ICEBEF 2026 | CONFERENCE PRESENTATION

DIGITAL SIGNALS IN LABOR MARKET DYNAMICS

A Google Trends Analysis of Job Search, Layoffs, Unemployment in Indonesia, 2017–2026

Ainun Azzahra[1] | Susanti Kurniawati[2] | Cepri Maulana[3]

Faculty of Economics and Business Education
Universitas Pendidikan Indonesia

RESEARCH PRESENTATION



WHY LOOK AT ONLINE SEARCH DATA?

OFFICIAL LABOR DATA

- BPS measures unemployment through **Sakernas.**
- **Sakernas** is conducted twice a year: **February** and **August.**
- Publication frequency can limit timely monitoring.

DIGITAL SEARCH ACTIVITY

- People search online for job opportunities.
- Searches may also reflect public attention to layoffs.
- Google Trends offers a higher-frequency digital signal.

RESEARCH GAP

Few studies test whether simple **job-search** and **job-loss index** move with unemployment — and whether the relationship remains **outside the COVID-19 period.**

RESEARCH QUESTION

Can Google Trends provide useful additional signals for monitoring Indonesia's labor market?

Source: BPS Sakernas and prior Google Trends literature.

RESEARCH OBJECTIVES & HYPOTHESES

01 Describe

Online search trends related to job opportunities and job losses.

02 Compare

Search index with the Open Unemployment Rate (OUR).

03 Test

Whether the associations remain stable beyond the COVID-19 period.

HYPOTHESES

H1 | JOB LOSS

Changes in the job loss index are positively associated with changes in OUR.

H2 | JOB SEARCH

The job search index show a long-term decline and no stable association with OUR.

OUR = Open Unemployment Rate.

RESEARCH METHOD & DATA

RESEARCH DESIGN

Quantitative time series design with correlational analysis.

GOOGLE TRENDS

Jan 2017 – Oct 2026
(118 monthly observations).

BPS / SAKERNAS

Aug 2017 – Aug 2026
(19 semester observations).

ALIGNING THE DATA

MAR–AUG

Average monthly searches
→ August: **OUR** *(same year)*.

SEP–FEB

Average monthly searches
→ February: **OUR** *(following year)*.

19 MATCHED SEMESTER OBSERVATIONS

Analysis: descriptive statistics • Pearson correlation • robustness checks

Sources: Google Trends (2017-2026); Statistics Indonesia (BPS), Sakernas.

BUILDING THE TWO SEARCH INDICES

INDEX A | JOB SEARCH

- “Lowongan Kerja”
- “Loker”

INDEX B | JOB LOSS

- “PHK”
- “Pesangon”

DATA PROCESSING

1 Four requested downloads

Different accounts and networks.

2 Average the downloads

Reduce sampling variation.

3 Combine keywords

Build one index for each group.

