Diamonds Are Forever, Wars Are Not: Is Conflict Bad for Private Firms?

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It seems clear to us that civil war ought to be central in the study of international economic development. Yet leading development economists have too often overlooked it; for instance, two respected and widely taught undergraduate development economics textbooks (Ray 1998; Todaro 1999) do not contain the words “war”, “conflict”, or “violence” in their subject index.

C. Blattman and E. Miguel “Civil War” (2010)
Why development economists should focus on civil conflict?

- Nowadays civil conflicts are far more common than international conflicts.
Why development economists should focus on civil conflict?

- Majority of recent intra-state conflicts happened in the poorest region of the world.
Causes of civil conflicts

- **Macro level studies**

- **Micro level studies**
  - Dube and Vargas “Commodity Price Shocks and Civil Conflict: Evidence from Colombia” (2009)
Macro level causes


- Findings: initial income, ethno-linguistic fractionalization, natural resources, initial population size are the main determinants.

- Nonmonotonic relationships between civil wars and both natural resources and level of societal fragmentaton.
Macro level causes

Table 1  Determinants of the occurrence and duration of civil war

<table>
<thead>
<tr>
<th>variable</th>
<th>Probit of occurrence</th>
<th>Tobit of duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coefficient</td>
<td>t-ratio</td>
</tr>
<tr>
<td>income</td>
<td>-0.001</td>
<td>2.70</td>
</tr>
<tr>
<td>primary</td>
<td>16.16</td>
<td>2.56</td>
</tr>
<tr>
<td>primary^2</td>
<td>-29.47</td>
<td>2.28</td>
</tr>
<tr>
<td>ELF</td>
<td>0.0329</td>
<td>1.35</td>
</tr>
<tr>
<td>ELF^2</td>
<td>-0.0004</td>
<td>1.60</td>
</tr>
<tr>
<td>population</td>
<td>0.0003</td>
<td>2.39</td>
</tr>
<tr>
<td>sigma</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Predicted</th>
<th>log likelihood: -193.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>0</td>
<td>65  6</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>13  14</td>
</tr>
</tbody>
</table>

Notes: primary = share of primary commodity exports to GDP in 1965
ELF = index of ethno-linguistic fractionalization in 1960
population = population in 1960 in 10,000
Macro level causes

- When regressing the probability of conflict on economic determinants, it is difficult to obtain unbiased estimates!
  - Omitted variable bias
  - Reverse causality
  - Measurement Error
Macro level causes


- Fundamental conditions for rainfall variation to be a valid instrument:
  - Relevance condition
  - Exogeneity
- **Main Findings**: economic variables have a high explanatory power.
Micro level causes

Dube and Vargas “Commodity Price Shocks and Civil Conflict: Evidence from Colombia” (2009)

- Higher income has two contrasting effects on the probability of triggering a civil war:
  - **Opportunity effect**: less incentives to join rebel groups, negatively related with civil war
  - **Rapacity effect**: gains from appropriations through rebellion actions increase, positively related with civil war.
Micro level causes

- **Main finding**: the prevailing effect depends on the type of good.
- For **capital intensive** goods the **rapacity effect** is dominant: correlation between oil price increase and higher number of paramilitary attacks in 1998-2005.
- For **labour intensive** goods the **opportunity effect** is prevalent: correlation between coffee price decrease in 1990 and increased violence.

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effect of the coffee and oil shocks on violence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>(1) Guerrilla attacks</th>
<th>(2) Paramilitary attacks</th>
<th>(3) Clashes</th>
<th>(4) Casualties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee int. x log coffee price</td>
<td>-0.611**</td>
<td>-0.160***</td>
<td>-0.712***</td>
<td>-1.828***</td>
</tr>
<tr>
<td></td>
<td>(0.249)</td>
<td>(0.061)</td>
<td>(0.246)</td>
<td>(0.987)</td>
</tr>
<tr>
<td>Oil production x log oil price</td>
<td>0.700</td>
<td>0.726***</td>
<td>0.304</td>
<td>1.526</td>
</tr>
<tr>
<td></td>
<td>(1.356)</td>
<td>(0.156)</td>
<td>(0.663)</td>
<td>(2.127)</td>
</tr>
<tr>
<td>Observations</td>
<td>17,604</td>
<td>17,604</td>
<td>17,604</td>
<td>17,604</td>
</tr>
</tbody>
</table>
Short run effects

- Effects of civil wars on firms’ performances are not clear:
  - Abadie and Gardeazabal (2003) find that the ceasefire in the Basque civil war had a positive impact on firms’ stocks
  - Guidolin and La Ferrara (2007) show that the end of the Angolan civil war decreased the returns on diamond mining enterprises.

