# 14.75 : Conflict Lecture

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# Outline

- Theory

  The puzzle: why do wars happen
  Some answers: Bias, commitment problems

- Empirics:

  Resources and conflict
  Leaders and conflict
  Cost of conflict

# The puzzle

- The key puzzle in conflict is why wars happen at all
- Why is this a puzzle?

# The puzzle

- Here is a very simple model of wars.

  Based on Jackson and Morelli model – this is a simpler version, we'll do the full version later in this lecture.

- Two countries: $i$ and $j$. Let $w_i$ denote wealth of country $i$
- Let's suppose that $w_i > w_j$.
- Suppose that country $i$ can decide whether or not to start a war with country $j$.
- If war exists, $i$ wins with probability $p_i\left(w_i, w_j\right)$, with $\frac{\partial p_i}{\partial w_i} \geq 0$ and $\frac{\partial p_i}{\partial wj} \leq 0$

  $p_i$ is called the *Contest Success Function*
  For now, let's assume a very simple contest success function

$$p_i = \frac{w_i}{w_i + w_j}$$

  What is the interpretation of this function?

# Costs and benefits of war

- Costs and benefits:

  War costs $C$.
  If $i$ wins, it gains fraction $G > 0$ of other country's wealth.
  So if $i$ wins $i$ ends up with

  $$w_i - C + Gw_j$$

  and if $i$ loses $i$ ends up with

  $$w_i - C$$

# Conditions for war

- When will $i$ start a war?

  $i$ will start a war if expected gains are greater than expected losses
  So

$$\begin{aligned} \frac{w_i}{w_i + w_j} G w_j - C &> 0 \\ \frac{w_i}{w_i + w_j} G w_j &> C \end{aligned}$$

  So gains from war are increasing in $G$, decreasing in $C$. If $G$ is high enough or $C$ is low enough, we can get war in equilibrium.
  In this particular model, they are also decreasing in inequality (i.e. they are increasing in $\frac{w_i w_j}{w_i + w_j}$. This is maximized at $w_i = w_j$. But this is less general).
  So far, no puzzle.

# The puzzle

- What is the puzzle?
- Suppose everyone knows that the parameters are such that

$$\frac{w_i}{w_i + w_j} G w_j > C$$

  so $i$ will prefer to attack $j$.
- What will $j$ do?
- $j$ will prefer to just pay $i$ to avoid the war
- In particular, suppose $j$ offers to pay $i$

$$\frac{w_i}{w_i + w_j} G w_j - C + \varepsilon$$

  in exchange for a peace treaty.
- $i$ will clearly accept this since this is greater (by $\varepsilon$) than gain from war

# Peace treaties

- Will this be better for $j$? Under war, $j$ will end up with

$$w_j \left(1 - \frac{w_i}{w_i + w_j} G\right)$$

since it will lose $Gw_j$ with probability $\frac{w_i}{w_i + w_j}$.

- It will prefer to make the payment of

$$\frac{w_i}{w_i + w_j} Gw_j - C + \varepsilon$$

if

$$\begin{aligned} w_j - \left(\frac{w_i}{w_i + w_j} Gw_j - C + \varepsilon\right) &> w_j \left(1 - \frac{w_i}{w_i + w_j} G\right) \\ - \left(\frac{w_i}{w_i + w_j} Gw_j - C + \varepsilon\right) &> w_j \frac{w_i}{w_i + w_j} G \\ C - \varepsilon &> 0 \end{aligned}$$

- So as long as $\varepsilon$ is positive but not too large relative to $C$, $j$ will prefer to make this payment, $i$ will accept it, and there will be peace.

# The puzzle

- This is the puzzle about war:

  The costs of war are just social losses $C$. Everyone loses $C$.
  The gains from war are (usually) a transfer.
  So it's Pareto improving to just make the expected value of the transfer anyway and avoid the social losses $C$.
  This is one view of diplomacy, peace treaties, etc.

- But this argument says that wars should never happen. Yet they do.
- Why?
- One answer is that wars are mistakes

  Grim trigger strategy with mutually assured destruction, but with noise you can get wars

- But why might there be rational reasons for war?

  What answers does Fearon give?

# Reasons for wars

- Some reasons people might choose wars:

  Irrationalities
  Divergent interests between leaders and citizens
  "Rational reasons"

    Private information about relative capabilities and problems (or misincentives) to communicate that information
    Commitment problems
    Indivisibilities

- There are models of each of these – I will focus on a model of leaders, transfers, and commitment

# A model of leaders, transfers, commitment, and war

## Jackson and Morelli (2007): "Political Bias and War"

- This is now the full model in Jackson and Morelli - it's slightly different than the version I started with.
- Two countries: $i$ and $j$. Let $w_i$ denote wealth of country $i$
- Either country can choose to start a war
- If war exists, $i$ wins with probability $p_i(w_i, w_j)$, with $\frac{\partial p_i}{\partial w_i} \geq 0$ and $\frac{\partial p_i}{\partial wj} \leq 0$. This is the Contest Success Function.
- Costs and benefits:

  War costs fraction $C > 0$ of each country's wealth. This cost is now proportional to wealth (whereas in the earlier model it was a fixed cost). If a country wins, it gains $G > 0$ of other country's wealth.
  So if $i$ wins $i$ ends up with

$$w_i(1 - C) + Gw_j$$

  and if $i$ loses $i$ ends up with

$$w_i(1 - C - G)$$

# Leaders

- Leaders:

  Leader $i$ controls fraction $a_i$ of country's wealth $w_i$
  If there is a war and $i$ wins, leader $i$ obtains fraction $a_i'$ of $Gw_j$
  Denote $B_i = \frac{a_i'}{a_i}$ to be the "political bias" of country. What is this?

- So leader will choose war if

$$a_i' p_i G w_j > [C + (1 - p_i) G] a_i w_i$$

  or equivalently

$$B_i p_i G w_j > [C + (1 - p_i) G] w_i$$

- So range of parameters where $i$ prefers war:

  Increasing in $B$ and $G$, and decreasing in $C$
  Depends only on the ratio of $\frac{C}{G}$ and not on levels
  Depends only on $B$ and not on values of $a$ and $a'$

# Analysis

- Proposition: If probability of winning is proportional to relative wealth ($p = \frac{w_j}{w_j + w_i}$), then with no bias there will be no war

  To see this, recall that $j$ prefers war if

  $$B_j p_j G w_i > \left[C + \left(1 - p_j\right) G\right] w_j$$

  Substituting yields:

  $$B_j \frac{w_j}{w_j + w_i} G w_i > \left[C + \frac{w_i}{w_j + w_i} G\right] w_j$$

  and rearranging yields

  $$\frac{\left(B_j - 1\right) G w_i}{w_i + w_j} > C$$

  So if there is no bias ($B_j = 1$), then $j$ will never prefer war.
  Intuition: as $w_i$ increases, gains from war increase but probability of winning decreases, and with proportional probability of winning these effects exactly cancel

