Domestic Violence over the Business Cycle

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Internal Seminar, November 2012

Motivation

General perception that domestic violence goes up in recessions.
Newspaper headlines:

- *Growth in violence against women feared as recession hits*, The Guardian, March 2009.
- *Recession blamed for massive increase in domestic violence*, The Independent, August 2011.
- *Reid: Unemployment leads to domestic violence*, CBS News, February 2010.

Research Questions

- This project
  - Does domestic violence move over the business cycle?
  - If so, by how much?
  - Mechanism?
- Down the road
  - Taking violence into account, what are the costs of the business cycle?
  - Policy implications?

Literature on Unemployment & Violence

Unemployment and violence are related to each other:

- Tauchen, Witte and Long (IER 1991)
- Tauchen and Witte (AEA PP 1995)
- Farmer and Tiefenthaler (Review of Social Econ 1997)
- Sarin (BA thesis, Yale, 2011)
- Several papers in medical journals

Problem:

- Studies based on cross sectional data.
- Difficult to disentangle selection vs. treatment.
- Few time series of domestic violence measures exist.

Other Economic Papers on Domestic Violence

- Card and Dahl (QJE 2011): football losses $\rightarrow$ violence.
- Aizer (AER 2010): gender wage gap $\rightarrow$ violence.
- Bowlus and Seitz (IER 2006): violence and divorce.
- Stevenson and Wolfers (QJE 2006): divorce law and violence.
- Bloch and Rao (AER 2002): dowry violence in India.
- Angelucci (BE Press 2008): *Oportunidades* and violence.
- Pollak (J Pop Econ 2004): intergenerational transmission of violence.

None of these papers look at business cycle.

Our Contribution

- Novel data from Sweden (long time series):
  - Crime data
  - Data from health sector, Skåne
- Findings:
  - High correlation of BC indicators with measures of domestic violence.
  - Large magnitudes.
- Use data to shed some light on mechanism.

Possible Mechanisms

- EMOTIONAL CUES – Recession triggers aggression
  - *Social information processing theories* emphasize social cues.
  - Card and Dahl (2011).
- STRATEGIC RESPONSE – Men use violence strategically.
  - Psychological *feminist theories*: violence is used to establish/maintain power and control over their partners
  - Aizer (2010), Angelucci (2008), Bloch and Rao (2002).
  - Higher relative male income may increase or decrease violence.
- INCREASE IN BAD MATCHES – Financial hardship forces more 'problem couples' to stay together.
  - Stevenson and Wolfers (2006)
- OTHER – unemployed people may spend more time with partner.
  – funding for prevention programs may fall.

Background: DV in Sweden

- Captured Queen Study, 2000.
- Sample of 10,000 women.
- Domestic violence is a big issue in Sweden:
  - 46% of women have been subjected to violence by a man since their 15th birthday.
  - In last year alone: 12%.
  - Particular risk groups: young, divorced, low income.
  - Perpetrator: present husband (11%), former husband (33%), boyfriend (15%), outside sexual relationship (30%).

Our Empirical Analysis

- Measures of domestic violence
  - Annual aggregate data on assaults, collected by National Council for Crime Prevention (BRA).
  - Administrative data from medical sector in Skåne, construct quarterly measures.
  - Focus on women.
- Analogue to usual BC methodology
  - BC indicators: real p.c. GDP, unemployment.
  - Detrend data.
  - Look at correlation of cyclical components.
- Regression analysis, use detailed individual information.

Swedish Crime Data

- Data from Swedish National Council for Crime Prevention.
- Annual data, 1981-2008.
- Assault, indoors, against women, by known person.
- Aggravated assault, indoors, against women, by known person.
- Correlations with cyclical component.

Variable	avg. annual # per 100K Pop	Corr GDP	Corr U
Assaults	120	- 0.85	0.66
Aggravated assaults	7	-0.57	0.38

Assaults and lagged GDP: Cyclical Components

Regression Analysis

$$x_t = \beta_0 + \beta_1 u_{t-1} + \beta_2 t + \varepsilon_t$$

x_t	women
avg. # annual cases	120
unemployment	2.75^{***}
time	2.5^{***}

Magnitude:

- If unemployment increases by 1 percentage point, then DV goes up by 2.7 assaults per 100,000 population. i.e. from 120 to 123.
- Average unemployment: 4.7%.
- Suppose unemployment doubles, then DV would go up by 14 cases, i.e. from 120 to 134, a 12% increase.

