



Consumer Sentiments VS. Economy Realities
Longitudinal Analysis of Changing Consumer Perceptions in Relation to
Employment

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December 2025

Socio-Economic Background

Exploratory Data Analysis Executive Summary

- Project Objective
- Data Source
- Data Reliability
- **THEME FOUND123**
- Limitations of the Analysis

Research Questions

-
-

Data Source and Assumptions

Data Cleaning Process

Notable Findings

Finding 1. Finding Theme

State the finding in a few lines (See Visualization 1).

Finding 2. (See Visualization 2).

Finding 3. (See Visualization 3).

Visualizations

Working repo could be found at:

<https://github.com/zzeng05/ZENG1-LIU2-727FINAL-scaVSeplly.git>

```
# Fetch SCA Data

cs_url <- "https://data.sca.isr.umich.edu/data-archive/mine.php#"

#function to fetch any sca table from data site
get_sca_table <- function(table_num,
                           from_year = 2008,
                           to_year   = 2025,
                           freq       = "monthly") {

  body_list <- list(
    table = as.character(table_num),
    format = "html",
    from   = as.character(from_year),
    to     = as.character(to_year),
    freq   = freq
  )

  res <- POST(cs_url, body = body_list, encode = "form")
  stop_for_status(res)

  page <- read_html(res)
```

```

page %>%
  html_node("div.output table") %>%
  html_table(fill = TRUE)
}

```

```

#fetch & clean table1: Consumer Sentiment Index
CS <- get_sca_table(1) %>%
  # same logic as your cs_tables[[2]] cleaning
  rename(
    month_chr = X1,
    year_chr  = X2,
    cs_chr    = X3
  ) %>%
  slice(-1) %>% # drop the header row inside the table
  mutate(
    month = as.integer(month_chr),
    year  = as.integer(year_chr),
    cs    = as.numeric(cs_chr),
    date  = ymd(sprintf("%04d-%02d-01", year, month))
  ) %>%
  arrange(date) %>%
  select(date, cs, year, month)

head(CS)

```

```

# A tibble: 6 x 4
  date          cs year month

```

	<date>	<dbl>	<int>	<int>
1	2008-01-01	78.4	2008	1
2	2008-02-01	70.8	2008	2
3	2008-03-01	69.5	2008	3
4	2008-04-01	62.6	2008	4
5	2008-05-01	59.8	2008	5
6	2008-06-01	56.4	2008	6

```
#fetch & clean table30: Expected Change in Unemployment During the Next Year
```

```
UNEPLY1 <- get_sca_table(30) %>%
  { setNames(., as.character(unlist(.[1, ]))) } %>%
  slice(-1) %>%
  mutate(
    Month = as.integer(Month),
    Year = as.integer(Year)
  ) %>%
  mutate(
    across(
      -c(Month, Year),
      ~ suppressWarnings(as.numeric(.))
    ),
    date = as.Date(sprintf("%04d-%02d-01", Year, Month))
  ) %>%
  relocate(date)

head(UNEPLY1)
```

```
# A tibble: 6 x 8
```

	date	Month	Year	Less	Same	More	`DK; NA`	Relative
	<date>	<int>	<int>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	2008-01-01	1	2008	6	46	47	1	59
2	2008-02-01	2	2008	9	41	50	0	59
3	2008-03-01	3	2008	7	38	55	0	52
4	2008-04-01	4	2008	5	36	59	0	46
5	2008-05-01	5	2008	3	41	56	0	47
6	2008-06-01	6	2008	5	31	64	0	41

```
UNEPLY_supp <- UNEPLY1 %>%  
  transmute(  
    date,  
    less_unemp = Less,  
    same_unemp = Same,  
    more_unemp = More,  
    dk_unemp   = `DK; NA`,  
    rel_unemp  = Relative,  
    net_unemp_expect = less_unemp - more_unemp  
  )  
  
head(UNEPLY_supp)
```

```
# A tibble: 6 x 7
```

	date	less_unemp	same_unemp	more_unemp	dk_unemp	rel_unemp
	<date>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	2008-01-01	6	46	47	1	59

2	2008-02-01	9	41	50	0	59
3	2008-03-01	7	38	55	0	52
4	2008-04-01	5	36	59	0	46
5	2008-05-01	3	41	56	0	47
6	2008-06-01	5	31	64	0	41

```
# i 1 more variable: net_unemp_expect <dbl>
```

```
UNEPLY_long <- UNEPLY_supp %>%
  select(date, less_unemp, same_unemp, more_unemp) %>%
  pivot_longer(
    cols = -date,
    names_to = "expectation",
    values_to = "share"
  )

UNEPLY_long <- UNEPLY_long |>
  dplyr::mutate(
    expectation = factor(
      expectation,
      levels = c("less_unemp", "same_unemp", "more_unemp"),
      labels = c("Less unemployment", "Same", "More unemployment")
    )
  )

ggplot(UNEPLY_long, aes(x = date, y = share, fill = expectation)) +
  geom_area(alpha = 0.618) +
  scale_fill_manual(
```

```

values = c(
  "Less unemployment" = "darkgreen",
  "Same"              = "grey70",
  "More unemployment" = "firebrick"
),
guide = guide_legend(reverse = FALSE)
) +
labs(
  title = "Expected change in unemployment over the next year",
  x      = "Date",
  y      = "Percent of respondents",
  fill   = NULL
) +
theme_minimal() +
theme(
  panel.grid = element_blank()
)

