People and the Labour Market:

Incorporating Behavioural Heterogeneity to Model Unequal Outcomes

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Overview

Motivation

Theoretical Embedding: Behaviour & the Job Search Process

Model: Incorporating Behavioural Heterogeneity

Preliminary Application to US Data

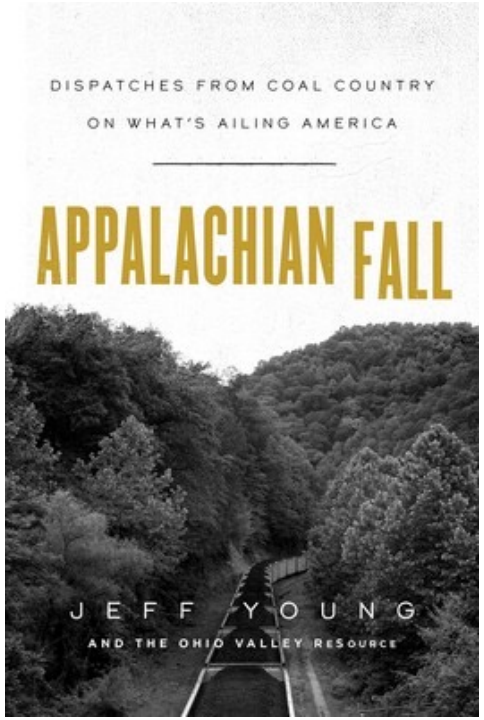
Discussion

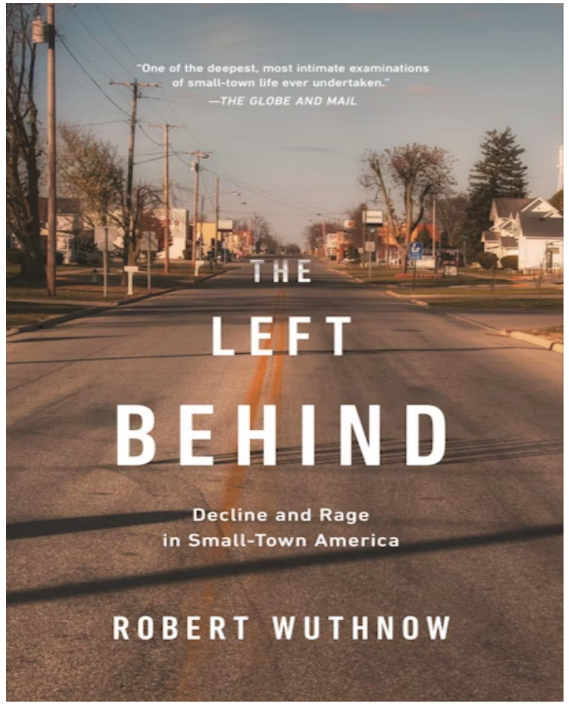
Motivation

Motivation

Policy Challenge

Business cycles and structural transformation processes are often accompanied by heterogeneous labour market frictions.





Motivation

Policy Challenge

Business cycles and structural transformation processes are often accompanied by heterogeneous labour market frictions.

Method

Agent-based models are a useful tool for modelling or simulating complex labour market dynamics.

Motivation

Some agent-based models of labour market dynamics:

Structural reform policy and unemployment and income inequality (Dosi et al. 2018)

Social networks on upskilling and job market opportunities (Gemkow and Neugart 2011)

Effect of migration in Austria (Poledna 2024)

Employment protection legislation and unemployment (Martin & Neugart 2009)

Green transition in Brazil (Berryman et al. 2023)

Decarbonisation of the US power sector (Bücker et al.)

Automation in the US labour market (del Rio-Chanona et al. 2021)

Motivation

Policy Challenge

Business cycles and structural transformation processes are often accompanied by heterogeneous labour market frictions.

Method

Agent-based models are a useful tool for modelling or simulating complex labour market dynamics.

Gap

Most existing agent-based labour market models neglect the role of behaviour in job search processes, despite their key role in determining heterogeneous outcomes.

Motivation

Across agent-based labour market models, **behaviour is often an afterthought despite its core role in job search processes.**

There is a wealth of evidence on ***behavioural heterogeneity in job searches*** from behavioural labour economics.

Some notable examples:

- **Gendered behaviour in reservation wage setting, search effort, aversion to relocation** has been found to contribute to wage gaps across countries.
- Search effort is influenced by **negative or positive affect towards the job search process itself**. The dynamics of this relationship changes over the search period.
- **Confidence in one's abilities or the job market** defines search effort and/or strategy.

Motivation

Policy Challenge

Business cycles and structural transformation processes are often accompanied by heterogeneous labour market frictions.

Method

Agent-based models are a useful tool for modelling or simulating complex labour market dynamics.

Gap

Most existing agent-based labour market models neglect the role of behaviour in job search processes, despite their key role in determining heterogeneous outcomes.

Relevance

Job search behaviour not only underlies the labour market adjustment process itself but also contributes to labour market inefficiencies such as gender wage gaps and long-term unemployment.

Ultimate Goal

Behaviourally micro-founded agent-based labour market model

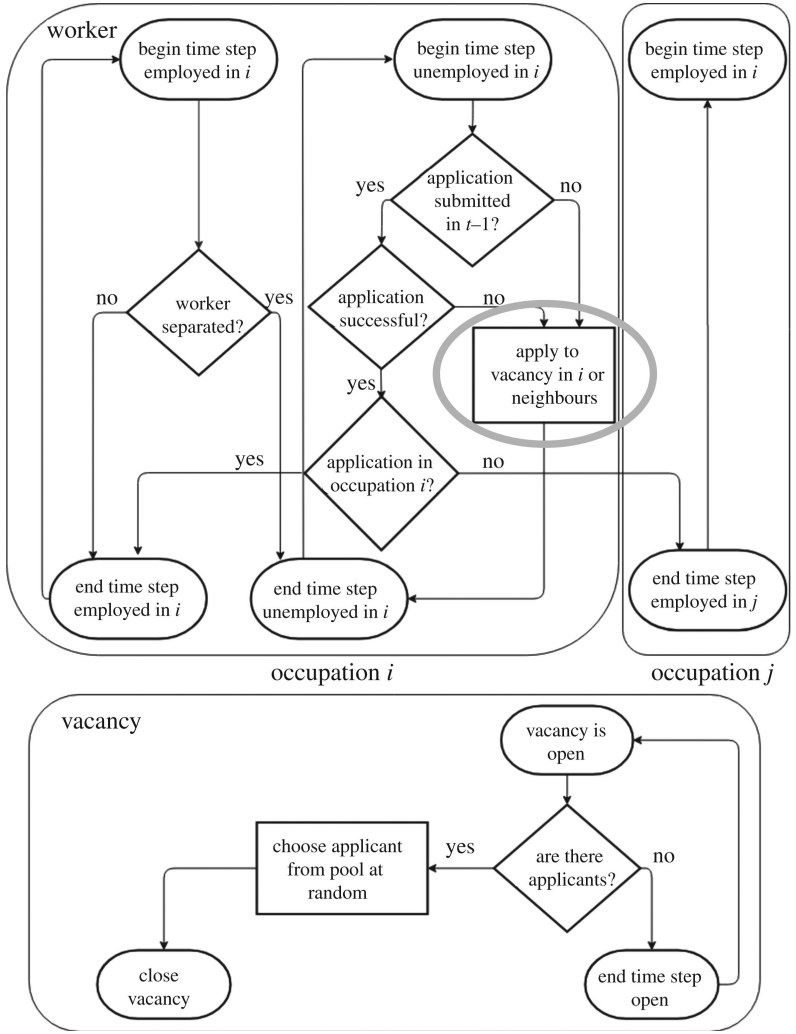
Research Question(s)

What is the use of incorporating behavioural heterogeneity into agent-based labour market models?
(Forthcoming) How will net-zero structural transformation interact with existing labour market inequalities?

Building the Model (1)

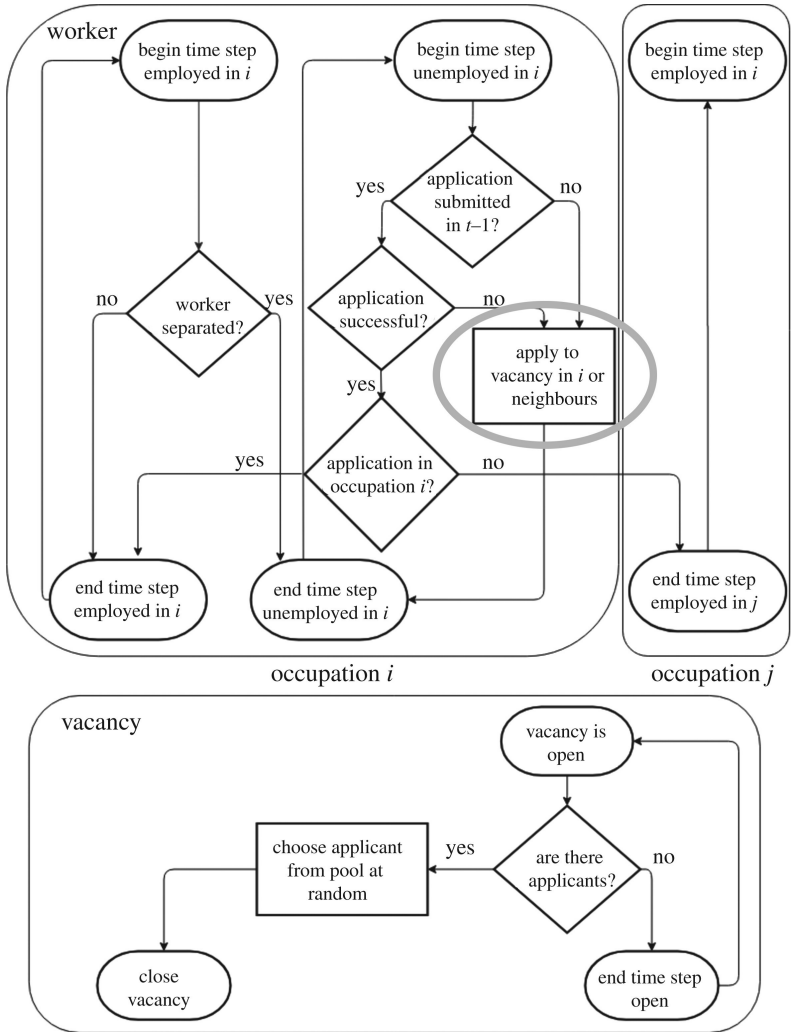
Starting Point

Starting point: del Rio-Chanona et al. 2021



del Rio-Chanona et al. 2021

Starting point: del Rio-Chanona et al. 2021



del Rio-Chanona et al. 2021

Occupational mobility network:

Nodes: *occupations (n = 464)*

Edges: *directed probability of transitioning between occupations*

Data: *US Current Population Survey*

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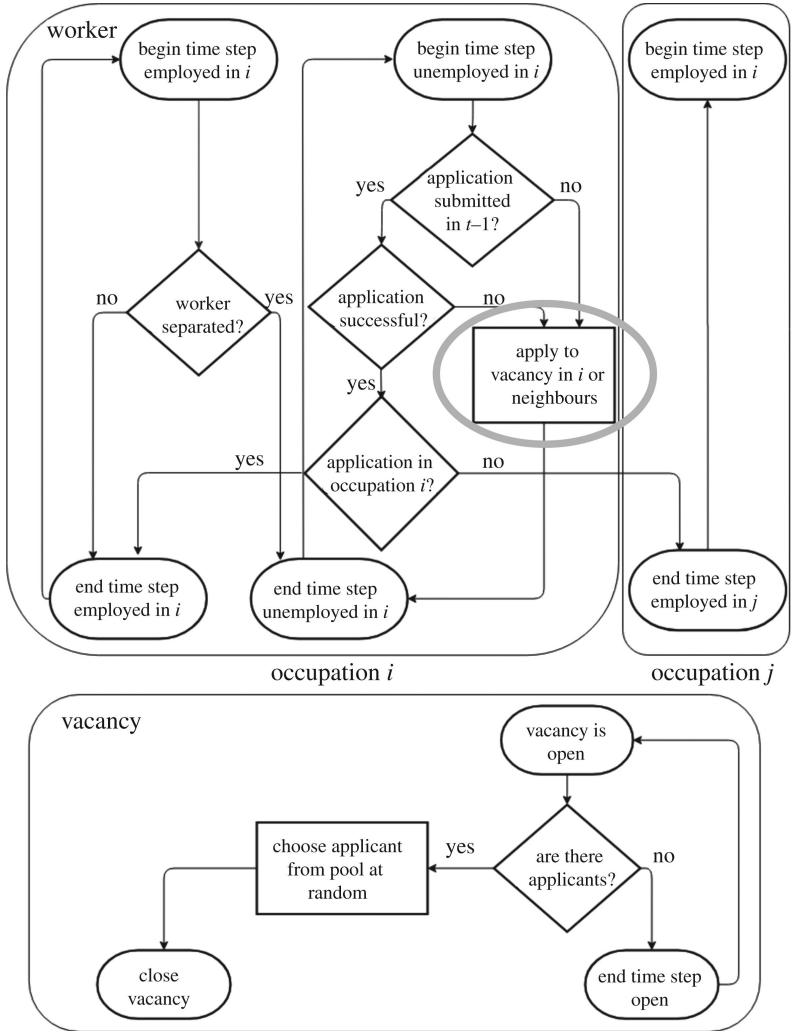


del Rio-Chanona et al. 2021

Occupational mobility network:

