The Dual U.S. Labor Market Uncovered

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Coarse classification of employed, unemployed, and non-participant

"A set of precise labor force concepts was developed in the late 1930s to classify people as working, looking for work, or not in the labor force. These concepts were adopted for a national survey of households, called the Monthly Report of Unemployment, which was initiated in 1940 by the Work Projects Administration. This survey was transferred to the Census Bureau in 1942 and later renamed the Current Population Survey. ... " (BLS, History of the Current Population Survey)

Finer classification needed to understand many aspects of labor market dynamics

- **Short- vs long-term employed**
  Explains unemployment dynamics and tenure distribution

  Hall (1982); Hyatt and Spletzer (2016); Pries (2004); Morchio (2020); Pries and Rogerson (2021)

- **Heterogeneity in types of unemployed**
  Explains variation in pace of recovery of unemployment across recessions as well as duration dependence of unemployment outflows

  van den Berg and van Ours (1996); Hornstein (2012); Kroft *et al.* (2016); Jarosch and Pilossoph (2019); Ahn and Hamilton (2020)

- **Differences in labor supply elasticities and labor force attachment**
  Explains joint occurrence of flows across the participation margin while many persons report to be always out of the labor force and not looking for work

  Elsby *et al.* (2015); Krusell *et al.* (2017); Kudlyak and Lange (2017); Heathcote *et al.* (2020)

U.S. labor market well approximated as the combination of three segments

Primary (Stability)   **Secondary (Turbulence)**   **Tertiary (Low Attachment)**

U.S. dual labor market structure with home production

- Dual Labor Market (DLM) hypothesis originally posited for the U.S.

  Doeringer and Piore (1970)

  "The dual labor market is distinguished by the stability of jobs and very limited mobility between the two market segments."

- Recent emphasis has been on Europe due to labor market institutions and regulations

  Bentolila *et al.* (2019)

- Institutions and regulations not necessary for dualism. Can emerge as a result of frictions, the existence of efficiency wages, and demand fluctuations

  Bulow and Summers (1986), Blanchard *et al.* (1990), Albrecht and Vroman (1992), Saint-Paul (1997)

- Supplement with tertiary sector to capture those with persistent non-participation

Uncover stark DLM narrative for the U.S.

Measure stocks and flows in three market segments using machine learning

- Estimate Hidden Markov Model (HMM) with inequality constraints on transition probabilities that identify the primary, secondary, and tertiary segments in the Current Population Survey (CPS) for 1980-2021

Three main themes of DLM narrative

- Aggregate averages are not representative of anyone's labor market experiences
- Majority of unemployment and turbulence attributable to secondary market
- Business cycle fluctuations mostly in the secondary market

Observables correlated with but explain little of segment membership

- The young, less-educated, and minorities overrepresented in secondary market
- Worker and job observables explain less than a fifth of variation in segment membership

Methodology

Hidden Markov Model

Identification of Macro Heterogeneity unsupervised machine learning problem

- Identification of Macro Heterogeneity involves classifying individuals at each point in time into untagged hidden labor market states

Hall and Kudlyak (2019), Shibata (2019), Gregory *et al.* (2021), Braxton *et al.* (2021)

We use Hidden Markov Model for identification of DLM and focus on business cycle and trend properties

- Follows both the current hidden state (stock) as well as path over time (flows)
- Suited to impose restrictions on differences in persistence of labor market states
- Links hidden labor market states to a *rich* set of respondent answers in the CPS
- Provides direct aggregation from individual-level results to aggregates

Related Literature
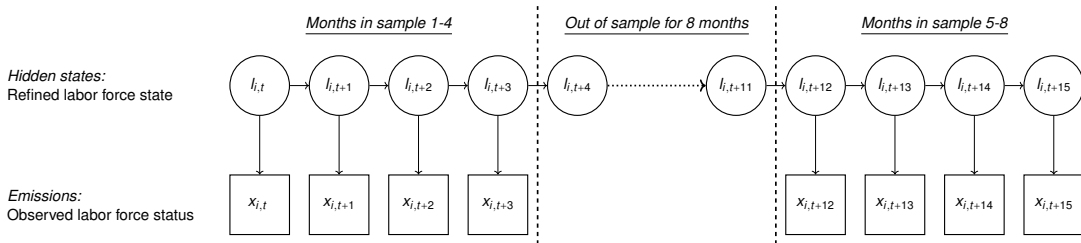
Hidden Markov Model: Basic concept
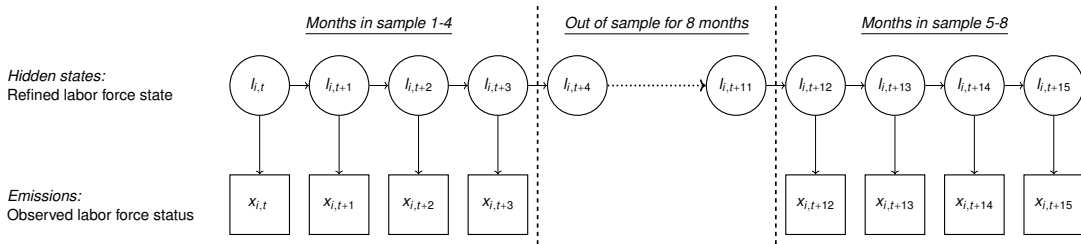
Describes categorical sequences data w/ the Markovian dynamics of latent states

- **Transition model**: Dynamics of hidden states
- **Emissions model**: Likelihood of observations — the hidden states

FOM example

Hidden Markov Model: Three objects

Hidden states: Refined labor force state

Months in sample 1-4   *Out of sample for 8 months*   *Months in sample 5-8*

$l_{i,t}$ $l_{i,t+1}$ $l_{i,t+2}$ $l_{i,t+3}$ $l_{i,t+4}$ $\cdots$ $l_{i,t+11}$ $l_{i,t+12}$ $l_{i,t+13}$ $l_{i,t+14}$ $l_{i,t+15}$

Emissions: Observed labor force status

$x_{i,t}$ $x_{i,t+1}$ $x_{i,t+2}$ $x_{i,t+3}$ $x_{i,t+12}$ $x_{i,t+13}$ $x_{i,t+14}$ $x_{i,t+15}$

Unconditional probabilities:
Stocks of individuals in each hidden state $\qquad\qquad\qquad$ $\delta_{l,t} = P\left(\ell_{i,t} = l; t\right)$

Transition probabilities (horizontal arrows):
Hidden states first-order Markov process $\qquad\qquad\qquad$ $q_{l,l',t} = P\left(l_{i,t} = l' \mid l_{i,t-1} = l; t\right)$

Emission probabilities (vertical arrows):
Observations only conditionally dependent on current hidden state $\quad$ $\omega_{x,l,t} = P\left(x_{i,t} = x \mid l_{i,t} = l; t\right)$

Introduce latent heterogeneity with a particular structure reflecting the DLM theory

$$l_{i,t} \in L, \text{ where } L = \{EP, UPS, UPL, NP, ES, USS, USL, NS, ET, UTS, UTL, NT\}$$

Primary · *Secondary* · *Tertiary*

Impose structure for identification and economic interpretability of hidden states
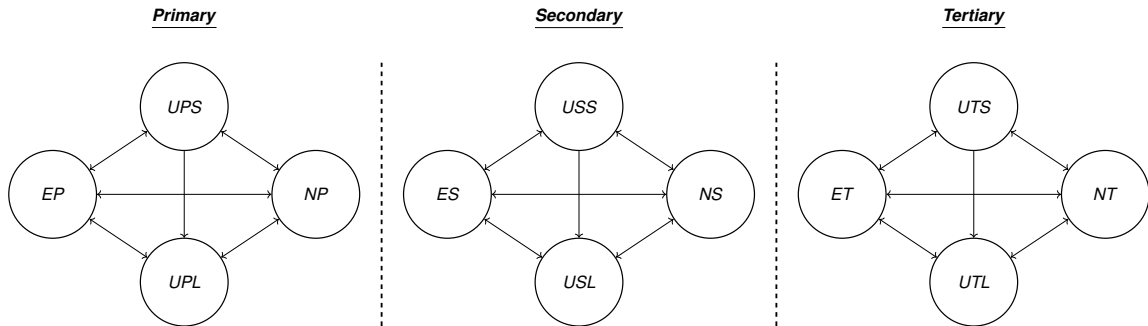
Assumptions and restrictions for identification and interpretability

1. **Markets distinguished by persistence of E and N**
   - Employment in primary sector more persistent than in other sectors
   - Persistence of non-participation higher in the tertiary sector
   - No mobility between sectors

2. **Long-term unemployment (UL) more persistent than short-term U (US)**
   - Inequality restrictions on persistence
   - Unemployment quality ladder is a one-way street: short-term U → long-term U
   - Characterizes the duration dependence of unemployment hazards