```

Expected change in unemployment over the next year



```
# Fetch BLS Data
```

```
bls_key <- "554489bce3f14059aaa2dbb976d62372" #need to change back to path before submission
```

```
# BLS series IDs:
```

```
# - LNS14000000: Unemployment rate (CPS, seasonally adjusted)
```

```
# - CES0000000001: All employees, total nonfarm (CES, thousands, SA)
```

```
series_ids <- c("LNS14000000", "CES0000000001")
```

```
# Request monthly data from 2008 to latest
```

```
res <- POST(
```

```
  url   = "https://api.bls.gov/publicAPI/v2/timeseries/data/",
```

```
  body  = list(
```

```
    seriesid      = series_ids,
```

```

    startyear      = "2008",
    endyear        = "2025",
    registrationkey = bls_key),
    encode = "json"
)

stop_for_status(res)

bls_list <- fromJSON(content(res, as = "text", encoding = "UTF-8"), simplifyDataFrame = TRUE)

# Transform BLS data to long format
series_tbl <- bls_list$Results$series

bls_long <- map_dfr(seq_len(nrow(series_tbl)), function(i) {
  series_id <- series_tbl$seriesID[i]
  dat      <- series_tbl$data[[i]]    #data.frame for the series

  as_tibble(dat) %>%
    transmute(
      series_id = series_id,
      year      = as.integer(year),
      period,
      value     = as.numeric(value)
    ) %>%
    # keep monthly observations (M01-M12)
    filter(str_starts(period, "M")) %>%

```

```

mutate(
  month = as.integer(str_remove(period, "M")),
  date  = ymd(sprintf("%04d-%02d-01", year, month))
)
})

head(bls_long)

```

```

# A tibble: 6 x 6
  series_id    year period value month date
  <chr>        <int> <chr>  <dbl> <int> <date>
1 LNS14000000  2025 M09      4.4     9 2025-09-01
2 LNS14000000  2025 M08      4.3     8 2025-08-01
3 LNS14000000  2025 M07      4.2     7 2025-07-01
4 LNS14000000  2025 M06      4.1     6 2025-06-01
5 LNS14000000  2025 M05      4.2     5 2025-05-01
6 LNS14000000  2025 M04      4.2     4 2025-04-01

```

```

# CPS unemployment rate
UNEEMPLOY_R <- bls_long %>%
  filter(series_id == "LNS14000000") %>%
  arrange(date) %>%
  transmute(
    date,
    unrate = value
  )

```

```
# CES total nonfarm employment & monthly job change
Job_V <- bls_long %>%
  filter(series_id == "CES0000000001") %>%
  arrange(date) %>%
  transmute(
    date,
    nonfarm_emp = value,
    job_change = nonfarm_emp - lag(nonfarm_emp)
  )

head(UNEEMPLOY_R)
```

```
# A tibble: 6 x 2
  date      unrate
  <date>    <dbl>
1 2008-01-01    5
2 2008-02-01  4.9
3 2008-03-01  5.1
4 2008-04-01    5
5 2008-05-01  5.4
6 2008-06-01  5.6
```

```
head(Job_V)
```