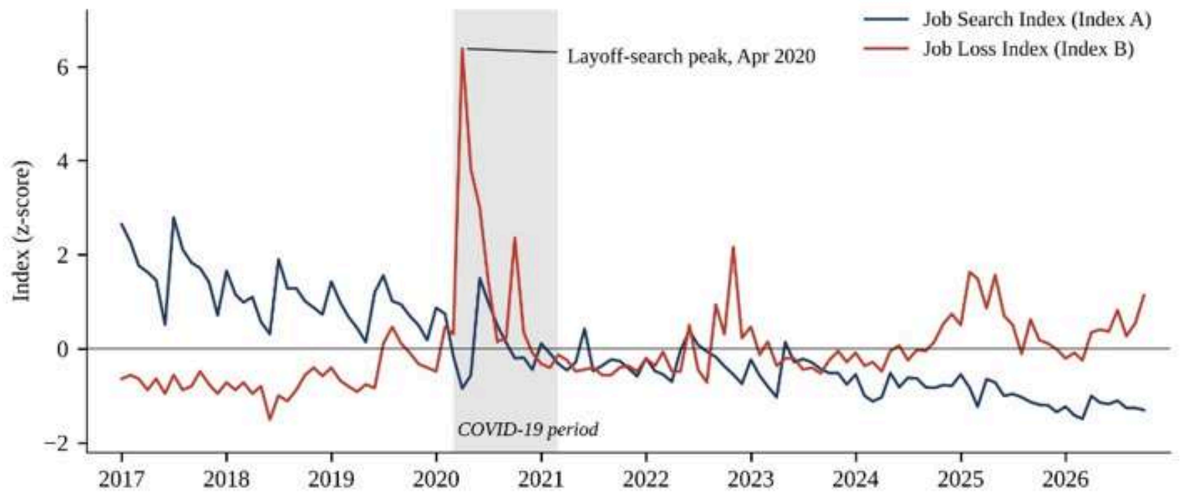
4 Standardize

Convert to z-scores.

IMPORTANT:
Google Trends measures relative search interest — not actual search counts.

Repeated retrieval follows the sampling-variation concern discussed by Eichenauer et al. (2022).

DESCRIPTIVE RESULTS: CONTRASTING SEARCH PATTERNS



JOB SEARCH INDEX **−64%**

74.4 → **26.8**

2017 — 2025

JOB LOSS INDEX **3.8×**

15.2 → **58**

2019 average — April 2020

KEY OBSERVATIONS

- **Job search interest declined** over the long term.
- Job search interest **did not rise** at the beginning of the pandemic.
- **Job loss** searches **peaked in April 2020**.
- The **August 2026 OUR** rose to 7.0% and was published on November 5, 2020.

Source: Google Trends and BPS. Index values are not directly comparable across separately normalized batches.

ASSOCIATION BETWEEN SEARCH INDICES AND OUR

PEARSON CORRELATION | SEMESTER-TO-SEMESTER CHANGES, LAG 0

Search Index	r	p-value	Result
Job Search	-0.21	0.200	Not significant
Job Loss	**0.67**	**0.002**	Significant



MAIN RESULT

r = 0.67

p = 0.002

Positive and statistically significant

INTERPRETATION



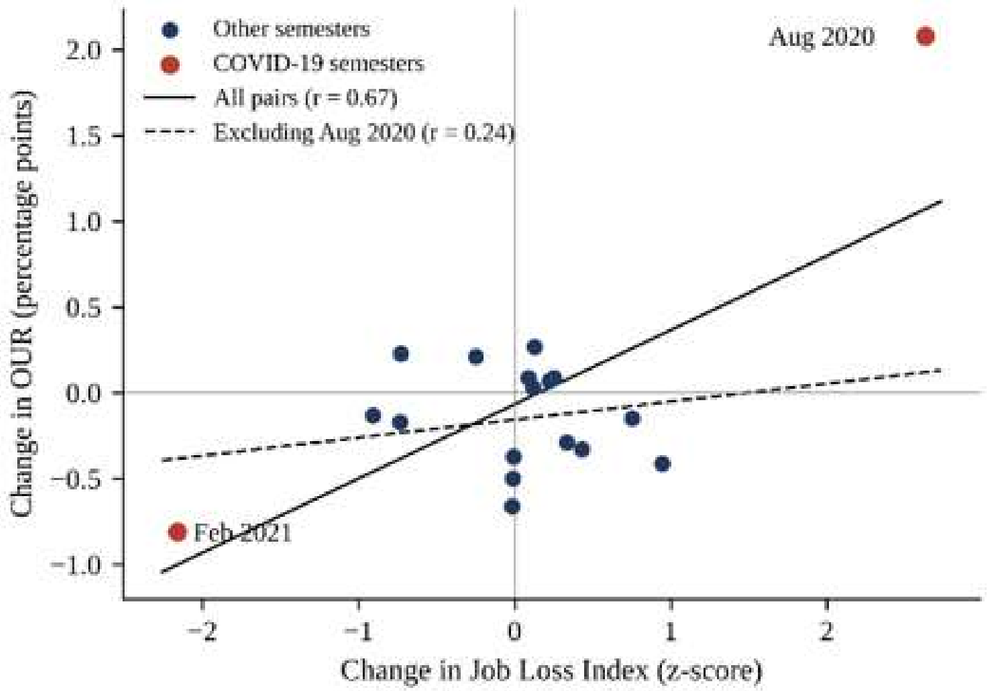
Increases in job-loss searches tended to occur alongside increases in OUR.