3. **No misclassification error**
   - Uncover latent states interpretable with observed LFS
   - Assures our constructed stocks and flows consistent with those published by BLS

4. **Random missing observations** (common assumption in HMM)

Use extensive answers about labor force status as emissions
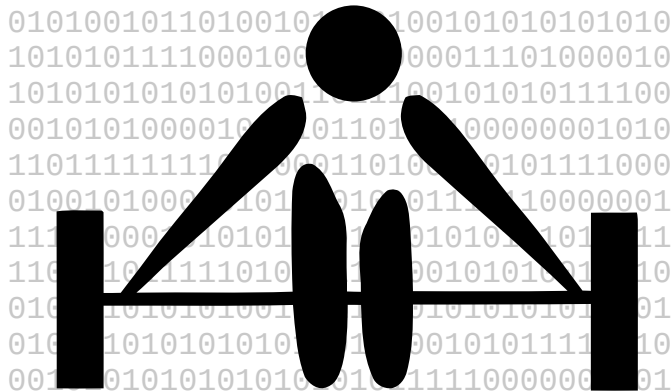
Total 29 labor force status, not just E, U, and N

1. **Employed** (3): Part-time for economic reasons, absent from work for other reasons, and the rest

2. **Unemployed** (16): 4 reasons for unemployment ⊗ 4 categories of unemployment duration
   - Reason: Temporary layoffs, temporary job ended, job losers, and the rest
   - Duration: less than 5 weeks, 5-14 weeks, 15-26 weeks, longer than 26 weeks

3. **Nonparticipation** (10)
   - Discouraged workers
   - Marginally attached
   - Temporary job ended in the previous job
   - Previous job search
   - Available for work or not
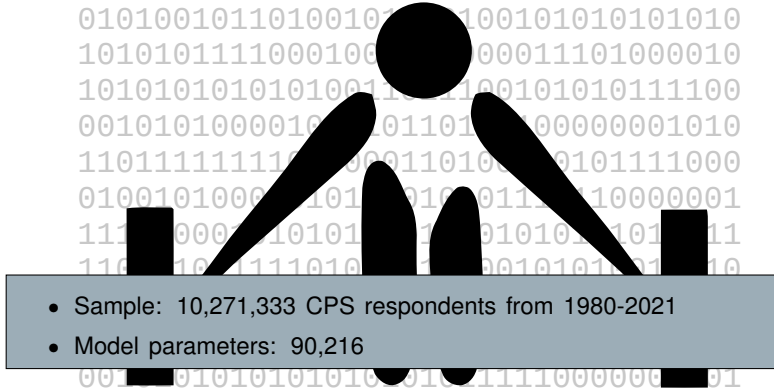   - Want a job

Methodology

Numerical implementation

Likelihood maximization using EM-algorithm

Dempster *et al.* (1977), Baum *et al.* (1970), Andersen *et al.* (2011)

Numerical weightlifting: New implementation of EM algorithm

- Sample: 10,271,333 CPS respondents from 1980-2021
- Model parameters: 90,216

Likelihood maximization using EM-algorithm

Dempster *et al.* (1977), Baum *et al.* (1970), Andersen *et al.* (2011)

E-step: Calculate expectation of full-information likelihood

- For a given set of parameter values, calculate the expected path across hidden states for individuals and substitute this into the likelihood function.

M-step: Maximize the expected likelihood with respect to the parameters

- Maximize the expected likelihood with respect to the parameters with inequality constraints

Algorithm from Andersen *et al.* (2011)

Iterate over two steps until convergence...

Date	Emission	P(P)	P(S)	P(T)
2005-01	Employed-not PTER+no other absence	89.2	7.3	3.5
2005-02	Employed-not PTER+no other absence	92.5	4.9	2.6
2005-03	Employed-not PTER+no other absence	94.8	3.2	2
2005-04	Employed-not PTER+no other absence	96.4	2.2	1.5
2006-01	Employed-not PTER+no other absence	98.9	0.9	0.2
2006-02	Employed-not PTER+no other absence	99.3	0.6	0.1
2006-03	Employed-not PTER+no other absence	99.5	0.4	0.1
2006-04	Employed-not PTER+no other absence	99.7	0.3	0.1

Someone who reports to be employed, is not absent from work, and does not work part-time for economic reasons

Date	Emission	P(P)	P(S)	P(T)
2005-01	Employed-not PTER+no other absence	89.2	7.3	3.5
2005-02	Employed-PTER	31.5	66.2	2.2
2005-03	Employed-PTER	1.7	98.2	0.1
2005-04	Employed-PTER	0.1	99.9	0
2006-01	Employed-PTER	0	100	0
2006-02	Employed-PTER	0	100	0
2006-03	Employed-PTER	0	100	0
2006-04	Employed-not PTER+no other absence	0	100	0

Because people who are PTER tend to have less persistent employment spells, worker classified in secondary market

Date	Emission	P(P)	P(S)	P(T)
2005-01	Employed-not PTER+no other absence	89.2	7.3	3.5
2005-02	U-Temporary job ended-less than 5 weeks	63.3	36.7	0
2005-03	Nonparticipants who do not want a job	46.6	53.3	0.1
2005-04	Nonparticipants who do not want a job	46.6	53.1	0.3
2006-01	Nonparticipants who do not want a job	10.2	87.7	2.1
2006-02	Nonparticipants who do not want a job	10.5	84.7	4.8
2006-03	Nonparticipants who do not want a job	10.6	78.8	10.5
2006-04	Nonparticipants who do not want a job	9.1	70.5	20.4

Whether you are marginally attached or don't want a job affects imputed probabilities

Other examples

Data prefers benchmark over notable alternatives

Comparison of model specifications

	segments	states	pars	logL	AIC	BIC
First-Order Markov (FOM)	1	3	18648	-3.80	78.18	78.44
Dual Labor Market without tertiary sector	2	8	59976	-3.46	71.24	72.09
DLM, only two types of U in secondary	3	10	68040	-3.43	70.58	71.54
Dual Labor Market (Benchmark)	3	12	90216	-3.41	70.18	71.46

- The most commonly used FOM does considerably worse
- Dual labor market improves even without the home production sector
- Number of unemployment types important

FOM vs. HMM I FOM vs. HMM II

Estimates capture important dimensions of heterogeneity

segment	to from	E	US	UL	N
Primary	E	**97.91**	0.73	0.04	1.32
	US	**51.12**	7.35	34.34	7.19
	UL	**23.34**	0.00	69.23	7.43
	N	46.26	2.15	1.96	**49.62**
Secondary	E	**85.00**	6.79	0.81	7.40
	US	**31.88**	31.17	7.75	29.19
	UL	**13.36**	0.00	63.62	23.03
	N	14.12	13.46	6.98	**65.44**
Tertiary	E	**72.14**	1.88	0.15	25.84
	US	**18.72**	9.50	26.96	44.82
	UL	**15.04**	0.00	64.24	20.71
	N	1.82	0.66	0.14	**97.38**

- **Short- vs long-term employed**
  Explained by difference in
  persistence of employment

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- **Heterogeneity in types of unemployed** Explained by different job finding rates across sectors and different types of unemployment within sectors

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- **Short- vs long-term employed** Explained by difference in persistence of employment
- **Heterogeneity in types of unemployed** Explained by different job finding rates across sectors and different types of unemployment within sectors
- **Differences in labor force attachment** Those in the primary sectors are the most attached to labor force, those tertiary the least attached

Results: Aggregates

Total is very different from each of its three parts

Labor-market aggregates by segment and total

|	Primary	Secondary	Tertiary	Total
Share of population	54.39	13.55	32.05	100.00
Unemployment rate	2.05	26.52	20.01	6.62
Labor-force participation rate	97.24	73.13	9.21	65.77
Employment-to-population ratio	95.24	53.66	7.33	61.42
Flows per capita	0.50	3.19	0.63	0.91

Unemployment LFPR EPOP

Shares of population in labor market segments
Monthly observations, not seasonally adjusted
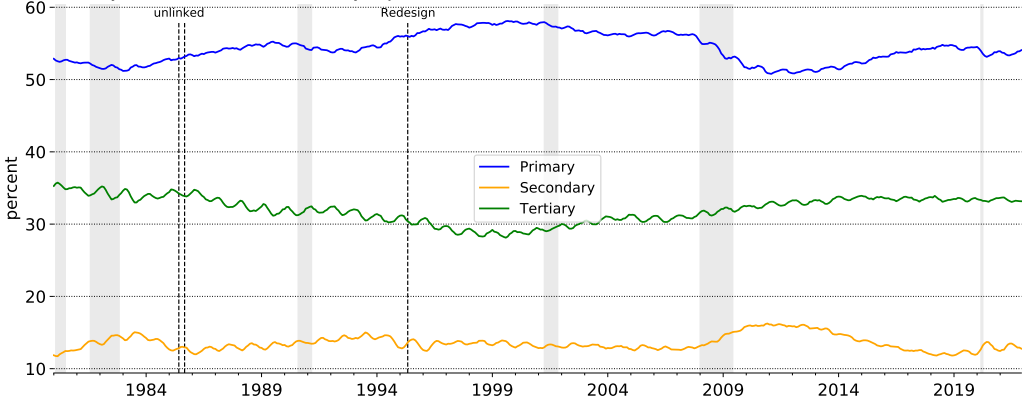
Source: CPS and authors' calculations

