The Effects of Terrorism on Labor Market
Case Study of Iraq

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Motivation

• Acts of Terrorism could have a potential to create significant economic impacts across the targeted country and across economic sectors.

• Iraqi conflict and subsequent terrorist activity created shocks to the labor market.

• Understanding the economic impacts of terrorist attacks on labor supply of countries under severe pressure may provide policy implications for countries such as U.S regarding refugees follow.
Iraq Conflict
Iraq Conflict

2006 Al-Askari (Shiite Holly Shrines) Bombing
Fig (1): Number of Monthly Terrorist Attacks In Iraq 2003-2016
البحث عن العمل
Objectives

• Provide empirical evidence on the economic consequences of terrorism on the labor market and labor force.

• Provide a clearer picture of the effects of terrorism on labor supply to the policy maker in both countries under severe conflict and refugee hosting countries.
Previous Literature

The larger literature tends to focus on the effects on the macroeconomic variables

• Topics range from savings to the stock market
  (For instance, see Venieris and Gupta, 1986; Mauro, 1995; Alesina and Perotti, 1996; Abadie and Gardeazabal, 2003; Echstein and Tsiddon, 2004; Miquel et al., 2004).

• Time Series and cross-country studies has been inconclusive
  (Blomberg et al., 2004; Crain and Crain, 2006; Gaibulloev and Sandler, 2008; Gries et al., 2011; and Meierrieks and Gries, 2013.

• Depending on the time span of the study, the impact of terrorism may vary
  (Becker and Murphy 2001).

• Analyzing specific parts of the economy, link between terrorism, acting as a negative shock, and a decrease in economic activity in a particular sector.
  (Drakos and Kutan, 2003; Enders and Sandler, 1991; Enders et al., 1992; Greenbaum and Hultquist, 2006).
Previous Literature

Fewer Literature analyzes the effect of political instability on, represented by a violence conflict or terrorism, on the labor market at individual or household level

Previous Literature

• Miaari and Sauer (2011) found significant negative effects of the conflict on Palestinian employment.

• Benmelech et al., (2010) provide empirical evidence of the high economic consequences in the harboring district as it in increasing the local unemployment rate and lower the average wage in addition to lower the percentage of the district’s population working in Israel.
Contributions

• Analyze the effect of terrorism in Iraq on the labor force using several measures of the labor supply

• Studying the effect of violence conflict in Iraq on labor supply using a nationwide household socio-economic survey that conducted on the household and individual level in 2007 by Iraqi Organization for Statistics and Information Technology (COSIT), Kurdistan Regional Statistics Office (KRSO) and World Bank.

• Expand on Benmelech et al (2010) to include both a measure of own governate terrorism and a geospatial variable to incorporate potential spillover effects of terrorism in neighboring governate.

• To the best of our knowledge this paper is the first economic analysis that tries to study the effect of insurgent and sectarian sequential violence on the Iraqi labor supply with micro-level data.
Conceptual Framework

• The US State Department, contained in Title 22 of the United States Code, Section 2656f(d). Accordingly,

“The term ‘terrorism’ means premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents, usually intended to influence an audience.”
Conceptual Framework

We assume the labor supply under terrorist attacks follows a constrained maximization problem:

\[
\begin{align*}
\text{Max } & U(X) \text{s. t. } \\
F &= N + wT = pX + wL + wIc \\
c &< \lambda
\end{align*}
\]

U(X) : household’s utility function for consumption X.
c : cost of endangerment from terrorism when hours of work \( \geq 0 \).
N : non-labor income.
p : price of the consumption good X.
w : the wage.
I : indicator equal to 1 when \( c < \lambda \) and equal to 0 when \( c \geq \lambda \) and 
F is full income.
Conceptual Framework

**H1:** As endangerment costs increase, the net benefit of working decreases, so households choose to supply less labor.

**H2:** The number of hours worked is inversely correlated with endangerment costs.

**H3:** Household wages will decrease as endangerment costs increase.

**H4:** Job permanence will decline as endangerment costs increase.
Identification Strategy:
Dependent Variables (Cross-Sectional Survey)

- **Working**
  \[ \begin{cases} 
  1 & \text{if respondent was working for at least 6 months in 2007;} \\
  0 & \text{otherwise.} 
  \end{cases} \]