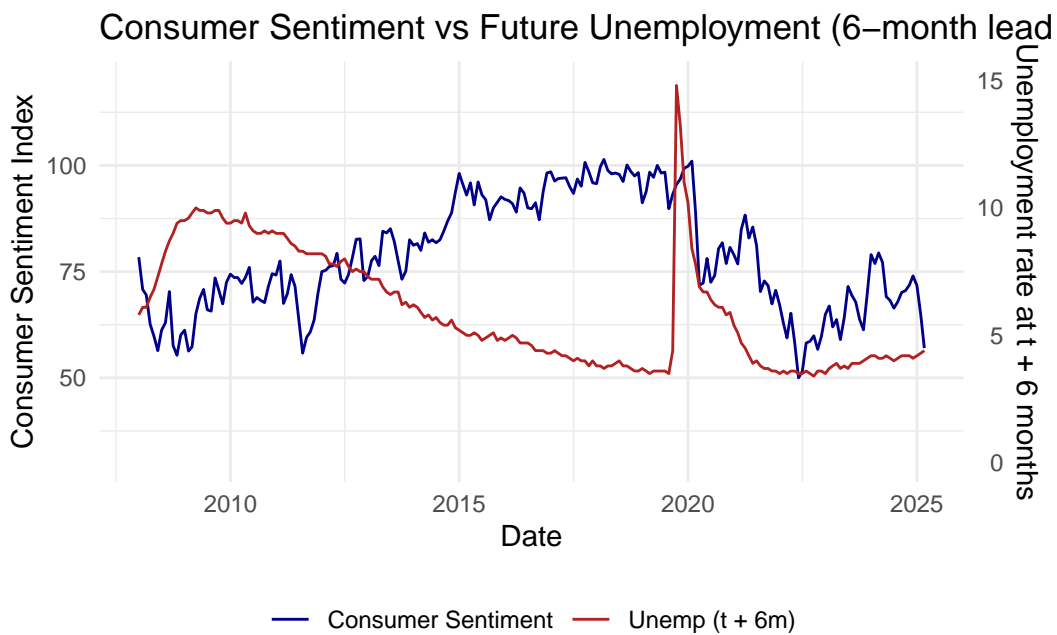
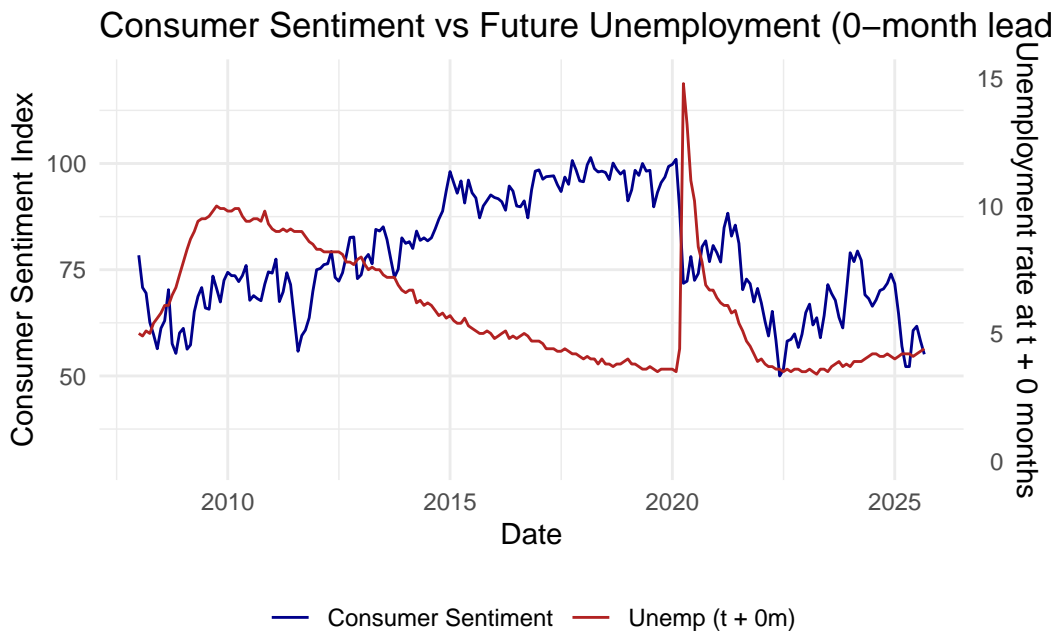
```
# A tibble: 6 x 3
  date      nonfarm_emp job_change
  <date>    <dbl>      <dbl>
1 2008-01-01    5.000000    0.000000
2 2008-02-01  4.900000    0.900000
3 2008-03-01  5.100000   -0.200000
4 2008-04-01    5.000000    0.100000
5 2008-05-01  5.400000   -0.400000
6 2008-06-01  5.600000   -0.200000
```

