Don’t get mad, get even: Conflict and politics in the face of economic adversity
Carlos F. Díaz-Alejandro Lecture

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MIT, Chicago, Copenhagen

Guayaquil, November 10, 2018
“War is not merely a political act, but also a real political instrument, a continuation of political commerce, a carrying out of the same by other means” Carl von Clausewitz On War

- Emphasis on the economic determinants of conflict and civil war.
- Negative economic shocks (bad rainfall, adverse movements in commodity prices), are thought to induce conflict via various channels
  - by undermining the capacity of the state (Fearon and Laitin, 2003).
- But people engage in conflict with goals in mind and there are different ways to attain them.
- One might be conflict, but as von Clausewitz reminds us, another could be politics.
Today I’m going to give you an example of a negative economic shock in Bolivia.

The next slide gives you a preview. It shows the dynamics of night light in part of Cochabamba department between 1997 and 2005. The department got darker.

1997 coincides with a big ramp-up of U.S. money flowing to the government of President (formerly General) Hugo Banzer to eradicate coca crops.

Given the importance of coca as a commercial crop in rural Bolivia, this had adverse effects on incomes.

One result could have been an outbreak of conflict.
Change in Night-Time Light intensity (1997-2005)
Consequences of a Negative Economic Shock

- There was no upsurge in conflict.
- But there was a powerful political reaction in the rise of the MAS (Movimiento al Socialismo) party culminating in the election of Evo Morales as president in 2006.
- This led to the abandonment of the coca eradication policy.
- The Bolivian campesinos didn’t get mad, they got even!
- Today I want to develop this case study as a way of arguing that behind every story about how negative economic circumstances lead to conflict, there is an implicit story about politics which is buried by the average effects.
  - e.g. when coffee prices go down the Colombians reach for their guns, but the Costa Ricans don’t (does anyone know what MAS stands for in Colombia?)
Homicide rate in Bolivia 1992-2016

Homicides per 100,000 inhabitants (Multiple sources, INE 2000-2016)
MAS Vote Share 1999 vs 2005
The Talk

Analytics

- First pass at the data:

1. I’m first going to try to convince you that coca eradication really did lead to an economic contraction in Bolivia by showing that as U.S. drug eradication money was ramped up, night luminosity went down in exactly the places (grid cells) that were suitable for coca in Bolivia.

2. Then I’m going to show you that the vote share for MAS went up significantly more in places which were suitable for coca.

- But why this political reaction in Bolivia?

- The key is the organization of rural society.
The Ayllus

- With roots back into the pre-colonial Andes, many rural communities are organized into collectivities called an Ayllus.
- Bolivian rural society has a deep history of collective organization, public good provision and accountability.
- Using a geocoded map for the presence of the Ayllus from 1854 we show that there are important heterogeneous effects
  - the vote share of the MAS goes up more in places which are coca suitable and which have an Ayllus.
- Importantly, the direct effect of the Ayllus is insignificant: it is the combination of negative shock and communal organization that is important.
The Identification Problem

- Coca suitability seems plausibly exogenous.
- But a potential problem with this analysis is the endogeneity of the location of the *Ayllus*.
- Why do some communities maintain this form but not others?
  - it could be that they were destroyed by Spanish colonialism, especially the *mita* labor draft for Potosí (Melissa Dell’s work)
  - or by the subsequent spread of haciendas and the need to control labor (though evidence for reconstruction after the 1952 Revolution)
  - or by urbanization and ‘modernization’
- Even though we have a historical measure of the presence of the *Ayllus*, there could be omitted variables which influence both whether it functions today and potential political identities/mobilization.
Though both historic Quechua and Aymara society are said to have been characterized by the *Ayllus*, it seems plausible that this was imported into Bolivia by the invading Incas who followed Pachacuti and Túpac Inca Yupanqui’s conquests of the independent Aymara kingdoms in the 1470s and 1480s.

The empire was focused around the expansion of the *Qhapaq Ñan* (Great Inca Road).

We use the location of the *Qhapaq Ñan* (controlling for the presence of contemporary roads) as an instrument for the location of the *Ayllus*.

The result confirm our initial OLS findings.
Pachacuti and Túpac Inca Yupanqui
(according to Guamán Poma de Ayala)
The Expansion of the Inca Empire
The Expansion of the Inca Empire

- Empire ruled by Pachacuti, 1438-1463
- Expansion under Pachacuti and Tupa Inca, 1463-1471
- Expansion under Tupa Inca, 1471-1493
- Expansion under Huayna Capac, 1493-1527
Remains of the Qhapaq Ñan
The Exclusion Restriction

- What determined the location of the *Qhapaq Ñan*, and what were its roles?
  - The road was not open to the public, but only the state officials, the army and the *chaskis*, the officials runners who ran between way stations, or *tampus* of which 2,000 have been counted. Road location took into account administrative and military objectives and the private estates of the nobility (e.g. Machu Picchu was an estate of Pachacuti).
  - D’Altroy observes
    
    “the highway has a reputation for ignoring obstacles in the interest of straightness.”

