Occupational Dynamics in the Current Population Survey

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Introduction

Introduction

In this project I study trends in US "occupational mobility".

- **Occupational Mobility:** The probability someone changes occupation between $t - 1$ and t.
    - What factors affect occupational mobility?
    - How has it evolved over time?
    - What are the implications of changing occupational mobility, in particular for inequality?

Why Do We Care?

- Choice of occupation is a important decision with regards to lifetime income, health-care access, lifestyle, etc.

- Best approximation of tasks we have in most data sets.

- Occupations becoming more important for wage determination.

Contributions

Empirical

Data & Methodology

- Develop new data cleaning procedure and construct occupational mobility series from that.

Determinants of Mobility

- Document a negative relationship between fixed cost of entering an occupation and mobility.

- Can explain negative relationship between education and mobility.

Lit Review

- Inequality:
    - Acemoglu Autor (2011) documents rise in importance of occupations for wages.
- Employment Dynamics:
    - Extend Moscarnini Thommson (2008), henceforth M&T 2008
    - Bolser et. al. (2016), Hyatt Speltzer (2013) document a decline in employer to employer transitions.
    - Mercan (2017) relates internet access & experimentation.
    - Xu (2017) extends M&T 2008 to present day and documents changes in occupational mobility.
- Models of Occupational Choice:
    - In spirit of Moscarini (2001, RES).
    - Xu (2017) and Dvorkin (2017) construct similar models with fixed transition costs.
    - Mercan (2017) employer to employer transitions with information frictions only.

Job-to-Job Transition VS Occupational Transition

Let us suppose we have a fry cook at McDonald's who can make the following transitions:

	Occupational	Job-to-Job
Wendy's Fry Cook	×	✓
McDonald's Manager	✓	×
Roofer	✓	✓

Think of occupations as a partition on the task space, changes in occupations reflect changes in tasks.

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Empirical Setup

Object of Interest

I define my measure of occupational mobility as:

$$MOB_{it} = \begin{cases} 0 & \text{if } o_t = o_{t-1} \\ 1 & \text{if } o_t \neq o_{t-1} \end{cases}$$

Primary object of interest is:

$$P(MOB_{it} = 1)$$

Due to the nature of my data I will only be able to estimate:

$$P(MOB_{it} = 1 | location_t = location_{t-1})$$

I will henceforth drop the conditional for convenience.

Data Sources

1. **Monthly CPS**
   - My primary data source, has an addressed based panel that can be turned into an individual level panel.
   - 1994-2017, dependent occupational coding introduced in 1994.
   - Results depend on how one treats individuals with missing answers to "dependent coding questions".
   - Downloaded from Kansas City Fed.

2. **Survey of Income and Program Participation**
   - 3 year waves of "monthly" individual level panel data.
   - Use 1996, 2001, 2004 and 2008 waves.

3. **O*Net**
   - "Job Zones", a type of occupation specific skill classification based on entry costs.
   - Manually match David Dorne's *occ*1990*dd* variable to these.

CPS Details

- Monthly Current Population Survey (CPS) data from 1976 to present.
  - Rotating "4-8-4" address-based panel structure.
  - Validated by age, sex and race.
- **My Sample:** Individuals aged 17-64 employed for at least 2 months. Only look at first 4 months of interviews.

Changes to the CPS

- In 1994 there was a change to the interviewing methodology in the monthly CPS to "dependent coding". Details
  - **Pre-1994:** respondents asked who they worked for/what they were doing every month (independent coding).
  - **Post-1994:** respondents asked if their primary activity had changed since last month (dependent coding).
- Changes in occupational classification system $\sim$ every 10 years.
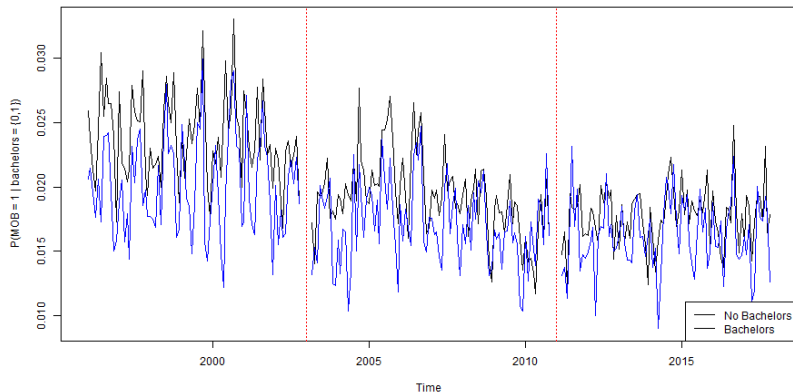
Aggregate Trends

