



US employment trends

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Sep'23



End to end data pipeline

- Data from US CES survey was fed to a local PostgreSQL database, that services an API¹ and is used for further analysis.
- Two series were chosen:
 - Total volume of women working in government.
 - Ratio between production and supervision employees.
- After a initial exploratory analysis that yielded some interesting insights, a forecast was fitted to establish an expected behaviour over the incoming two years.
- Prediction is loaded to the database to be exposed in the API for further use.
- Codes and results can be found at https://github.com/adanttmm/Employee_case.

¹ Tested in localhost:3000 before including it into a Docker container.

Data enablement

- After a first assessment of the source, required and relevant files are selected for our purpose.
- A Python scraper code is used to download datasets directly into local PostgreSQL database.
- After some exploration to understand the data, materialized views with available data (starting from 1964) are constructed to feed the API.
- PostgREST API with basic requirements is exposed on localhost:3000.

* Python scraper code in https://github.com/adanttmm/Employee_case/blob/main/app/scraper.py.

* Python forecasts code in https://github.com/adanttmm/Employee_case/blob/main/app/write_forecast.py

* SQL code for materialized views https://github.com/adanttmm/Employee_case/blob/main/app/MatViz_generate.sql.

* SQL code for API schema and data https://github.com/adanttmm/Employee_case/blob/main/app/RestApi_setup.sql.

API response for women in government

```
localhost:3000/women_ x localhost:3000/producti x
localhost:3000/women_in_government
Google Maps Gmail YouTube Maps
Pretty-print
[{"to_char": "January", "1964", "valuein": 3727}, {"to_char": "February", "1964", "valuein": 3776}, {"to_char": "March", "1964", "valuein": 3769}, {"to_char": "April", "1964", "valuein": 3815}, {"to_char": "May", "1964", "valuein": 3800}, {"to_char": "June", "1964", "valuein": 3721}, {"to_char": "July", "1964", "valuein": 3500}, {"to_char": "August", "1964", "valuein": 3507}, {"to_char": "September", "1964", "valuein": 3747}, {"to_char": "October", "1964", "valuein": 3915}, {"to_char": "November", "1964", "valuein": 3964}, {"to_char": "December", "1964", "valuein": 3973}]
```

API response for production - supervision ratio

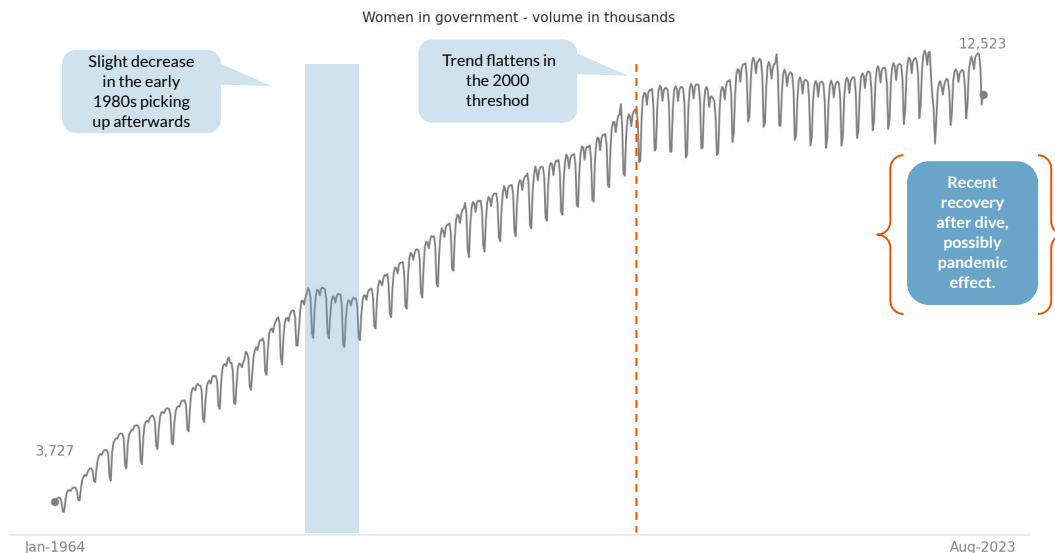
```
localhost:3000/women_ x localhost:3000/producti x
localhost:3000/production_supervision_ratio
Google Maps Gmail YouTube Maps
Pretty-print
[{"to_char": "January", "1964", "prodsuperratio": 4.866474784321487}, {"to_char": "February", "1964", "prodsuperratio": 4.864019896190899}, {"to_char": "March", "1964", "prodsuperratio": 4.883431988988881}, {"to_char": "April", "1964", "prodsuperratio": 4.8415931403887332}, {"to_char": "May", "1964", "prodsuperratio": 4.880383988792266}, {"to_char": "June", "1964", "prodsuperratio": 5.0517586073937153}, {"to_char": "July", "1964", "prodsuperratio": 5.03712254848882}, {"to_char": "August", "1964", "prodsuperratio": 5.002882389762621}, {"to_char": "September", "1964", "prodsuperratio": 5.10079133423466}, {"to_char": "October", "1964", "prodsuperratio": 5.006319898571951}, {"to_char": "November", "1964", "prodsuperratio": 4.335579}, {"to_char": "December", "1964", "prodsuperratio": 4.335579}
Data types: 98715682
```