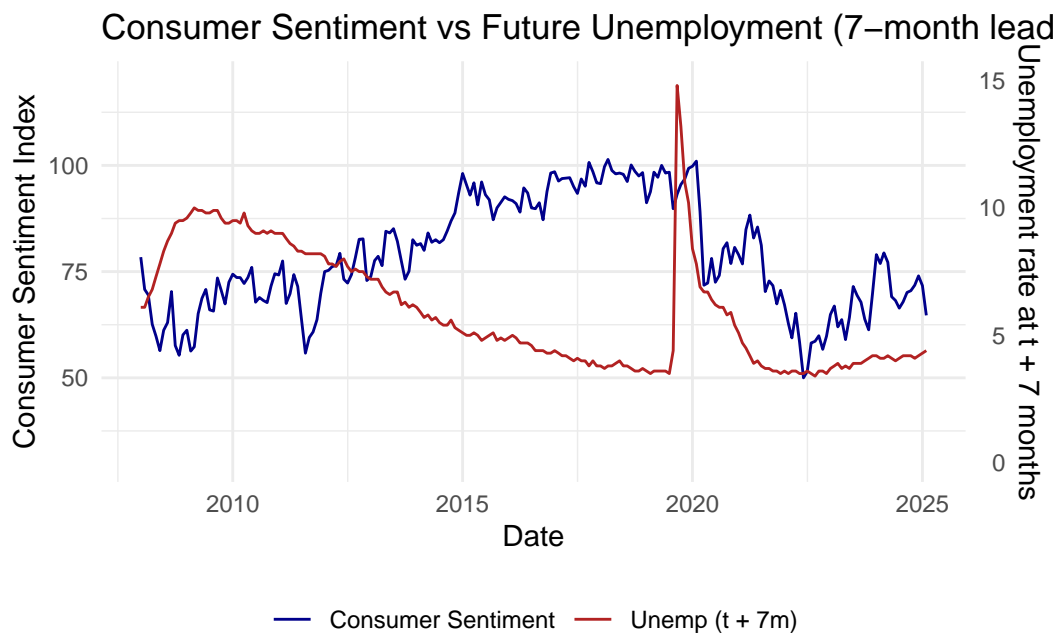
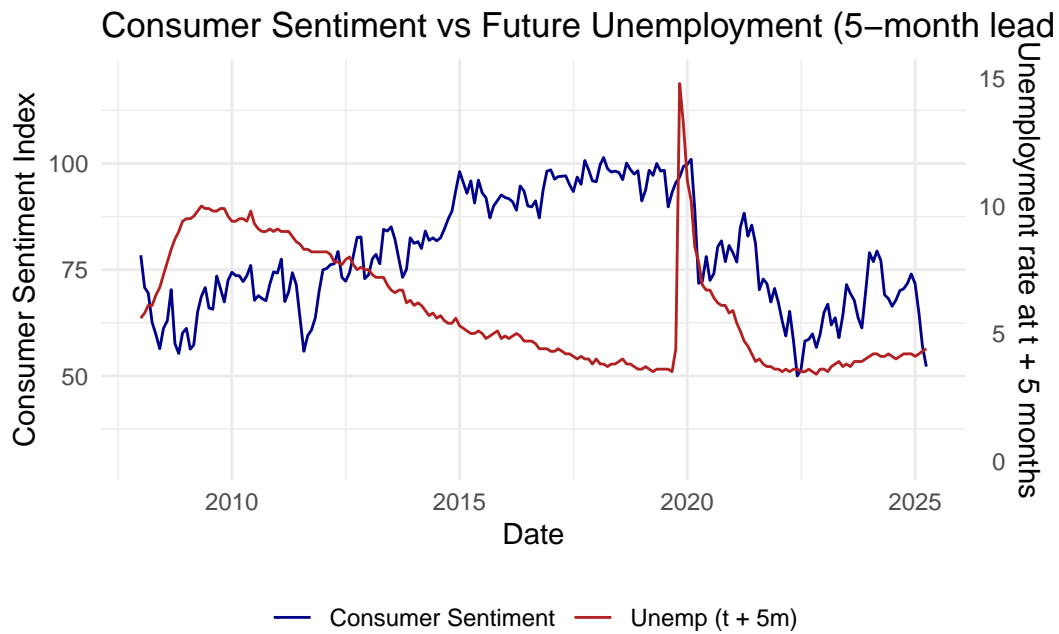
	<date>	<dbl>	<dbl>
1	2008-01-01	138391	NA
2	2008-02-01	138327	-64
3	2008-03-01	138257	-70
4	2008-04-01	138038	-219
5	2008-05-01	137851	-187
6	2008-06-01	137698	-153