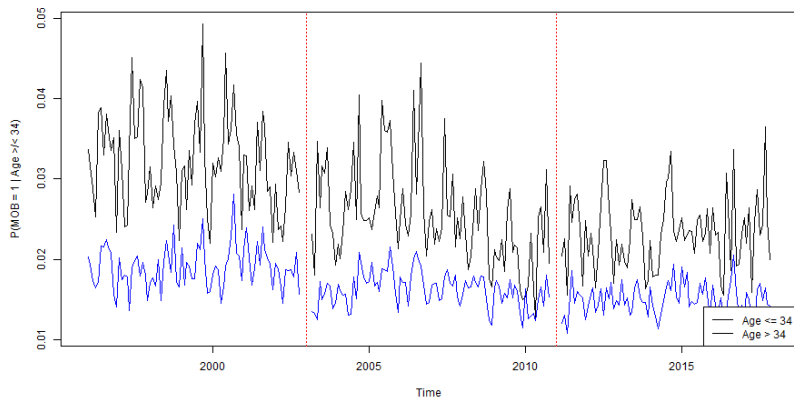# Occupational Mobility Over Time
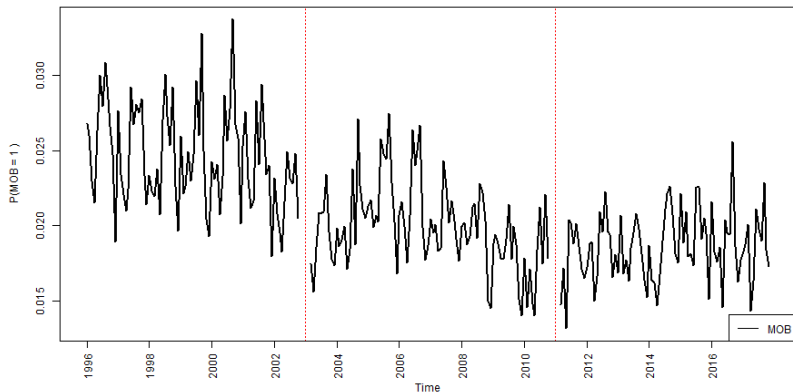
Occupational Mobility Over Time, By Gender
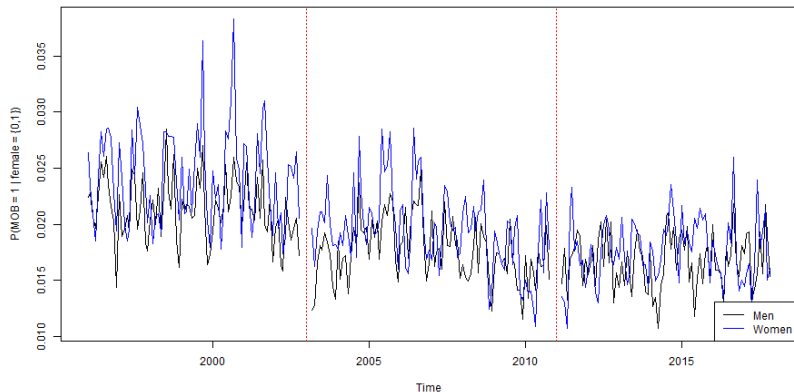
Occupational Mobility Over Time, By Education

Occupational Mobility Over Time, By Age

Empirical Causes of Mobility

Who is Mobile?

Already documented that younger workers are more mobile than older workers, but here is a (possibly) puzzling finding.

	mean	**sd**	**N**
No Bachelors	2.0	14.2	1984707
Bachelors	1.8	13.1	1031868

Table 1: Mobility rates in percent for non-suspicious individuals who have a bachelors and who don't.

Other Demographics

Who is Mobile?

Cost of entering an occupation negatively related to mobility rate in that occupation.

