Quantifying Domestic Violence in Times of Crisis: Real-Time Measurement Using Search Data

Dan Anderberg
(Royal Holloway UoL)

Helmut Rainer
(U of Munich, ifo Inst.)

Fabian Siuda
(Vienna UEB)

April 26, 2025

Core Takeaway

- During the covid-crisis we reached for an **alternative data source** to monitor IPV incidence in the UK **in real time**.
- Used **Google search data** and found a substantially **larger IPV increase** than found in police data.
- Such data are **readily available** and **methods** are rapidly improving for continuous real-time monitoring.
- Can to **support policy**, e.g. informing **dashboards** or **early-warning systems** during future shocks.

COVID-19 & Domestic Violence: A Measurement Dilemma

Feminist economics

In quarantine with an abuser: surge in domestic violence reports linked to coronavirus

Cases typically spike in times of economic crisis – and with most of the US told to stay home, hotlines are worried victims can't leave

COVID-19 & Domestic Violence: A Measurement Dilemma

Feminist economics

In quarantine with an abuser: surge in domestic violence reports linked to coronavirus

Cases typically spike in times of economic crisis – and with most of the US told to stay home, hotlines are worried victims can't leave

- Concern that **lockdown increased IPV**, but **police reports** suspected of **under-capturing** this.
- **Helplines** reported **sharp increases** (60%) but varied regionally and lacked standardisation.
- Victimisation surveys of **no help** due to lag.

COVID-19 & Domestic Violence: A Measurement Dilemma

Feminist economics

In quarantine with an abuser: surge in domestic violence reports linked to coronavirus

Cases typically spike in times of economic crisis - and with most of the US told to stay home, hotlines are worried victims can't leave

→ There was an **urgent need for reliable real-time indicators**.

- Concern that **lockdown increased IPV**, but **police reports** suspected of **under-capturing** this.
- **Helplines** reported **sharp increases** (60%) but varied regionally and lacked standardisation.
- Victimisation surveys of **no help** due to lag.

Leveraging Google Search Data

1. Collected UK-level **daily Google search data** for **five years** on a **large number of help-seeking terms** along with corresponding **daily police calls-for-service data on IPV**.

Leveraging Google Search Data

1. Collected UK-level **daily Google search data** for **five years** on a **large number of help-seeking terms** along with corresponding **daily police calls-for-service data on IPV**.

2. Used a signal-to-noise approach to **train an algorithm on all the pre-2020 data**, thereby **identifying the search-terms with the most IPV predictive power**.

Leveraging Google Search Data

1. Collected UK-level **daily Google search data** for **five years** on a **large number of help-seeking terms** along with corresponding **daily police calls-for-service data on IPV**.

2. Used a signal-to-noise approach to **train an algorithm on all the pre-2020 data**, thereby **identifying the search-terms with the most IPV predictive power**.

3. Weighted the search-terms into **composite search-based IPV Index**.

Leveraging Google Search Data

1. Collected UK-level **daily Google search data** for **five years** on a **large number of help-seeking terms** along with corresponding **daily police calls-for-service data on IPV**.

2. Used a signal-to-noise approach to **train an algorithm on all the pre-2020 data**, thereby **identifying the search-terms with the most IPV predictive power**.

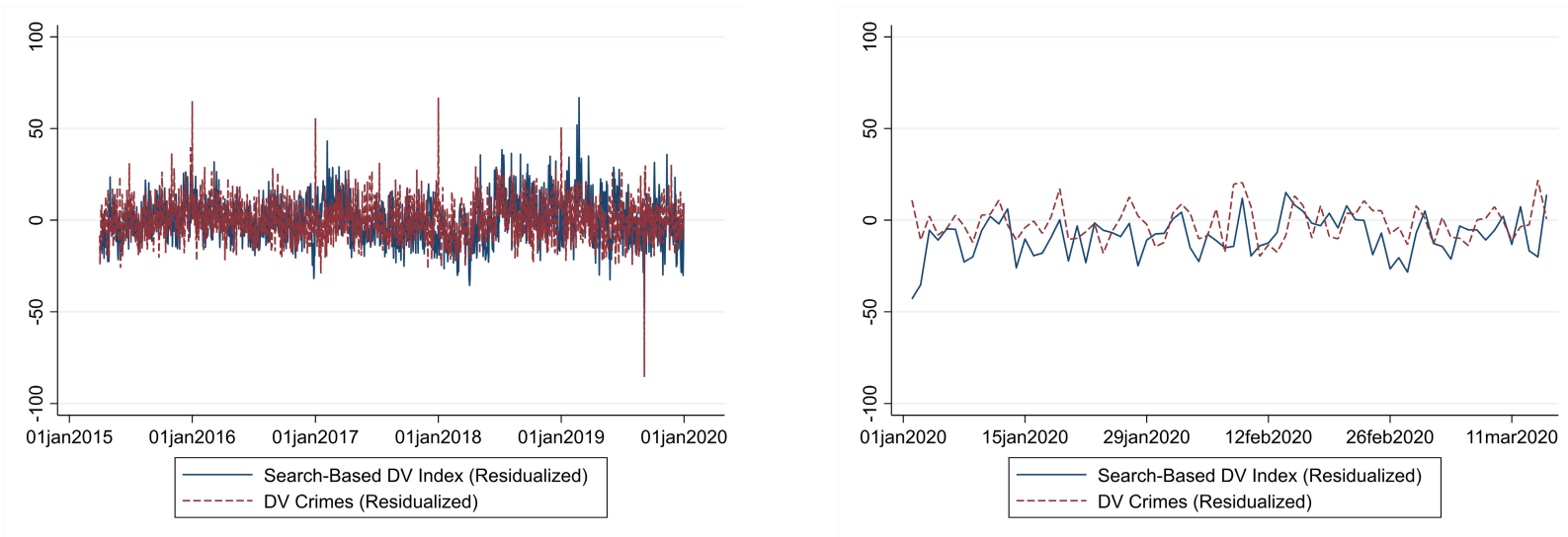
3. Weighted the search-terms into **composite search-based IPV Index**.