Nodes: *occupations (n = 464)*

Edges: *directed probability of transitioning between occupations*

Data: *US Current Population Survey*

Spontaneous separation and vacancy creation processes which create movement in the model

State-dependent separation and vacancy creation processes which follow fluctuations in labour demand

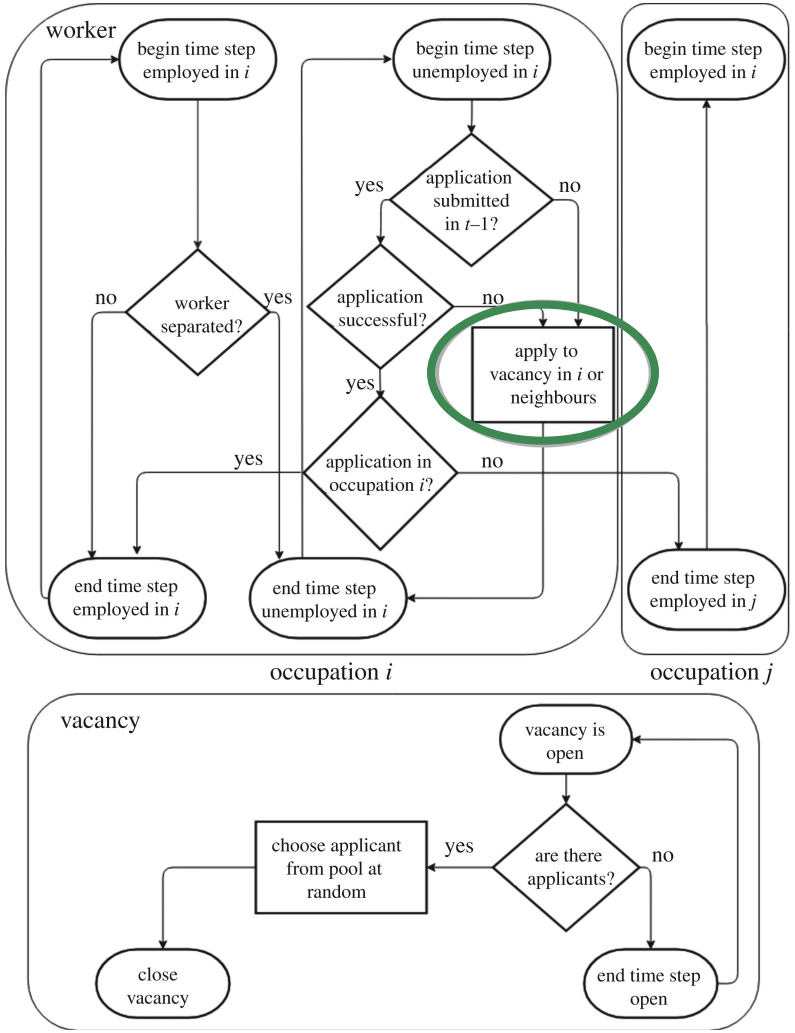
Labour market adjustment parameter

Data: *Calibrated (prelim.) to most recent full and non-recession business cycle periods pre-Covid using JOLTS and BLS time series*

Building the Model (2)

Incorporating Behavioural Heterogeneity

Behavioural heterogeneity in job search



del Rio-Chanona et al. 2021

Surveying job search behaviour

Behaviours

Choice of search channel (online, newspaper, network, employment agency)

Delay search

Reservation wage

Other non-wage reservation preferences

Job search effort *(hours spent searching, applications sent)*

Job search intensity (planning, strategy)

"Aiming high or low"

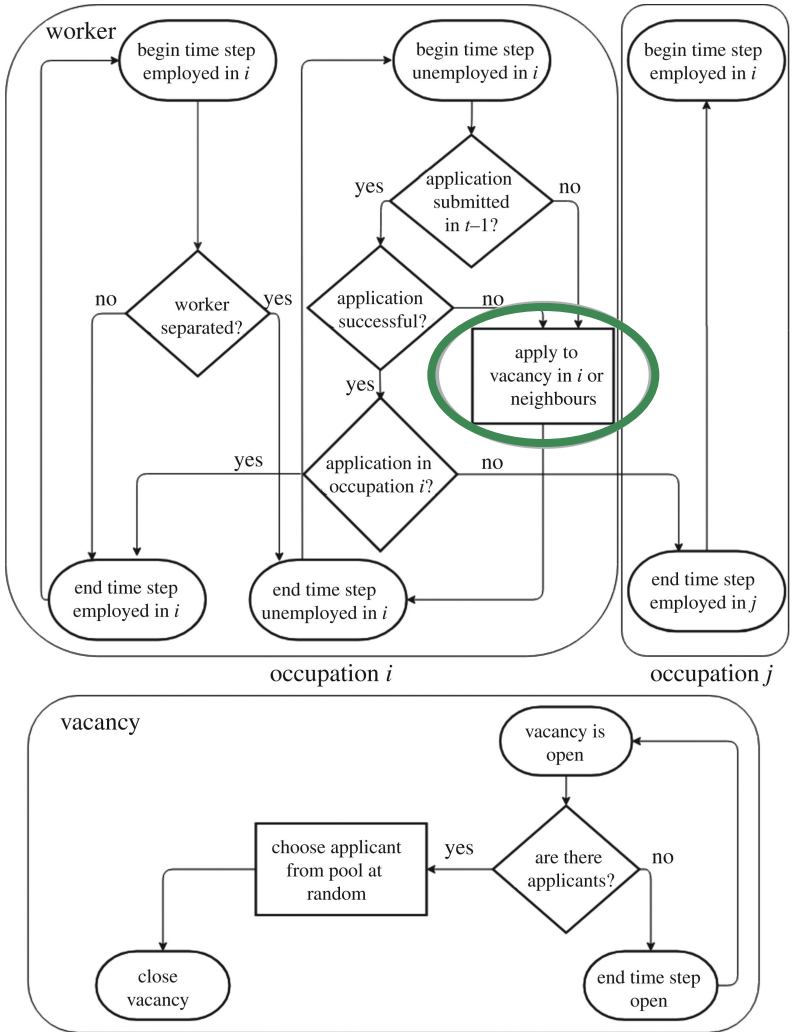
Apply only for newer job postings

Non-linear search effort

Dynamism/Oscillating Search Effort

Cyclicality of job search in tight labour markets

Incorporating behavioural heterogeneity



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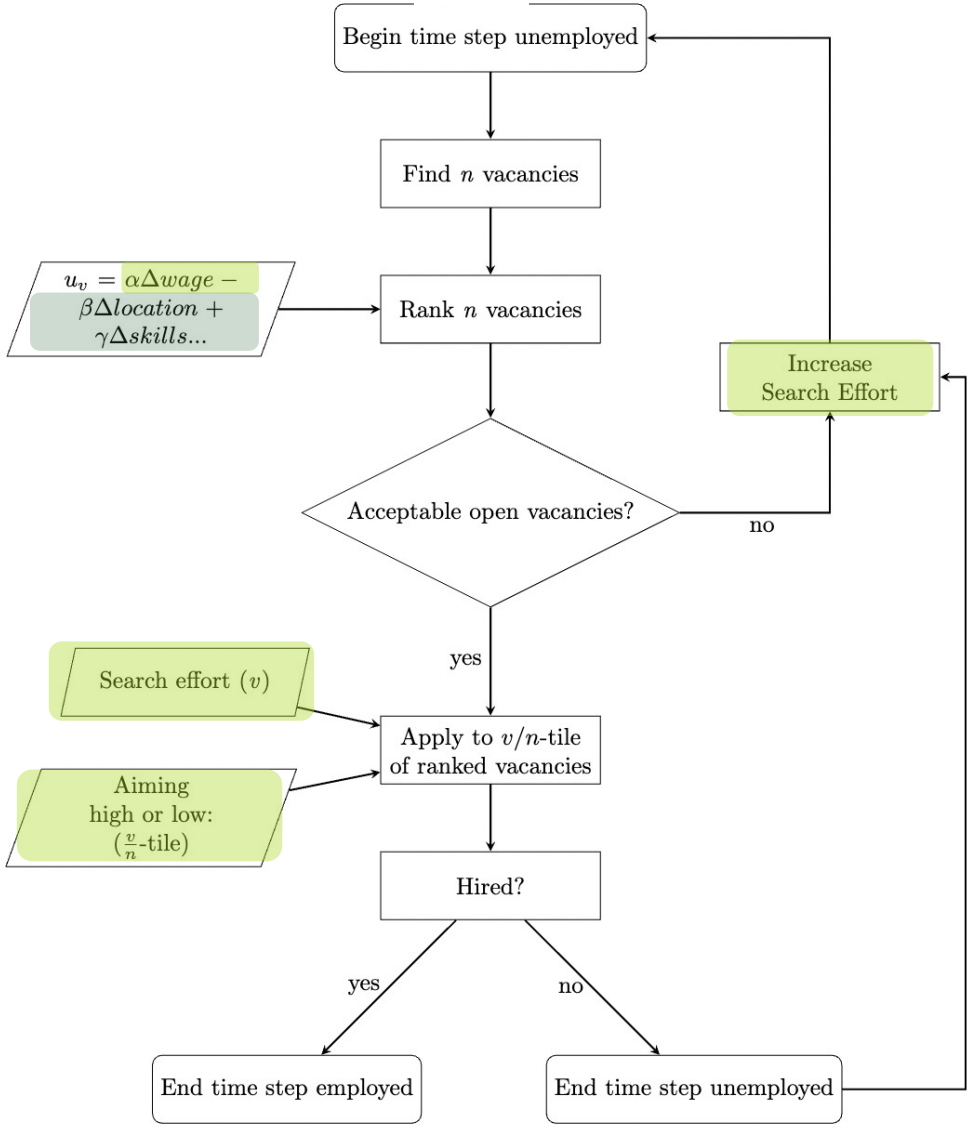
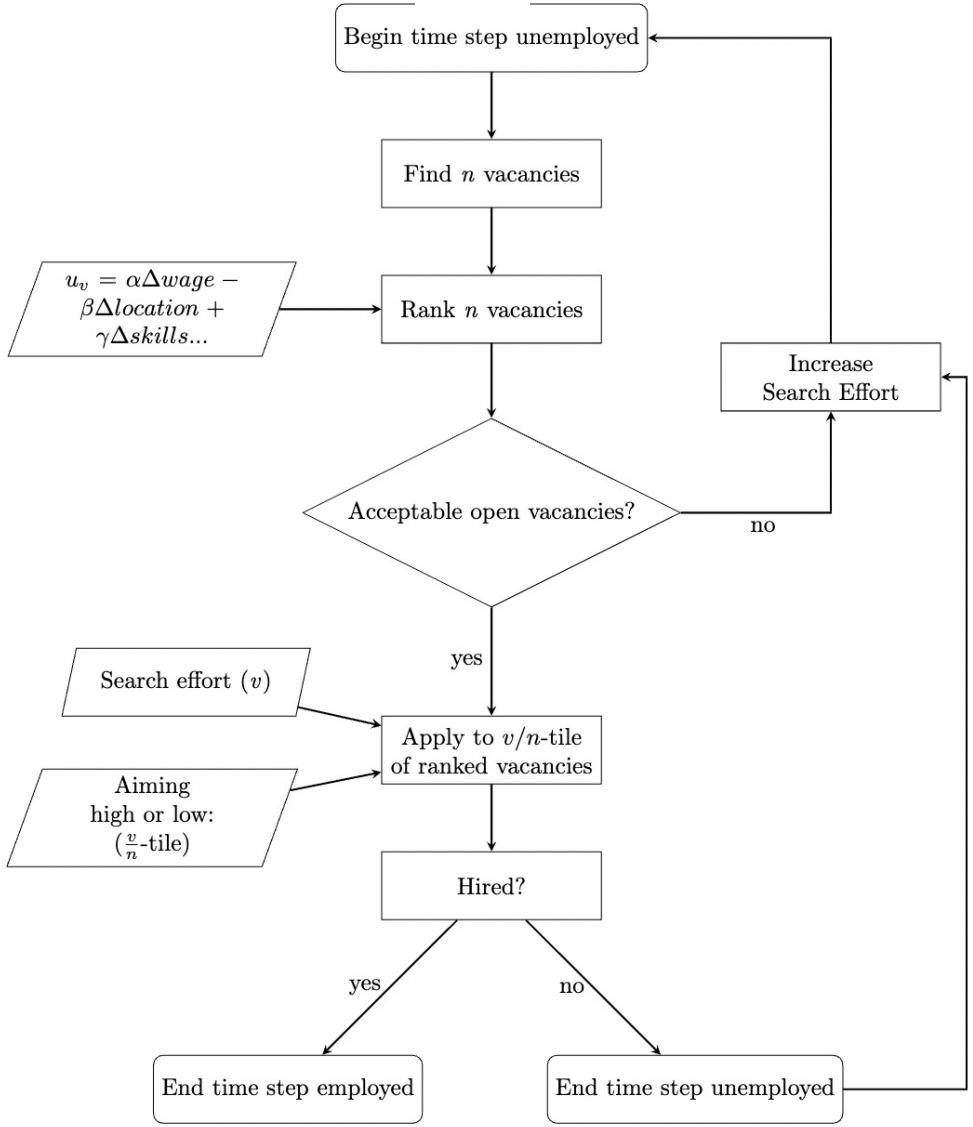