- Not general: with other probability functions, one country can prefer

# Analysis

## Case 1: No transfers

- Recall country $i$ wants war if

$$B_i p_i G w_j > [C + (1 - p_i) G] w_i$$

and country $j$ wants war if

$$B_j p_j G w_i > [C + (1 - p_j) G] w_j$$

- Proposition 1:
  1. If $B_i = B_j = 1$, then at most one country wants to go to war
  2. Fixing $\frac{C}{G}$, if $B_i$ and $B_j$ are both sufficiently large, then both countries want to go to war
  3. Fixing $B_i$ and $B_j$, if $\frac{C}{G}$ is sufficiently large, then neither country wants to go to war

# Proofs

- Proof of part 1
- If $B_i = B_j = 1$, then the conditions for war are:

$$\begin{aligned} \text{i:} \quad & p_i G w_j > \left[C + (1 - p_i)\, G\right] w_i \\ \text{j:} \quad & p_j G w_i > \left[C + (1 - p_j)\, G\right] w_j \end{aligned}$$

- Suppose wlog that $i$ wants war, so

$$p_i G w_j > \left[C + (1 - p_i)\, G\right] w_i$$

- Want to show

$$\begin{aligned} p_j G w_i &< \left[C + (1 - p_j)\, G\right] w_j \\ (1 - p_i)\, G w_i &< C w_j + p_i G w_j \\ (1 - p_i)\, G w_i - C w_j &< p_i G w_j \\ (1 - p_i)\, G w_i - C w_i + C w_i - C w_j &< p_i G w_j \\ \left[C + (1 - p_i)\, G\right] w_i - C w_i - C w_j &< p_i G w_j \\ -C w_i - C w_j &< p_i G w_j - \left[C + (1 - p_i)\, G\right] w_i \end{aligned}$$

# Proofs

$$-Cw_i - Cw_j < p_i G w_j - \left[C + (1 - p_i)\, G\right] w_i$$

- We know that

$$\begin{aligned} p_i G w_j &> \left[C + (1 - p_i)\, G\right] w_i \\ 0 &< p_i G w_j - \left[C + (1 - p_i)\, G\right] w_i \end{aligned}$$

Since

$$0 < p_i G w_j - \left[C + (1 - p_i)\, G\right] w_i$$

and

$$-Cw_i - Cw_j < 0$$

we know that

$$-Cw_i - Cw_j < p_i G w_j - \left[C + (1 - p_i)\, G\right] w_i$$

which is what we were trying to show.

# Proofs

- Proof of part 2: Fixing $\frac{C}{G}$, if $B_i$ and $B_j$ are both sufficiently large, then both countries want to go to war
- The conditions for war are:

$$\begin{aligned} \text{i:} \quad & B_i p_i G w_j > \left[C + (1 - p_i)\, G\right] w_i \\ \text{j:} \quad & B_j p_j G w_i > \left[C + (1 - p_j)\, G\right] w_j \end{aligned}$$

- It is easy to see that sending $B_k \longrightarrow \infty$, both sides will want war

# Proofs

- Proof of part 3: Fixing $B_i$ and $B_j$, if $\frac{C}{G}$ is sufficiently large, then neither country wants to go to war
- The conditions for war are:

$$\begin{aligned} \text{i:} \quad & B_i p_i G w_j > \left[C + (1 - p_i)\, G\right] w_i \\ \text{j:} \quad & B_j p_j G w_i > \left[C + (1 - p_j)\, G\right] w_j \end{aligned}$$

- We can rewrite as

$$\begin{aligned} \text{i:} \quad & B_i p_i w_j > \left[\frac{C}{G} + (1 - p_i)\right] w_i \\ \text{j:} \quad & B_j p_j w_i > \left[\frac{C}{G} + (1 - p_j)\right] w_j \end{aligned}$$

- So once again, clearly sending $\frac{C}{G} \longrightarrow \infty$, neither side wants war
- What is the intuition here?

# Analysis

## Case 2: Transfers with commitment

- Idea of commitment

  In domestic context, commitment can be through changes in constitution, ownership of assets
  In international context, commitment can be through international institutions

- Assumption about transfers: the bias for transfer is the same as the bias for war – the leader of losing country pays $a_i$ and leader of winning country gets $a_i'$
- Transfers will avoid a war if

$$p_j\left(1+B_j\frac{w_i}{w_j}\right)-1>\frac{C}{G}>\frac{(1-p_j)\,(B_iB_j-1)}{\left(1+B_j\frac{w_i}{w_j}\right)}$$

  LHS states that country $j$ wants to go to war with $i$ in absence of transfer (same equation as before)
  RHS states that country $i$ willing to make a transfer high enough that would induce $j$ to prefer peace

- Derivation of RHS:

  $j$ prefers peace if

$$(1 - C - G)\, a_j w_j + p_j G \left( a_j w_j + a'_j w_i \right) \leq a_j w_j + a'_j t$$

  which simplifies to

$$p_j G \left( w_j + B_j w_i \right) \leq (C + G)\, w_j + B_j t$$

  Likewise $i$ prefers peace if

$$\left(1 - p_j\right) G \left( w_i + B_i w_j \right) \leq (C + G)\, w_i - t$$

  Combining these yields the RHS of the previous expression

- Recall transfers will avoid a war if

$$p_j\left(1+B_j\frac{w_i}{w_j}\right)-1>\frac{C}{G}>\frac{(1-p_j)\left(B_iB_j-1\right)}{\left(1+B_j\frac{w_i}{w_j}\right)}$$

- Propositions 2 and 3:

  With no bias, there is no war. So, in this model, the ability to make transfers prevents war (as in the simpler model we started with)
  More generally, the range of $\frac{C}{G}$ where transfers can avoid $j$ wanting to launch an attack is increasing when

  1. $B_j$ decreases, since $i$ is less likely to want to go to war, and therefore willing to pay more to avoid it
  2. $p_j$ increases, since it makes $j$ more likely to want war and $i$ more willing to pay to avoid it
  3. $\frac{w_i}{w_j}$ increases (holding $p$ fixed), for same reasons as (2)

# Analysis

## Case 2: Transfers with commitment

- Recall transfers will avoid a war if

$$p_j \left(1 + B_j \frac{w_i}{w_j}\right) - 1 > \frac{C}{G} > \frac{(1 - p_j)(B_i B_j - 1)}{\left(1 + B_j \frac{w_i}{w_j}\right)}$$

- So:

  With bias, transfers can prevent war if the bias $B_i$ of the target country $i$ is not too great

# Analysis

## Case 3: Transfers with no commitment

- Now, transfers need to be self-enforcing, i.e., after transfer takes place, aggressor needs to prefer no war to war. Why is this?
- Transfers have three effects on ex-post probability of war, which operate in different directions:

  Make target poorer and less appealing (decrease war)
  Make challenger richer, with more to lose (decrease war)
  Increase the probability that challenger will a subsequent war (increase war)

- Properties of this equilibrium:

  Cases where transfers can avoid war with no commitment are a strict subset of cases where it avoids war with commitment
  It is possible that small transfers avoid a war whereas large transfers do not (if transfer is too large, it affects the probability of victory too much and ex-post the aggressor will want to invade)

# Analysis

- Conclusions

  If probability of winning is proportional to relative wealth ($p = \frac{w_j}{w_j + w_i}$), then with no bias there will be no war, even without commitment
  With other probability functions, if you lose either unbiasedness or commitment, you can get war

- Endogenous bias

  With no transfers, everyone prefers unbiased leader, because the leader maximizes the same thing as the population
  With transfers, citizens might prefer a biased leader if it induces more transfers from the other side
  Any examples like this?