Health Care Data: Skåne

- Largest region: 1.25 Million people, 13% of Swedish population.
- Administrative data, 1999-2008.
- Comprehensive inpatient and outpatient records, with ICD codes.
- External injury causes (e.g. assault).
- Include place of occurrence (e.g. home).
- For example: X99 = assault by sharp object.
  X99.0 = idem, at home.
- Z63.0 = problems in relationship with spouse or partner.
- Merge with LISA registry: individual characteristics.
- Merge with aggregate indicators: quarterly municipal unemployment, quarterly unemployment for region.
- Focus on women, 14+ years old.

Some Descriptive Data

Average annual occurrence of violence measures (women only).

Variable	Code	Occurrence
All assaults (Aizer 2010)	X85-X99, Y00-Y05 Y08-Y09	307
Assaults, at home	same, but .0	56
Bodily assaults	Y04, Y05	248
Bodily assaults, at home	same, but .0	36
Conflict with partner	Z63.0	218

Empirical Analysis

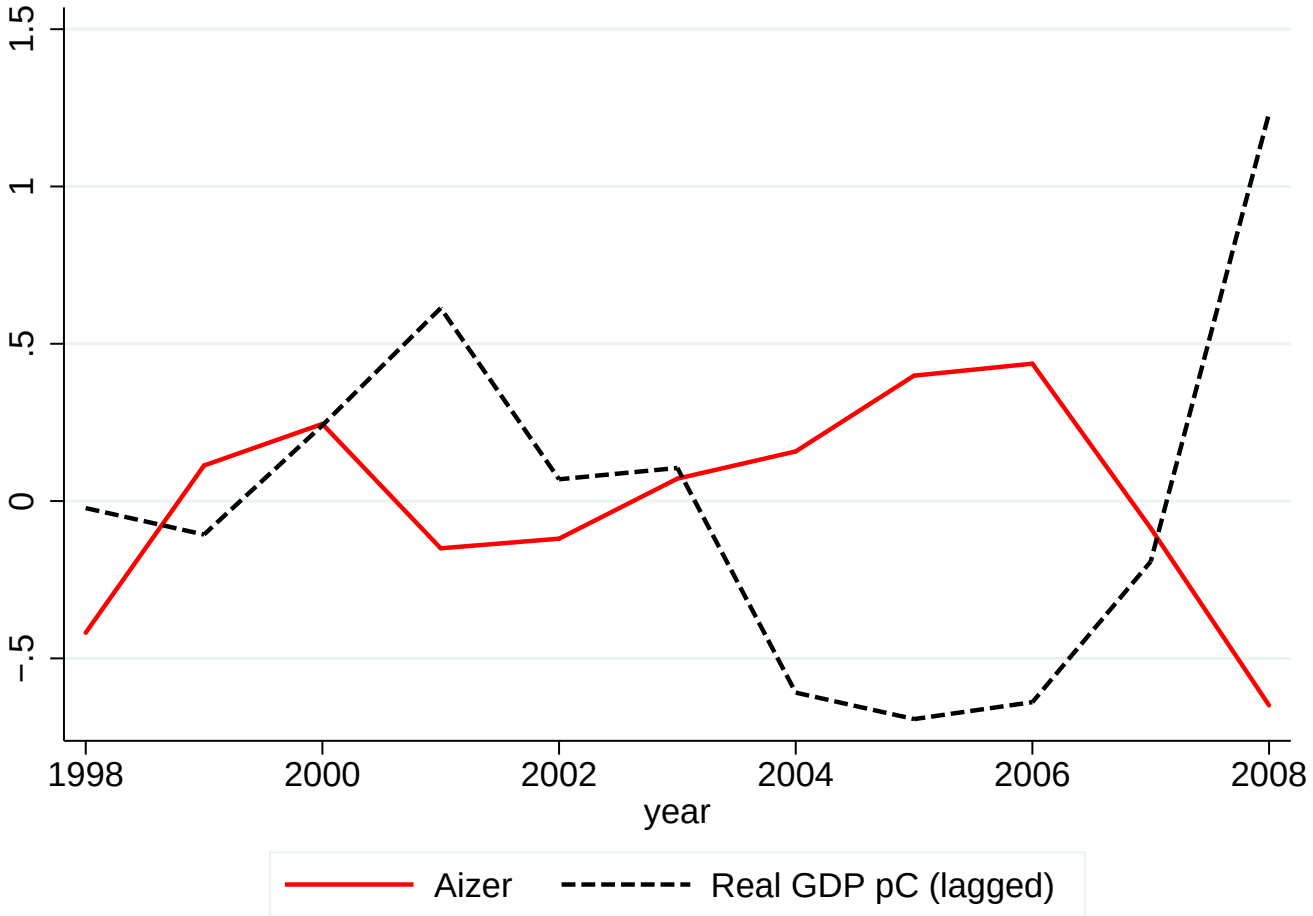
1. Correlations of cyclical components (analogue to Macro BC literature).
2. Regression analysis on three levels:
   (a) Aggregate: dependent variable is cases of DV per 10,000 women in a given quarter, in Skåne.
   (b) Municipality: dependent variable is cases of DV per 10,000 women in a given quarter, in a particular municipality.
   (c) Individual: binary dependent variable: did a woman experience DV in a given quarter.