Incorporating behavioural heterogeneity

Vacancies:

1 2 3 4 . . . *n*

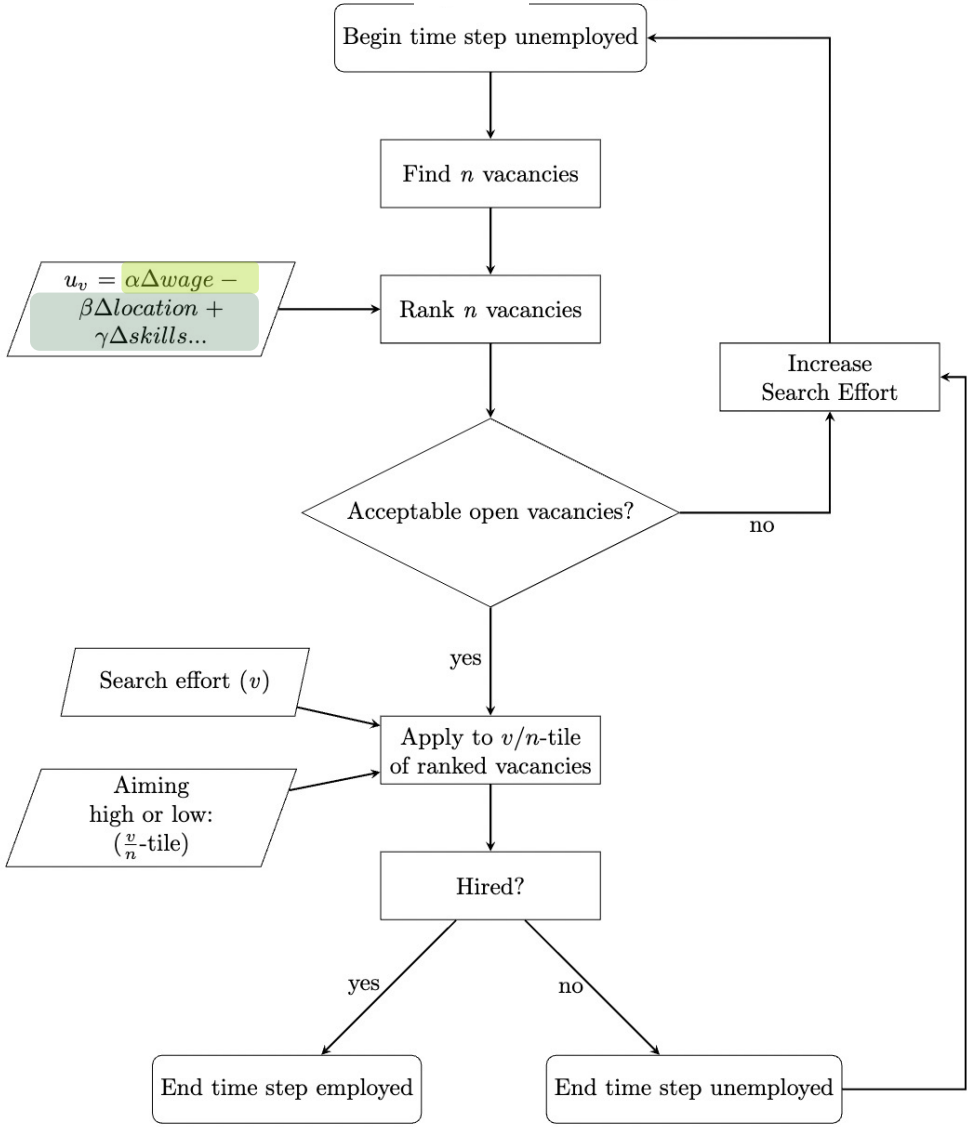


(1) Preferences

Vacancies:

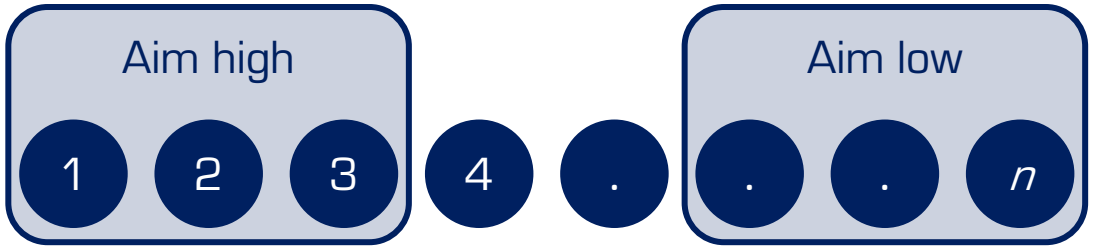
1 2 3 4 . . . *n*

$u_1 \gg u_n$

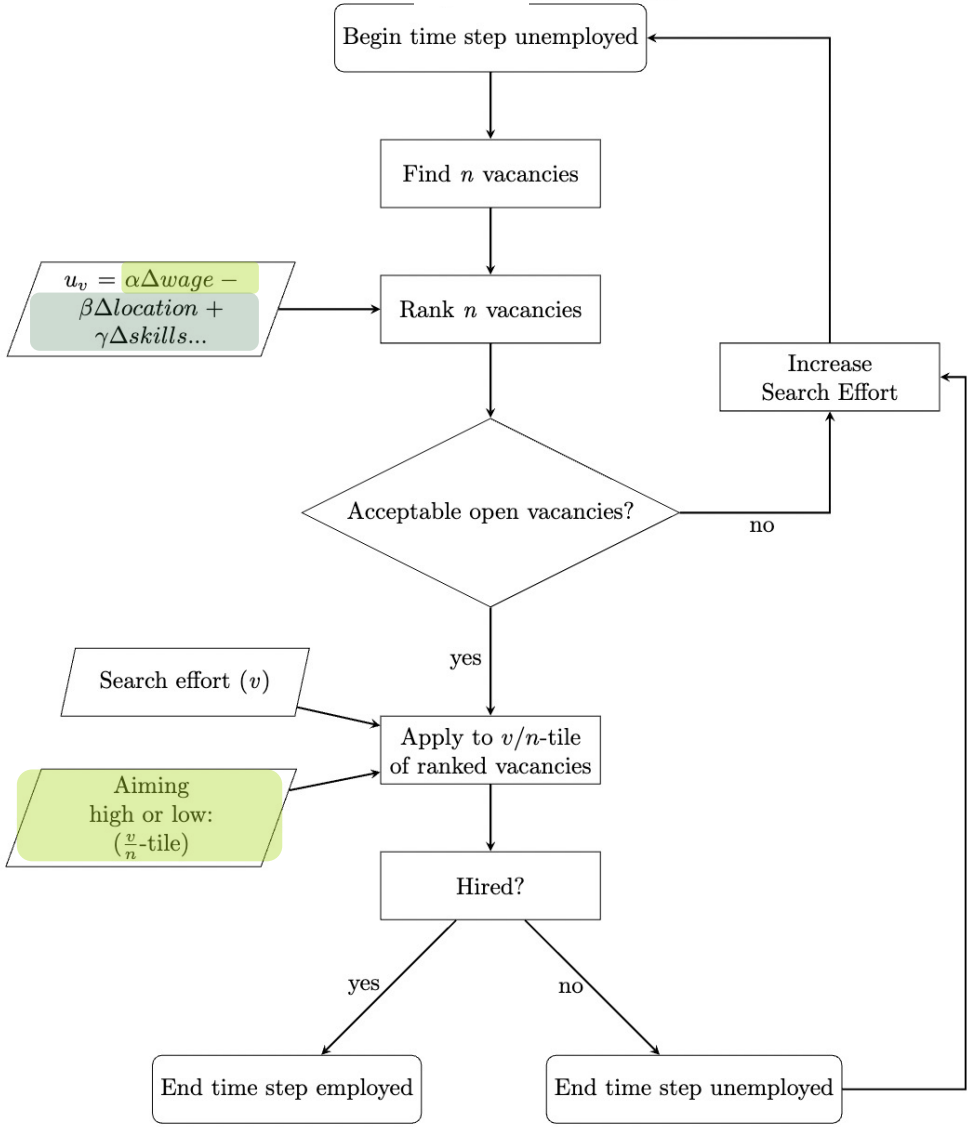


(2) Aim high or low

Vacancies:

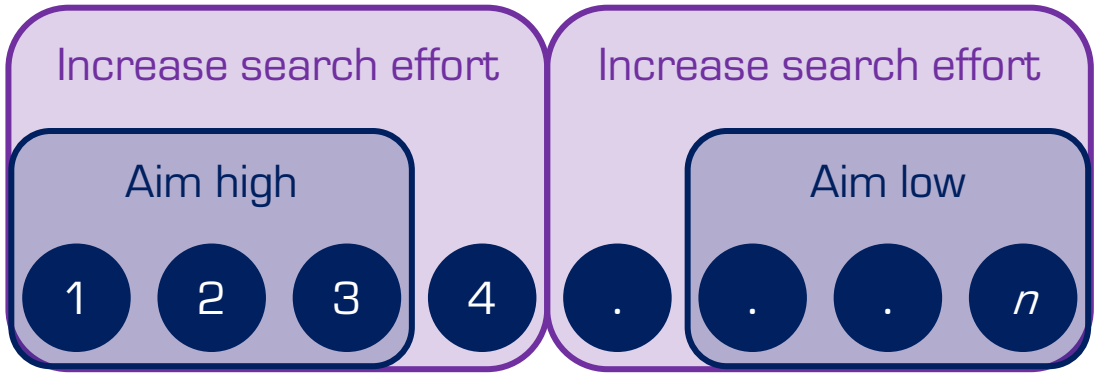


$$u_1 \gg u_n$$

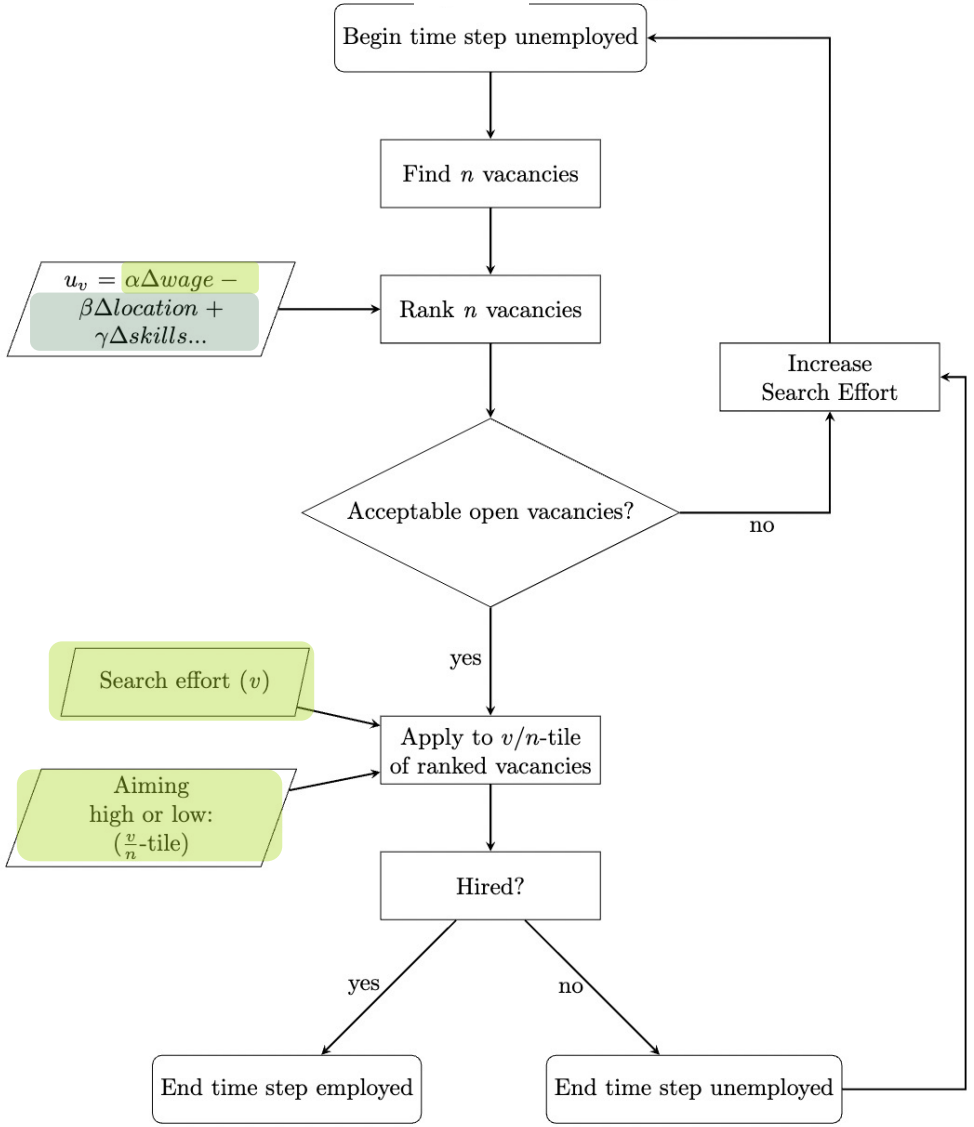


(3) Determine search effort

Vacancies:

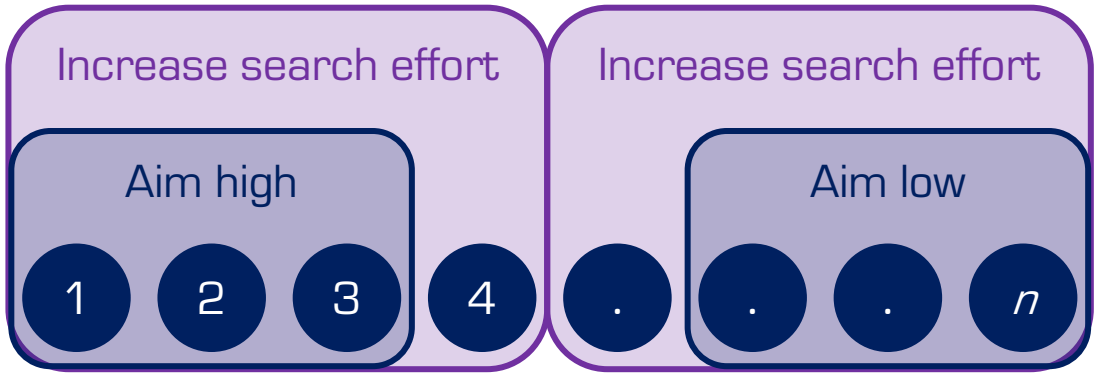


$$u_1 \gg u_n$$



(4) Non-linear search effort

Vacancies:



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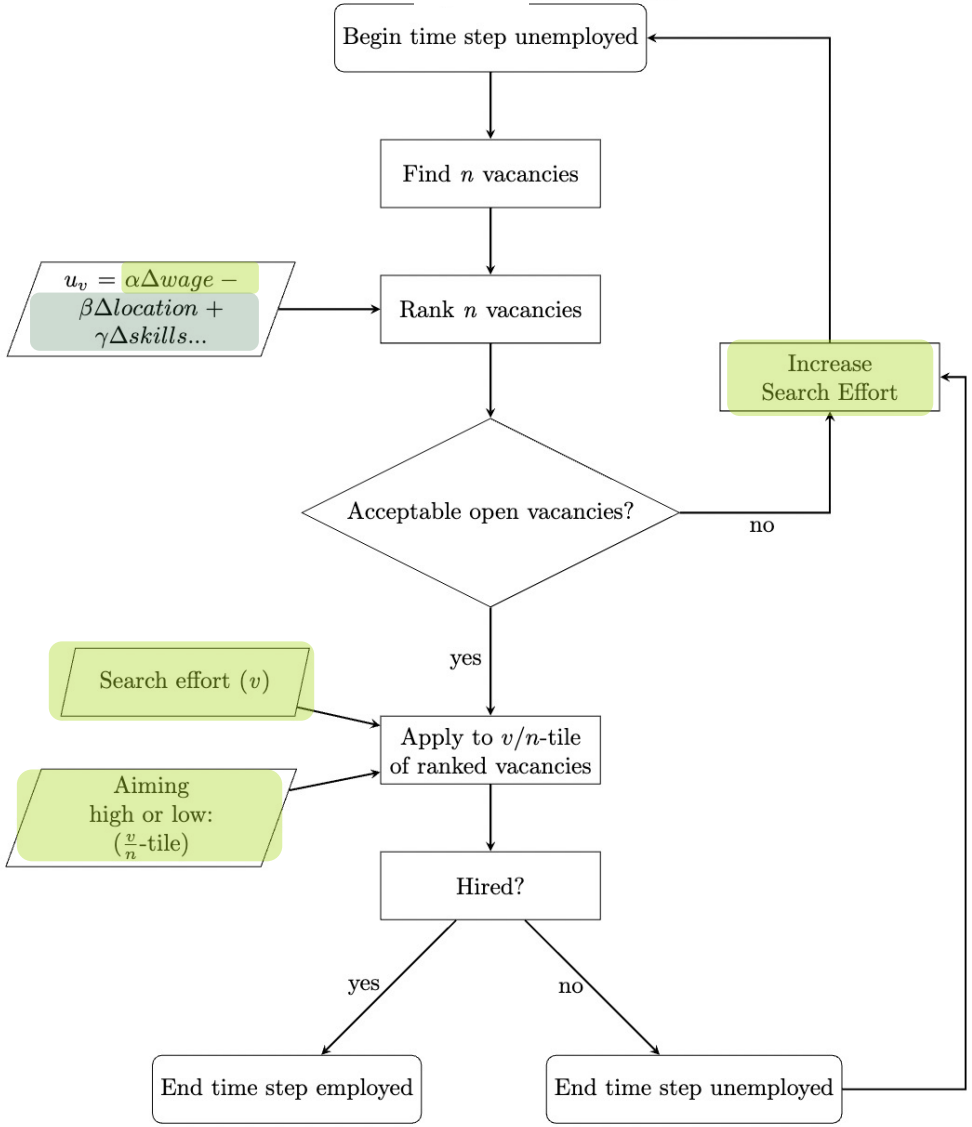


Application

*Incorporating behaviour using **sparse data***

Validation

Moving toward validation of the model's dynamics
using three stylized facts about the US labour market:

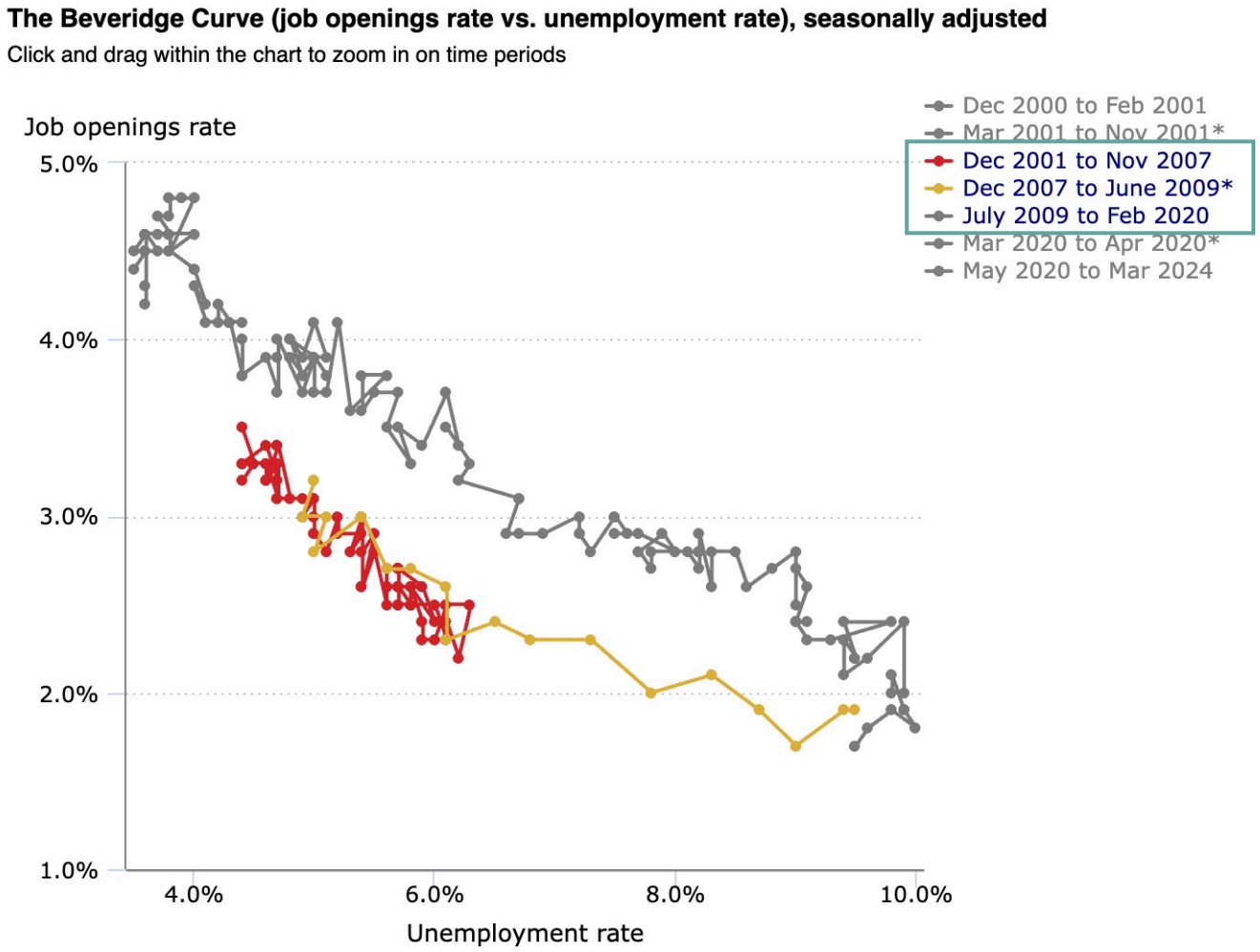
Beveridge Curve

Gender Wage Gap

Long-term Unemployment

Beveridge Curve

Replicating Beveridge Curve



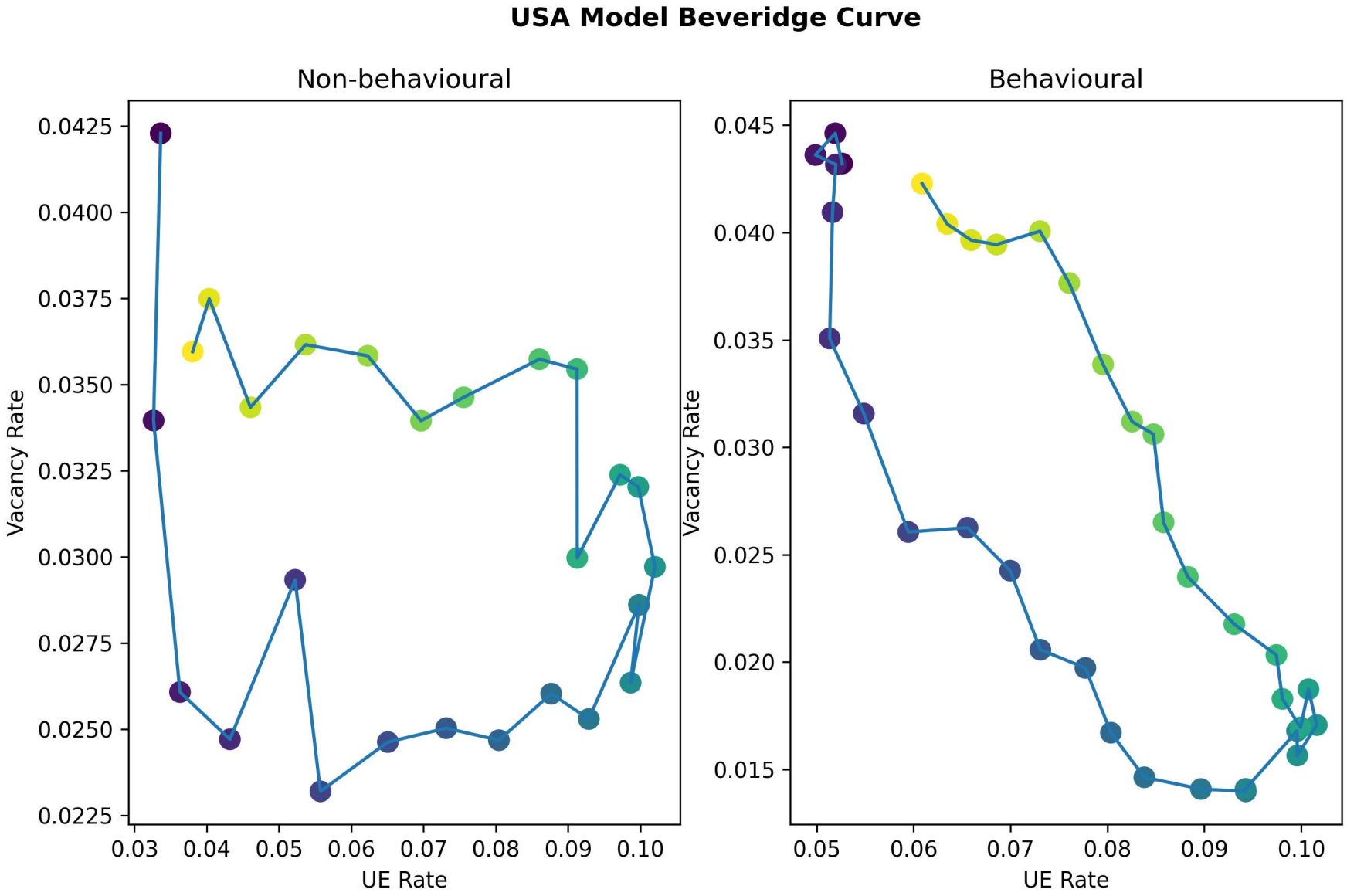
Source: U.S. Bureau of Labor Statistics.