  E.g. you might elect Ronald Reagan to scare the Soviet Union, even if you think he's more prone to war than you'd like him to be

# Empirical work on conflict

- Here are some questions we'll examine:
- Where does conflict take place?
- Resources

  For civil wars, resources can have multiple impacts
  More to grab if resources go up. But also opportunity cost of fighting increases.
  Examples: changes in prices, changes in foreign aid

- Leaders

  If biased leaders can cause conflict, does changing the leader change conflict?

- The economic costs of war

  Costs of child soldiers
  Economic costs in the short run
  Economic costs in the long run

# Trends in conflict

Image removed due to copyright restrictions. Please see: Figure 1. Number and Percentage of Countries with Ongoing Civil Wars by Year from 1945-1999 from Fearson, James D., and David D. Laitin. "Ethnicity, Insurgency, and Civil War." *The American Political Science Review* 97 no. 1 (2003): 75-90.

# Patterns of where conflict occurs

Image removed due to copyright restrictions. Please see: Table 1. Logit Analyses of Determinants of Civil War Onset, 1956-99 from Fearson, James D., and David D. Laitin. "Ethnicity, Insurgency, and Civil War." *The American Political Science Review* 97 no. 1 (2003): 75-90.

# Resources and civil war

- Note we can start by using the same models as before, but think of countries as groups within the countries (i.e., $i$ = incumbent government, $j$ = rebels)
- How did resources ($w$) enter into the model above?

  Affected the amount you had to gain from winning
  Affected the probability you won
  Affected the costs of fighting (since the cost was proportional to wealth)

- What would be an effect of an increase in $w_i$ (governemnt wealth) on rebel's desire to start a civil war?

  Bigger gains from winning
  Increases costs to government of a war (e.g. more valuable factories that can get blown up; higher wages needed to pay soldiers)
  But lower probability of winning
  Net effect ambiguous

# What else might matter

- For civil war, for the rebels ($j$) the costs of fighting $C$ may be largely about opportunity cost. Why?
- Soldiers have to come from somewhere. So you have a choice:

  > Should you be a farmer and grow coffee (or whatever).
  > Or should you go join a rebel army and try to overthrow the government?

- Increasing economic opportunities for rebels (e.g. increasing the returns to growing coffee) make being a soldiers less attractive, holding everything else constant

# Testing the role of resources

## Miguel et al (2004): "Economic Shocks and Civil Conflict: An Instrumental Variables Approach"

- Suppose you just regressed probability of civil war on gdp per capita (Like Fearon and Laitin)
- Would this be a good idea? Why or why not?
- Problem is that civil war is probably very bad for economic growth
- Idea of this paper:

  We want to look for "exogenous" shocks to income and see if they affect conflict
  They propose to look at the impact of rainfall, which in very poor countries affects incomes

# Rainfall, Growth, and Conflict

- What's the regression they'd want to estimate?
- What's the first stage?
- What's the reduced form?
- What's the IV?
- What's the exclusion restriction?
- Does this seem plausible? What might you be concerned about?
- Thinking about the various ways that incomes could affect conflict, which ones would this affect?

# Specifications

- First stage:

$$g_{it} = a + X'b + c_1 \Delta R_{it} + c_2 \Delta R_{it-1} + \alpha_t + \varepsilon_{it}$$

- Reduced form:

$$conflict_{it} = a + X'b + c_1 \Delta R_{it} + c_2 \Delta R_{it-1} + \alpha_t + \varepsilon_{it}$$

- IV:

$$conflict_{it} = a + X'b + g_{it} + \alpha_t + \varepsilon_{it}$$

where we instrument for $g_{it}$ using the predicted relationship from the first stage

# Results

## First stage - Reduced form - IV

Images removed due to copyright restrictions. See: Miguel, Edward, Shanker Satyanath, et al. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112, no. 4 (2004): 725-53.
Table 2 Rainfall and Economic Growth (First Stage) Dependent Variable: Economic Growth Rate, *t*
Table 3 Rainfall and Civil Conflict (Reducted-Form)
Table Economic Growth and Civil Conflict.

# Testing conflict theories using within-country data

## Dube and Vargas (2010): "Commodity Price Shocks and Civil Conflict: Evidence from Columbia"

- Common theme of conflict theory: if you increase a country's wealth, you increase the probability a country will be attacked
- In the civil war context there are two countervailing forces:

  Increasing income increases the return from winning a conflict ($\uparrow$ fighting)
  But increasing income also raises the return to working instead of fighting to expropriate resources ($\downarrow$ fighting)
  So net effect is ambiguous, and depends on the type of shock and the factor intensity of the shock

    Increase return to capital-intensive sector might increase war if it increases returns to owning capital more than wages
    Increase return to labor-intensive sector might decrease war if it increases return to labor more than to expropriating resources

- Dube and Vargas test these ideas using within-country data from Colombia

# Empirical idea

- Empirical Strategy:

  Shocks to international oil price are shocks to expropriable sector
  Shocks to international coffee price are shocks to labor-intensive sector
  Different parts of the country specialize in oil vs. coffee, so these shocks affect each municipality differently
  Predictions? Plausible? Concerns?

- Data

  Municipal level data on all conflict incidents from 1988-2005 – 21,000 incidents in total – in 966 municipalities
  Classify municipality as coffee producing based on 1997 "National Coffee Survey"
  Classify municipality as oil producing if they contain oil reserves or oil pipelines

# Specification

- Estimate

$$\begin{aligned} y_{it} &= \alpha_j + \beta_t + (CoffeeInt_j \times CoffeePrice_t)\,\delta \\ &\quad + (Oil_j \times Oilprice_t)\,\lambda + Pop_{jt}\phi + \varepsilon_{jt} \end{aligned}$$

  where they instrument for $(CoffeeInt_j \times CoffeePrice_t)$ using $CoffeeInt_j$ times the quantity of foreign coffee exports in time $t$

- Can also include department (state) specific time trends
- Outcome variables:

  Conflict
  Wages
  Government spending

# Results

## Conflict

Table IV: The Effect of the Oil and Coffee Shocks on Violence, 1988-2005

| Dependent variables: | (1) Guerrilla attacks | (2) Paramilitary attacks | (3) Clashes | (4) Casualties |
|---|---|---|---|---|
| | | Panel A: *The oil shock* | | |
| Oil production x log oil price | 0.454 | 0.805 | 0.042 | 0.876 |
| | (1.110) | (0.139)*** | (0.656) | (1.761) |
| Oil pipe length x log oil price | -0.341 | 0.281 | -0.083 | 0.336 |
| | (0.540) | (0.113)** | (0.338) | (1.653) |
| Observations | 16,395 | 16,395 | 16,395 | 16,395 |
| | | Panel B: *The coffee shock* | | |
| Coffee int x log coffee price | -0.198 | -0.057 | -0.285 | -0.868 |
| | (0.073)*** | (0.022)*** | (0.086)*** | (0.364)** |
| Observations | 15,999 | 15,999 | 15,999 | 15,999 |
| | | Panel C: *The coffee and oil shocks* | | |
| Coffee int x log coffee price | -0.192 | -0.064 | -0.285 | -0.881 |
| | (0.071)*** | (0.022)*** | (0.087)*** | (0.359)** |
| Oil production x log oil price | 0.493 | 0.810 | 0.107 | 1.038 |
| | (1.112) | (0.139)*** | (0.661) | (1.791) |
| Oil pipe length x log oil price | -0.295 | 0.292 | -0.003 | 0.554 |
| | (0.543) | (0.113)*** | (0.334) | (1.633) |
| Observations | 15,999 | 15,999 | 15,999 | 15,999 |
| | | Panel D: *Control for department trends* | | |