4. **Validation**: Verified good **predictive power** in a **testing period** – the first 75 days of 2020.

Training and Testing the Algorithm for the Index

Search-based IPV index and police-reported IPV in the training and the testing period (both pre-lockdown)

Figure 1: Training Period and Testing Period



What the Index Revealed about the Lockdown Period

- Lockdown period:
  - **Police-recorded IPV** rose by 5–7%;

What the Index Revealed about the Lockdown Period

- Lockdown period:
  - **Police-recorded IPV** rose by 5–7%;
  - **Search index** rose by 40%.

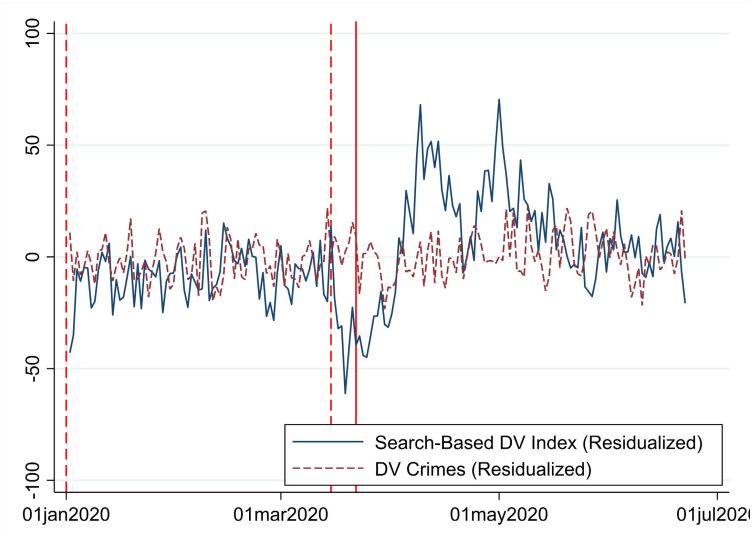
What the Index Revealed about the Lockdown Period

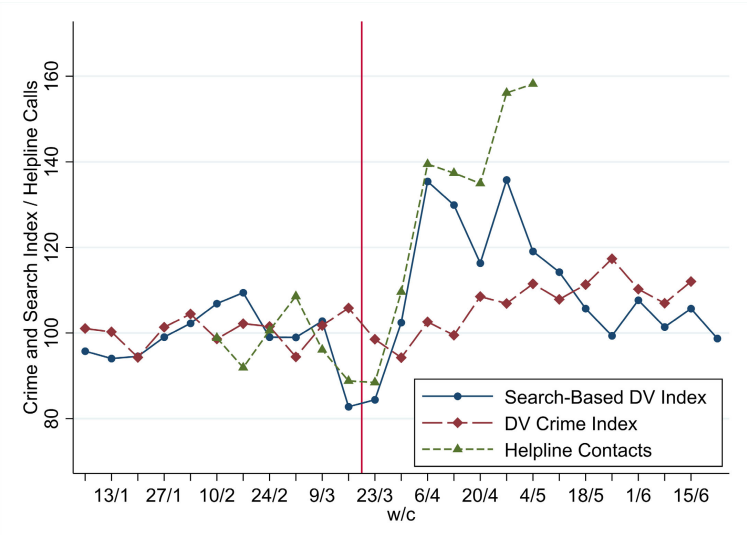
- Lockdown period:
  - **Police-recorded IPV** rose by 5–7%;
  - **Search index** rose by 40%.
  - **Helpline data** rose by 40-60%,

What the Index Revealed about the Lockdown Period

- Lockdown period:
  - **Police-recorded IPV** rose by 5–7%;
  - **Search index** rose by 40%.
  - **Helpline data** rose by 40-60%,

Figure 2: During the Lockdown Period Spring 2020





What the Index Revealed about the Lockdown Period

- Similar patterns replicated in **Los Angeles**.