Composition of flows per capita by market segment

Average annualized flows per capita; by segment and total
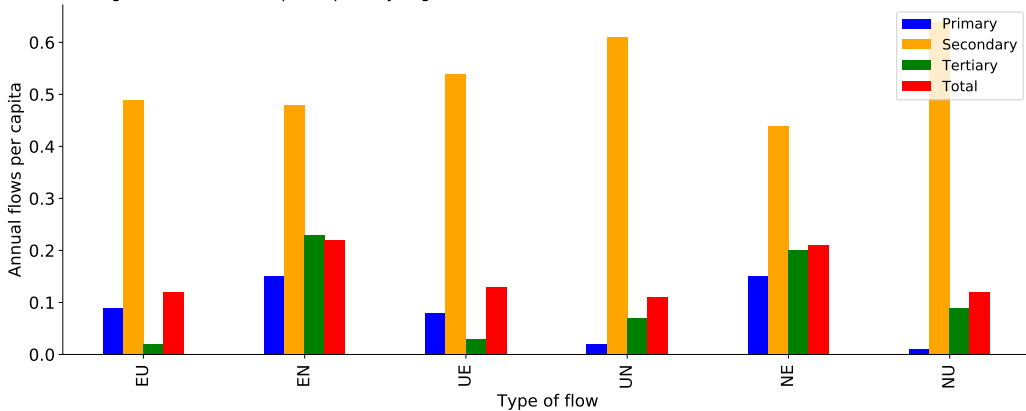
Source: BLS and authors' calculations

- Secondary: highest turnover between all labor force states

	Primary	Secondary	Tertiary
Median tenure	4.6	1.6	1.7
J-to-J rate	2.0	3.7	2.1
Median weekly hours	40.3	30.9	29.9
Median hourly wage	100.0	75.0	74.0
Median weekly earnings	100.0	52.3	53.9

- **Shorter job tenure and more frequent job-to-job transitions in secondary**

Notes: Job tenure computed using CPS tenure supplement 1983-2020.

Job-to-job transition rate for 1994-2022. Hours and wages reported for

1989-2022.

High turnover and lower hours/wages in secondary

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- **Lower weekly hours and hourly wages in secondary**

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- **Shorter job tenure and more frequent job-to-job transitions in secondary**
- **Lower weekly hours and hourly wages in secondary**
- **Median weekly earnings twice in primary**

Doeringer and Piore (1970), Piore (1970), Berger *et al.* (1980)

Business cycle properties very different

measure	statistic	Primary	Secondary	Tertiary
Unemployment	$\sigma(x)$	**0.52**	**2.61**	**2.54**
	$\rho(x_t, Y_t)$	-0.75	-0.63	-0.50
LFPR	$\sigma(x)$	**0.19**	**1.12**	**0.33**
	$\rho(x_t, Y_t)$	**0.29**	**-0.25**	**-0.11**
EPOP	$\sigma(x)$	**0.61**	**2.02**	**0.37**
	$\rho(x_t, Y_t)$	0.70	0.49	0.26

Notes: Standard deviation of HP-filtered cyclical gap from quarterly seasonally adjusted data and correlation of HP-cyclical gap of variable with that of GDP.

- **Secondary sector 3 to 5 times more volatile then the primary**

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- **Secondary sector 3 to 5 times more volatile then the primary**
- **LFPR procyclical in the primary sector but countercyclical in secondary**
- Informative about the difficulty of matching the cyclical behavior of LFPR in three-state models

Contribution of Segments to Aggregates

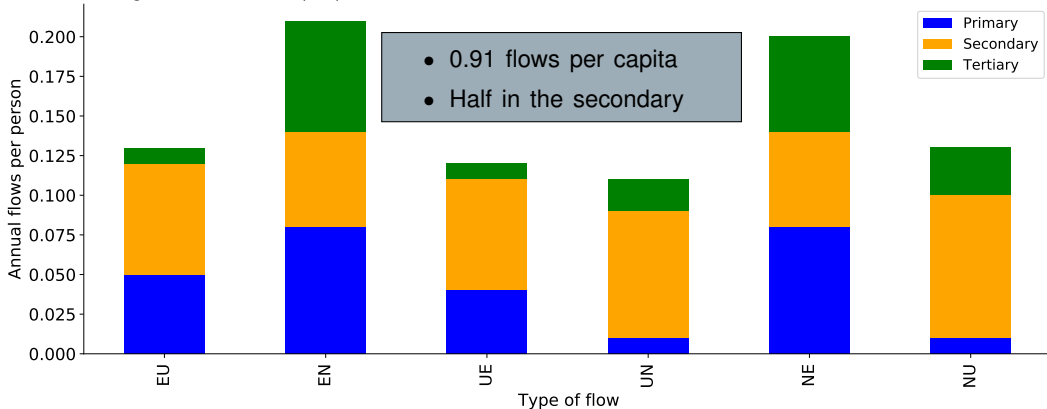## Different markets contribute to different labor market aggregates

	Primary	Secondary	Tertiary	Total
Share of population	54.39	13.55	32.05	100.00
Unemployment rate	1.64	4.05	0.92	6.62
Labor-force participation rate	52.89	9.92	2.95	65.77
Employment-to-population ratio	51.81	7.26	2.35	61.42
Flows per capita	0.27	0.43	0.20	0.91

- Primary sector account for 84% of employment but accounts for only 25% of unemployment
- Secondary sector constitutes less than 14% of the population but accounts for almost two thirds of unemployment
- Labor market flows highly concentrated

Composition of flows per person in the population

Average annualized flows per person

Legend:
- Primary
- Secondary
- Tertiary

Callout box:
- 0.91 flows per capita
- Half in the secondary

Y-axis: Annual flows per person
X-axis: Type of flow (EU, EN, UE, UN, NE, NU)

Source: BLS and authors' calculations

Trends
Declining Turnover

Annual flows per person

Monthly observations; rolling 12-month sum of flows per person in CNI population 16+y
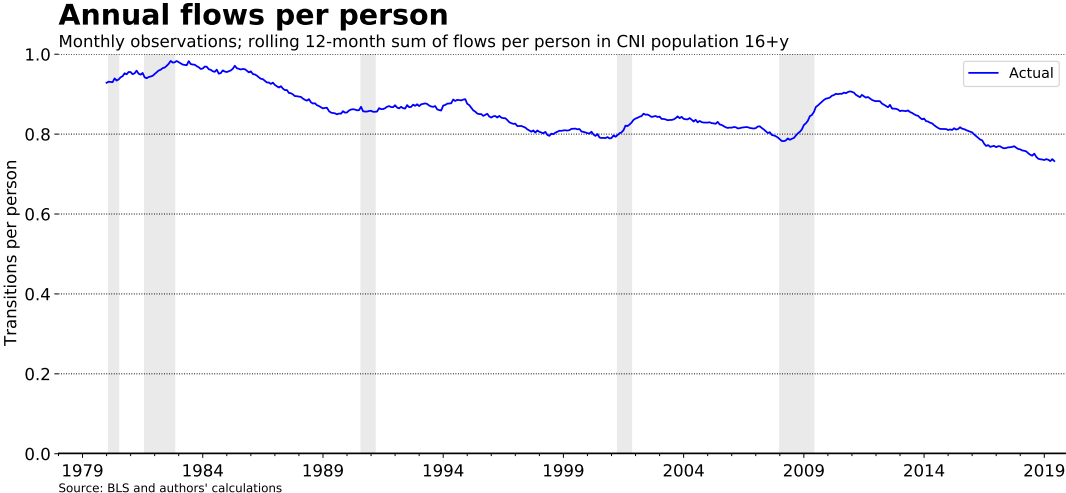
Source: BLS and authors' calculations

Flows per capita in labor market segments
Monthly observations, not seasonally adjusted, annualized monthly flows per person in segment
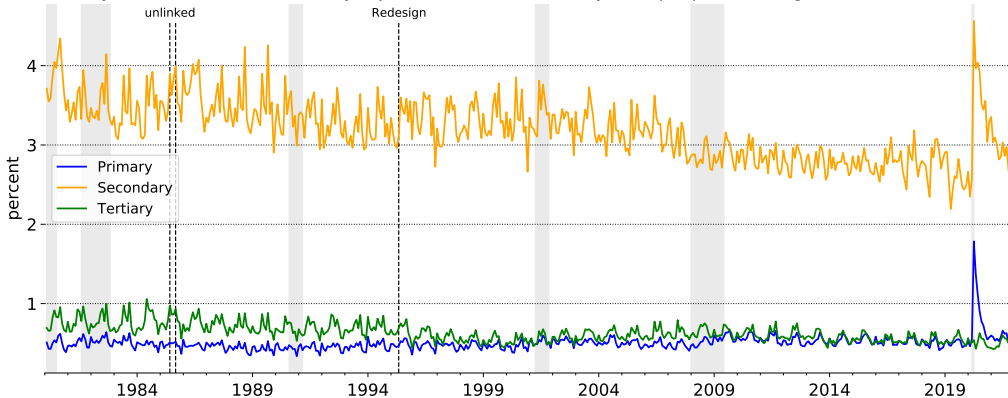
Source: CPS and authors' calculations