$jobzone_{t-1}$	**mean**	**sd**	**N**
1	2.9	16.8	163502
2	2.2	14.8	958306
3	1.7	13.2	744053
4	1.7	13.2	864439
5	1.3	11.6	286275

Table 2: Mobility rates in percent for non-suspicious individuals given job zone in $t - 1$. Time Series

Suggests a Roy model with fixed transition cost is the right way to think about this.

Transitions Between Skill Levels

Table 3: Markov Transition Probabilities in Percent Given $MOB_{it} = 1$

	$jobzone_t$				
$jobzone_{t-1}$	1	2	3	4	5
1	**19.88**	49.04	15.59	13.73	1.76
2	9.37	**47.81**	23.2	16.85	2.77
3	4.46	35.39	**28.38**	25.92	5.85
4	3.38	20.79	21.17	**44.66**	9.99
5	1.99	15.22	19.69	38.47	**24.64**
Total	7.06	35.87	22.99	27.37	6.71

Modeling

"So What" Model

Consumer Problem: Roy Model w/ Frictions & Imperfect Info:

$$\max_{o'} u(w_{it}, v_{it}, f_{it}(o, o')) = g(w_{it}(o') + v_{it}(o')) - f_{it}(o, o') \quad (1)$$

- $w_{it}(o)$ is individual i's wage at period t in occupation o.
- $v_{it}(o)$ is a random occupational specific taste.
- $f_{it}(o, o')$ is the cost of transitioning to occupation o' from o.

Firm Problem: Aggregate for N occupations:

$$y_t = F(y_{1t}, .., y_{Nt}) \quad (2)$$

Let A_{ot} be a technology shiftier and L_{ot} be the set of individuals employed in o:

$$y_{ot} = A_{ot} G(L_{ot}) \quad (3)$$

Model Estimation and Intuition

Intuition

How does it relate to job zone facts?

- People who end up in high fixed cost occupations only do so if they have a high taste/productivity in those occs.

How Does this relate to inequality?

- Fixed costs will prevent people from moving across occupations creating wage differentials.

Estimation

What Moments Can Identify the Model?

- Can construct a Markov transition matrix like the one shown earlier for 330 occupations at monthly level.
- Should be enough moments to pin down fixed costs at an annual level.

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Conclusion

Empirics

- Fixed costs seem to be an important factor in occupational choice.
- Suggests it should be a component in any model that wants to think about occupational choice.

Modeling

- Much more to be done!
- Fixed costs $f_{it}(o, o')$ potentially important for wage inequality.
- Current goal is to quantify that relationship and get a time series for them.
  - Probably need to add death probability and some kind of search.

What About the SIPP?

Figure 1: Mobility as in the CPS using SIPP data
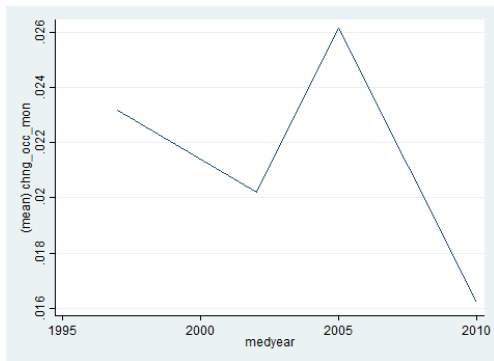
Are Suspicious Observations Different?

	mean	sd	N
Bachelors 0	32	57	1663600
Bachelors 1	25	66	102170
Age 0	43	3.4	1663600
Age 1	41	3.6	102170
White 0	88	56	1663600
White 1	82	61	102170

Table 4: Demographic Summary Statistics for non suspicious (0) and suspicious (1) observations

Not that much, all said and done it seems like we can just drop suspicious transitions.

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Other Demographics

	mean	**sd**	**N**
Male	1.87	13.5	1555575
Female	2.06	14.2	1461000
Non-White	1.97	13.9	392238
White	1.95	13.8	2624337
17 $\leq$Age$<$ 35	2.74	16.3	785844
35 $\leq$Age$\leq$ 64	1.68	12.9	2230731

Table 5: Mobility rates in percent, non-suspicious, different demographics.

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Dependent Coding

Ask you your occupation at the start of the sample, then ask a series of questions to determine if this has changed.