Correlations with Business Cycle

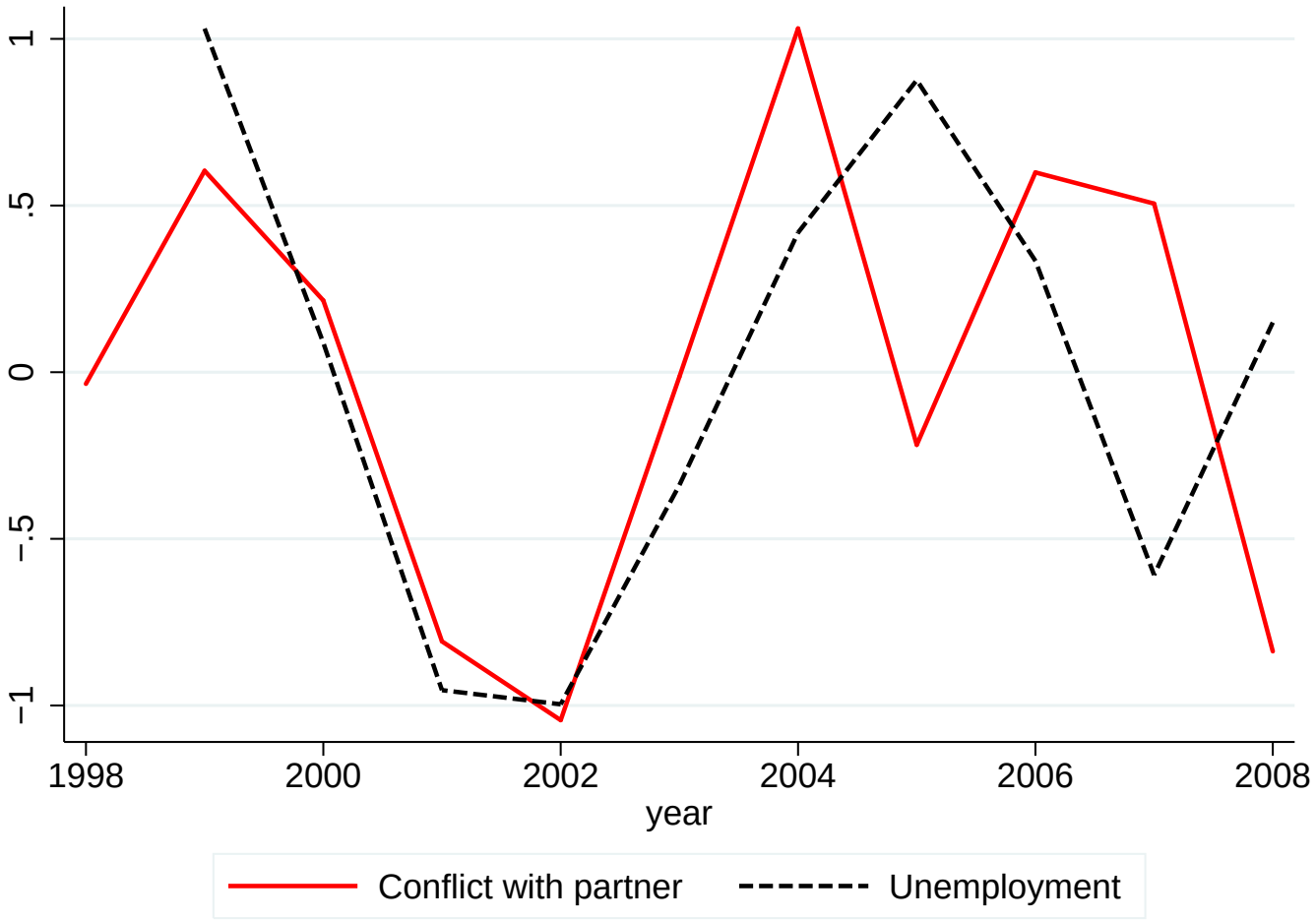
- Variables are detrended.
- Table shows correlations of cyclical components.