Employer-to-employer transition decline more even

J2J Transitions by Market Segment
Percent of job holders
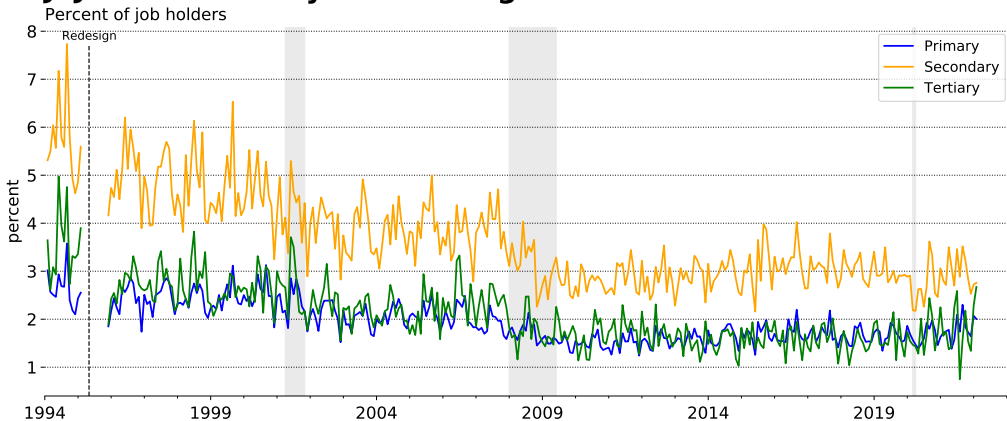
Source: BLS and authors' calculations

Results: Individual-level

Classification is probabilistic based on posterior probabilities

$$P_i(M) = \sum_{l \in \{EM, UMS, UML, NM\}} P\left(\ell_{i,t} = l \mid \boldsymbol{x}_i, \boldsymbol{\theta}\right), \text{ where } M \in \{P, S, T\}$$

Primary   Secondary   Tertiary
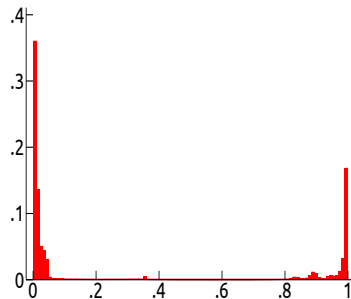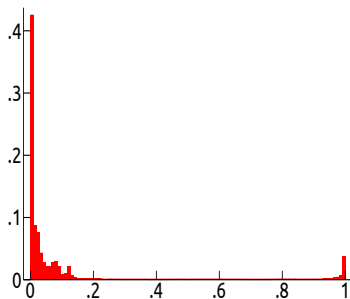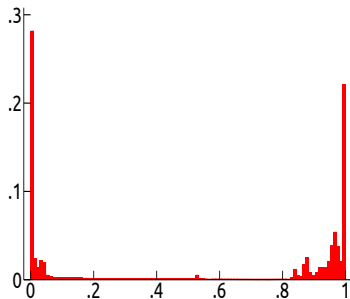
Sectors correspond with several answers to CPS questions

State Emission	EP	ES	ET	UPS	UPL	USS	USL	UTS	UTL	NP	NS	NT
EX	98.7	67.9	93.4	-	-	-	-	-	-	-	-	-
EPE	1.0	29.7	2.3	-	-	-	-	-	-	-	-	-
ENW	0.3	2.4	4.4	-	-	-	-	-	-	-	-	-
UTL5	-	-	-	29.8	0.7	7.9	0.2	4.0	0.2	-	-	-
UTL14	-	-	-	4.0	14.1	4.1	0.3	0.8	0.8	-	-	-
UTL26	-	-	-	0.3	6.8	1.0	0.6	0.4	0.3	-	-	-
UTLLT	-	-	-	0.4	3.7	0.6	1.9	0.5	0.3	-	-	-
UTJ5	-	-	-	9.7	0.4	5.2	0.2	1.0	0.1	-	-	-
UTJ14	-	-	-	0.6	4.0	2.6	1.7	0.3	0.4	-	-	-
UTJ26	-	-	-	0.1	1.7	0.5	1.7	0.1	0.2	-	-	-
UTJLT	-	-	-	0.4	0.3	0.2	5.1	0.5	0.1	-	-	-
UJL5	-	-	-	32.1	2.9	9.7	1.2	1.6	0.2	-	-	-
UJL14	-	-	-	1.3	33.6	6.8	4.3	0.8	0.5	-	-	-
UJL26	-	-	-	0.2	19.3	1.1	6.5	0.5	0.3	-	-	-
UJLLT	-	-	-	1.0	9.6	0.4	29.8	1.7	0.3	-	-	-
UX5	-	-	-	16.5	0.5	33.8	1.5	71.3	6.9	-	-	-
UX14	-	-	-	2.0	1.8	18.9	9.1	8.3	52.4	-	-	-
UX26	-	-	-	0.5	0.5	3.8	7.1	0.7	23.6			
UXLT	-	-	-	1.2	0.2	3.4	28.9	7.5	13.6	-	-	-
NTJDW	-	-	-	-	-	-	-	-	-	0.0	0.1	0.0
NTJMA	-	-	-	-	-	-	-	-	-	0.0	0.1	0.0
NTJNA	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0
NTJNS	-	-	-	-	-	-	-	-	-	0.3	0.6	0.0
NTJDNW	-	-	-	-	-	-	-	-	-	1.2	0.9	0.2
NDW	-	-	-	-	-	-	-	-	-	0.9	3.6	0.1
NMA	-	-	-	-	-	-	-	-	-	1.4	7.0	0.1
NNA	-	-	-	-	-	-	-	-	-	0.4	1.9	0.1
NNS	-	-	-	-	-	-	-	-	-	10.2	19.1	1.3
NDNW	-	-	-	-	-	-	-	-	-	85.6	66.8	98.3

Minorities, young, less-educated overrepresented in secondary

	Primary	Secondary	Tertiary	Total
Men	55.0	**50.1**	37.1	48.6
Women	**45.0**	**49.9**	**62.9**	51.4
White	82.9	75.5	81.5	81.4
Black	11.2	**18.0**	12.4	**12.5**
Other	5.9	6.5	6.1	6.1
High-school	45.1	**62.8**	65.9	**54.2**
Some college	29.6	24.3	21.2	26.2
College	**25.3**	12.9	12.8	**19.6**
16-24	16.7	33.5	20.8	20.3
25-54	**68.8**	53.4	28.1	**53.7**
55+	14.5	13.1	51.1	26.1

- **Gender differences along primary vs. tertiary**

Doeringer and Piore (1970), Piore (1970), Berger *et al.* (1980)

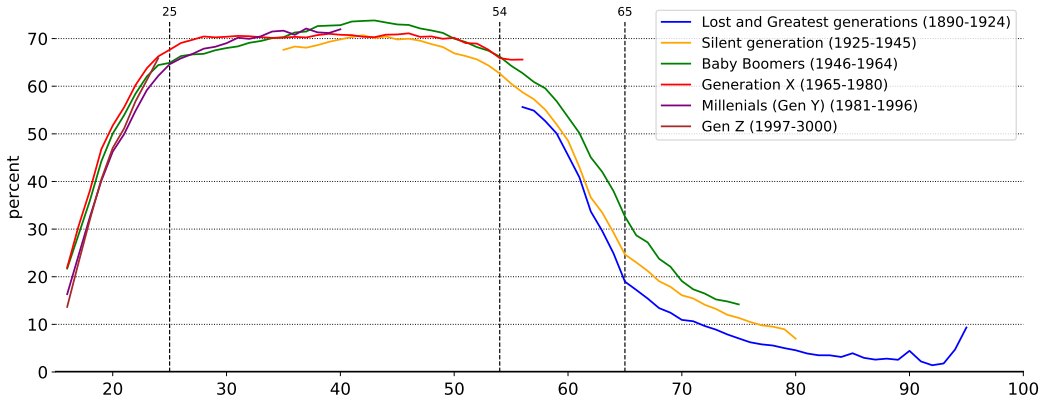|	Primary	Secondary	Tertiary	Total
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- **Gender differences along primary vs. tertiary**
- **Black workers overrepresented in the secondary segment**