- Number of working hours per week

- Compensation measure (last amount of paycheck in cash + in-kind)

- Job Permanence
  - Permanent more than 30 hours a week
  - Permanent less than 30 hours a week
  - Seasonal
  - Irregular
  - Other
Identification Strategy:
Dependent Variables (Panel Data Survey)

Working = \begin{cases} 
1 & \text{if respondent works during month } x \text{ in 2007;} \\
0 & \text{otherwise.} 
\end{cases}
Identification Strategy: Explanatory Variables

• Sum of terrorism incidents per governorate

• Sum of non-combatant Iraqi fatalities from terrorism attack (robustness check)
A = the sum of terrorism incidents or non-combatant fatalities in Iraq.

\[ G_i = \text{the sum of terrorism incidents or non-combatant fatalities } A(k) \text{ in governate where household } i \text{ is located.} \]

\[ \sum OG_i = \text{the sum of terrorism incidents or non-combatant fatalities } A(k) \text{ in all other governates where household } i \text{ does not live.} \]
\[ \sum N_{Gi} = \text{the sum of terrorism incidents or non-combatant fatalities in all governates that are next to the governate where individual } i \text{ lives} \]

\[ \sum D_{Gi} = \text{the sum of terrorism incidents or non-combatant fatalities in all governates that are not next to the governate where individual } i \text{ lives.} \]
Identification Strategy: Explanatory Variables

\[ Z_i = \frac{1}{\sum_{j \neq i} d_i - d_j} A_j \]

\( Z_i = \) The distance-weighted sum of the terrorist attacks \( A(j) \).
\( d(i) = \) the centroid of the governate where the individual lives.
\( d(j) = \) the centroid of the governate where terrorist act occurred.
Identification Strategy

Control Variables

Basic
Governorate, household size, sex, age, born in governorate, and population density

Socio-Economic
Years of schooling, bachelor degree, economic Sector, poverty line, Paasche index, suffer disability/illness, suffer illness and agriculture wage job

Political
Percentage of voter turnout

Effect Of Terrorism On Labor Market
Data: Source

- Iraq Household Socioeconomic survey of 2007 by Iraqi Organization for Statistics and Information Technology (COSIT), Kurdistan Regional Statistics Office (KRSO) and World Bank
- Iraq Body Count project (IBC)
- Iraqi Organization for Statistics and Information Technology (COSIT) database
Data: Statistical Summary (Cross-Sectional Survey)

<table>
<thead>
<tr>
<th>Labor Supply Outcome</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
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<tbody>
<tr>
<td>Hours worked past 7 days</td>
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<td>18.45793</td>
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<tr>
<td>Amount of last paycheck cash+kind (1000 ID)</td>
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<td>242.6647</td>
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<tr>
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<td></td>
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<tr>
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<td>0.93589</td>
<td>0.24495</td>
</tr>
<tr>
<td>Yes</td>
<td>127,297</td>
<td>0.06411</td>
<td>0.24495</td>
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<tr>
<td>Job Permanence</td>
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<td></td>
</tr>
<tr>
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<tr>
<td>Permanent less than 30 hours a week</td>
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<tr>
<td>Other</td>
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<td>0.00523</td>
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</table>

Fig (2): Frequency Distribution of Job Permanence

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## Data: Statistical Summary

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
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<tr>
<td>Number of Terrorist Incidents in 2007</td>
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<td>565.5</td>
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<td>Number of Terrorist Incidents in 2006</td>
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<td>612.6</td>
</tr>
<tr>
<td>Number of Terrorist Incidents in 2005</td>
<td>127,297</td>
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<td>Number of Terrorist Incidents in 2004</td>
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<td>107.2</td>
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<tr>
<td>Max Number killed in 2007</td>
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<td>Max Number killed in 2005</td>
<td>127,297</td>
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<td>Max Number killed in 2004</td>
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<td>753.4</td>
<td>1404.4</td>
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</table>