- Low external validity: results on the effects of civil war may vary a lot if different areas are considered.
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Political scenario

- Opposing parties in Angola after independence from Portugal in 1974:
  - Movimento Popular de Libertação de Angola (MPLA) led by José Eduardo dos Santos
  - Uniao Nacional para a Independencia Total de Angola (UNITA) led by Jonas Savimbi.
Timing of the events

- MPLA wins national elections in 1992; UNITA does not recognize the result and starts a civil war.
- Lusaka Peace Protocol in 1994: UNITA is given legal rights to mine and to form partnerships with foreign companies.
- 22 February 2002: Jonas Savimbi dies in an ambush.
- 4 April 2002: cease-fire is signed.
Diamond industry in Angola

- Angola is one of the **largest diamond producers** by value in the world.
- In 2000 diamond sales reached $1.1 billion.
- Close link between **diamond industry and conflict**:
  - MPLA mainly financed its military operations with sales of oil and official diamond concessions
  - UNITA through diamond sales after illegal occupation of many mines.
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Methodology

- **Event Study** to understand how conflict influences the value of diamond mining companies.

- **Market model**

  \[ r_t = \alpha + \beta r_t^M + \theta S_t + e_t \]

  - \( r_t \): daily rate of return on a stock
  - \( r_t^M \): return on the market portfolio
  - \( S_t \): set of dummies for company-specific events unrelated to Angolan political events
  - \( e_t \): unexplained residual, called **abnormal return**
For each political event, estimation window and event window are used to find the relationship between an unexpected shock in stocks’ value and political events:

1. Estimate the market model in the estimation window and find $\hat{\alpha}$, $\hat{\beta}$, $\hat{\theta}$.
2. Predict $e_t$ in the event window.
3. Generate the series of cumulative abnormal returns from the first day of the event window:

$$CAR_t = \sum_{j=t_0-k}^{t} e_j$$
Methodology

- CARs are aggregated for two different portfolios of companies:
  - **Angolan portfolio**, made of diamond mining firms holding concession in Angola
  - **Control portfolio**, made of diamond mining firms that do not have interests in Angola.

- Control portfolio is needed to check that the effects on the $CAR$ of Angolan companies are not caused by shocks in the market where they trade, not captured by the market index $r^M_t$. 
Methodology

The impact of a political event is then assessed in two ways:

- **Plot** $CAR_t$: a downward (upward) sloping $CAR$ means that the event had a negative (positive) impact.

- **Test the null** that the event has no impact.
Data: Sources

- The time period considered goes from January 1, 1998 to June 28, 2002, which corresponds to the most intense phase of the conflict.

- Different databases have been crossed for the analysis:
  - **Datamstream** and **Bloomberg** for financial data
  - **Lexis-Nexis** for data on political conflict.
Data: Angolan companies

- Seven diamond companies holding concessions in Angola.
- The portfolio is an equally weighted average of them.
- Not doing this weighting would essentially limit the analysis to De Beers.
Data: Non-Angolan companies

- The control portfolio is a weighted average of forty-two companies that satisfy three criteria during the sample period:
  1. Listed in one of the markets where the Angolan companies are traded;
  2. Continuously traded over the sample period;
  3. Not holding exploration or mining concessions in Angola.
**Tracking**

- Ex-ante trends for the two groups are very similar.
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To test the previous model we consider the stocks’ response to Savimbi’s death on February 22, 2002.

This event is highly relevant: given that he was seen as the main obstacle to the peace process, the probability of a cease-fire drastically increased after his death.
Effect on the Angolan portfolio

- $CAR$ declined 7% three days after the event: investors perceived Savimbi’s death as bad news for Angolan companies.
Effect on the control portfolio

- The abnormal return increased 1.4% on the event date: investors perceived Savimbi’s death as **no news** or as **good news** for companies **not operating in Angola**.
Significance tests

- Significance tests *reject* both the hypothesis that the $CAR$ of the Angolan portfolio is zero in correspondence to the event and that the $CAR$ difference between the two portfolios is zero against the positive alternative.

<table>
<thead>
<tr>
<th>Event window</th>
<th>ANGOLAN portfolio</th>
<th>CONTROL portfolio</th>
<th>Difference $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank statistic</td>
<td>p-value two-tailed</td>
<td>Sign statistic</td>
</tr>
<tr>
<td>Abnormal returns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(-0, +1)$</td>
<td>-3.065</td>
<td>0.002</td>
<td>-1.414</td>
</tr>
<tr>
<td>$(-3, +3)$</td>
<td>-2.430</td>
<td>0.015</td>
<td>-6.584</td>
</tr>
<tr>
<td>Raw returns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(-0, +1)$</td>
<td>-2.020</td>
<td>0.043</td>
<td>-2.554</td>
</tr>
<tr>
<td>$(-3, +3)$</td>
<td>-2.711</td>
<td>0.007</td>
<td>-2.000</td>
</tr>
</tbody>
</table>

$^a$Test of the null that the “Control” mean minus the “Angolan” mean is zero, against the alternative that it is positive.
Peace is bad news

- Peace is **bad news** for Angolan firms. Why?
  - **Transparency**: the end of the war may have generated an increase demand of transparency, reducing rents for firms.
  - **Increase in competition**: potential entry of new firms.
  - **Rent Seeking**: civil war limited government’s ability to extract rents; tighter government control is likely to increase firms’ costs for corruption.
  - **End of Price War**: UNITA “competitive force” will disappear.
In order to reinforce the validity of the obtained results, some robustness checks are conducted.