Doeringer and Piore (1970), Piore (1970), Berger *et al.* (1980)

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Doeringer and Piore (1970), Piore (1970), Berger *et al.* (1980)

- **Gender differences along primary vs. tertiary**
- **Black workers overrepresented in the secondary segment**
- **Educational attainment correlated with segment membership but not sufficient**
- **Prime-age workers more likely to be in primary**

Segment share by cohort: Primary

Fraction of persons in primary segment, by age and cohort

Legend:
- Lost and Greatest generations (1890-1924)
- Silent generation (1925-1945)
- Baby Boomers (1946-1964)
- Generation X (1965-1980)
- Millenials (Gen Y) (1981-1996)
- Gen Z (1997-3000)

Source: BLS and authors' calculations

Segment share by cohort: Secondary

Fraction of persons in secondary segment, by age and cohort
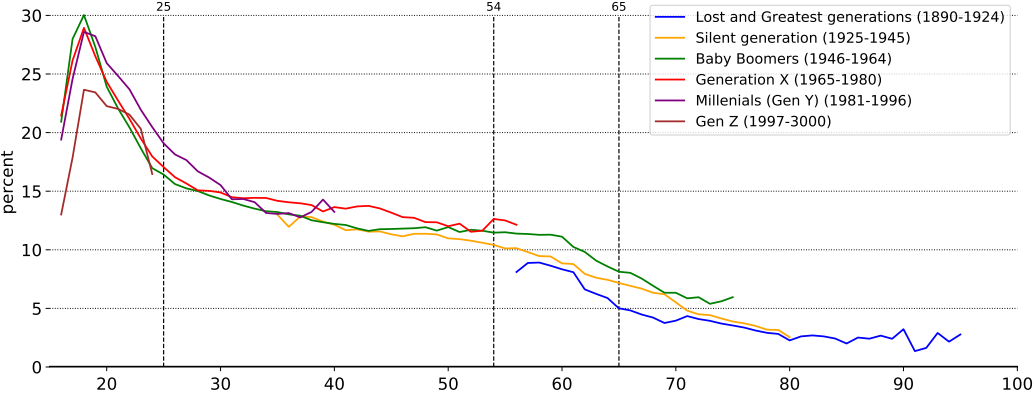
Source: BLS and authors' calculations

Segment share by cohort: Tertiary
Fraction of persons in tertiary segment, by age and cohort
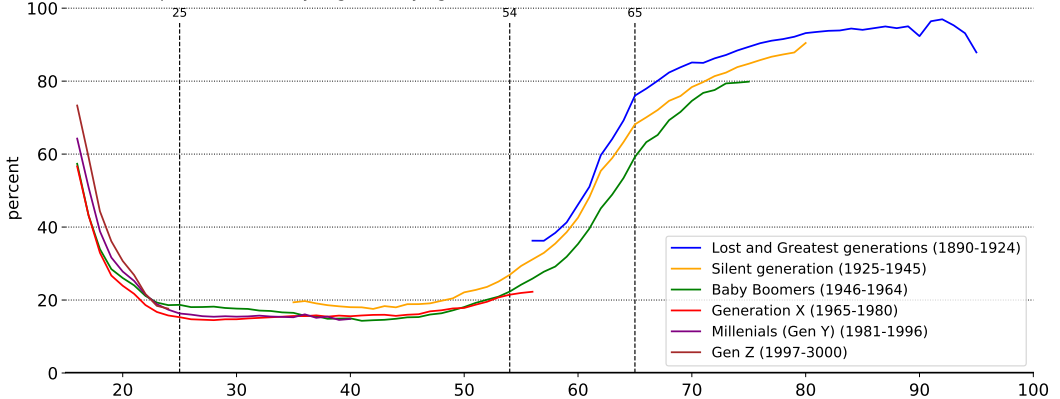
Source: BLS and authors' calculations

The probability that individual i belongs to segment M:

$$p_i^M = c_0^M + c_x^M X_i + D_t^M + \epsilon_i^M \quad \text{for} \quad M = 1, 2, \text{and } 3$$

- X_i: female, age 16-24, age 55+, high-school graduation or less, some college and associate degree, black, hispanic
- routine-cognitive, routine-manual, non-routine manual
- Industry dummies
- D_t^M: Time dummies

Finding: R^2 is less than 20% for all specifications, especially hard to capture primary/secondary distinction

Rsquares

Distribution of segments within industries

Legend: ■ Primary ■ Secondary ■ Tertiary

X-axis categories: Total, Government, Finance, Mining, Manufacturing, Education, Information, Transportation, Professional, Agriculture, Trade, Other, Construction, Leisure, No industry

Geography   Age   Gender   Race   Education
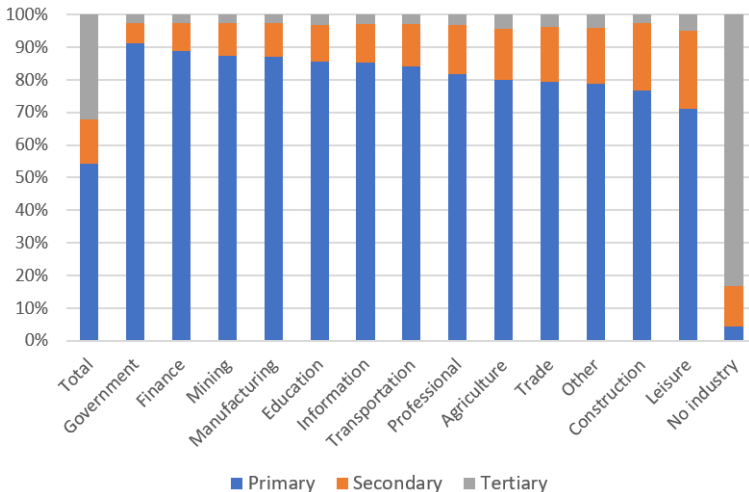
Implications and Conclusion

Study the reasons for market segmentation

- Initially indifferent workers endogenously sort into segments due market imperfections
  Bulow and Summers (1986), Albrecht and Vroman (1992), Saint-Paul (1997)
- Barriers to education and information as well as discrimination

  Doeringer and Piore (1970), Piore (1970), Berger *et al.* (1980)

Reassess cost of unemployment and role of unemployment insurance

- Costs of business cycles based on average does not apply to anyone Krusell *et al.* (2010)
- UI is transfer to those in secondary for absorbing most of economic fluctuations

Focus on secondary sector for stabilization policies

- Because of the different degrees of business-cycle sensitivity across market segments, it is important for the implementation of such policies to identify who is in the secondary tier

The labor market is the sum of three very different parts

Primary (Stability)   **Secondary (Turbulence)**   **Tertiary (Low Attachment)**

Provides a new perspective on many empirical puzzles in macro-labor and food for thought for future theories and policy design

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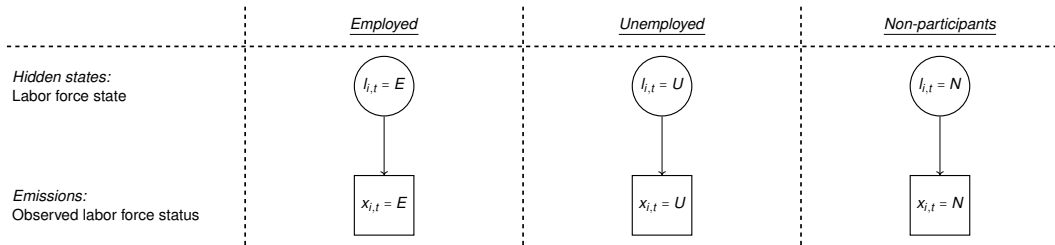## Contributions relative to labor-market machine-learning literature

Growing literature on using machine learning to learn about rich heterogeneity in labor market outcomes

	Data Set	Time Period
Ahn, Hobijn, and Şahin (2022)	CPS	1980-2021
Shibata (2019)	CPS	1976-2014
Hall and Kudlyak (2019)	CPS	2014-2017
Ahn and Hamilton (2020)	CPS	1976-2017
Gregory, Menzio, and Wiczer (2021)	LEHD	1997-2014

We use a **time-varying** parameter model to uncover differences in the **dynamic** features of each segment (e.g., seasonality, trend, cyclicality) that provides **economic interpretability** and **direct aggregation** of **individual-level results**. Back

Benchmark: First-Order Markov (FOM) model of three states

No hidden states

	Employed	*Unemployed*	*Non-participants*
Hidden states: Labor force state	$l_{i,t} = E$	$l_{i,t} = U$	$l_{i,t} = N$
Emissions: Observed labor force status	$x_{i,t} = E$	$x_{i,t} = U$	$x_{i,t} = N$

FOM: Observed three-state flows are those of the underlying Markov model (Shibata, 2019)