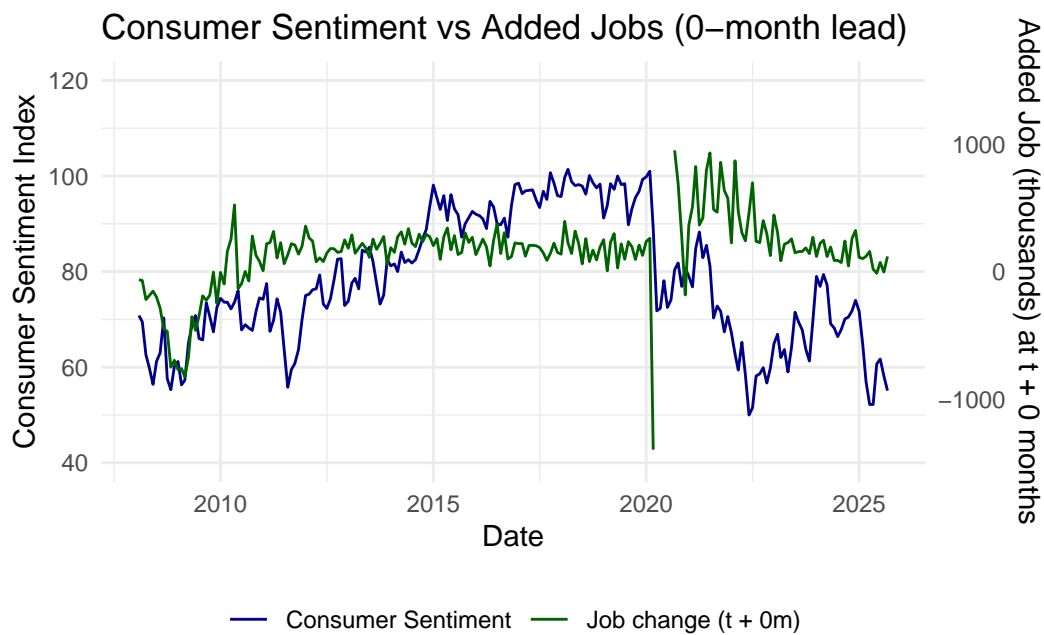
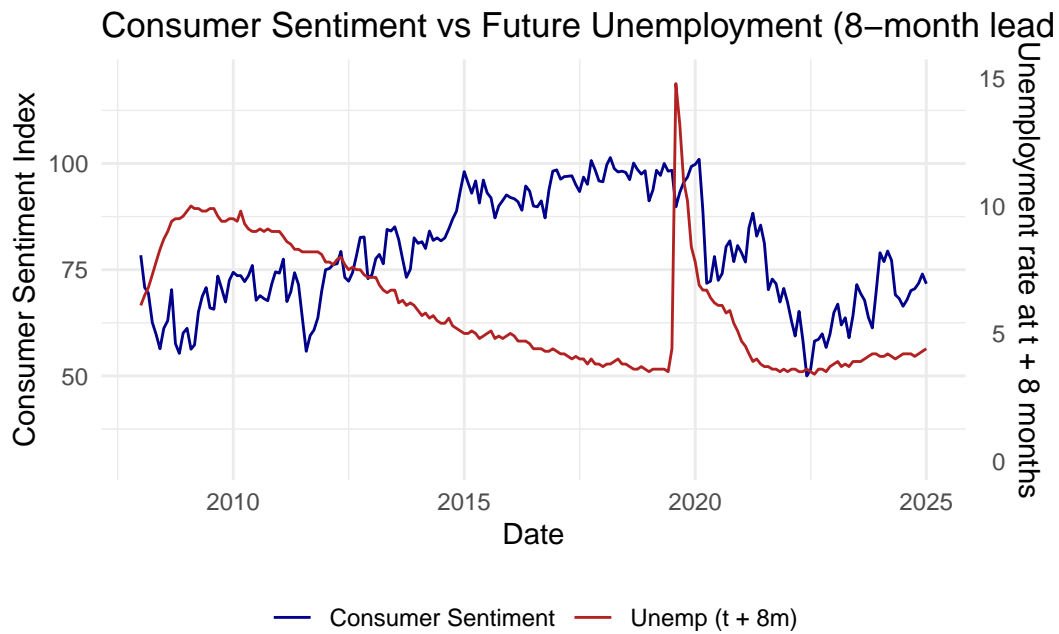
Visualization 1. Lagged Time-Series of Consumer Sentiment and Unemployment Rate/Job Change