# Results

## Wages

Table VI: The Effect of the Coffee and Oil Shocks on Wages, 1996-2004

| Subsample: | (1) All workers | (2) Agricultural workers | (3) Non-agricultural workers |
|---|---|---|---|
| Coffee int x log coffee price | 0.096 | 0.111 | -0.099 |
| | (0.026)*** | (0.029)*** | (1.040) |
| Oil production x log oil price | 1.100 | 0.176 | 1.818 |
| | (1.097) | (1.880) | (9.748) |
| Oil pipe length x log oil price | -0.136 | -0.149 | -0.179 |
| | (0.088) | (0.130) | (1.068) |
| Observations | 52,773 | 34,768 | 18,005 |

# Results

## Other agricultural products

Table VIII: The Effect of Other Agricultural Price Shocks on Violence, 1988-2005

| Dependent variables: | (1) Guerrilla attacks | (2) Paramilitary attacks | (3) Clashes | (4) Casualties |
|---|---|---|---|---|
| Coffee int. x log coffee price | -0.179 | -0.074 | -0.256 | -0.793 |
| | (0.088)** | (0.024)*** | (0.101)** | (0.293)*** |
| Sugar int. x log sugar price | -0.435 | -0.112 | -0.275 | -2.023 |
| | (0.020)*** | (0.006)*** | (0.020)*** | (0.075)*** |
| Banana int. x log banana price | -0.097 | -0.188 | -0.807 | -2.223 |
| | (0.024)*** | (0.008)*** | (0.037)*** | (0.092)*** |
| Palm int. x log palm price | -0.040 | -0.060 | -0.144 | -0.812 |
| | (0.149) | (0.014)*** | (0.066)** | (0.273)*** |
| Tobacco int. x log tobacco price | -0.597 | -0.079 | -0.774 | -2.391 |
| | (0.158)*** | (0.017)*** | (0.030)*** | (0.628)*** |
| Observations | 15,709 | 15,709 | 15,709 | 15,709 |

# One more example

- What about the impact of foreign aid?
- Suppose the US government increases its supply of food aid to a country.
- What would you expect the impact on conflict to be? How does the model help you think about this?
- Suppose you regressed conflict on aid. Would this be a good idea? Why or why not?

# Food aid and conflict

## Nunn and Qian (2012): "Aiding Conflict: The Impact of U.S. Food Aid on Civil War"

- Empirical idea:

  The US food aid system is part of a system to keep farm prices high in the US
  So when there is a good wheat crop in the US, the government buys extra wheat and gives it out as aid
  Tends to give it out to the same countries

- So...

  They look at whether good US wheat harvests lead to more or less conflict in countries that tend to receive aid
  Idea is that this is occuring through the aid channel
  Thoughts?

# Results

## Wheat aid vs. wheat production

Images removed due to copyright restrictions. See: Nunn, Nathan, and Nancy Qian. "Aiding Conflict: The Impact of U.S. Food Aid on Civil War." NBER Working Paper No. 17794 (2012).
Figure 5: Average U.S. Wheat Aid and Lagged U.S. Wheat Production
Figure 7: Average Civil Conflict Incidence and Lagged U.S. Wheat Production
Table 2: The Effect of Food Aid on Conflict
Table 7: The Effect of Food Aid on Small- and Large-Scale Conflicts

- What is this?

# Do Leaders Matter?

## Jones and Olken (2009): "Hit or Miss: The effect of assassinations on institutions and war"

- Empirical question: do leaders affect war?

  Previous theories suggests that they might
  Specific prediction:

  If you are engaged in a war, this may be because you have a biased leader
  So if you change the leader, that increases the probability war ends

- Empirical strategy: (we've seen this before)

  Examine assassinations of national leaders
  Use failed assassination attempts as controls, and examine the difference between successful and failed attempts

- Outcomes: political regime change and change in conflict

# Results

## Conflict

TABLE 7—ASSASSINATIONS AND CONFLICT: CHANGE ONE YEAR AFTER ATTEMPT

| | Gleditsch-COW dataset 1875–2002 (1) | Gleditsch-COW dataset 1946–2002 (2) | PRIO/Uppsala dataset 1946–2002 (3) |
|---|---|---|---|
| *Panel A: Average effects* | | | |
| Success | −0.072 | 0.041 | 0.162 |
| | (0.068) | (0.093) | (0.071) |
| Parm. *p*-value | 0.29 | 0.66 | 0.02** |
| Nonparm. *p*-value | 0.57 | 0.83 | 0.03** |
| Observations | 223 | 116 | 116 |
| Data source | Gleditsch | Gleditsch | PRIO |
| *Panel B: Split by war status in year before attempt* | | | |
| Success × intense war | −0.255 | −0.103 | −0.110 |
| | (0.144) | (0.257) | (0.294) |
| Success × moderate war | | | 0.334 |
| | | | (0.163) |
| Success × not at war | −0.024 | 0.020 | 0.070 |
| | (0.068) | (0.086) | (0.057) |
| Intense war—parm. *p*-value | 0.08* | 0.69 | 0.71 |
| Intense war—nonparm. *p*-value | 0.13 | 1.00 | 0.69 |
| Moderate war—parm. *p*-value | N/A | N/A | 0.05** |
| Moderate war—nonparm. *p*-value | N/A | N/A | 0.13 |
| Not at war—parm. *p*-value | 0.73 | 0.82 | 0.22 |
| Not at war—nonparm. *p*-value | 0.62 | 0.71 | 0.21 |
| Observations | 222 | 116 | 116 |
| Data source | Gleditsch | Gleditsch | PRIO |

# The costs of conflict

- Costs of conflict are many
- Examples?

  Lives lost
  Destruction of capital stock (bombed factories, etc)
  Lack of investment
  Lost human capital aquisition

- Evidence we'll examine:

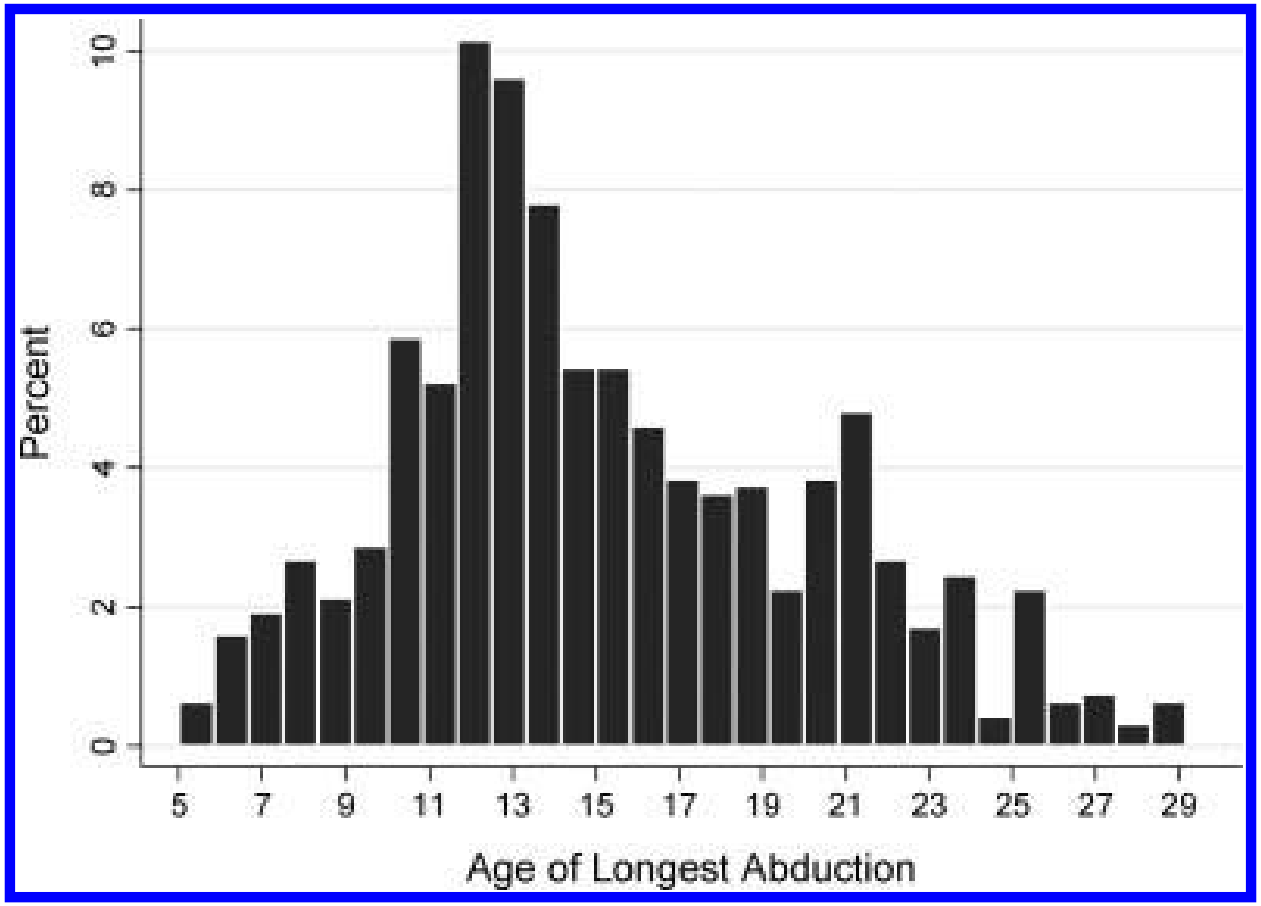
  Human capital costs: Child soldiering in Vietnam
  Economic costs over the short run: Spain
  Economic costs of large wars long run: World War II, Vietnam

# Child soldiers

- Survey in northern Uganda, where rebel group forcibly recruited 60,000 - 80,000 youth to join a rebel Army
- Normally, people join armies voluntarily. Why would this be a problem for estimating the impact of being a child soldier?
- In this case, however, children were abducted. This is horrible, but how does it help the research design?
- Research design: compare people who were abducted to those born in same place who were not. Good research design?

# Summary statistics on child soldiers

FIGURE 2.—DISTRIBUTION OF ABDUCTIONS BY AGE AT THE TIME OF ABDUCTION




The bars represent a probability mass function for age at the time of longest abduction, and so sum to 1. The data include absentee youth and youth who have since died or did not return from abduction (collected from the household survey).

# Summary statistics on child soldiers

TABLE 1.—DESCRIPTION OF KEY VARIABLES: WAR EXPERIENCES AND POSTWAR OUTCOMES

| Variable Name | Description | Sample Mean: All | Abducted | Not Abducted | Number of Observations |
|---|---|---|---|---|---|
| *War experiences* | | | | | |
| Months abducted | Length of the respondent's longest abduction, in months | | 8.9 [15.6] | | 462 |
| Age of abduction | Age (in years) at the time of the respondent's longest abduction | | 15.3 [4.7] | | 462 |
| Index of violence experienced | Sum of 17 indicators of violence witnessed, received, or upon own family | 5.0 [3.1] | 7.2 [2.7] | 3.2 [2.1] | 738 |
| Index of violence perpetrated | Sum of 8 indicators of violence perpetrated by the respondent (self-reported) | 0.7 [1.4] | 1.5 [1.8] | 0.1 [0.3] | 738 |
| *Education and labor market outcomes* | | | | | |
| Educational attainment | Highest level of education obtained (including tertiary and vocational training) | 7.4 [3.0] | 7.1 [2.9] | 7.6 [3.0] | 741 |
| Indicator for functional literacy | Indicator equaling 1 if a respondent reports being able to read a book or a newspaper in any language | 0.75 [0.43] | 0.69 [0.46] | 0.80 [0.40] | 741 |
| Indicator for any work in past month | Indicator equaling 1 if days employed were greater than zero | 0.64 [0.48] | 0.69 [0.46] | 0.61 [0.49] | 741 |
| Indicator for capital or skill-intensive work | Indicator equaling 1 if the main occupation is a profession, a vocation, or a small business | 0.10 [0.30] | 0.08 [0.26] | 0.12 [0.32] | 741 |
| Daily wage (in Uganda shillings) | Gross cash earnings in the past month divided by days employed; 237 observations are undefined | 3,221 8,621 | 2,498 4,941 | 3,915 11,018 | 504 |
| *Psychosocial outcomes* | | | | | |
| Index of psychological distress | Sum of 19 survey questions on symptoms of depression and traumatic stress | 4.0 [2.4] | 4.2 [2.5] | 3.8 [2.2] | 741 |
| Indicator for top 25% of distress index | Indicator equaling 1 if the psychological distress index exceeds a score of 5 (the top quartile) | 0.27 [0.4] | 0.32 [0.5] | 0.23 [0.4] | 741 |
| Index of social support | Sum of 14 questions on concrete social support received from family and friends in past month | 5.5 [2.4] | 5.5 [2.4] | 5.5 [2.5] | 741 |
| Indicator for hostility | Indicator equaling 1 if reported being one of four hostile behaviors | 0.07 [0.3] | 0.07 [0.3] | 0.07 [0.3] | 741 |
| Indicator for a physical fight | Indicator equaling 1 if the respondent reported being in a physical fight in the past 6 months | 0.07 [0.3] | 0.07 [0.2] | 0.07 [0.3] | 741 |

Sample means weighted by inverse sampling and inverse attrition probabilities. Standard deviations are in brackets.