Model misspecified because 3-state flows are non-Markovian

- Short-term vs long-term employment to match tenure distribution
- History helps predict current flows
- Duration dependence of unemployment exits

1-month transition probabilities between labor market states
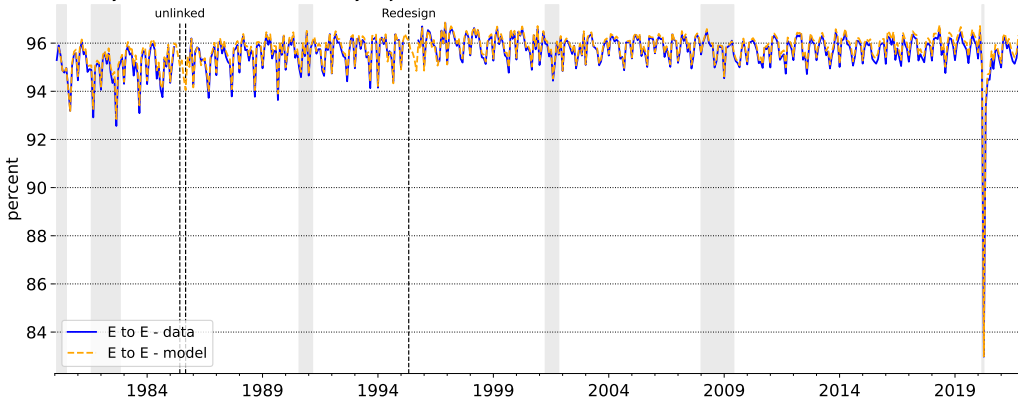
Monthly observations; not seasonally adjusted

Source: BLS and authors' calculations

12-month transition probabilities between labor market states

Monthly observations; not seasonally adjusted
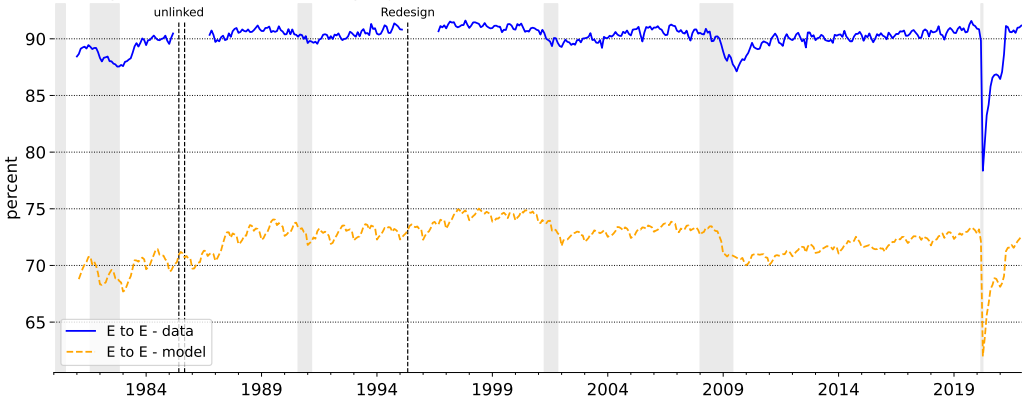
Source: BLS and authors' calculations

Back

E-step example: Time-variation in the parameters

Date	Emission	P(P)	P(S)	P(T)
1986-10	Employed-not PTER+no other absence	87.8	7.8	4.4
1986-11	Employed-PTER	24.8	73.8	1.4
1986-12	Employed-PTER	1	98.9	0.1
1987-01	Employed-PTER	0	100	0
1987-10	Employed-PTER	0	100	0
1987-11	Employed-PTER	0	100	0
1987-12	Employed-PTER	0	100	0
1988-01	Employed-not PTER+no other absence	0	100	0

Because people who are PTER tend to have less persistent employment spells, worker classified in secondary market Back

E-step example: Non-respondent in second part of sample period

Date	Emission	P(P)	P(S)	P(T)
2005-01	Employed-not PTER+no other absence	89.2	7.3	3.5
2005-02	Employed-PTER	31.5	66.2	2.2
2005-03	Employed-PTER	1.7	98.2	0.1
2005-04	Employed-PTER	0.1	99.9	0
2006-01	Missing	0.1	99.9	0
2006-02	Missing	0.1	99.9	0
2006-03	Missing	0.1	99.9	0
2006-04	Missing	0.1	99.9	0

Because people who are PTER tend to have less persistent employment spells, worker classified in secondary market

Back

Date	Emission	P(P)	P(S)	P(T)
2005-01	Employed-not PTER+no other absence	89.2	7.3	3.5
2005-02	U-Temporary job ended-less than 5 weeks	63.3	36.7	0
2005-03	U-Temporary job ended-less than 5 weeks	38	62	0
2005-04	U-Temporary job ended-less than 5 weeks	8.7	91.3	0
2006-01	Employed-not PTER+no other absence	19.4	80.6	0
2006-02	Employed-not PTER+no other absence	27.8	72.2	0
2006-03	Employed-not PTER+no other absence	36.5	63.5	0
2006-04	Employed-not PTER+no other absence	45.8	54.2	0

Model fits multi-month transitions substantially better than FOM

spec periods flow	data 1-month	model 1-month	FOM 1-month	data 12-month	model 12-month	FOM 12-month
E to E	95.61	95.40	95.73	90.09	87.07	72.20
E to N	2.95	2.97	2.74	7.26	8.91	23.97
E to U	1.43	1.63	1.53	2.65	4.02	3.83
N to E	4.55	5.01	4.46	10.76	15.54	40.66
N to N	92.96	92.00	92.88	86.92	80.76	54.56
N to U	2.49	2.99	2.66	2.32	3.70	4.78
U to E	25.26	25.30	24.39	49.99	56.89	56.64
U to N	22.69	22.48	21.18	27.90	29.86	38.98
U to U	52.06	52.22	54.43	22.11	13.25	4.38

Back

Segment predicts likelihood of outcomes a year from now

segment	to freq from	E 1-m	US 1-m	UL 1-m	N 1-m	E 12-m	US 12-m	UL 12-m	N 12-m
Primary	E	97.91	0.73	0.04	1.32	95.16	0.82	1.21	2.80
	US	51.12	7.35	34.34	7.19	94.13	0.81	2.05	3.01
	UL	23.34	0.00	69.23	7.43	93.31	0.81	2.70	3.18
	N	46.26	2.15	1.96	49.62	94.91	0.82	1.40	2.87
Secondary	E	85.00	6.79	0.81	7.40	54.85	10.58	8.10	26.46
	US	31.88	31.17	7.75	29.19	53.52	10.62	8.63	27.23
	UL	13.36	0.00	63.62	23.03	51.93	10.52	9.68	27.87
	N	14.12	13.46	6.98	65.44	52.76	10.63	8.94	27.67
Tertiary	E	72.14	1.88	0.15	25.84	8.57	0.85	1.10	89.48
	US	18.72	9.50	26.96	44.82	8.17	0.84	1.40	89.60
	UL	15.04	0.00	64.24	20.71	8.93	0.84	1.95	88.29
	N	1.82	0.66	0.14	97.38	6.85	0.82	1.01	91.33

Kudlyak and Lange (2017) and Shibata (2019) Back

Employment-population ratio in labor market segments

Monthly observations, not seasonally adjusted, share of population
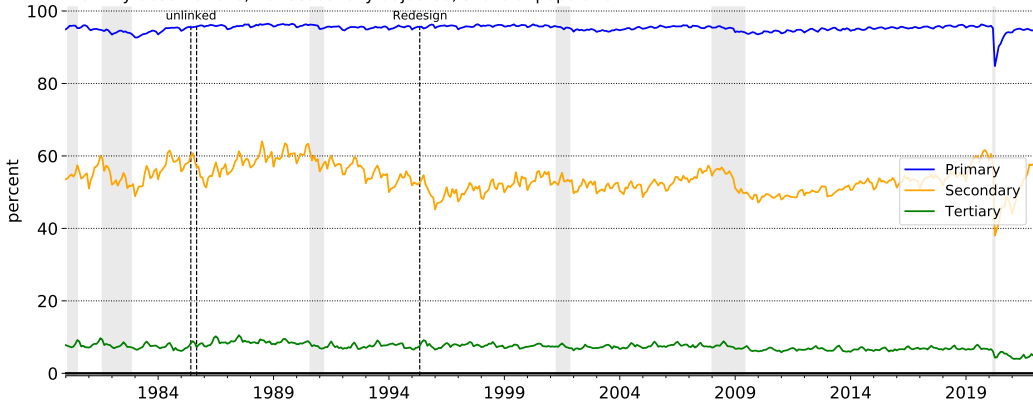
- Primary and tertiary: flat EPOP ratios; stark difference in levels
- Secondary: cyclically sensitive