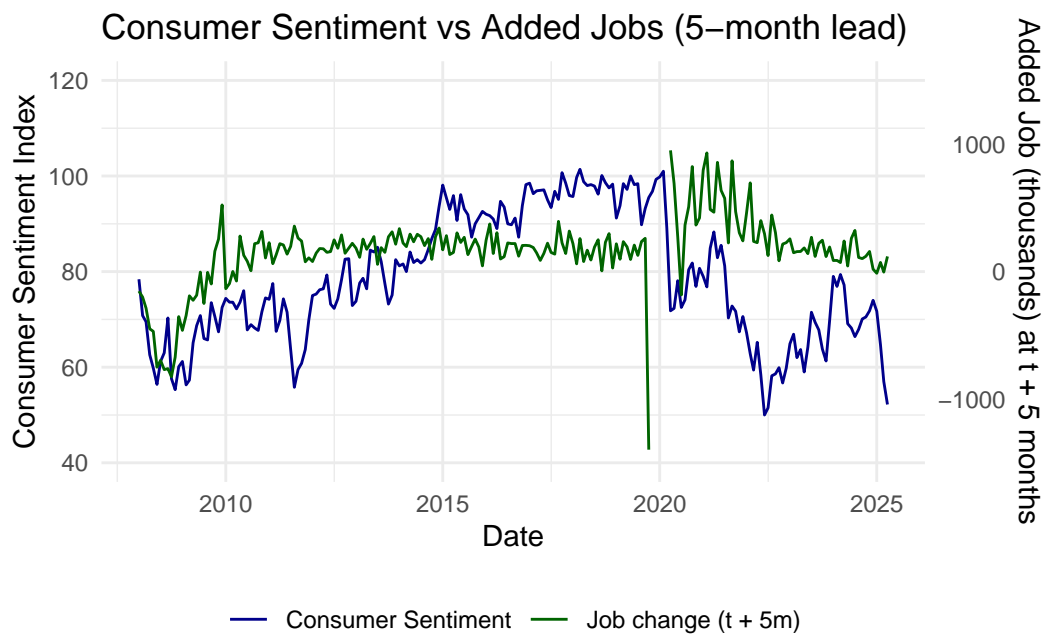
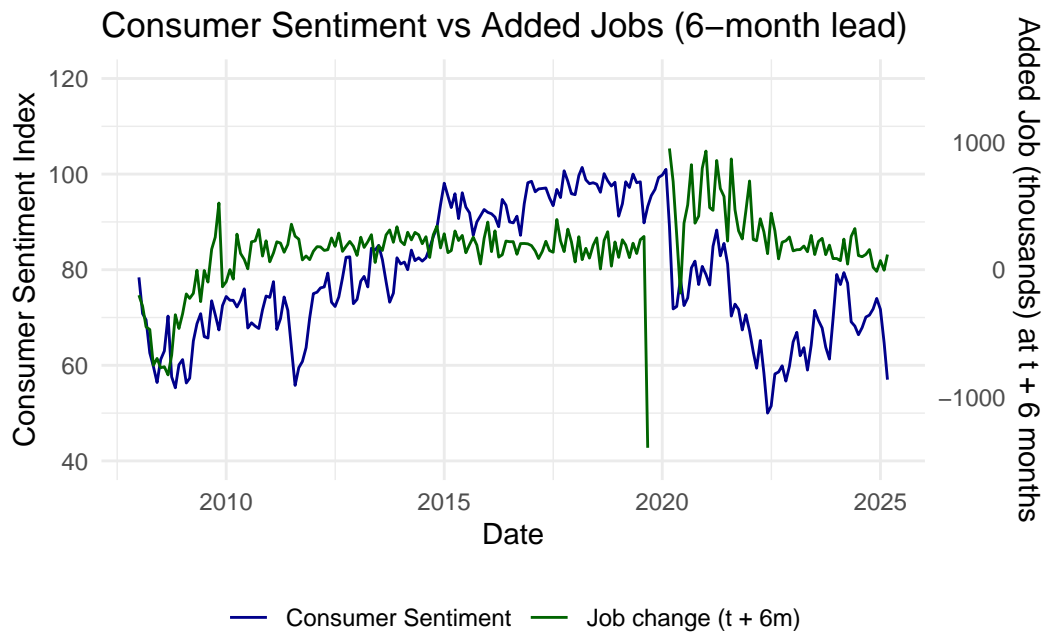
A tibble: 6 x 5