# Impact

TABLE 3.—ESTIMATES OF THE AVERAGE TREATMENT EFFECT OF ABDUCTION

| Dependent Variable | (1) ATE | (2) Nonabducted mean | (3) %Δ |
|---|---|---|---|
| *Educational and labor market outcomes* | | | |
| Years of education | −0.75 [0.17]*** | 7.6 | −10% |
| Indicator for functional literacy | −0.15 [0.04]*** | 0.80 | −19% |
| Indicator for any employment in the past month | 0.03 [0.04] | 0.61 | 5% |
| Indicator for capital- or skill-intensive work | −0.05 [0.02]** | 0.12 | −43% |
| Log (Daily wage) | −0.33 [0.15]** | n.a | n.a |
| *Psychosocial and health outcomes* | | | |
| Index of psychological distress | 0.57 [0.20]*** | 3.8 | 15% |
| Indicator for top quartile of distress | 0.11 [0.04]*** | 0.23 | 49% |
| Index of social support | −0.16 [0.14] | 5.5 | −3% |
| Indicator for hostile attitudes | 0.03 [0.01]** | 0.07 | 40% |
| Indicator for physical fights | −0.02 [0.02] | 0.07 | −29% |

Each entry represents a separate WLS regression. All variables defined and described in table 1. *Significant at 10%. **Significant at 5%. ***Significant at 1%. Treatment is binary and equals 1 if ever abducted and 0 otherwise. The percentage change (%Δ) is calculated as the ATE relative to the mean value for nonabducted youth. Robust standard errors in brackets, clustered by sampling unit (location and abduction status). Controls in the WLS regressions include age and location dummies, age and location interactions, and pretreatment individual and household characteristics. Weighted by inverse sampling probability, inverse attrition probability, and inverse propensity score.

# Short-run economic impact

- A nice study of the economic impact – in the short run – of conflict comes from Spain
- This study examines the impact of Basque terrorism
- Compares GDP per capita in the Basque country to other provinces which were chosen to match the Basque country before terrorism started
- Findings: about a 10% reduction in output per-capita due to the conflict
- Note: not much capital destroyed (i.e. not like World War II in Europe), so this is mostly capturing flight of workers, lack of investment

# Short-run economic impact

Images removed due to copyright restrictions. See: Abadie, Alberto, and Javier Gardeazabal. 2003. "The Economic Costs of Conflict: A Case Study of the Basque Country ." *American Economic Review*, 93 (1): 113-32.
Figure 1. Per Capita GDP for the Basque Country
Figure 4. A "Placebo Study," per Capita GDP for Catalonia

# What about the long run?

- At the micro and macro level, conflict seems to impose costs when it happens

  Lost economic activity
  Reduced human capital

- Do you think these shocks should persist? I.e. after a war, do you think you are permanently poorer, or do you recover?
- Thoughts?

# Why you might be permanently poorer

- The key question is whether there is a poverty trap or not
- Consider the following very simple model
- Suppose

$$y = f(k)$$

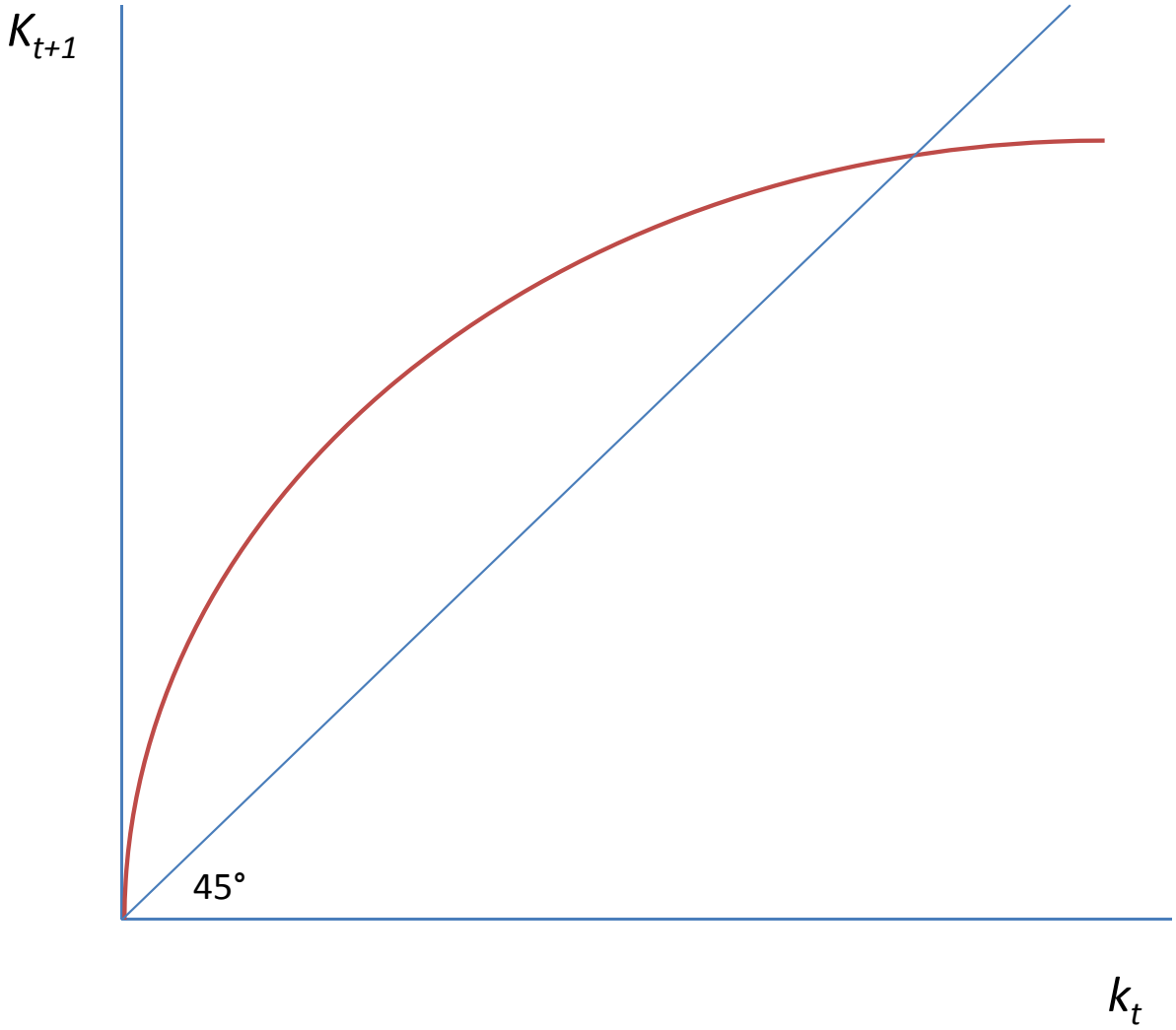
where $f(k)$ is the aggregative production function as a function of the per-person capital stock $k$

- Suppose people invest a constant fraction $\alpha$ of output. Capital depreciates at rate $\delta$. Then