Source: CPS and authors' calculations

Labor force participation rate in labor market segments

Monthly observations, not seasonally adjusted, share of population
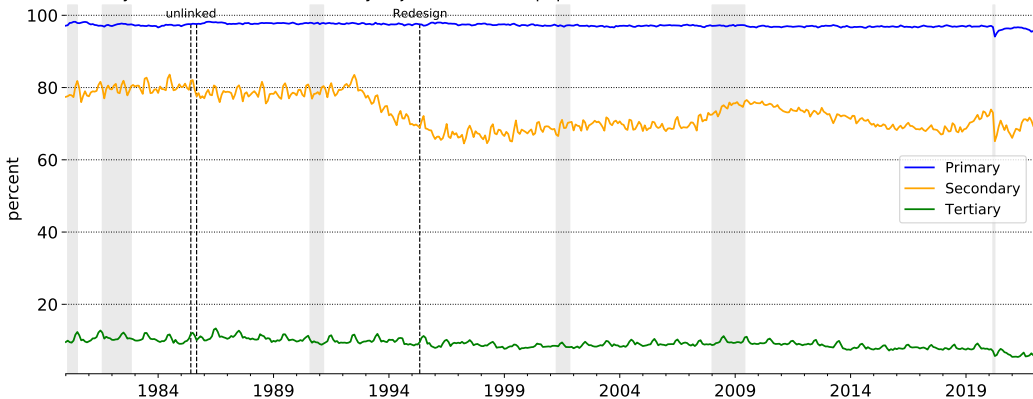
- Secondary market: LFPR rose during the Great Recession.
- Tertiary market: slow downtrend + seasonality

Source: CPS and authors' calculations

Unemployment rates in labor market segments

Monthly observations, not seasonally adjusted, share of labor force
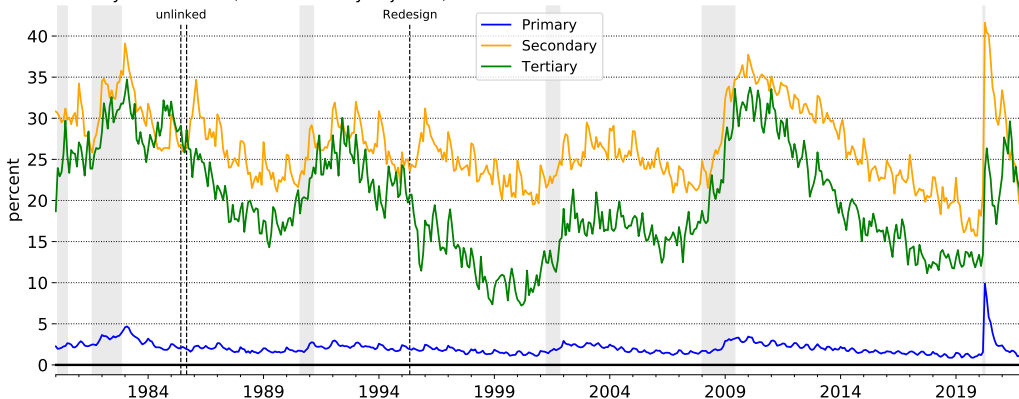
Source: CPS and authors' calculations

- Secondary and tertiary : Countercyclical.
- COVID-19 hit the primary sector unprecedentedly.

Fraction of population in hidden states
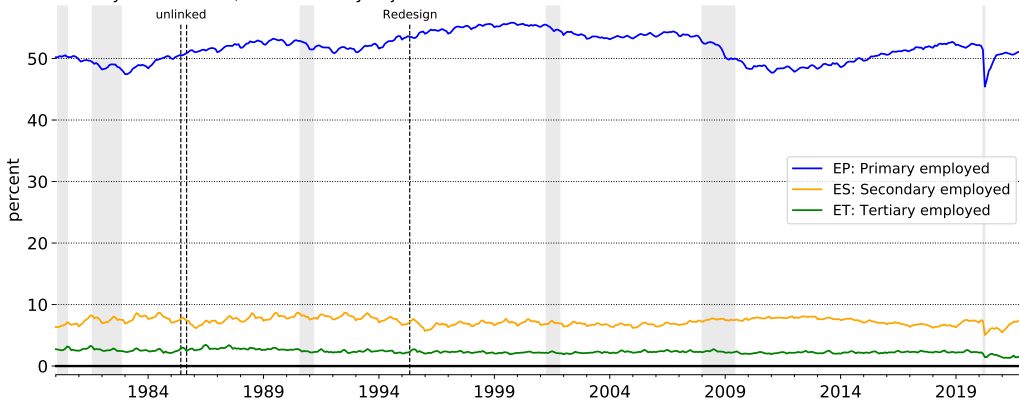
Monthly observations; not seasonally adjusted

- Primary employment: the majority of employment.

Source: BLS and authors' calculations

Fraction of population in hidden states
Monthly observations; not seasonally adjusted
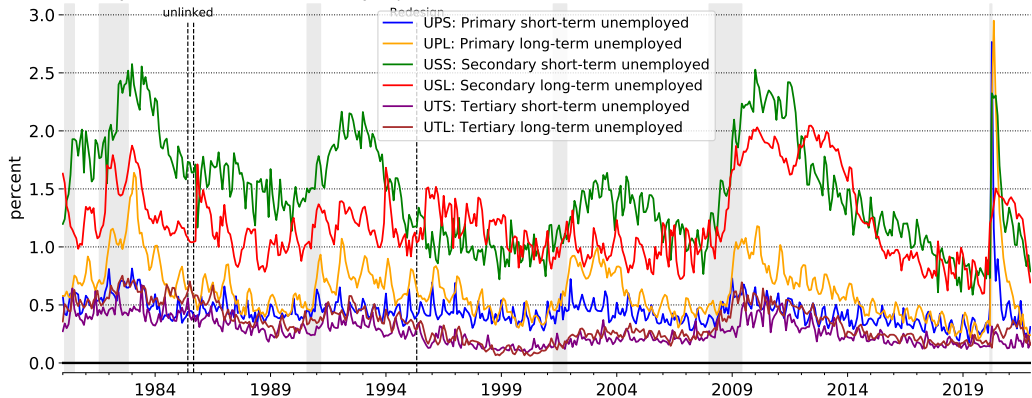
Source: BLS and authors' calculations

- Secondary: the majority of unemployment.

Fraction of population in hidden states

Monthly observations; not seasonally adjusted
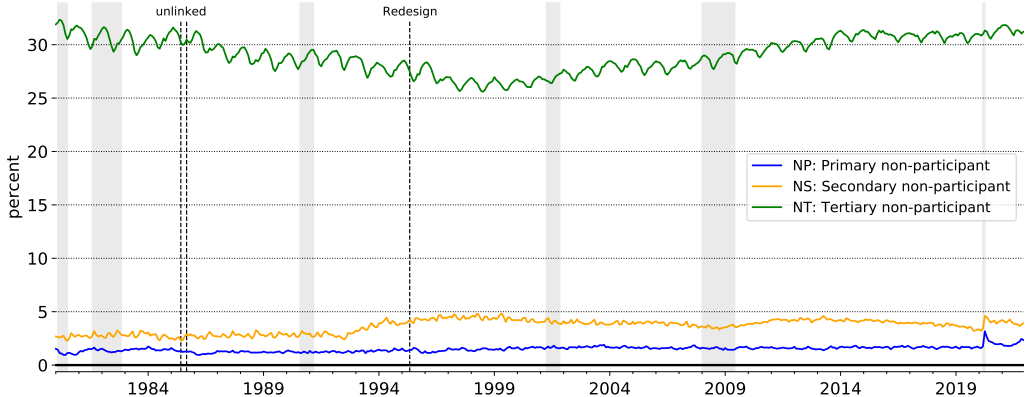
- Tertiary: the majority of nonparticipation.