### The Distribution of Terrorist Incidents in Iraq in 2007

- **Anbar**: 5.3%
- **Baghdad**: 42.7%
- **Basra**: 7.5%
- **Babel**: 5.0%
- **Babel**: 12.4%
- **Ninewa**: 9.8%
- **Karbala**: 5.0%
- **Kirkuk**: 4.0%
- **Muthanna**: 0.2%
- **Mishan**: 0.5%
- **Najaf**: 0.7%
- **Sulaymaniyah**: 0.1%
- **Salah al-Din**: 6.3%
- **Tidjari**: 2.0%
- **Wassit**: 2.0%
- **Zanjan**: 0.3%
- **Babel**: 1.6%
- **Erbil**: 0.0%
- **Karbala**: 0.5%
- **Mishan**: 0.5%
- **Muthanna**: 0.2%

1/12/2018

Effect Of Terrorism On Labor Market
Empirical Method : (Cross-Sectional Survey)

• Cross-sectional governorate level model as following:

\[ Y_{iG} = \alpha_0 + \beta^T X_{iG} + \gamma^T C_{iG} + \varepsilon_{iG} \]

Where

- \( Y_{iG} \): Labor force outcome of interest for individual \( i \) in governorate \( G \)
- \( X_{iG} \): The set of explanatory variables represent different terrorism measures
- \( C_{iG} \): The set of control factors
- \( \varepsilon_{iG} \): The error term
Empirical Method: Cross-Sectional Survey and Panel Data Survey

• Following the definitions of variables provided in section for panel data, the following regressions are constructed:

• $Y_i = \alpha + \beta G_i$
• $Y_i = \alpha + \beta G_i + \phi OG_i$
• $Y_i = \alpha + \beta G_i + \phi NG_i + \delta DG_i$
• $Y_i = \alpha + \beta Z_i$
Empirical Results: (Cross-Sectional Survey)
Liner Probability Regression, Number of Incidents 2006 and Working in 2007

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Incl economic &amp; Scio-economics controls</td>
<td>NO</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Education and political controls</td>
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<td>No</td>
<td>No</td>
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<td>127,276</td>
<td>127,022</td>
<td>124,573</td>
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<tr>
<td>R-squared</td>
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<td>0.135</td>
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P-value in parentheses: *** p<0.01, ** p<0.05, * p<0.1
### Empirical Results: (Cross-Sectional Survey)

Marginal Analysis, Number of Incidents and Working in 2007

<table>
<thead>
<tr>
<th>Variables</th>
<th>2007</th>
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<th>2005</th>
<th>2004</th>
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<td>-0.000216***</td>
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<tr>
<td>Incl regional and locational</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>indicators</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incl economic &amp; Scio-economic</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>controls</td>
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<tr>
<td>Education and political controls</td>
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<tr>
<td>Observations</td>
<td>124,573</td>
<td>124,573</td>
<td>124,573</td>
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P-value in parentheses: *** p<0.01, ** p<0.05, * p<0.1
### Empirical Results: (Cross-Sectional Survey)
OLS Estimation, Number of Incidents 2006 and Hours Worked per Week 2007

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
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<th>(4)</th>
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<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
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<td>Yes</td>
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<tr>
<td>R-squared</td>
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P-value in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Empirical Results : (Cross-Sectional Survey)
OLS Estimation, Number of Incidents 2006 and Last Paycheck in cash+ in-Kind (1000 ID) 2007

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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</tr>
</thead>
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<td>Yes</td>
</tr>
<tr>
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<td>-116.7*** (0.000)</td>
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<tr>
<td>R-squared</td>
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<td>0.005</td>
<td>0.142</td>
<td>0.149</td>
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P-value in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Empirical Results : (Cross-Sectional Survey)
OLS Estimation, Number of Incidents 2006 and Job Permeance 2007

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
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<tr>
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<td>0.005</td>
<td>0.142</td>
<td>0.149</td>
</tr>
</tbody>
</table>

P-value in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Robustness Check

• Replace sum number of incidents with sum of non-combatant Iraqi fatalities from terrorism attack.
• Different years 2004, 2005, 2006 and 2007
Conclusion

• Results support each of the hypotheses. As endangerment costs rise, proxied by the number of terrorist incidents or the maximum number of civilian fatalities, labor supply distortions result.

• There is evidence that households choose to not work when the endangerment costs reach a certain threshold.
Policy Implication

• For Policymakers in Iraq, these results should lead to specific types of interventions in areas particularly impacted by terrorism.

• Countries like the United States who face an influx of refugees from countries with high levels of conflict and violence.