API response for women in government forecast

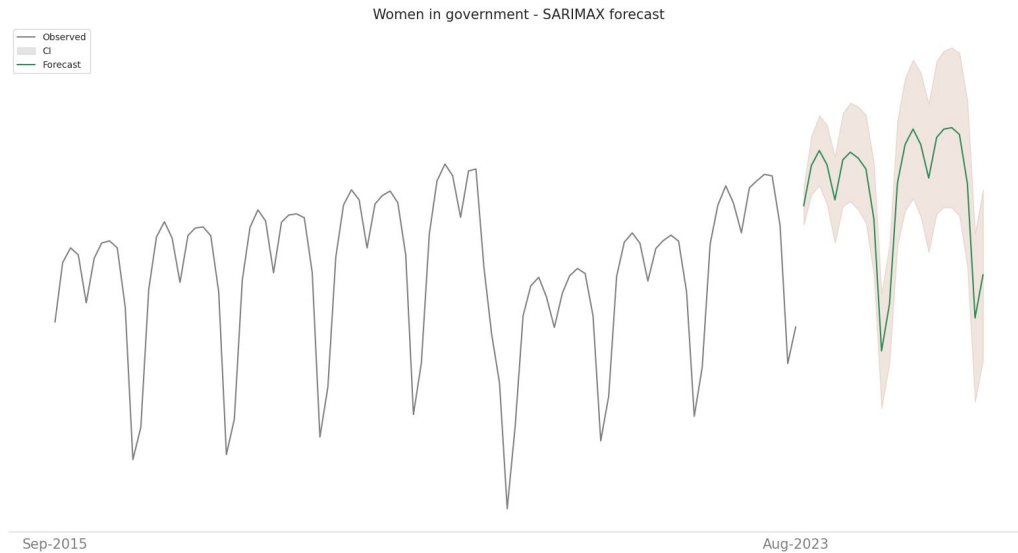
```
localhost:3000/women_ x +
localhost:3000/women_in_government_forecast
Google Maps Gmail YouTube Maps
Pretty-print
[{"date_series": "2023-09-30", "forecast": 13227.549084932316}, {"date_series": "2023-10-31", "forecast": 13461.862143310792}, {"date_series": "2023-11-30", "forecast": 13540.653270915314}, {"date_series": "2023-12-31", "forecast": 13467.412438949882}, {"date_series": "2024-01-31", "forecast": 13262.515429842811}, {"date_series": "2024-02-29", "forecast": 13498.01397666386}, {"date_series": "2024-03-31", "forecast": 13540.147787888819}, {"date_series": "2024-04-30", "forecast": 13505.439688956477}]
```

Women in government

Steep growth until reaching flat trend at the beginning of the century.

