

# Ukrainian Refugees & Unemployment Rate in the Czech Republic

Team A:

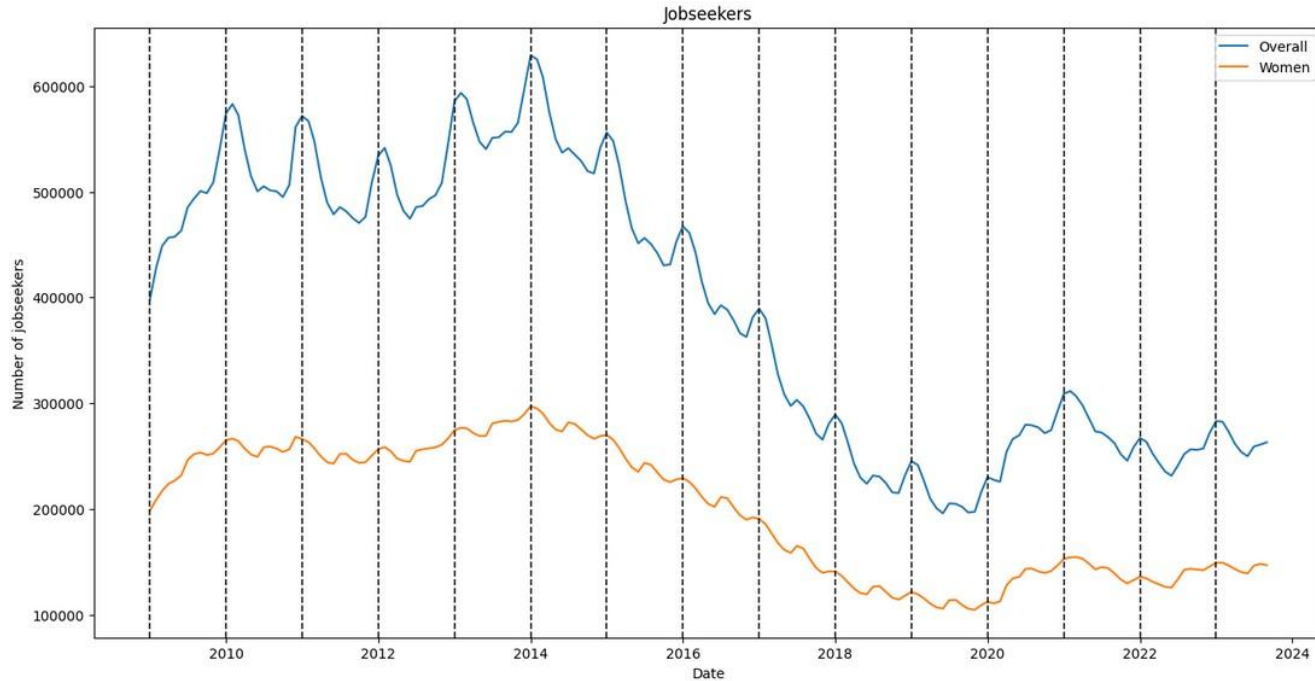
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# Problem Definition