Variable	GDP	Unemployment
All assaults (Aizer 2010)	-0.78	0.44
Bodily assaults	-0.79	0.52
Assaults, at home	-0.69	0.40
Bodily assaults, at home	-0.65	0.47
Conflict with partner	-0.66	0.54

Assaults and lagged GDP: Cyclical Components



Conflict with Partner and Unemployment: Cyclical Components



Baseline Regression Results

$$DV_{tm} = \beta_0 + \beta_1 * U_{t-1,m} + \beta_2 t + \sum_s \beta_{3,s} season_s + \sum_m \beta_{4m} D_m + \varepsilon_{t,m}$$

Level	aggregate	municipal	individual
Regression	OLS	OLS	probit (marginal effects)
DV/10,000	1.91	1.62	0.00013
$unemployment_{-1}$	31.4^{***}	13.9^{**}	0.001^{***}
linear time trend	0.087^{***}	0.061^{***}	0.00000461^{***}

If unemployment goes up by one percentage point ...

- DV in Skane goes up by 31.4* 0.01 = 0.31 cases per ten thousand. From 1.91 to 2.22, i.e. 16%.
- DV in the avg. municipality increases by 13.9 * 0.01 = 0.14 cases per ten thousand. From 1.62 to 1.76, i.e. about 8%.
- the probability of DV increases by 0.001*0.01= 0.00001. From 1.3 to 1.4 per ten thousand, i.e. by 8%.

Analysis by Groups

Question: Is DV response to the BC higher for certain groups?
We redo the analysis for subgroups of the population:

- by age
- by education
- by country of origin

We find: response is largest for the young, the uneducated, and immigrants from poor countries.

Age

- Hypothesis: The DV response to the BC varies with age.
- Analyze 3 groups: 16-24, 25-40, 40+.

		4 separate regressions		
	Baseline	16-24	25-40	40+
average DV/10,000	1.3	4.3	1.6	0.5
marginal effect of $U_{-1,m}$	0.001^{***}	0.005^{***}	0.0009	0.00015
t-statistic	(4.10)	(3.43)	(1.52)	(0.71)

Education

- Hypothesis: The DV response to the BC varies with education
- Analyze 3 groups:
  - primary and lower secondary education
  - secondary education and vocational training
  - graduate and postgraduate education

	4 Separate Regressions			
	baseline	drop outs	high school	college
average DV/10,000	1.3	4.3	1.6	0.5
marginal effect of $U_{-1,m}$	0.001^{***}	0.003^{***}	0.001^{**}	-0.000
t-statistic	(4.10)	(3.17)	(2.51)	(0.87)

Country of Origin

- Hypothesis: The DV response to the BC varies with country of origin.
- Analyze 3 groups:
  - Sweden
  - "Europe+": EU-15, Norway, North America, Oceania
  - Other = Africa, Latin America, Eastern Europe

	4 separate regressions			
	Baseline	Other	Sweden	Europe
average DV/10,000	1.3	1.94	1.25	1.0
marginal effect of $U_{-1,m}$	0.001^{***}	0.005^{**}	0.001^{***}	-0.001
t-statistic	(4.10)	(2.30)	(3.68)	(0.29)

Back to the Mechanism

Question: Can we use the data to learn something about *why* domestic violence goes up in recessions?