Beveridge Curve

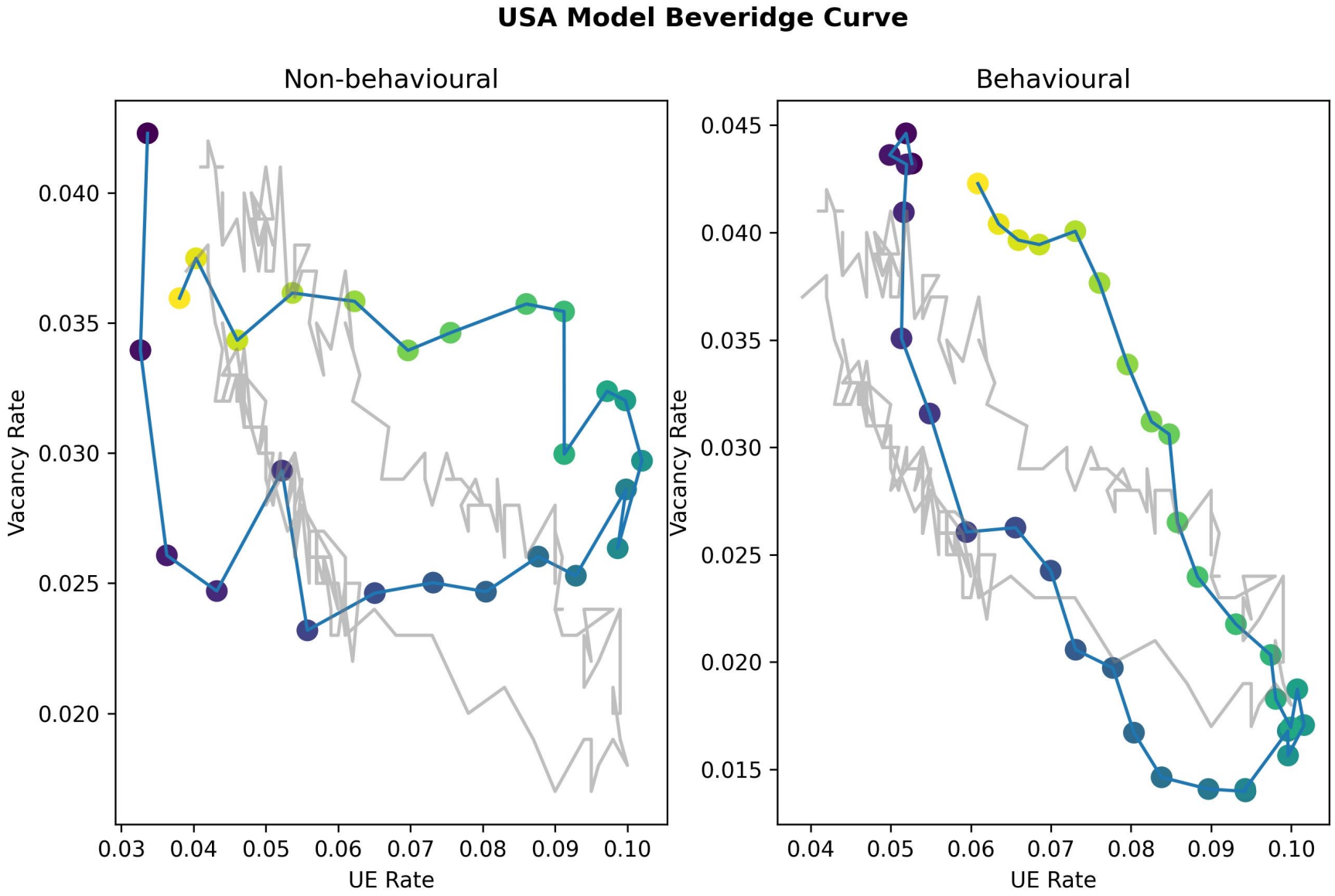
Data inputs:

- Job Openings Rate (s.a.) JOLTS
- Unemployment Rate (s.a.) BLS

Replicating Beveridge Curve

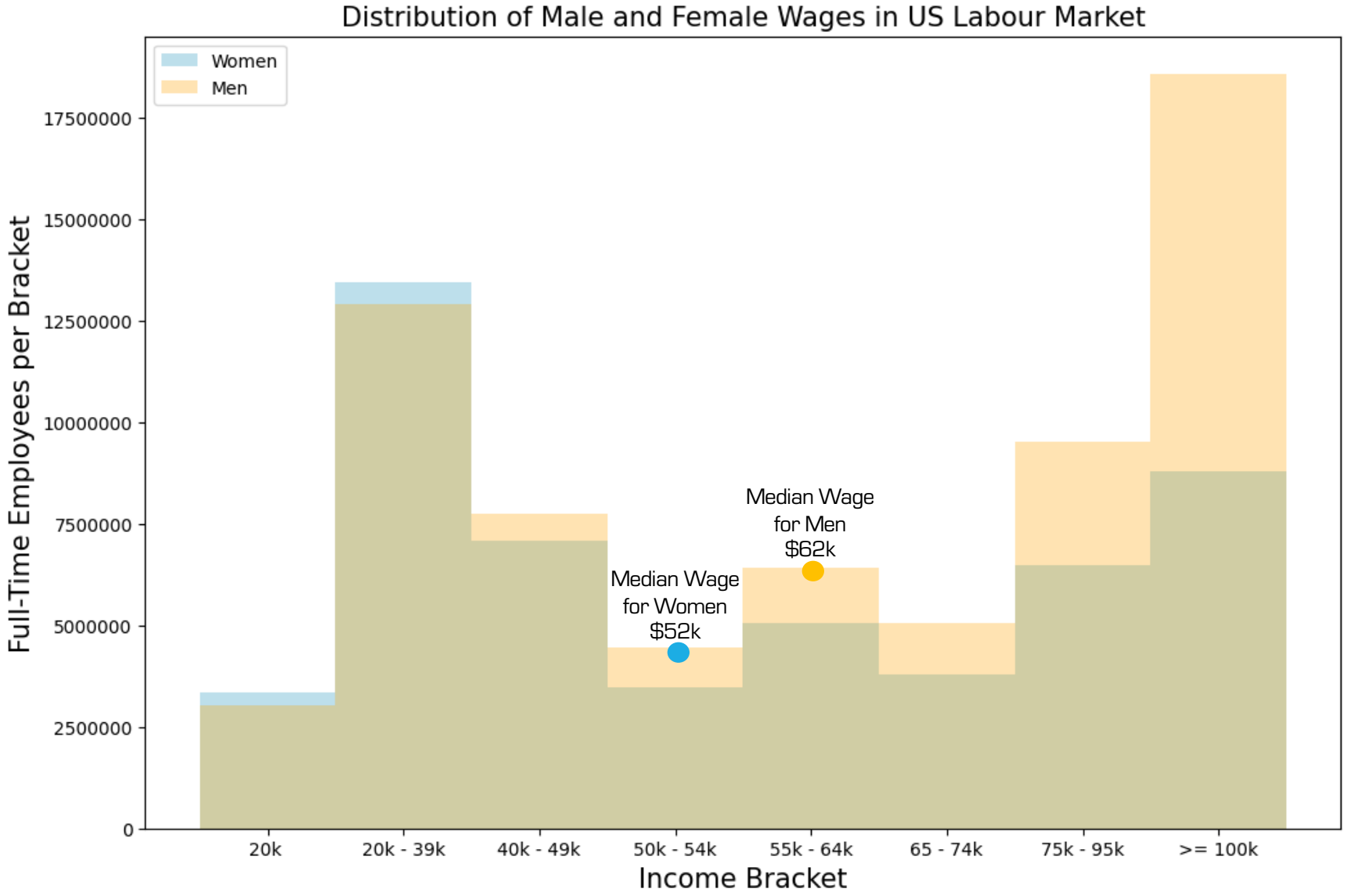


Replicating Beveridge Curve



Gender Wage Gap

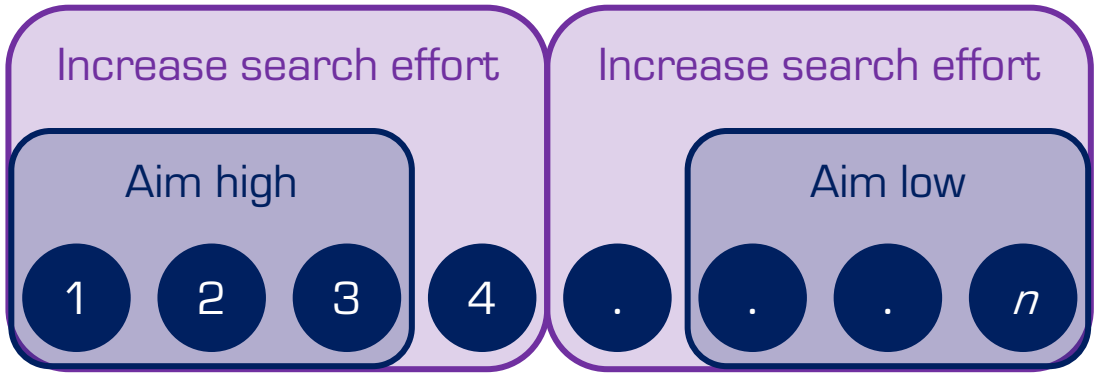
Nearly all national economies exhibit a gender wage gap



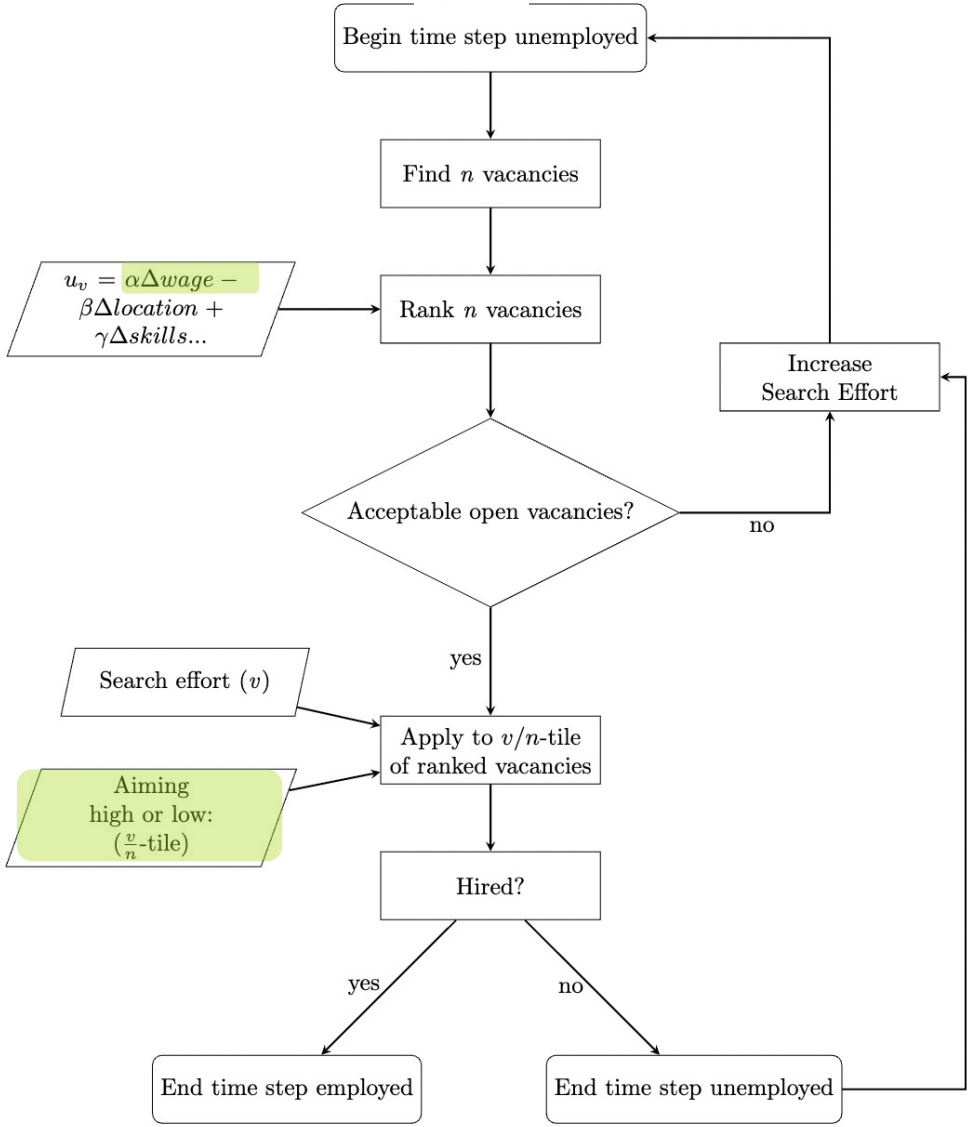
Data from the US Bureau of Labour Statistics