This is an association, not evidence of causation.

n = 18 for first-difference analysis. Bonferroni threshold = 0.05 / 16 = 0.003.

ROBUSTNESS CHECKS

Specification	r	p-value
All observations	0.67	0.002
Excluding August 2020	0.24	0.357
Excluding February 2021	0.63	0.006
Excluding COVID-related changes	-0.13	0.641
Spearman, all observations	0.20	0.438



Main finding

The positive correlation became weaker and insignificant after excluding key COVID-19 observations.

Interpretation

The relationship was strongly influenced by the pandemic period and was not stable across the full period.

The full-sample correlation is strongly influenced by the August 2020 observation.

Robustness results: Pearson and Spearman correlations: first differences in OUR and Job Loss Index.

IMPLICATIONS & LIMITATIONS

IMPLICATIONS

- Google Trends can add a digital signal to labor-market monitoring.
- It may help track public attention during major economic shocks.
- Use it alongside BPS statistics — not as a replacement.

LIMITATIONS

- Only four keywords and 19 semester observations.
- Search interest is not actual unemployment or search counts.
- Digital access and search behavior may affect representation.
- Correlation only; no causal or forecasting model was tested.

GOOGLE TRENDS + OFFICIAL BPS DATA = A MORE COMPLETE VIEW

Possible digital-divide effects are discussed in the paper but were not directly tested.

CONCLUSION

Three Takeaways

01		**Job Search**	The index declined by about 64% between 2017 and 2025.
02		**Job Loss**	The index peaked in April 2020 at 3.8× its 2019 average.
03		**Unemployment**	The positive correlation was significant in the full sample, but not robust outside COVID-19.



Google Trends can **complement** official labor-market statistics, but it **cannot yet predict** unemployment changes consistently.

Thank You!



Thank you for your attention and valuable time.

ICEBEF 2026

Selected References

1. D'Amuri, F., & Marcucci, J. (2017). The Predictive Power Of Google Searches In Forecasting Us Unemployment. International Journal Of Forecasting, 33(4), 801–816. Https://Doi.Org/10.1016/J.Ijforecast.2017.03.004
2. Smith, P. (2016). Google's MIDAS Touch: Predicting UK Unemployment With Internet Search Data. Journal Of Forecasting, 35(3), 263–284. Https://Doi.Org/10.1002/For.2391
3. Naccarato, A., Falorsi, S., Loriga, S., & Pierini, A. (2018). Combining Official And Google Trends Data To Forecast The Italian Youth Unemployment Rate. Technological Forecasting And Social Change, 130, 114–122. Https://Doi.Org/10.1016/J.Techfore.2017.11.022
4. Nagao, S., Takeda, F., & Tanaka, R. (2019). Nowcasting Of The U.S. Unemployment Rate Using Google Trends. Finance Research Letters, 30, 103–109. Https://Doi.Org/10.1016/J.Frl.2019.04.005
5. Borup, D., & Schütte, E. C. M. (2022). In Search Of A Job: Forecasting Employment Growth Using Google Trends. Journal Of Business And Economic Statistics, 40(1), 186–200. Https://Doi.Org/10.1080/07350015.2020.1791133
6. Eichenauer, V. Z., Indergand, R., Martínez, I. Z., & Sax, C. (2022). Obtaining Consistent Time Series From Google Trends. Economic Inquiry, 60(2), 694–705. Https://Doi.Org/10.1111/Ecin.13049