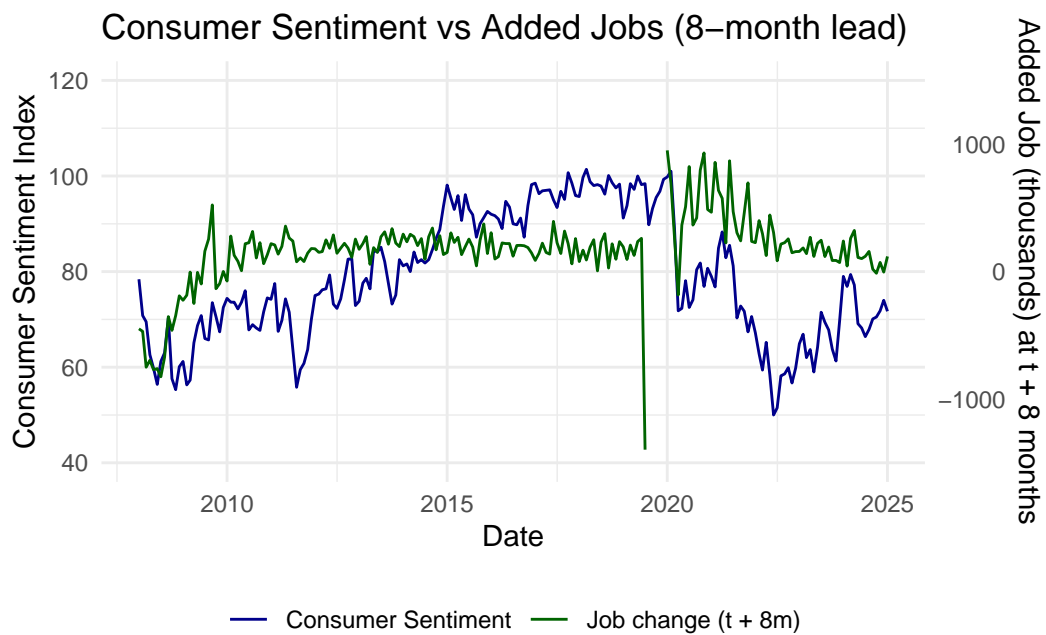
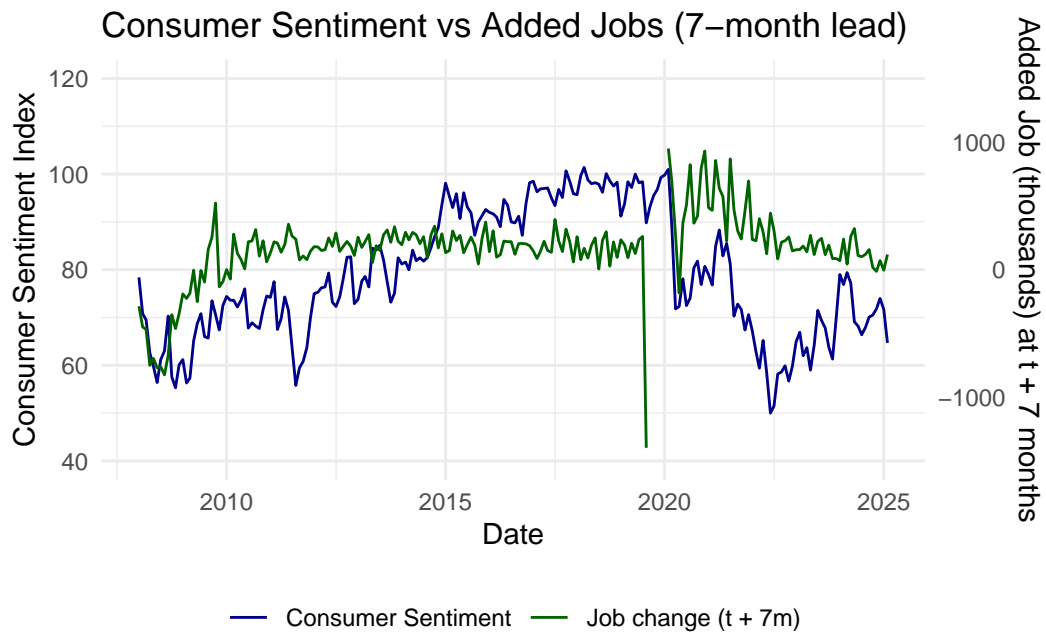
	date	cs	unrate	nonfarm_emp	job_change
	<date>	<dbl>	<dbl>	<dbl>	<dbl>
1	2008-01-01	78.4	5	138391	NA
2	2008-02-01	70.8	4.9	138327	-64
3	2008-03-01	69.5	5.1	138257	-70
4	2008-04-01	62.6	5	138038	-219
5	2008-05-01	59.8	5.4	137851	-187
6	2008-06-01	56.4	5.6	137698	-153