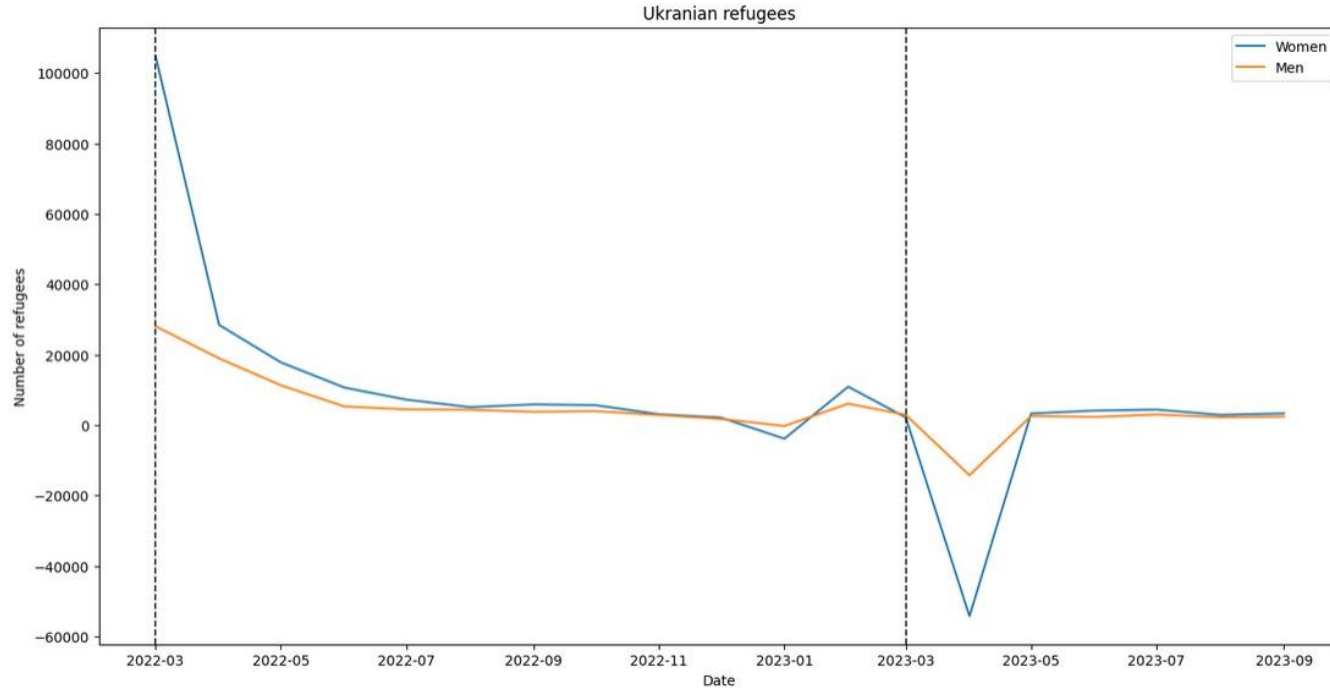
- Inspiration: the observations of a Labor Office employee
  - The number of unemployed women has been steadily increasing
- Research Question: Does the growing number of incoming Ukrainian refugees directly affect the growing unemployment of women in the Czech Republic
  - Or is it simply a result of the changing economy



# Trends in Unemployment



# Ukrainian Refugees Trends



# Dataset

- Economic predictors
  - Factors influencing the economy the most
  - For example:
    - Monthly inflation rate
    - Monthly minimum wage
    - Monthly average salary
    - Unemployment rate
    - and more
  - Consider a wide time span
    - Jan 2009 - Sep 2023
  - Divide by regions
- Refugee-related predictors
  - The number of incoming refugees for every month since the beginning of the war
  - Women and men of working age
  - Added cumulative lags
  - Much smaller time span
    - Mar 2022 - Sep 2023

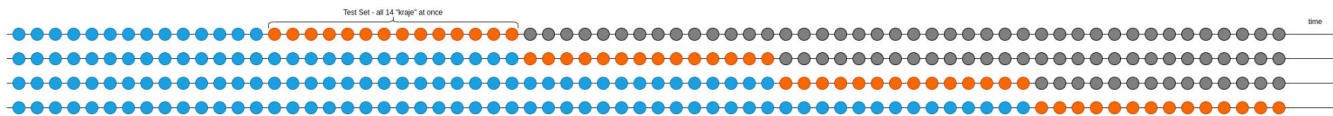
# Dataset Example

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  "month": 9, "year": 2023, "kraj": "ZLK", "general_thefts": 67.0,  
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  "celkem_w2": 314.0, "celkem_w3": 628.0, "celkem_w4": 895.0, ..., "celkem_w19": 11226.0,  
  "m_do_65_w2": 126.0, "m_do_65_w3": 226.0, ..., "m_do_65_w19": 2955.0,  
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  "monthly_min_wage": 17300, "monthly_inflation_rate_wrt_last_year": 6.9,  
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  "z_do_65_w2_ratio": 0.3821656050955414, ..., "z_do_65_w19_ratio": 0.4371102797078211,  
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  "obsazenaAZrusenaVPM": 911, "absolventiSkolAMladistvi": 811,  
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}
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- 117 predictors
- 2478 data points

# Approach

- Preliminary data analysis: trends, seasonality, cycles, correlations
- Time-series → **Ex-post predictions**
- Compare 2 types of models
  - Only based on economic predictors vs. Include refugee data as well
- Different time spans
  - Data imputation
  - Only consider war period (Mar 2022 - Sep 2023)
- Regression
  - Ridge Regression
  - LASSO (also as feature selector)
  - Huber Regression
- Test: improved **temporal cross-validation**