Incorporating behavioural heterogeneity

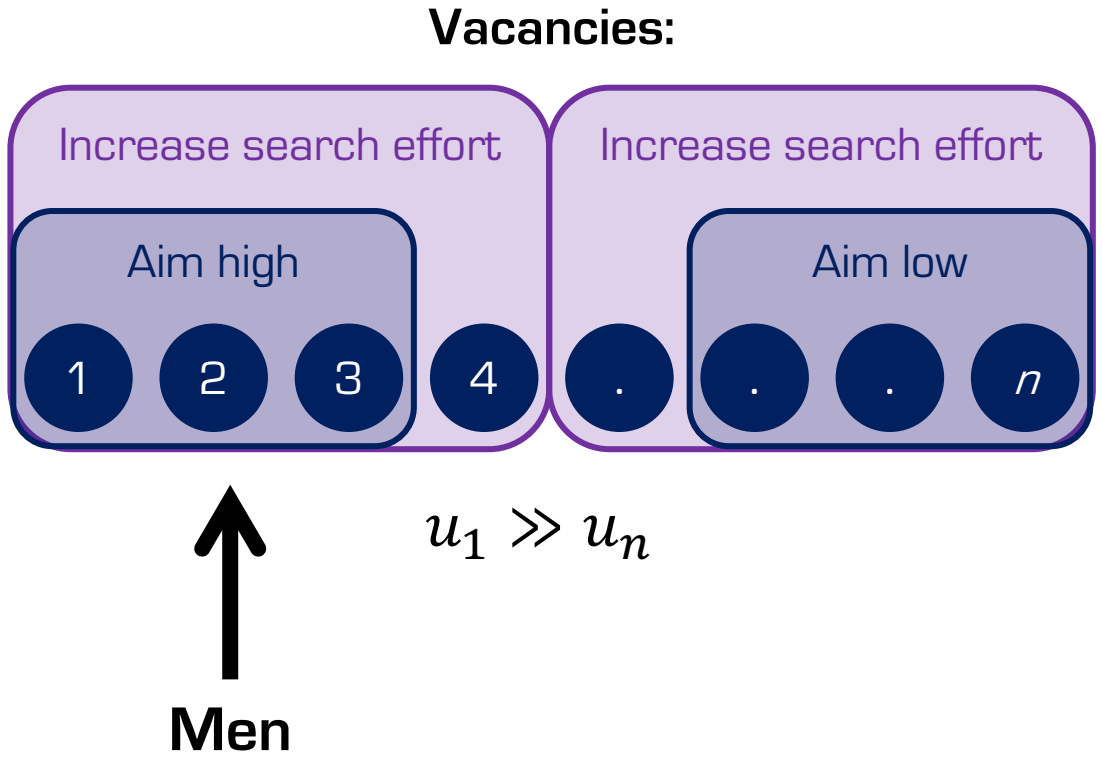
Vacancies:

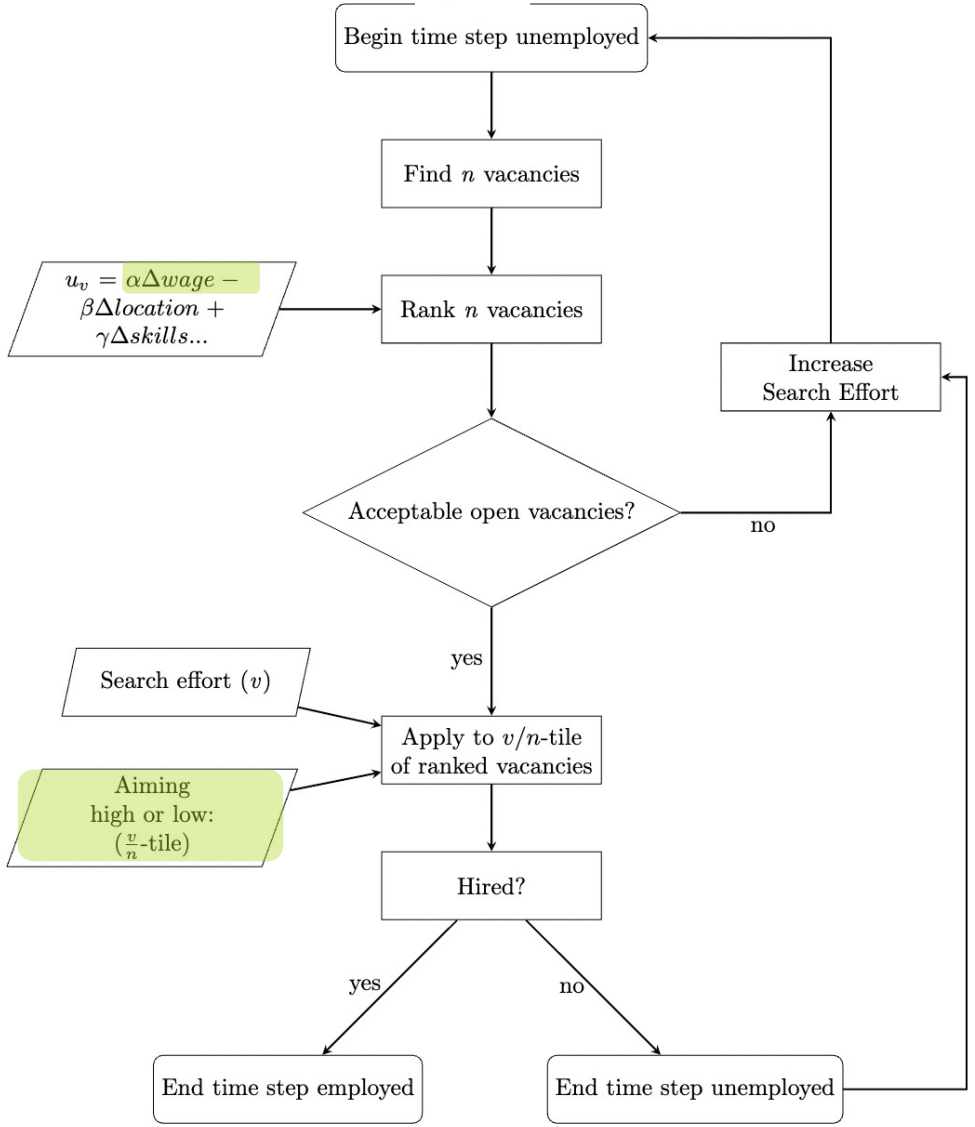


$$u_1 \gg u_n$$



Incorporating behavioural heterogeneity





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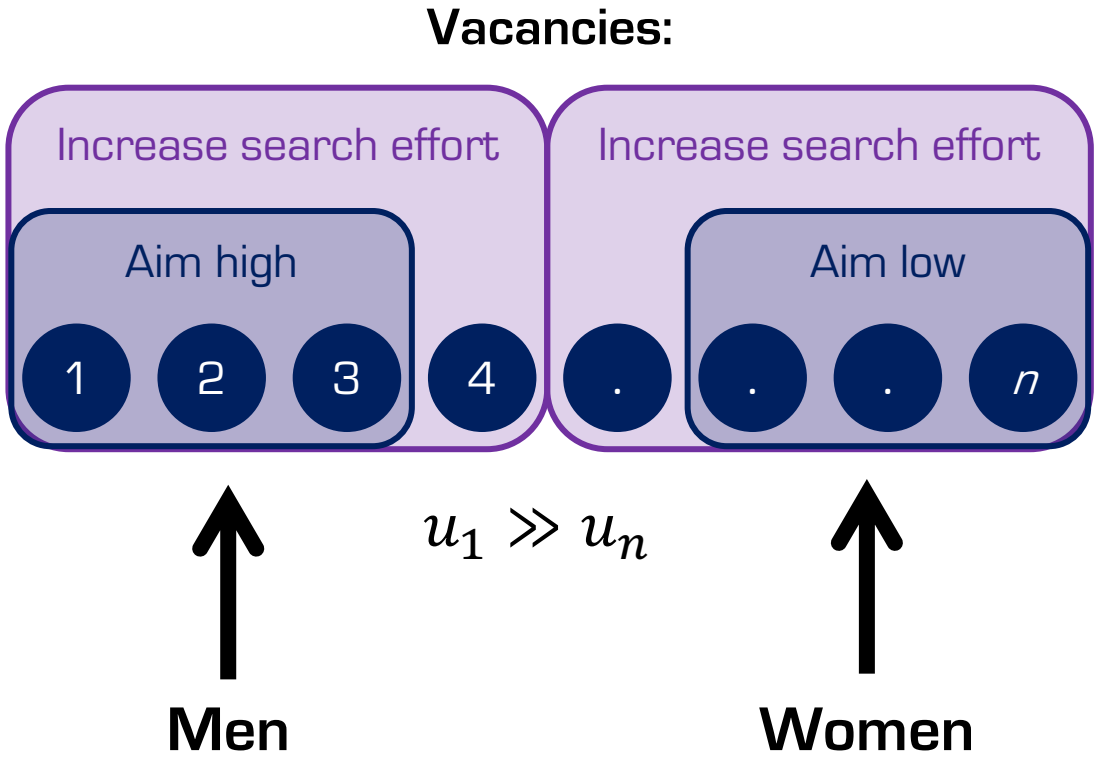
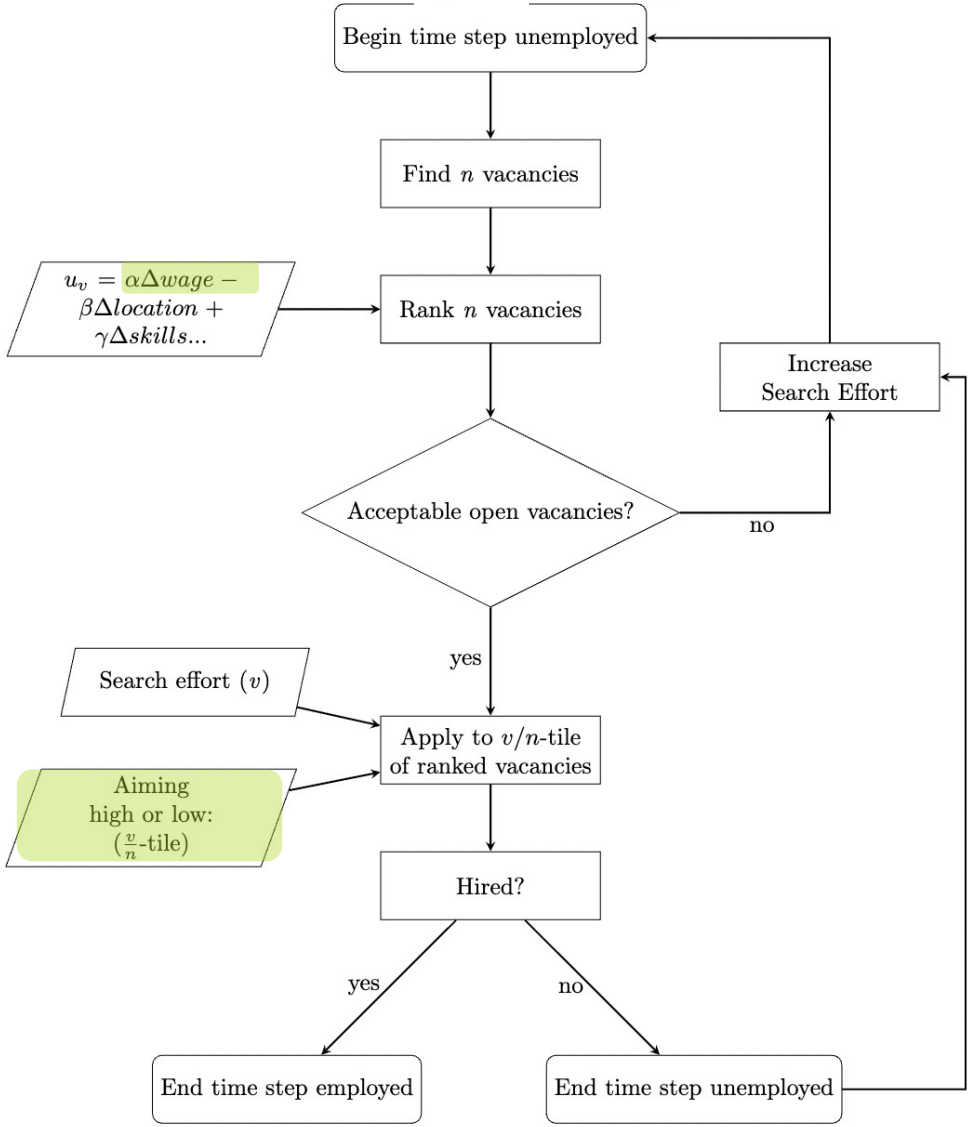