1. EMOTIONAL CUES: If unemployment makes men aggressive, one would expect
   - An immediate response.
   - Similar effects on women and children.
2. STRATEGIC RESPONSE: If men use violence strategically, one would expect
   - No/little effect on children.
   - Relative male/female unemployment to play a role.
   - Individual unemployment to play a larger role than municipality unemployment.
3. INCREASE IN BAD MATCHES: If financial hardship causes more bad matches to stay together in recessions, one would expect
   - Response to be particularly large for married/cohabiting couples.

Immediate vs. Delayed Response

5 probit regressions, with different unemployment lags, quarterly data

Lag	regression coefficient	t-statistic
contemporaneous	1.78	$(3.24)^{***}$
1 quarter	2.23	$(4.11)^{***}$
2 quarter	1.71	$(3.41)^{***}$
3 quarter	0.86	(1.58)
4 quarter	0.18	(0.33)

Delayed effect is larger than immediate effect

Evidence against emotional cues mechanism?

Male vs. Female Unemployment

- Aggregate time series data:

$$y_t = \beta_0 + 42.66^{***} U_{t-1} + 2.30^{**} (U^M_{t-1}/U^F_{t-1}) + \ldots$$

- Male unemployment relative to women's unemployment matters: if male unemployment goes up from 5 to 6%, then DV goes up by 2.3*0.2=0.46 cases per 10,000 women (larger than the 0.31 in the baseline specification).

Evidence in favor of strategic motive?

Aggregate vs. Individual Unemployment

- Individual level probit regression.
- Restrict sample to couples. Individuals are merged as follows
  - identical parish-id, family type and income,
  - define as couple the two oldest family members,
  - couples in which one "partner" was the other one's child were removed.
- Unemployment indicator constructed: if individual received any unemployment benefits in that year.

	marginal effects
municipal unemployment, quarter	0.00006
own unemployment, year	0.00001*
partner unemployment, year	0.00002**

- Own unemployment seems a lot more important than "general economic conditions."

Evidence in favor of strategic motive?

Women vs. Children

Back to crime data.

$$x_t = \beta_0 + \beta_1 u_{t-1} + \beta_2 t + \varepsilon_t$$

x_t	baseline	children ≤ 6	children 7-14	children ≤ 14
avg. # assaults	120	4.7	17	21.7
unemployment	2.75^{***}	0.08	0.27	0.35
time	2.5^{***}	0.36^{***}	1.43^{***}	1.79^{***}

Assaults against children do not go up in recessions.

Evidence in favor of strategic motive?

Single vs. Married

- Hypothesis: The DV response to the BC varies with marital status.
- Have only information on household type, not individual marital status.
- We classify women by type of household, starting at age 25 to avoid mistakenly assigning marital status of parents.
- Assign people to one of 3 groups:
  - Married and cohabiting women.
  - Single mothers.
  - Single women without children in HH.

	baseline	married	single moms	single, no kids
average DV/10,000	1.3	0.3	2.4	1.3
marg. effect of $U_{-1,m}$	0.001^{***}	-0.00014	0.00093	0.001^{**}
t-statistic	(4.10)	(0.70)	(0.73)	(2.16)

Evidence against "increase in bad matches" mechanism?

Summary

- Empirical analysis of domestic violence, using novel data from Sweden
  - Aggregate crime data.
  - Administrative data from medical sector in Skåne.
- Main Findings:
  - Sizeable effect: a 1 percentage point $\uparrow$ in U, increases DV by 8-16%.
  - Response largest: young, uneducated, immigrants from poor countries.
  - Evidence in favor of strategic motive (against "emotional cues" and "increase in bad matches" mechanisms).
- Next steps:
  - More robustness checks.
  - Male vs. female income.
  - Other outcome variables (Z63, conflict with partner).
  - Taking DV into account, quantify BC costs.
  - Policy implications?