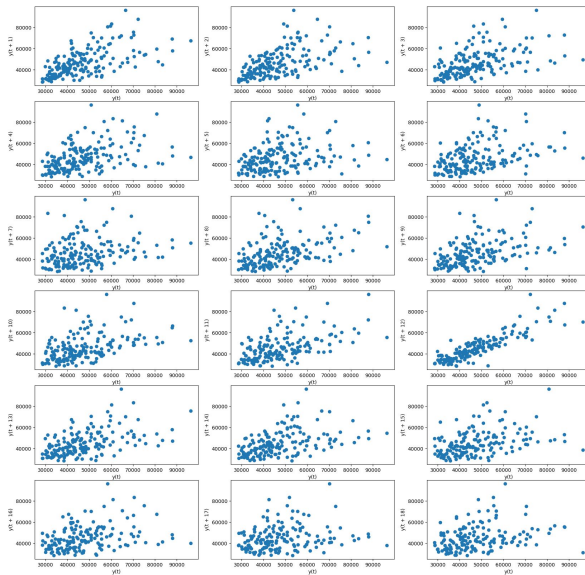
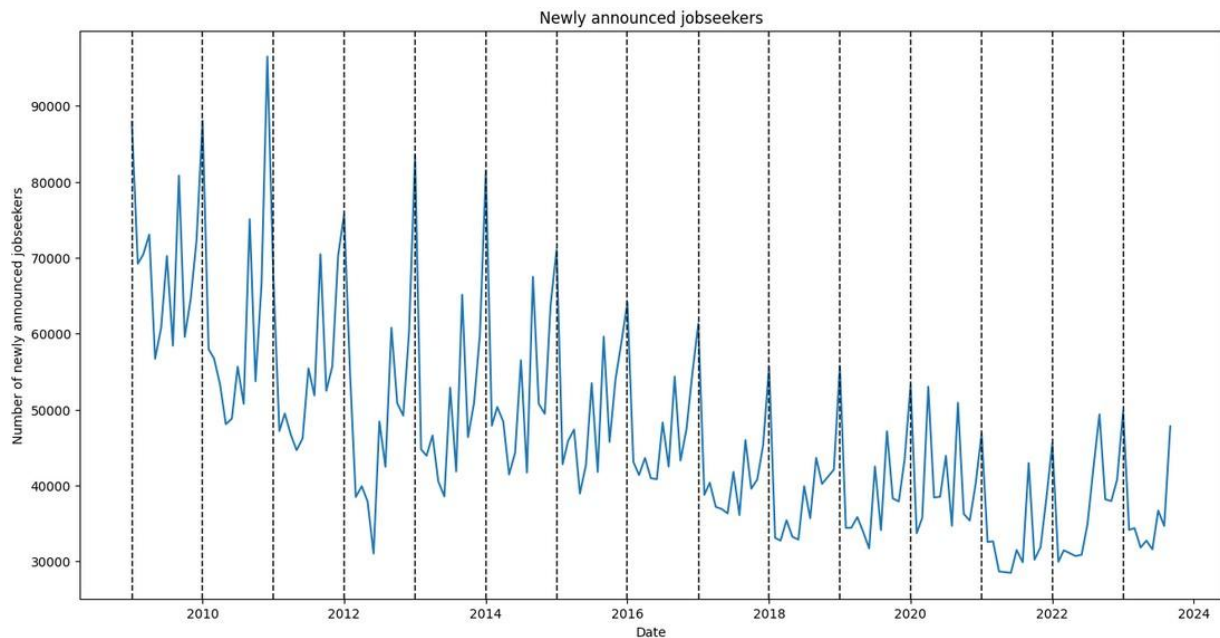


# Results and Findings

- Data structure: revealed trends and seasonalities in predictors
  - Regression models comparison
    - Short-span models generally better
    - Refugee model more precise than economic model
      - 513 vs 665 RMSE
  - Backed by attempted hypothesis testing
  - Conclusion: refugee statistics have positive impact on female unemployment prediction precision
  - Seemingly, the influx of Ukrainian refugees influences the female unemployment rate in the Czech Republic
- 



# Seasonality Example





Thank you for your  
attention!

Long live team A!

# Questions