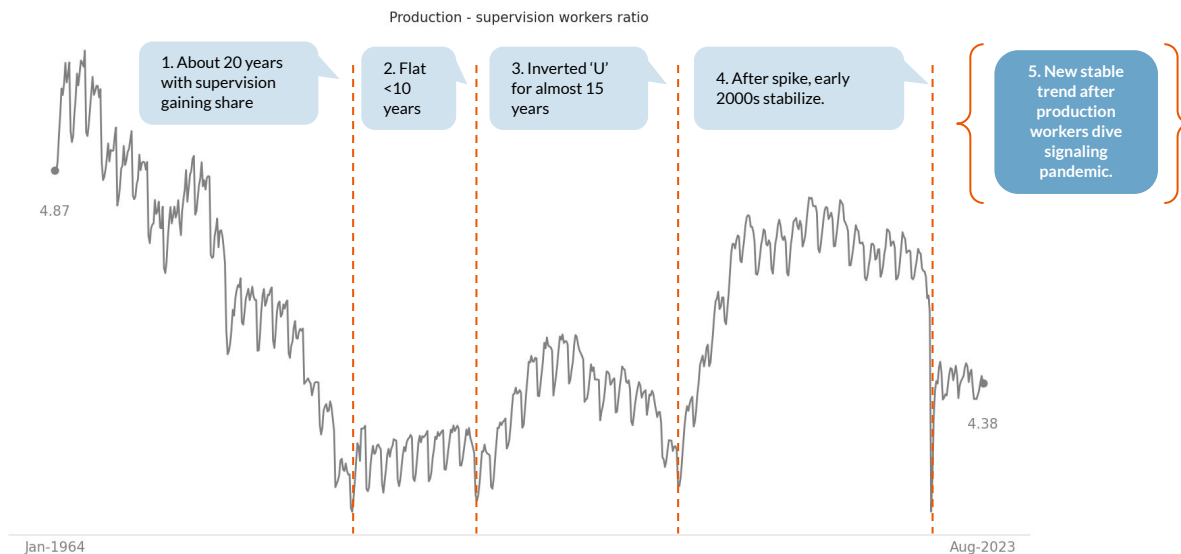


Forecast shows slight recovery with a similar seasonal trend for incoming years.

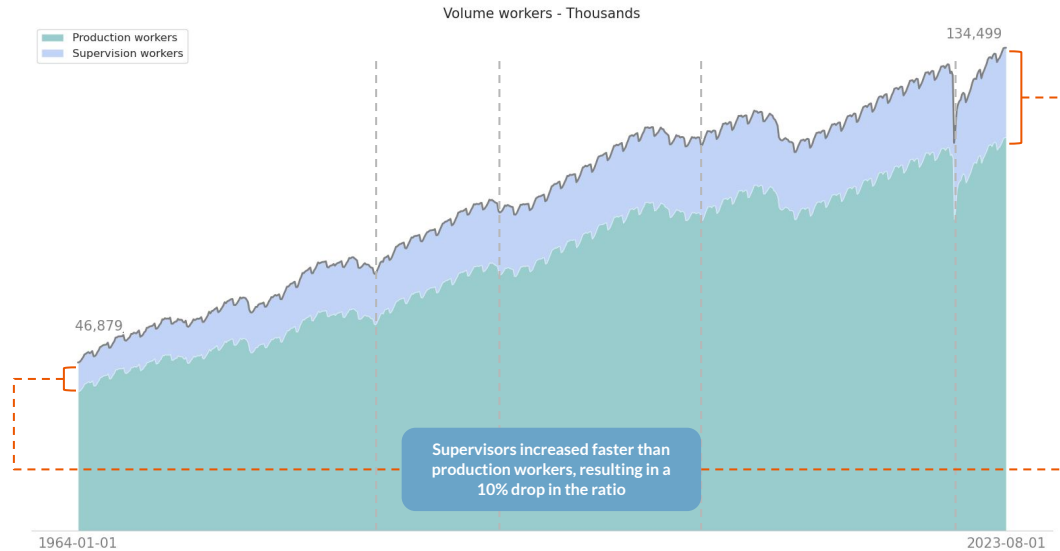


Production - supervision workers ratio

There are 5 phases found in the historical trend.



Proportion of production workers is 10% lower and continues to decrease.



Forecast shows a stable expected behaviour for next two years.