LAPD Calls for Service 2024 to Present

Search

Incident_Number	Area_Occ	Rpt_Dist	Dispatch_Date	Dispatch_Time	Call_Type_Code	Call_Type_Text
PD25041100000553	Outside		2025 Apr 11 12:00:00 AM	03:47:49	006	CODE 6
PD25041000005436	Outside		2025 Apr 10 12:00:00 AM	21:57:42	006	CODE 6
PD25041100000538	Harbor	0501	2025 Apr 11 12:00:00 AM	03:46:26	906B1	906 CODE 30 RINGER
PD25041100000295	Outside		2025 Apr 11 12:00:00 AM	01:25:13	006	CODE 6
PD25041100000554	Outside		2025 Apr 11 12:00:00 AM	03:48:08	006	CODE 6
PD25041100000393	Southwest	0391	2025 Apr 11 12:00:00 AM	02:15:00	906B1	906 CODE 30 RINGER
PD25041100000485	West Valley	1033	2025 Apr 11 12:00:00 AM	03:10:42	415M	415 MAN

Records per page 50 1,955,301 to 1,955,350 of 1,955,351

What the Index Revealed about the Lockdown Period

- Similar patterns replicated in **Los Angeles**.

LAPD Calls for Service 2024 to Present

Search

Incident_Number	Area_Occ	Rpt_Dist	Dispatch_Date	Dispatch_Time	Call_Type_Code	Call_Type_Text
PD25041100000553	Outside		2025 Apr 11 12:00:00 AM	03:47:49	006	CODE 6
PD25041000005436	Outside		2025 Apr 10 12:00:00 AM	21:57:42	006	CODE 6
PD25041100000538	Harbor	0501	2025 Apr 11 12:00:00 AM	03:46:26	906B1	906 CODE 30 RINGER
PD25041100000295	Outside		2025 Apr 11 12:00:00 AM	01:25:13	006	CODE 6
PD25041100000554	Outside		2025 Apr 11 12:00:00 AM	03:48:08	006	CODE 6
PD25041100000393	Southwest	0391	2025 Apr 11 12:00:00 AM	02:15:00	906B1	906 CODE 30 RINGER
PD25041100000485	West Valley	1033	2025 Apr 11 12:00:00 AM	03:10:42	415M	415 MAN

Records per page 50 1,955,301 to 1,955,350 of 1,955,351

Key Message

Search data on help-seeking offered **available "independent" evidence** on the scale and timing of the crisis. Captures **intent to act**, not just completed acts of help-seeking or formal reports.

A Version of Nowcasting

"Nowcasting"

Uses **digital, high-frequency data** to **estimate <u>current states</u>** (vs. retrospective reporting).

A Version of Nowcasting

"Nowcasting"

Uses **digital, high-frequency data** to **estimate <u>current states</u>** (vs. retrospective reporting).

- Used in **economics** (e.g. GDP forecasts from online prices or satellite data), now emerging in social and health research.

A Version of Nowcasting

"Nowcasting"

Uses **digital, high-frequency data** to **estimate <u>current states</u>** (vs. retrospective reporting).

- Used in **economics** (e.g. GDP forecasts from online prices or satellite data), now emerging in social and health research.
- Can be combined with powerful **machine learning techniques** (neural networks, random forest, text mining/NLP...)

A Version of Nowcasting

"Nowcasting"

Uses **digital, high-frequency data** to **estimate <u>current states</u>** (vs. retrospective reporting).

- Used in **economics** (e.g. GDP forecasts from online prices or satellite data), now emerging in social and health research.
- Can be combined with powerful **machine learning techniques** (neural networks, random forest, text mining/NLP...)

Policy applications

Real-time **risk mapping**, rapid **service demand projections**, etc.

New Data, New Frontiers

Where These Methods Can Be Applied?

- **Data Sources**: Social media, helpline logs, EHRs, DV forums.
- **Examples** of use:
  - Detect underreporting (Shanmugam et al., 2024).
  - Forecast IPV-linked suicides (Kafka et al., 2024).
  - Identify systemic risks in teen dating violence (Cohen et al., 2018).
- **Caution**: Ethical use is essential: data protection, avoid surveillance misuse.
- **Demand is growing**: Funding growing for AI-IPV projects.

THANK YOU FOR LISTENING!

Dan.Anderberg@rhul.ac.uk