- Location also dictated by the desire to service religious shrines, often on the mountaintops where people were sacrificed to gods like Inti. There were quite a few of these in Bolivia.
- Seems plausible that the road location is excludable from the second stage.
Location of Inca Mountain Shrines and La Doncella
a sacrifice from Llullaillaco, Argentina
The Connection to the Ayllus

- Why is there a first-stage? Why does the location of the *Qhapaq Ñan* predict the *Ayllus* today?
  - clearly associated with Quechua (Inca) presence
  - the *Ayllus* is built into the Inca creation myth; the creator God Wiraqocha summoned four brothers and four sisters who became the Inca ancestors from a cave, the Rich Window. Then the called forth the Maras and Tambos. The principle couple Manqo Qhapaq and Mama Oqllu then formed the Tambos into ten kin groups which are called *Ayllus* in the historical accounts.
  - it seems to also have been a conduit via which *mitmaq* colonization took place.
- The first-stage is picking up the stronger organizational roots of the *Ayllus* in areas of Inca colonization.
Table 3.2 The ten ayllu formed at Pacariqtampu, according to Sarmiento; spellings after Urton (1990: 25).

<table>
<thead>
<tr>
<th>Hanan Cuzko (&quot;Upper Cuzco&quot;)</th>
<th>Hurin Cuzko (&quot;Lower Cuzco&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chawin Cuzco Ayllu</td>
<td>Sutiq-T'okoqo Ayllu</td>
</tr>
<tr>
<td>Arayraka Ayllu</td>
<td>Maras Ayllu</td>
</tr>
<tr>
<td>Cuzco-Kallan</td>
<td></td>
</tr>
<tr>
<td>Tarpuntay Ayllu</td>
<td>Kuykusa Ayllu</td>
</tr>
<tr>
<td>Wakaytqai Ayllu</td>
<td>Maska Ayllu</td>
</tr>
<tr>
<td>Sanuq Ayllu</td>
<td>Oro Ayllu</td>
</tr>
</tbody>
</table>
The Data

Politics

- **Electoral data**
  - MAS party born in 1987. It formed a coalition with other parties during the next years and only was in 1999 when it ran as an independent party.
  - This combines data on different elections, e.g. 1999, 2004, 2010 for Mayors, 2005, 2009 national elections.
  - In those years, we have information on the support for the MAS for 4,854 voting tables.
  - From *El Tribunal Supremo Electoral de Bolivia*, the main electoral entity in Bolivia.

- **U.S. counter narcotics aid**
  - This data comes from *The U.S. National Security and Economic Prosperity (USAID)*.
Voting tables
The Data

Coca Suitability

- We used data from the FAO’s Ecocrop database which shows the “optimal” and “absolute” temperature, rainfall, elevation, slope etc. that make for ideal coca growing conditions.
- We define Coca Suitability to be one if all “absolute” requirements are met, zero otherwise.
Erythroxylum coca

Authority
Family Magnoliopsida: Rosidae: Linneas: Erythroxylaceae
Synonyms
Common names coca leaf, coca, Peru coca
Editor
Ecocrop code 14047

Notes
SOURCES
Roecklein J 1987 pp 275 [USE]
Duke J 1975 pp 16 [PH, RAIN, TEMP]
Williams C 1979a pp 79-80 [USE, FER]
Purseglove J 1974 pp 632-633 [USE]

GROWING PERIOD
Perennial shrub or small tree. Growing 4-8 years to first harvest, and having 20 years of economical life.

Ecocrop Data sheet EcoPort
# The Data

## Development outcomes and Covariates

- We measure development by nighttime light intensity.
  - Since 1992, the National Oceanic and Atmospheric Administration (NOAA) produces a raster on light density measured by satellites at night.
  - This index goes from 0 to 63 (0 means lowest light intensity).
  - As dependent variables, we use:
    - *Lights*: log of (one plus) the raw index.
    - *High light intensity*: proportion of pixels with a value of 63.