Gender wage gap

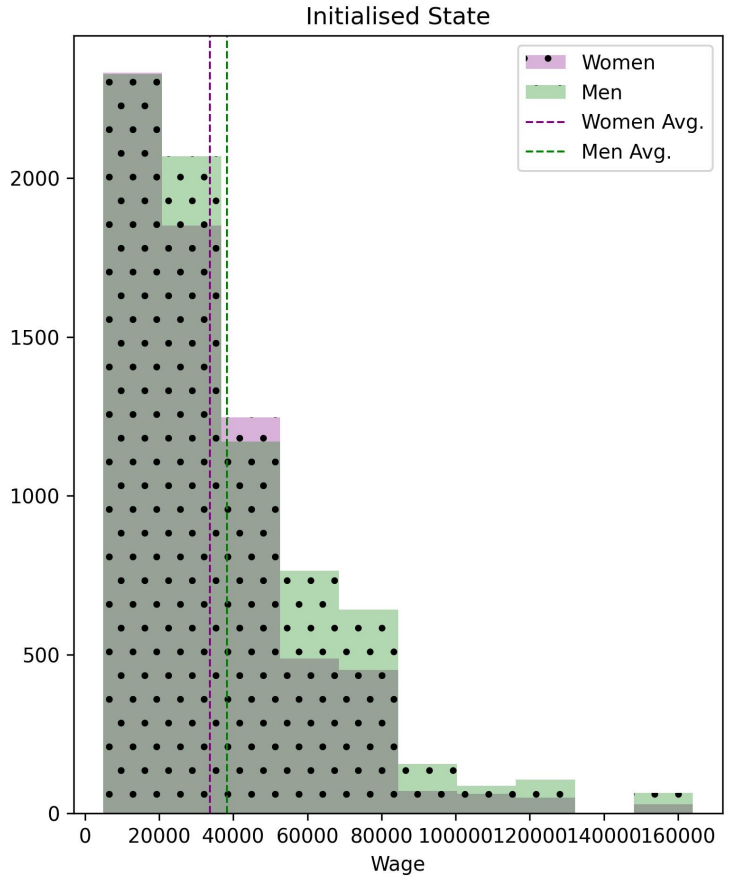
Data inputs:

Gender share of occupations
CPS – BLS

Median wage of occupations
BLS

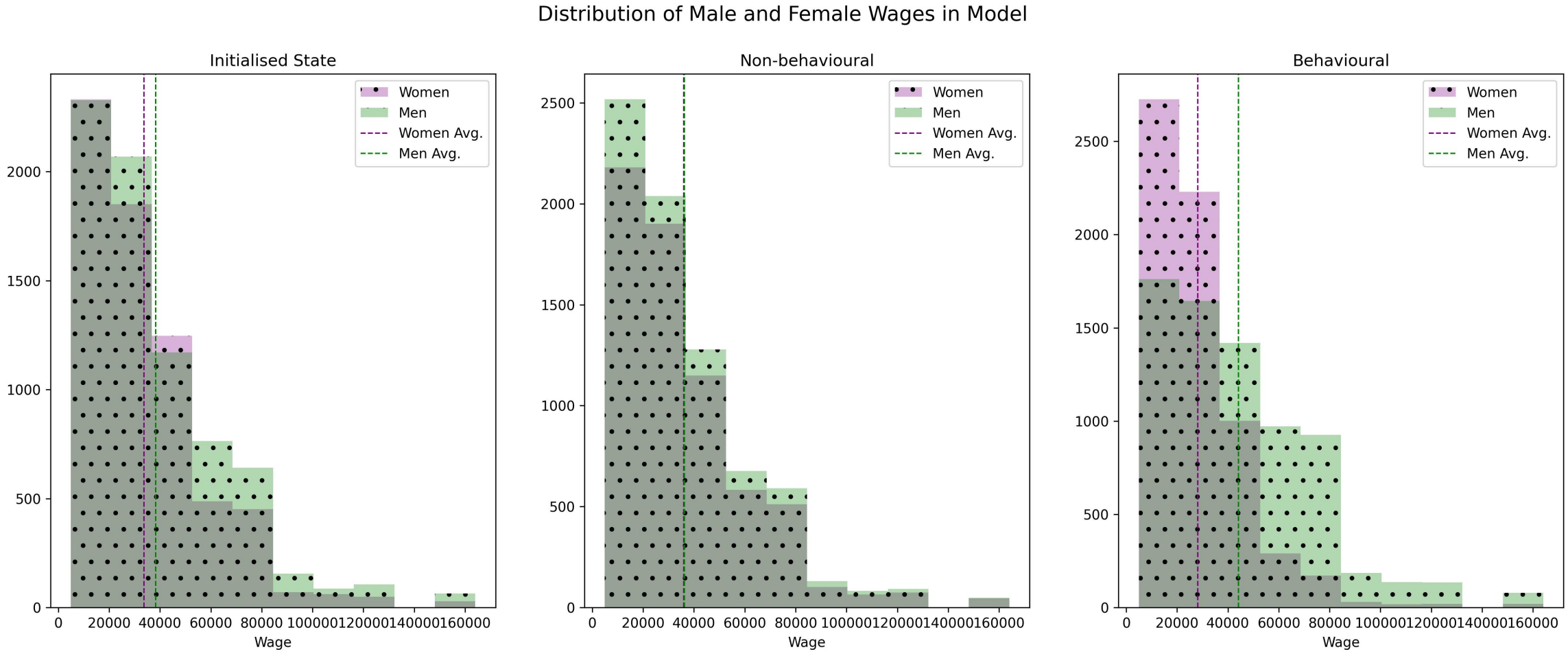
Replicating gender wage gaps

Distribution of Male and Female Wages in Model



Female share of employed: 47%
Mean Female Wage: $33756
Mean Male Wage: $38316
Gender wage gap: 12%

Replicating gender wage gaps

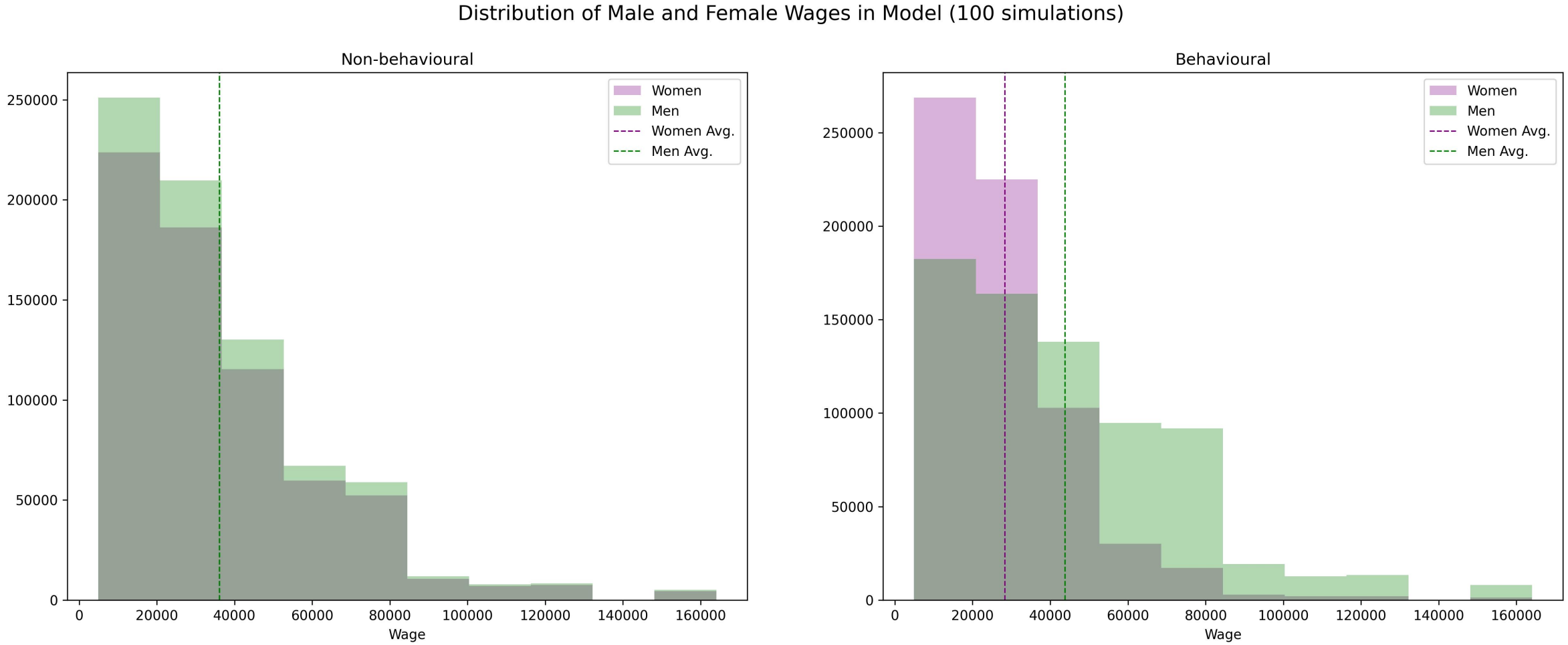


Female share of employed: 47%
Mean Female Wage: $33756
Mean Male Wage: $38316
Gender wage gap: 12%

Female share of employed: 47%
Mean Female Wage: $36009
Mean Male Wage: $36256
Gender wage gap: 1%

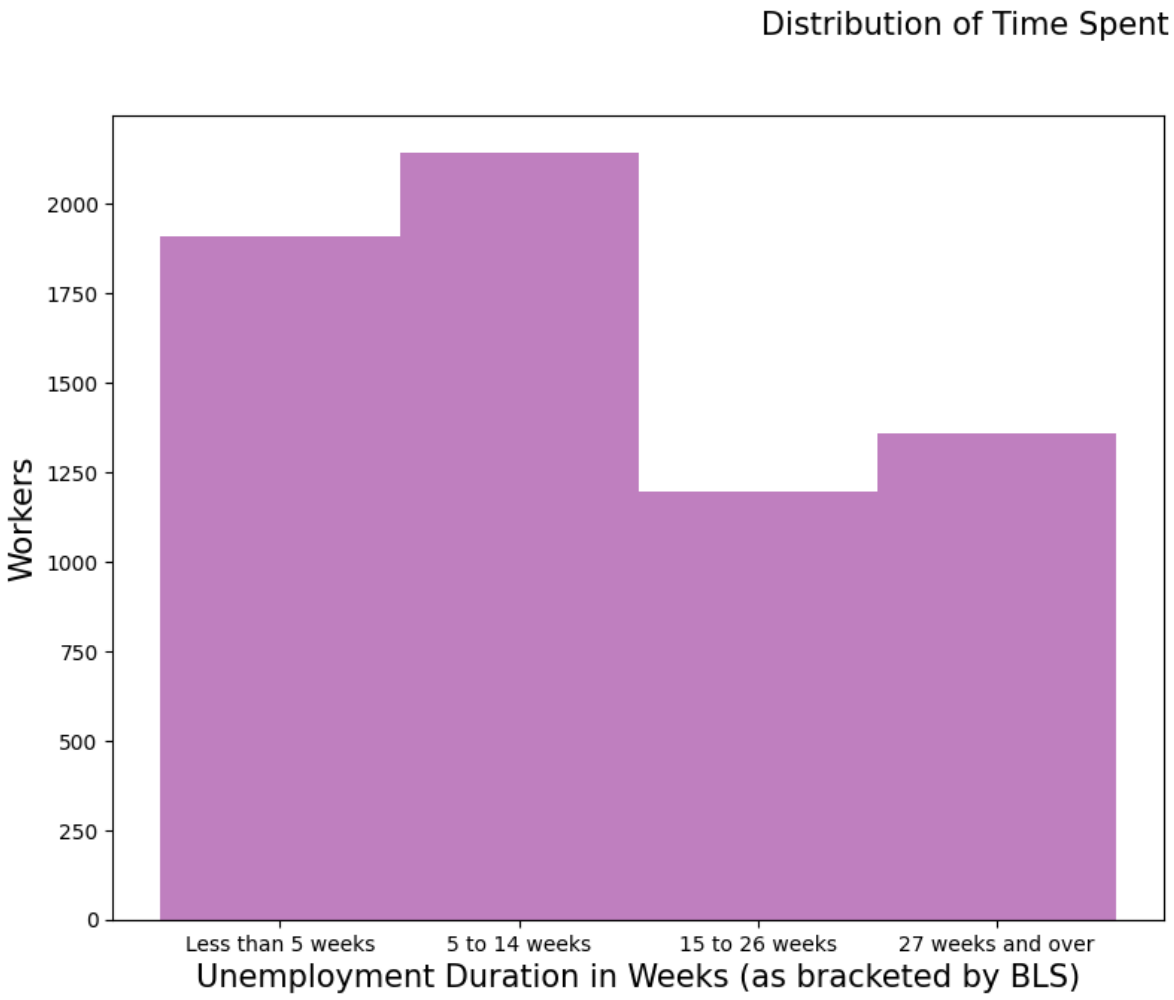
Female share of employed: 47%
Mean Female Wage: $28123
Mean Male Wage: $44104
Gender wage gap: 36%