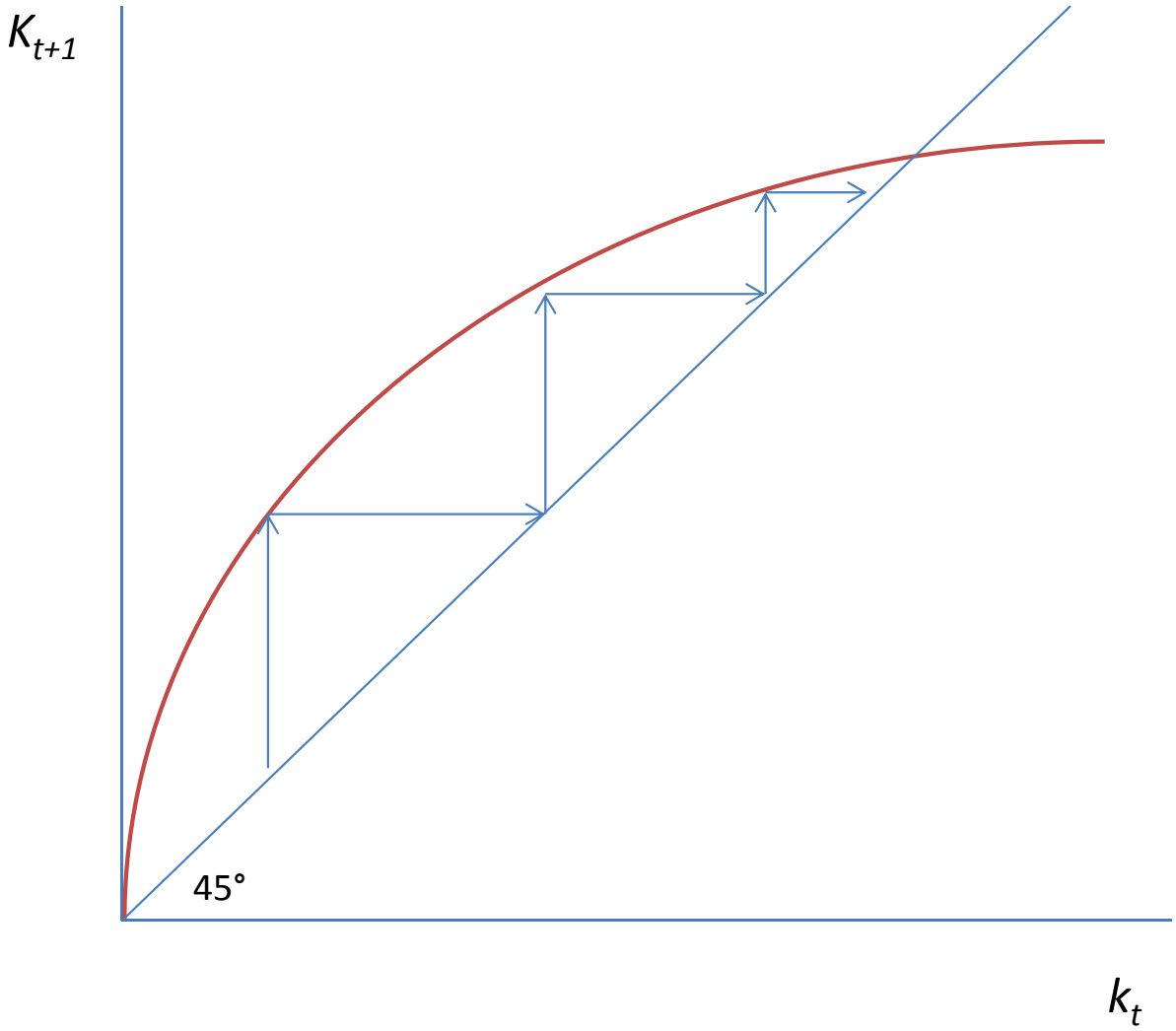
$$\begin{aligned} k_{t+1} &= k + \alpha f(k) - \delta k \\ &= (1-\delta) k + \alpha f(k) \end{aligned}$$

- We can think of a war as a shock to $k$ – we reduce $k$ by some amount.
- What is the long run effect?
- Answer: it depends on the production function