- We use as controls latitude, longitude, ruggedness and distance to the coast.
Econometric Model

We estimate a standard panel data model of the following form

\[ y_{it} = \delta_t + \eta_i + \beta (D_t \cdot C_i) + \gamma (D_t \cdot C_i \cdot A_i) + X_{it}' \lambda + \varepsilon_{it} \quad (1) \]

- \(y_{it}\) is either a measure of nighttime light intensity, or the vote share for MAS in grid-cell \(i\) (averaging over voting tables).
- \(\delta_t\) are time effects and \(\eta_i\) grid-cell fixed effects.
- \(D_t\) is the total amount of U.S. drug eradication aid.
- \(C_i\) is coca suitability of \(i\).
- \(A_i\) is a count variable which is the number of Ayllus in \(i\).
- \(X_{it}'\) is a covariate vector and \(\varepsilon_{it}\) is the error term.
The Economic Impact of Coca Eradication

- We first examine the impact of U.S. drug enforcement aid on nighttime light.
- Using either *Lights* or *High light intensity* we have a significant negative relationship between drug enforcement aid and light intensity.
- Suitable places for coca had a reduction in *Lights* equivalent to 18.1% of the mean or 15.3% of one standard deviation.
- Suitable places for coca had a reduction in *High light intensity* equivalent to 33.4% of the mean or 25.5% of one standard deviation.
## US Aid and effect on Night-Time Light

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<td><strong>High light intensity</strong></td>
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<tr>
<td>Coca Suitability</td>
<td>-0.025**</td>
<td>-0.020**</td>
<td>-0.194**</td>
<td>-0.201**</td>
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<td>(0.009)</td>
<td>(0.007)</td>
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<tr>
<td>Ayllus</td>
<td>0.0296</td>
<td>0.0291</td>
<td>0.000845</td>
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<td>(0.0649)</td>
<td>(0.0650)</td>
<td>(0.0159)</td>
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<td>Coca Suitability × Ayllus</td>
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<td>0.284</td>
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*Don’t get mad, get even*
The Political Reaction to a Negative Shock

- We next turn to the impact of drug enforcement aid on politics.
- The dependent variable is the vote share for the MAS in a grid cell.
- The first column shows that this is positive and significantly related to the interaction of drug enforcement aid and coca suitability.
- The second column shows that when we add the triple interaction with the *Ayllus* this term is positive and significant.
- *Ayllus* interacted with drug enforcement money is not significant.
## Negative shocks and political support

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<tr>
<td>Coca Suitability</td>
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<td>0.0152**</td>
<td>0.0209***</td>
<td>0.0151**</td>
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<tr>
<td></td>
<td>(0.00367)</td>
<td>(0.00424)</td>
<td>(0.00352)</td>
<td>(0.00425)</td>
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<tr>
<td>Ayllus</td>
<td>-0.000983</td>
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<td>-0.000978</td>
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<tr>
<td></td>
<td>(0.000836)</td>
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<td>(0.000837)</td>
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<tr>
<td>Coca Suitability × Ayllus</td>
<td>0.0118**</td>
<td></td>
<td>0.0119**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00421)</td>
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<td>(0.00421)</td>
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Quantitative effects

- In absence of Ayllus, places with one standard deviation greater coca suitability have, on average, 7.54 percentage points greater MAS vote share.
  \[ \approx \left( \frac{0.0151}{0.328} \right) \cdot 15.221 \cdot 0.328 \]
  Estimated effect  mean US aid  s.d. Coca
  This is equivalent to an increase of 18.9% of the mean and 19.6% of one standard deviation.

- In addition to this effect, among places with the Ayllus, a one standard deviation increase in coca suitability increases the MAS vote share by 3.27 percentage points.
  \[ \approx \left( \frac{0.0119}{0.551} \right) \cdot 15.221 \cdot 0.551 \cdot 0.328 \]
  Estimated effect  mean US aid  mean Ayllus  s.d. Coca
  This is equivalent to an increase of 8.2% of the mean and 8.5% of one standard deviation.
The Qhapaq Ñan

- To construct the Inca Road variable we geocoded the map of the Inca Road system from 1471.
- This map is from *The National Museum of the American Indian*.
- Then we constructed a variable =1 if the Qhapaq Ñan intersects a grid cell $i$, =0 otherwise.
The First Stages

- We now estimate the two-stage least squares model where (1) is the second stage and with two first stages

\[
D_t \cdot C_i \cdot A_i = \phi_t + \psi_i + \alpha (D_t \cdot C_i) + \beta (D_t \cdot l_i) + \gamma (D_t \cdot C_i \cdot l_i) + X_{it}' \lambda + \epsilon_{it},
\]
\[
D_t \cdot A_i = \omega_t + \rho_i + \theta (D_t \cdot C_i) + \tau (D_t \cdot l_i) + \kappa (D_t \cdot C_i \cdot l_i) + X_{it}' \chi + \nu_{it}
\]