- Involvement in conflict zones
Robustness

2 Corruption

- Anticorruption episode (unexpected suspension of Endiama’s director) was perceived as good news for the mining companies with direct interest in this episode, but not for other companies.
Robustness

Alternative Interpretations

- **Official end** of the war, on April 4, 2002, gives similar results to those obtained for Savimbi’s death.

- Peace could have generated a **fall** in diamond prices.
Robustness

How different types of events affect firm value?

<table>
<thead>
<tr>
<th>Event</th>
<th>Angolan $\beta_A$</th>
<th>Control $\beta_C$</th>
<th>Test $\beta_A - \beta_C = 0$ (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of conflict</td>
<td>-0.03**</td>
<td>0.004</td>
<td>0.001</td>
</tr>
<tr>
<td>(0.009)</td>
<td>(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government victories</td>
<td>0.014</td>
<td>0.042**</td>
<td>0.1</td>
</tr>
<tr>
<td>(0.012)</td>
<td>(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNITA attacks civilians</td>
<td>0.019</td>
<td>-0.0001</td>
<td>0.28</td>
</tr>
<tr>
<td>(0.017)</td>
<td>(0.004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNITA attacks mines</td>
<td>-0.028</td>
<td>0.013**</td>
<td>0.03</td>
</tr>
<tr>
<td>(0.017)</td>
<td>(0.005)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNITA attacks garimpeiros</td>
<td>-0.014</td>
<td>0.009</td>
<td>0.15</td>
</tr>
<tr>
<td>(0.014)</td>
<td>(0.005)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry regulation</td>
<td>-0.01**</td>
<td>-0.013</td>
<td>0.82</td>
</tr>
<tr>
<td>(0.004)</td>
<td>(0.010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Robustness

5 Matched Pairs

- Match each of the target companies to one control company chosen according to the following criteria:
  - Listed in the same stock exchange;
  - Closest possible size versus the Angolan company.

<table>
<thead>
<tr>
<th>Event window</th>
<th>Rank statistic a</th>
<th>p-value One-tailed a</th>
<th>Rank statistic a</th>
<th>p-value One-tailed a</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-0, +1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 1 (Listing: JSE)</td>
<td>1.418</td>
<td>0.078</td>
<td>0.878</td>
<td>0.190</td>
</tr>
<tr>
<td>Pair 2 (Listing: TSX)</td>
<td>2.440</td>
<td>0.007</td>
<td>-0.697</td>
<td>0.243</td>
</tr>
<tr>
<td>Pair 3 (Listing: ASX)</td>
<td>2.503</td>
<td>0.006</td>
<td>2.741</td>
<td>0.003</td>
</tr>
<tr>
<td>Pair 4 (Listing: TSX)</td>
<td>1.815</td>
<td>0.035</td>
<td>1.123</td>
<td>0.131</td>
</tr>
<tr>
<td>Pair 5 (Listing: JSE)</td>
<td>-0.725</td>
<td>0.234</td>
<td>0.305</td>
<td>0.380</td>
</tr>
<tr>
<td>Pair 6 (Listing: TSX)</td>
<td>1.181</td>
<td>0.119</td>
<td>2.514</td>
<td>0.006</td>
</tr>
<tr>
<td>Pair 7 (Listing: TSX)</td>
<td>1.727</td>
<td>0.042</td>
<td>1.454</td>
<td>0.073</td>
</tr>
<tr>
<td>(-3, +3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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*Diamonds Are Forever, Wars Are Not: Is Conflict Bad for Private Firms?*  
Gualtiero Azzalini, Benedetta Brioschi
Concluding remarks

- Peace is a **bad news** for diamond companies operating in Angola.
  - Sizeable and statistically significant **decrease** in the abnormal return of the Angolan portfolio;
  - The effect is not driven by unmeasured shock: the **counterfactual** (control portfolio) shows no significant reaction.

- **Limited external validity.**
- **Small sample:** just seven companies in the Angolan portfolio
Policy implications

Policy makers should take into account the following aspects:

- Some firms, not directly related to the war industry, could benefit from a conflict environment in resource-dependent economies.
- There might be incentives to exert political and economic pressure not to stop the fight.
Questions and answers