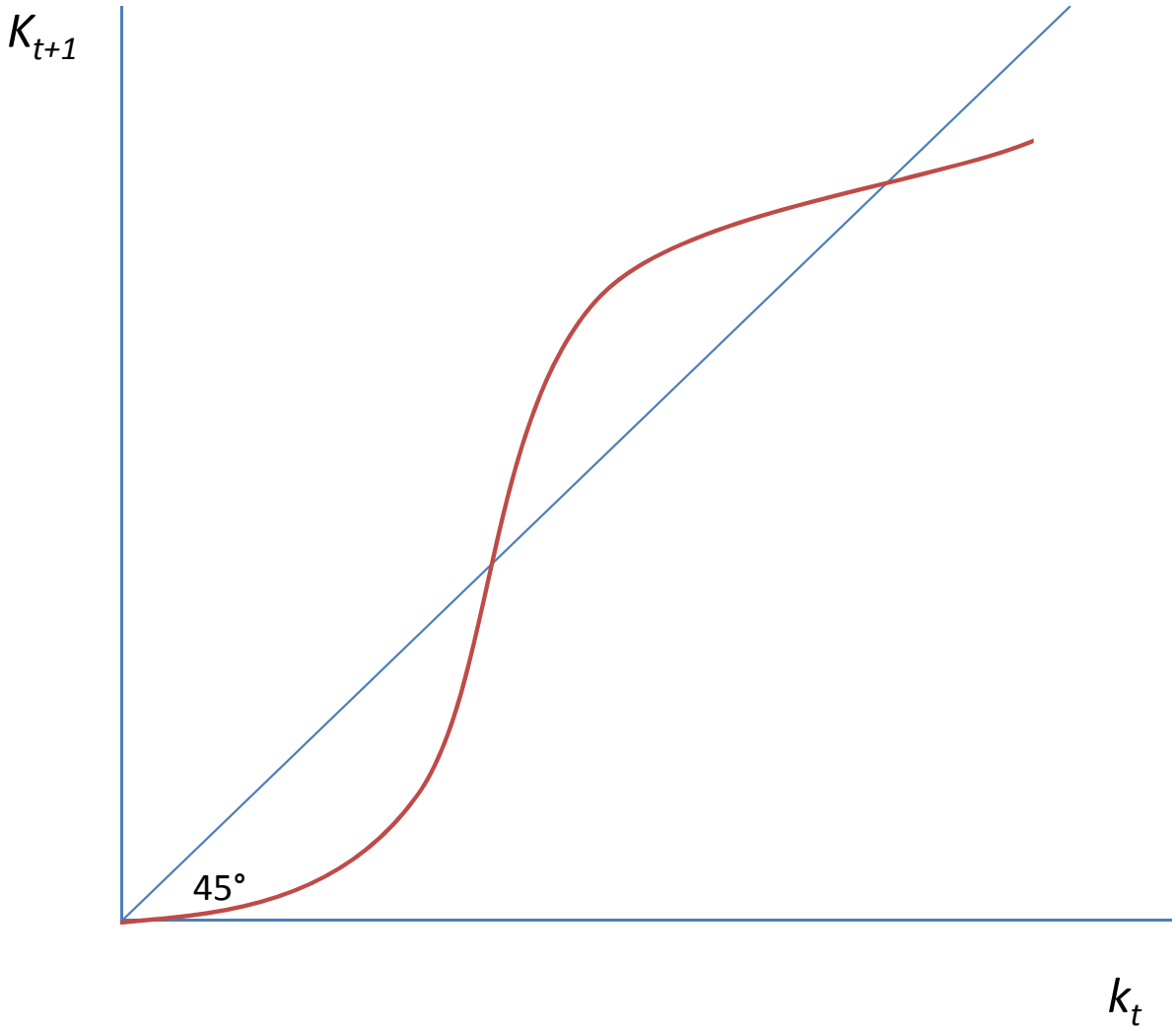
# Example with no poverty traps



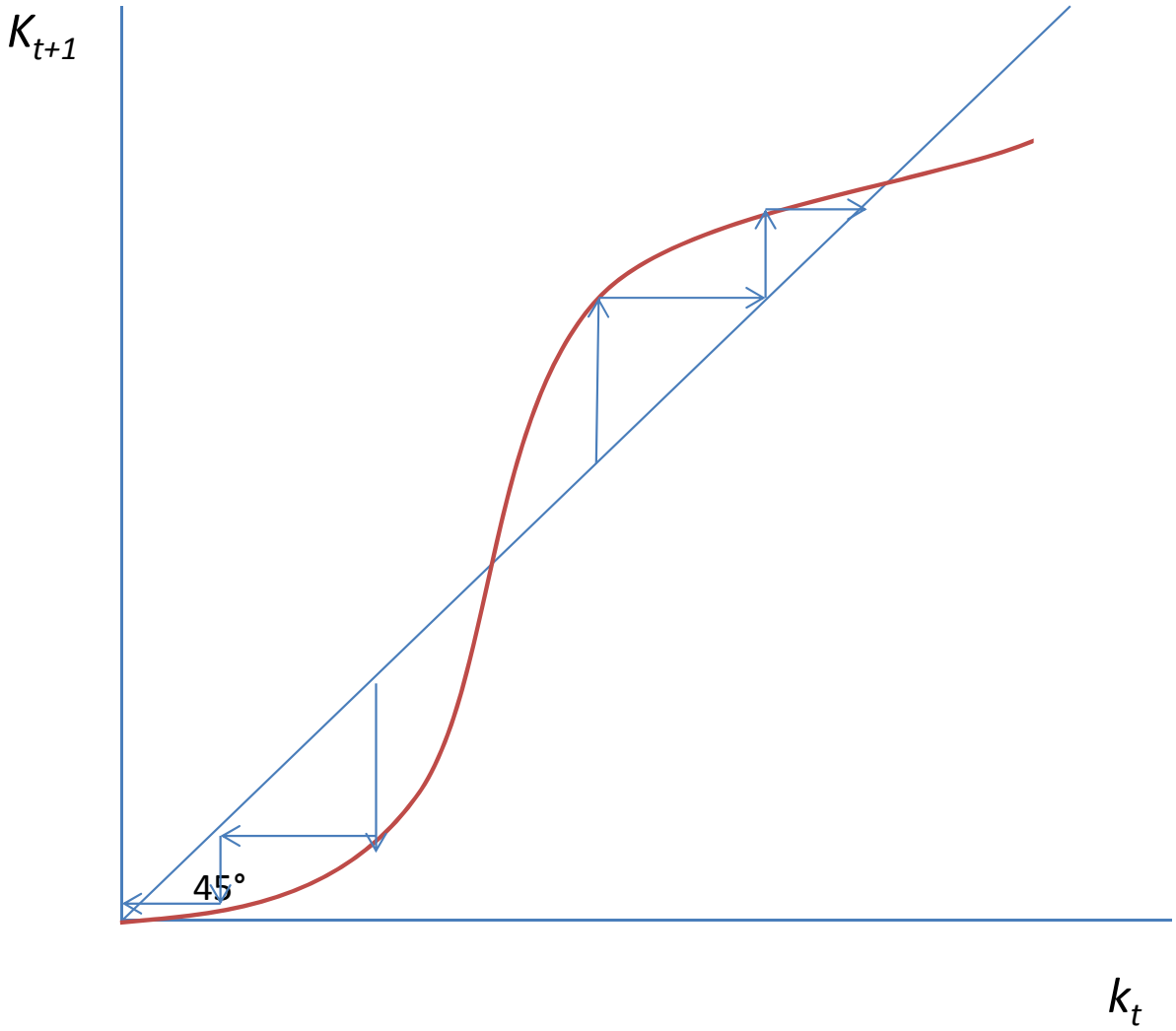
# Example with no poverty traps



# Example with poverty traps



# Example with poverty traps



# Empirical test

## Miguel and Roland 2010: "The Long Run Impact of Bombing Vietnam"

- The US dropped a masive amount of bombs on Vietnam

> *"The United States Air Force dropped in Indochina, from 1964 to August 15, 1973, a total of 6,162,000 tons of bombs and other ordnance. U.S. Navy and Marine Corps aircraft expended another 1,500,000 tons in Southeast Asia. This tonnage far exceeded that expended in World War II and in the Korean War. The U.S. Air Force consumed 2,150,000 tons of munitions in World War II - 1,613,000 tons in the European Theater and 537,000 tons in the Pacific Theater - and 454,000 tons in the Korean War. "*

# Empirical test

## Miguel and Roland 2010: "The Long Run Impact of Bombing Vietnam"

- The US dropped a masive amount of bombs on Vietnam

> *"Given the prewar Vietnamese population of 32 million, U.S. bombing translates into hundreds of kilograms of explosives per capita, more than the entire weight of the Vietnamese nation. For another comparison, the atomic bombs dropped at Hiroshima and Nagasaki had the power of roughly 15,000 and 20,000 tons of TNT, respectively. Measured this way, U.S. bombing in Indochina represents roughly 100 times the combined impact of the Hiroshima and Nagasaki atomic bombs. "*

# Empirical test

## Miguel and Roland 2010: "The Long Run Impact of Bombing Vietnam"

- The US dropped a masive amount of bombs on Vietnam
- The bombing was concentrated – roughly 70% of total ordinance was dropped in 10% of districts

# Distribution of bombing

Images removed due to copyright restriction. See: Miguel, Edward, and Gérard Roland. "The Long Run Impact of Bombing Vietnam." NBER Working Paper No. 11954. 2008.
Table 4: Local Bombing Impacts on Estimated 1999 Poverty Rate
Table 6: Local War Impacts on Consumption Expenditures and Growth (VLSS Data)
Table 7: Local War Impacts on Physical Infrastructure and Human Capital

# Empirical test

## Miguel and Roland 2010: "The Long Run Impact of Bombing Vietnam"

- The US dropped a masive amount of bombs on Vietnam
- The bombing was concentrated – roughly 70% of total ordinance was dropped in 10% of districts
- What would expect if there were poverty traps? If there were not poverty traps?
- Empirical approach:

  Compare areas that were more heavily bombed to those that were less heavily bombed
  Examine areas that were close to 17th parallel – North/South border and center of fighting

# Other evidence

- Note that other studies find similar effects for the bombing of Japan and Germany: within about 20 years, things go back to the way they were before
- Thus the economic impact of conflict – while very severe in the short run – does not seem to condemn countries to poverty forever

# Conclusions

- Coase theorem suggests a key puzzle is why conflict occurs in equilibrium – and much theory is about providing explanations for this phenomenon... and developing tests of their implications
- When conflicts occur:
  - Wealth shocks have ambiguous impacts on conflict
  - Productive wealth shocks (rainfall, coffee prices) decrease conflict
  - Unproductive wealth shocks (food aid, oil prices) increase conflict
- Impacts of conflict:
  - Severe human and economic costs in the short run
  - But impacts may be transitory, even for very large conflicts

# 14.75 Political Economy and Economic Development

Fall 2012