born proportionally to how many cattle each property owner has, with reversion to focal points (50-50, all or nothing, you-materials/me-labor).

- Neighbors interact on a variety of issues including water supply, controlled burns, fence repairs, social events and staffing the volunteer fire department.

- Neighbors communicate with each other extensively. Individuals usually attempt to maintain a good reputation associated with their family name. Negative truthful gossip usually engenders a resolution of the quarrelsome issue quickly.

- Residents of open range sections of the county have different size tracts and primary occupations. Some are large scale cattlemen, others are simply owners of small scale country homes, ranchettes.

- Residents who have been part of the county for many generations tend to follow the norm against legislation. New residents or those who are soon to leave are most likely to litigate in order to enforce property rights. Nearly all long term residents oppose legislation that would close the range. Closing the range would enforce property rights and end the string of informal arrangements that have ruled interactions on the open range.

A) Create a model that explains these above facts, emphasizing how cooperation arises without enforcement by the state. The model need not necessarily be mathematical, but it should be concise and address the stylized facts at issue.
B) Show under this model how state intervention could be counterproductive, in the sense that Shasta residents would oppose state imposed closure of the range, and it would reduce total welfare.

2) Controlling Politicians Model from Class, Section 2.5.

All agents have utility given by \( \sum_{t=0}^{\infty} \beta c_t \), where \( c_t = \theta_t(1-x_t) \). \( \theta_t \) is the state of nature and \( x_t \) is the amount the politician steals in period \( t \). Politicians have a utility function of \( \sum_{t=0}^{\infty} \beta x_t \) (note this is a different utility function from the lecture notes). Voters coordinate on the decision to replace a politician based only on the current realization of variables.

A) Let \( \theta_t = 1 \) for all \( t \). What is the optimal decision to replace rule for the voters? What is the value of remaining in office for the politician? What is the politician's optimal strategy?

B) Let \( \theta_t \) be distributed uniformly from \([\theta, \bar{\theta}]\) and be observable only to the politician. What is the optimal decision to replace rule for the voters? What is the value of remaining in office for the politician? What is the politician’s optimal strategy?

C) Let \( \theta_t \) be distributed uniformly from \([\theta, \bar{\theta}]\) and be observable to both the politician and the voters. What is the optimal decision to replace rule for the voters? What is the value of remaining in office for the politician? What is the politician’s optimal strategy?

D) Is the politician extracting higher rents in the second or third case? How much more? Why?

3) Pitfalls of Empirical Work

Consider the following regressions. In each case, explain the reasoning and criticize it. Feel free to elaborate as much as you like, in particular, giving suggestions of how you would improve on the empirical strategy. For research strategies that have not yet been discussed in class, use your knowledge of applied econometrics to comment on the approach.

A) A researcher wants to find out whether greater ethnic fragmentation leads to worse political decisions. For this reason, she runs a regression of the fraction of local government revenues in U.S. cities spent for education on an index of ethnic diversity in the city.

B) A researcher wants to find out whether common (British) law leads to better political outcomes. For this reason, he runs a regression of an index of corruption on a dummy for having common law rather than French civil law or German legal code.

C) Another researcher wants to answer the same question, and he runs regression of an index for corruption on a dummy for having common law, and instruments this using a dummy for having been a British colony.

D) A researcher wants to investigate the relationship between democracy and inequality, so he runs a regression of various measures of democracy on measures of inequality.

E) A researcher wants to investigate whether political instability in a country's neighbors has a negative effect on economic performance. So he runs a regression of log income
on a variety of controls, an index of political instability in the country, and the average of the index of political instability among the country's neighbors.

F) A researcher wants to investigate the relationship between inequality and growth, so he runs a regression of growth on initial inequality using cross-sectional data. He also runs a panel regression of growth in a five-year period on inequality during the five-year period, as well as country fixed effects and time effects.

4) Acemoglu, Johnson, Robinson *Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution*

In their paper, Acemoglu, Johnson and Robinson study countries colonized by European powers during the past 500 years. They find that countries that were relatively richer and more densely populated in 1500, tended to be relatively poorer and less industrialized today compared to other colonized countries that were not as well off in 1500.

Is this fact consistent with a view that institutions are important? If not, elaborate. If the fact is consistent, develop an argument explaining this reversal of fortune, in the context of institutions. Pay special attention to why institutions may not have changed, why some actors may oppose institutional change even if it is socially beneficial, and how these factors affecting institutional change may have interacted with industrialization.

5) Class Conflict and Cooperation Model from Class, Section 2.3.

Consider a dynamic economy with two groups: capitalists and workers. Capitalists begin each period with an endowment $e$ of capital, and decide how much to invest of this to be used with workers. All consumption is at the end of the period and total consumption of a capitalist is his returns from investment plus what he has not invested $(e - k)$. Normalize the numbers of capitalist and workers each to 1.

Aggregate production is $F(k, l) = f(k)$. $f''(e) < 0, f'(e) > 1, f'(e) > 1 - \mu$

In any period workers have the ability to expropriate a fraction $\mu$ of total output, and both capitalists and workers have a discount factor $\beta$.

A) Consider the set of stationary equilibria where capitalists offer $\delta f(k)$ to workers in each period, and if workers expropriate anything more than $\delta$, there is no investment again in the future. Assume that if a capitalist invests (i.e. workers have never expropriated more than $\delta$), then each capitalist invests until net marginal return to investment equals the return from the storage technology. Clearly define the strategies of the capitalists and workers. What values of $\delta$ and $k$ are sustainable? Draw a graph with $k$ on the x-axis and $\delta$ on the y-axis that shows the combinations for which a equilibrium is sustainable.

B) Suppose capitalists can collude, such that one capitalist can make decisions on behalf of the capitalist class, and all capitalists then follow her decision in solidarity. What is the set of $\delta$ and $k$ they can support? (again you may assume a trigger strategy reverting to autarky) Redraw your graph from A). Compare the set of sustainable equilibria in B) to the set in A). Why is the set of B) larger?

C) Suppose that workers collude and find a way to increase $\mu$. Redraw your graphs from part A) and B)? Is this a Pareto improvement?

D) What is the effect of workers and capitalists becoming less patient? Again, redraw your graphs and state the effects upon $\delta^*$ and $k^*$. 