Replicating gender wage gaps



Long-term Unemployment

Distribution of unemployment duration exhibits long tail



Data from the US Bureau of Labour Statistics

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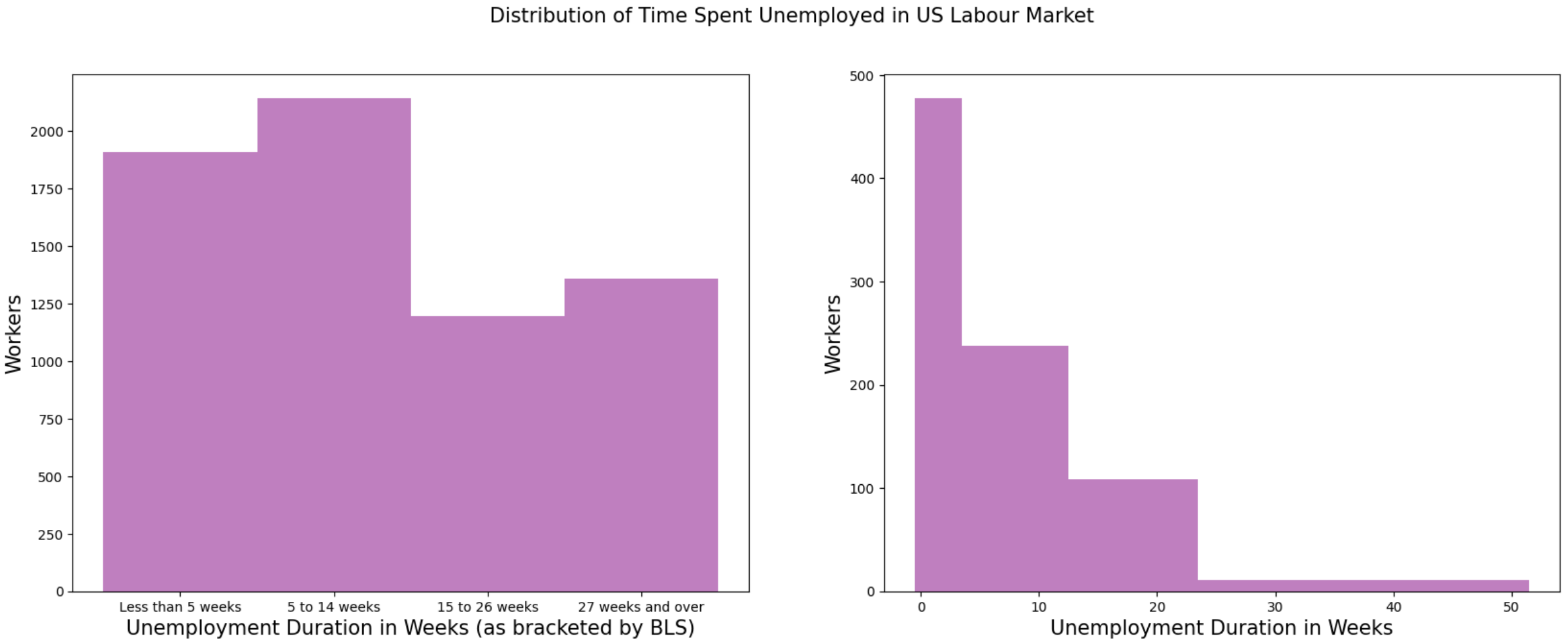


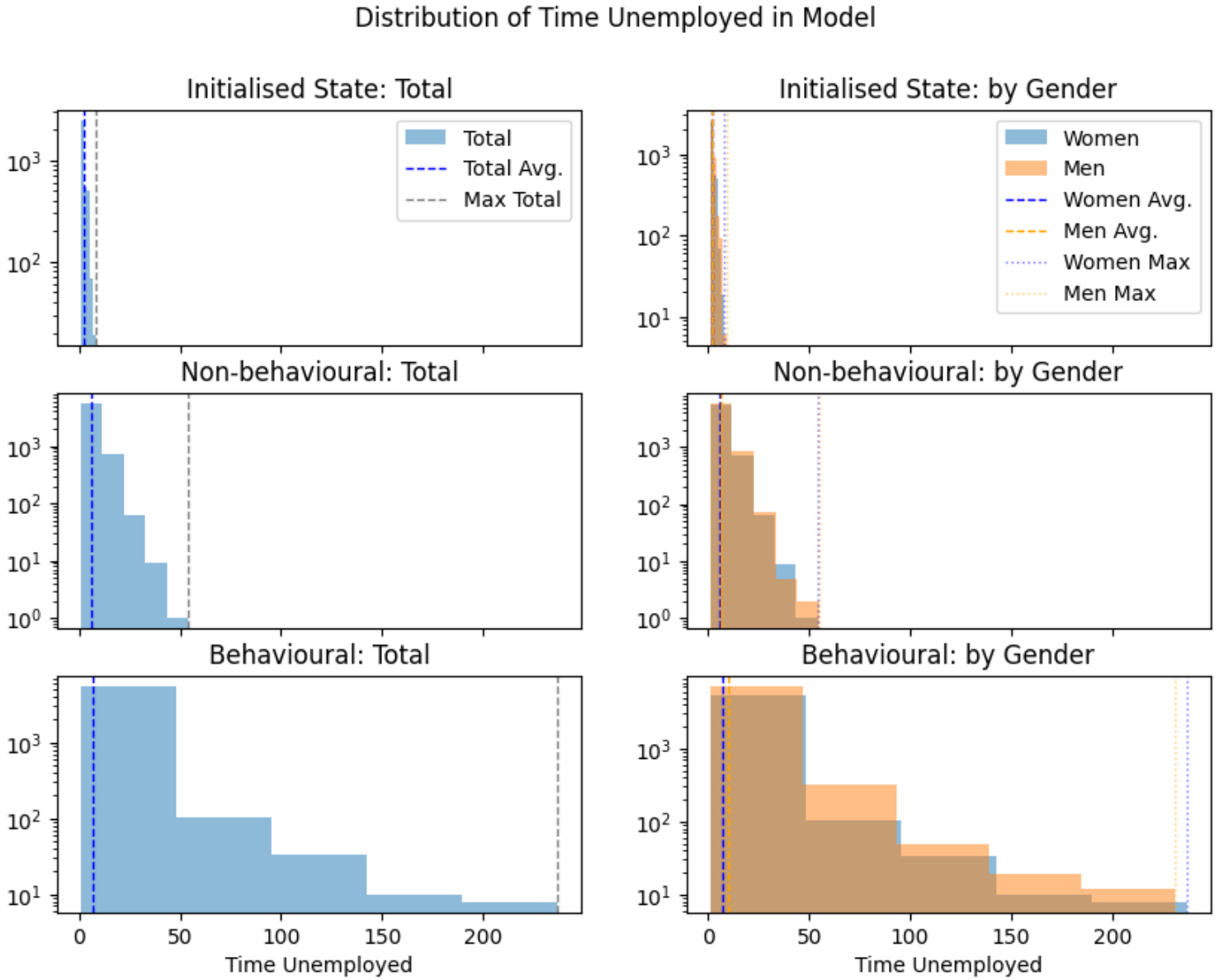
Data from the US Bureau of Labour Statistics

Long-term unemployment

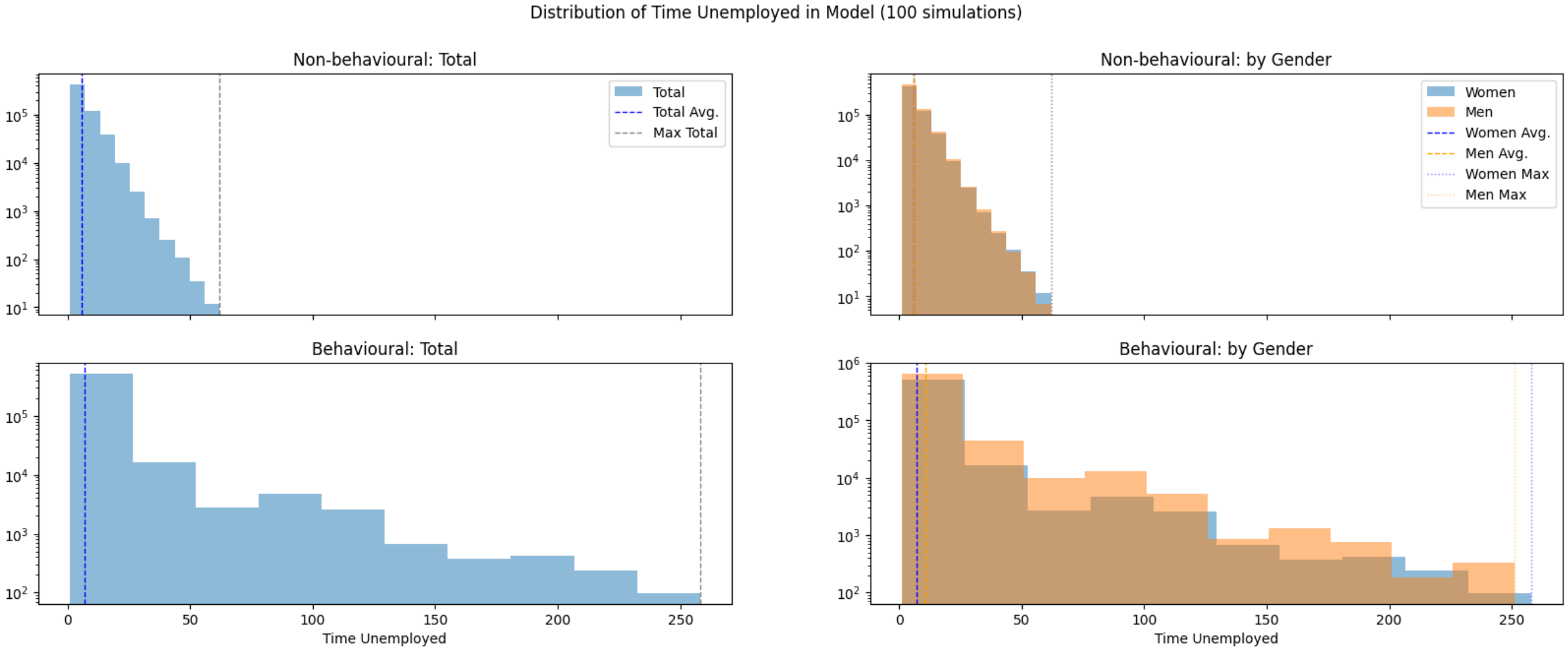
Data inputs:

TBD – suggestions welcome!

Replicating shape of LTUER



Replicating shape of LTUER



Next steps

- **Thoroughly validate against stylized facts presented:**
  - *Calibrate behavioural heuristics*: Incorporate data from additional sources to arrive at key distributions of behavioural parameter values (JOLTS, Time Use Survey, World Value Survey)
- **Replicate co-movements of GDP and unemployment rate** using historical data:
  - More realistic calibration to business cycles
  - Facilitate out-of-sample testing
- **Application:** Examine the interaction of a projected net-zero transformation on existing labour market inequalities.

Thank you!

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Aspiration

*Incorporating behaviour using **rich micro data***

Motivation and Research Question

Motivation

As in the first study, this work will aim to incorporate behaviour into our existing understanding of occupational transitions.

The value added of this latter effort will be:

- The use of rich micro data to understand what determines job to job transitions (ie. skills, wage, gender, location)
- To replace any parameters inferred from aggregate distributions and disparate surveys in the former model with observed variation in the micro-level data
- Ideally, depending on the quality of the data, we will move to deduce the role of identity in job transitions
- This latter point requires significantly more theoretical work at this point

Research Question(s)

What determines occupational transitions?
Can we deduce information about the role of identity in such transitions?

Data Progress

We are closing in on two possible options for our micro-level data:

Germany

SIAB: Sample of Integrated Labour Market Biographies

2% random sample of all individuals in the German Labour Market (whose employment is subject to social security)

Brazil

Relação Anual de Informações Sociais (RAIS)

- 67% of total labour force
- 570 occupations and 16 regions
- Contains all active employer- employee contracts in each year in the formal labour force in Brazil, which accounts for about 67% of the total labour force in Brazil.