- \( l_i \in \{0, 1\} \) is the presence of the Qhapaq Ñan.
- We find robust first-stage estimates.
- No weak instrument problem.
## First Stage

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<td></td>
<td></td>
<td>... Ayllus</td>
<td>... Coca Suitability × Ayllus</td>
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<tr>
<td><strong>Interaction of US Counter-Drug aid and:</strong></td>
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<tr>
<td>Coca Suitability</td>
<td>0.0119</td>
<td>0.0125</td>
<td>0.281***</td>
<td>0.307***</td>
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<td>(0.0160)</td>
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<td>(0.0164)</td>
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<td>Inca roads</td>
<td>1.403***</td>
<td>1.441***</td>
<td>-2.22e-05</td>
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<td>(0.1590)</td>
<td>(0.1641)</td>
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<td>Coca Suitability × Inca roads</td>
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<td>0.00174</td>
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<td>1.421***</td>
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The Second Stage

- We can now instrument for our interaction terms involving the *Ayllus* in (1).
- The estimated coefficients are very similar in magnitude to the OLS coefficients.
- Results very supportive of the basic results.
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<tbody>
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<td><strong>Dependent variable:</strong> Proportion of votes for MAS</td>
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<tr>
<td><strong>Interaction between (log of) US Counter-Drug aid and:</strong></td>
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<tr>
<td>Coca Suitability</td>
<td>0.0178**</td>
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<tr>
<td></td>
<td>(0.00565)</td>
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<tr>
<td>Ayllus</td>
<td>-0.00183</td>
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<tr>
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<td>(0.00163)</td>
<td>(0.00158)</td>
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<td>Coca Suitability $\times$ Ayllus</td>
<td>0.0165*</td>
<td>0.0175*</td>
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<td>(0.00887)</td>
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Controlling for Contemporary Roads

- Despite the above arguments about the location and construction of Inca roads, one might be concerned that modern roads were built ontop of Inca roads (clearly true in some cases) and that this is confounding the results.
- We construct a variable which is $=1$ if a grid-cell is intersected by a modern road.
- Our basic results are robust to this.
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<td>Interaction between (log of) US Counter-Drug aid and:</td>
<td></td>
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</tr>
<tr>
<td>Coca Suitability</td>
<td>0.0178** (0.00570)</td>
<td>0.0181** (0.00562)</td>
</tr>
<tr>
<td>Ayllus</td>
<td>-0.00177 (0.00161)</td>
<td>-0.00175 (0.00165)</td>
</tr>
<tr>
<td>Coca Suitability × Ayllus</td>
<td>0.0132* (0.00601)</td>
<td>0.0135* (0.00588)</td>
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<tr>
<td>Modern roads</td>
<td>-9.86e-05 (0.000153)</td>
<td>-9.67e-05 (0.000141)</td>
</tr>
<tr>
<td>Coca Suitability × Modern roads</td>
<td>-0.000510 (0.000520)</td>
<td>-0.000508 (0.000522)</td>
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The Reduced Form

- It is interesting to look directly at the reduced form where we replace the Ayllus in (1) with our Inca Road variable.
- Being on the Inca road is associated with an approximate increase of 8.3% in the likelihood of having an Ayllus.
## Results

**Identification**

- **Dependent variable:** Proportion of votes for MAS

### Interaction between (log of) US Counter-Drug aid and:

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<td>Inca roads</td>
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<tr>
<td></td>
<td>(0.00228)</td>
<td>(0.00224)</td>
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<tr>
<td>Coca Suitability × Inca roads</td>
<td>0.0190*</td>
<td>0.0189*</td>
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<td>(0.00829)</td>
<td>(0.00831)</td>
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### Controls

- **Observations:** 58,905  
- **Cells:** 11,781

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*Don’t get mad, get even*

Guayaquil, November 10, 2018
Conclusions

Collecting Thoughts

- In this talk I showed that in Bolivia a negative economic shock led to a massive political reaction when it was combined with the Ayllus.
- Though this is subject to ongoing fieldwork by us, the likely channel is that the local history of institutionalized (and non-violent) cooperation, deliberation and accountability favored politics
  - e.g. the end of Sánchez de Lozada
- Go back to negative shocks and conflict in Africa
  - the African context and politics is completely missing from this work.
  - what aspect of African society favors violence over politics?
- A more general point is that you can’t do development economics without knowing something about the specificity of the countries you are ‘studying’.