1. Last month you said your employer was **X**, do you still work for **X** at your main job?

2. Have the usual activities and duties of your job changed since last month?

3. Last month your usual activities were **X**. Is this an accurate description of your current job?
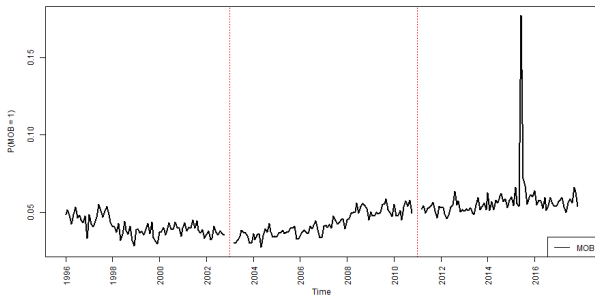
If an answer indicates a change, or if it is left blank, we move to independent coding.

Suspicious Transitions

A transition is "suspicious" if it accompanies a inappropriately blank response to a coding question.
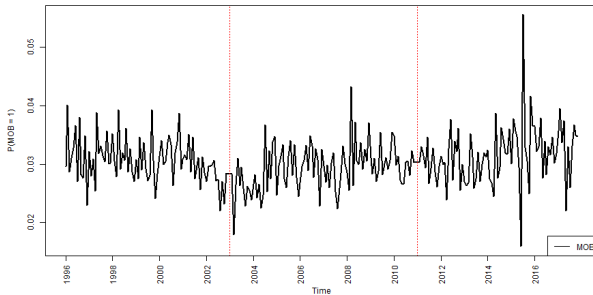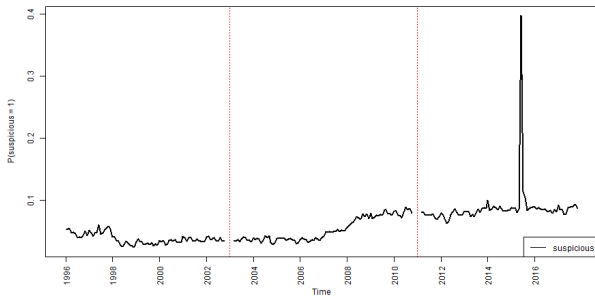
Raw Mobility Trend

Figure 2: $P(MOB_{it} = 1)$

M&T 2008 Mobility Trend

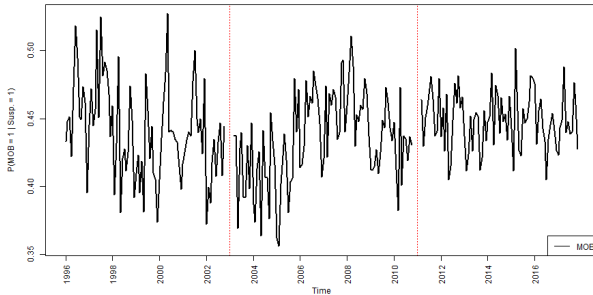Figure 3: MOB adjusted according to M&T 2008, Seasonally Adjusted

Suspicious Observations

Figure 4: $P(suspicious_{it} = 1)$
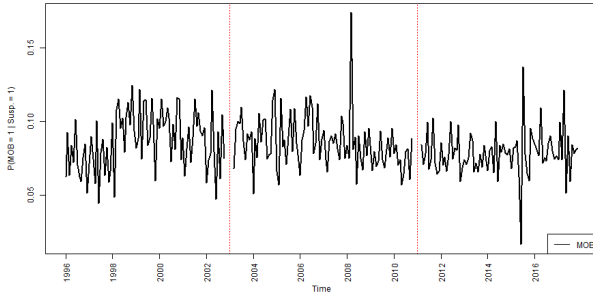
Mobility Given Susp. $= 1$

Figure 5: $P(MOB_{it} = 1 \| suspicious_{it} = 1)$

Not that crazy, M&T 2008 find a pre-1994 mobility rate of 34%.

Cleaned Suspicious Mobility

Figure 6: Mobility Given Susp. = 1, Cleaned According to M&T 2008

Only addresses part of the problem, uses up panel structure.

- **Solution:** Drop people with suspicious observations.

Demographic Comparison

Occupational Mobility Conditional on Job Zone

Figure 7: $P(MOB_{it} = 1 \| jobzone_{t-1})$, 6 Month MA