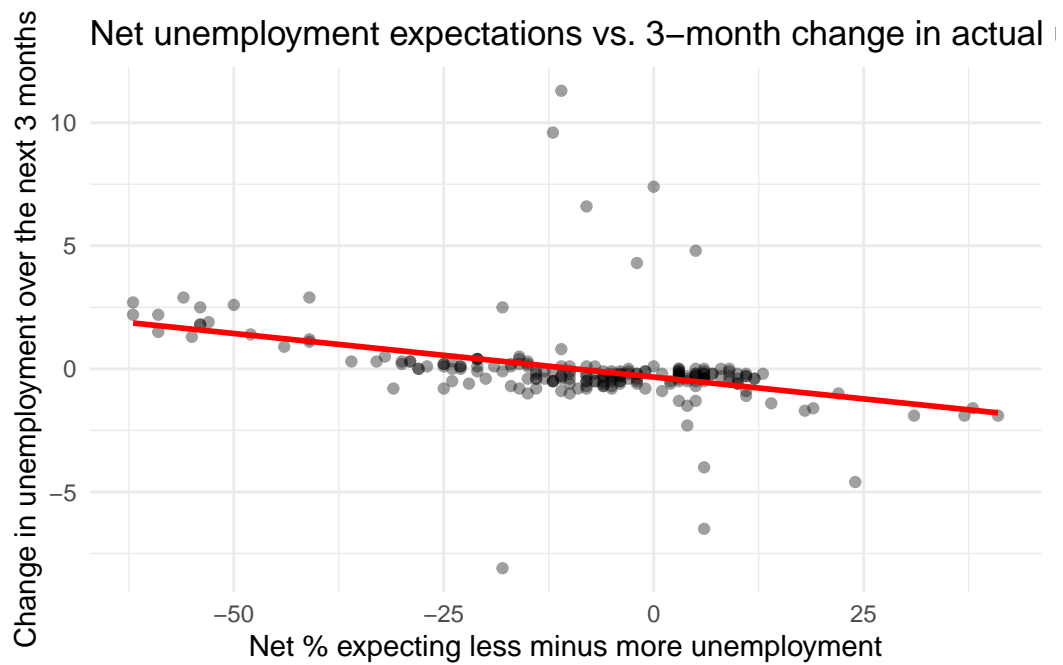








Visualization 2. Scatter: net expectations vs subsequent unemployment change



Visualization 3. Time series: net expectations vs actual unemployment (dual axis)

```
expect_vs_unemp_dual <- function(data_macro2,
                                  cs_limits = c(-60, 60), # for net expectations
                                  unemp_limits= c(2, 12)) {

  df <- data_macro2 %>%
    filter(!is.na(net_unemp_expect), !is.na(unrate)) %>%
    arrange(date)
```

```

ex_min <- cs_limits[1]
ex_max <- cs_limits[2]
ur_min <- unemp_limits[1]
ur_max <- unemp_limits[2]

ex_rng <- ex_max - ex_min
ur_rng <- ur_max - ur_min

df <- df %>%
  mutate(
    unrate_scaled = ex_min + (unrate - ur_min) * (ex_rng / ur_rng)
  )

ggplot(df, aes(x = date)) +
  geom_line(aes(y = net_unemp_expect, color = "Net expectations (Less-More)")) +
  geom_line(aes(y = unrate_scaled, color = "Unemployment")) +
  scale_y_continuous(
    name = "Net (Less-More) unemployment expectations",
    limits = cs_limits,
    sec.axis = sec_axis(
      trans = ~ (.- ex_min) * (ur_rng / ex_rng) + ur_min,
      name = "Unemployment"
    )
  ) +
  scale_color_manual(
    values = setNames(

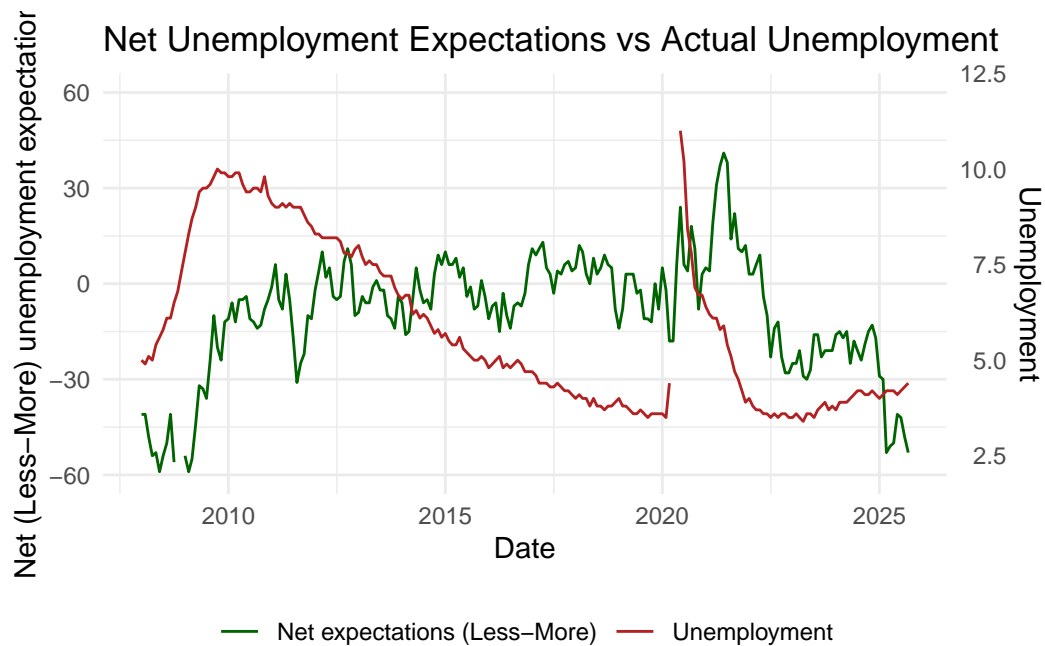
```

```

    c("darkgreen", "firebrick"),
    c("Net expectations (Less-More)", "Unemployment")
  )
) +
labs(
  title = "Net Unemployment Expectations vs Actual Unemployment",
  x      = "Date",
  color = NULL
) +
theme_minimal() +
theme(legend.position = "bottom")
}

expect_vs_unemp_dual(macro2)

```



Indications

SOME REAL WORLD INDICATIONS.

Conclusion & Outlook

Limitation

References

<https://data.sca.isr.umich.edu/data-archive/mine.php>

<https://www.bls.gov/cps>

<https://www.bls.gov/ces>