Source: BLS and authors' calculations

Observables explain small share of segment membership variation
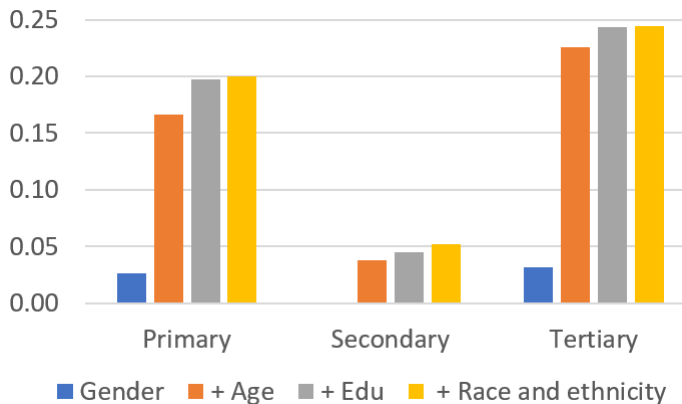
back

Observables explain small share of segment membership variation
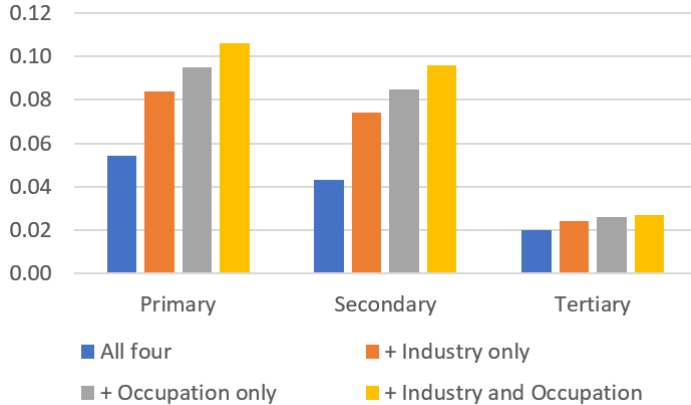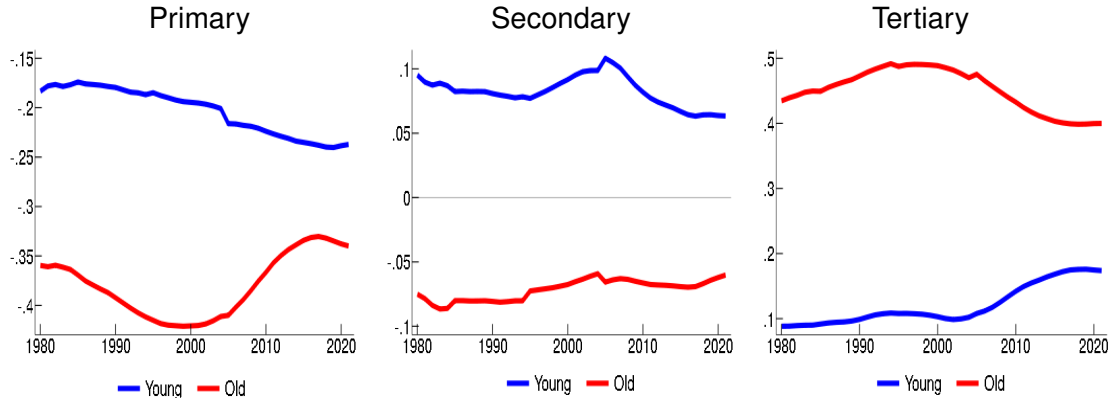
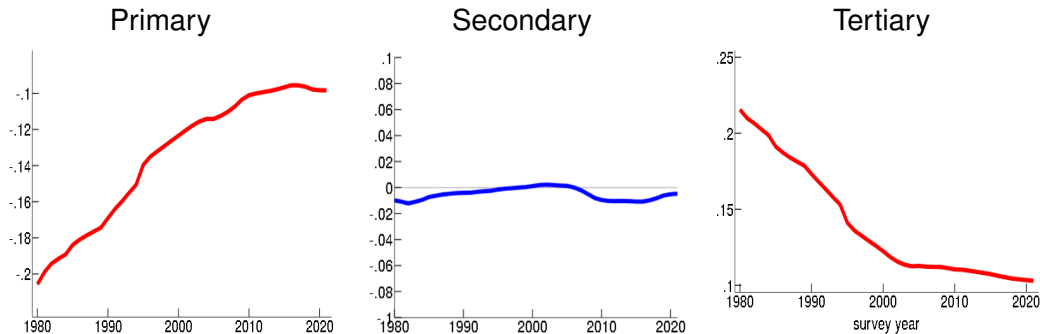# Geography of Dual Labor Market

Geography of Dual Labor Market
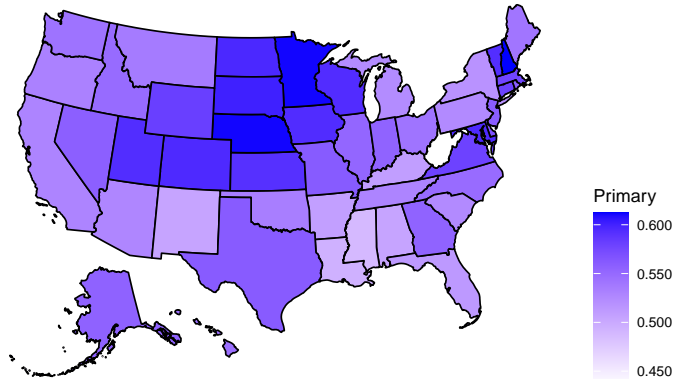
Geography of Dual Labor Market
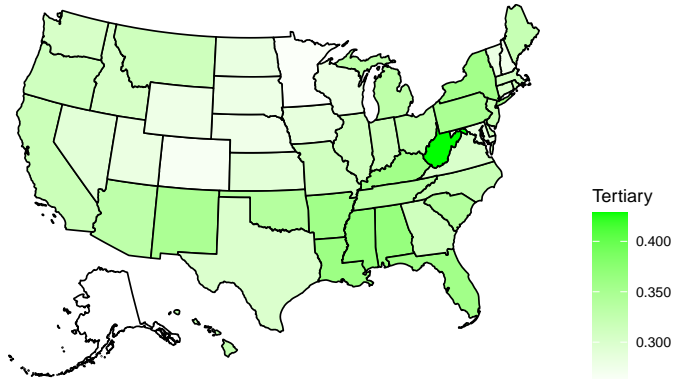
Posterior probability by age over time

Primary	Secondary	Tertiary

- Workers 16-24 year old more likely to be in the secondary sector
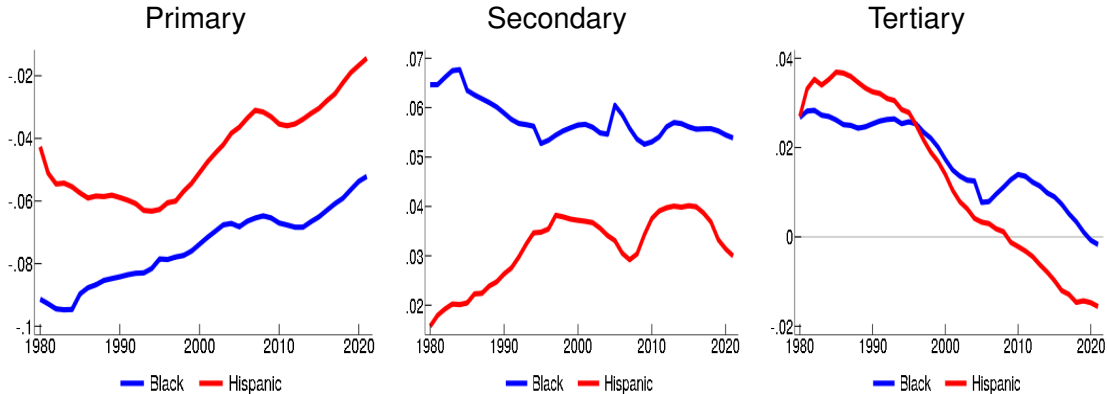- Workers 55+ most likely in the tertiary sector

Back

Posterior probability of women over time

Primary   Secondary   Tertiary

- Women more likely in the primary sector over time
- The decline in tertiary sector involvement slows down after 2000
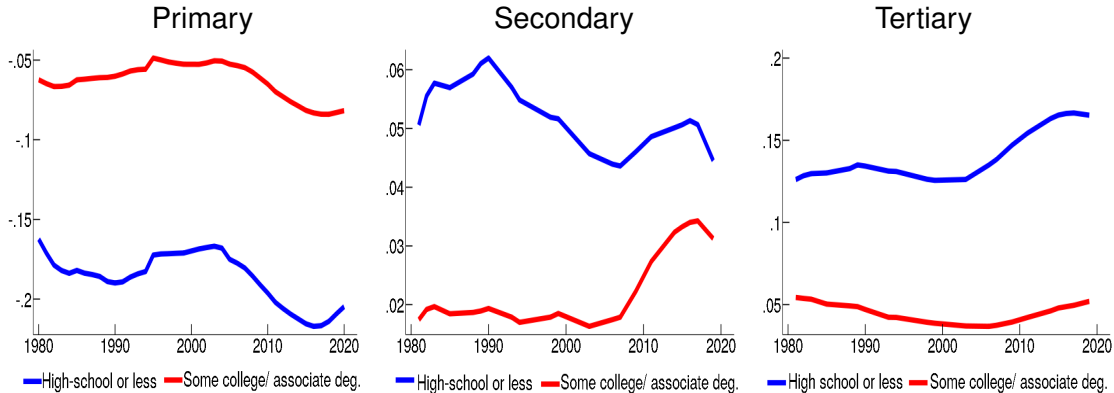
Back

Posterior probability by race and ethnicity over time

- Disparities both in primary/secondary market and persistence in nonemployment
- Some improvement over time in disparities

Back

Posterior probability by education over time

Primary | Secondary | Tertiary

- Rise in tertiary market for high-school educated workers
- Education only partially captures type of market

Back