Productivity and Turnover in the Veterans Health Administration

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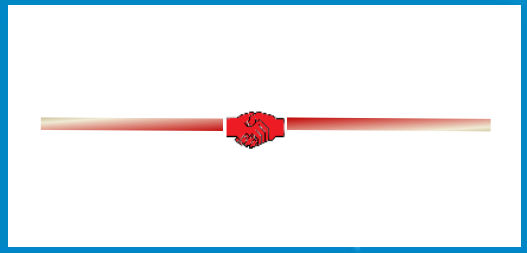

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Acknowledgements

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Motivation

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- Workload is associated with burnout and turnover (Zeytinoglu et al., 2007; Williams et al., 2007)
- Workload is managed through productivity standards
- Health care delivery system managers may assume that higher productivity has only positive consequences

Research question

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- Does provider workload/productivity have a causal impact on turnover?
- We believe there is little evidence on the causal effect of productivity on turnover because

  1) data on physician productivity and turnover is not easily available

  2) there are unobservable characteristics which bias estimates of the relationship between productivity and turnover

Provider cohort

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We study psychologists/psychiatrists at the VHA because:

- VHA patients have a high prevalence of mental health diagnoses (Trivedi et al., 2015), so psychiatrists/psychologists are at the top of VHA's priority list for recruitment and retention

- Psychiatrists and psychologists make up a large group of physicians working with mental health patients, giving us more statistical power to detect the effect

- There is a scarcity of mental health providers in the US in general

Regression specification

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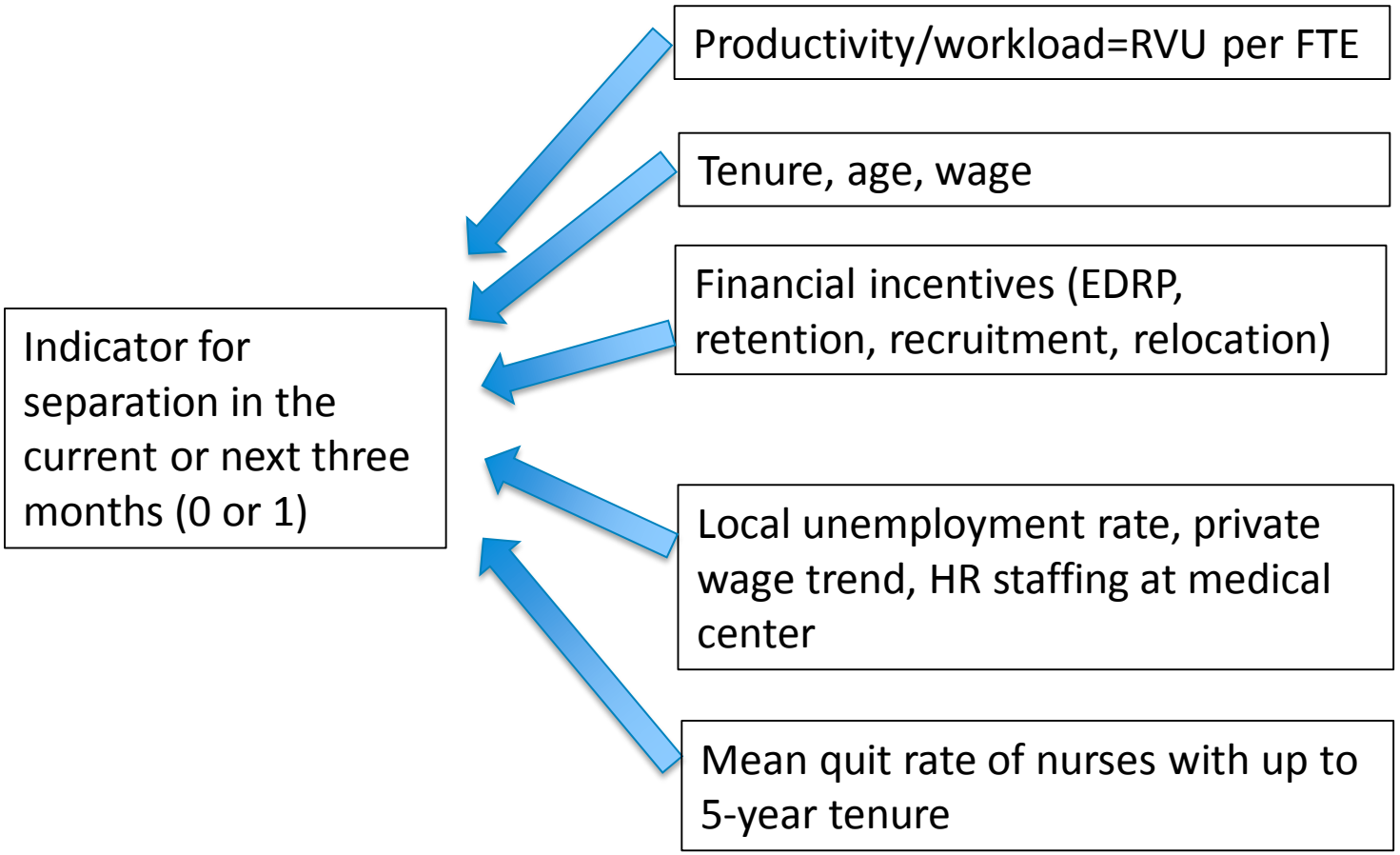

Poll question #1

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Are you familiar with instrumental variable methods for estimating causal effects?

- Yes
- No
- A little

Instrumental variables

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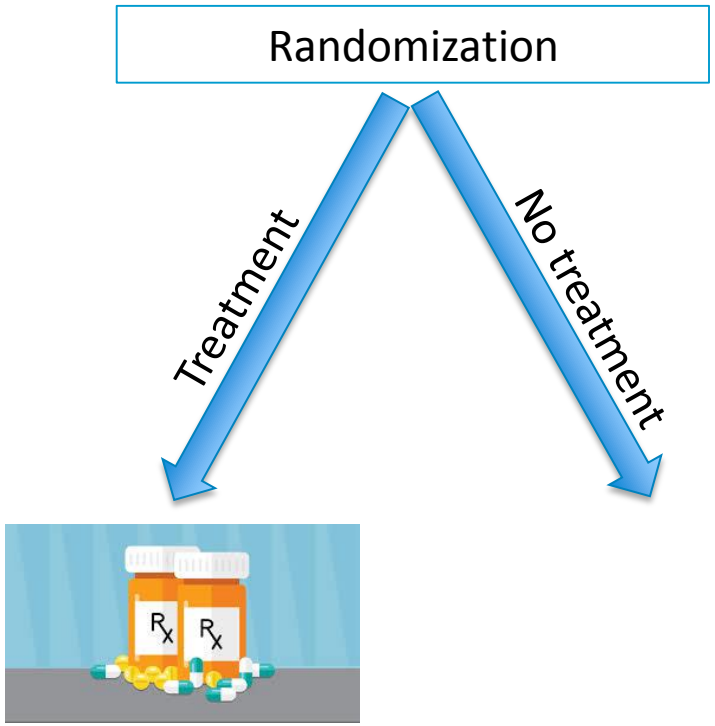
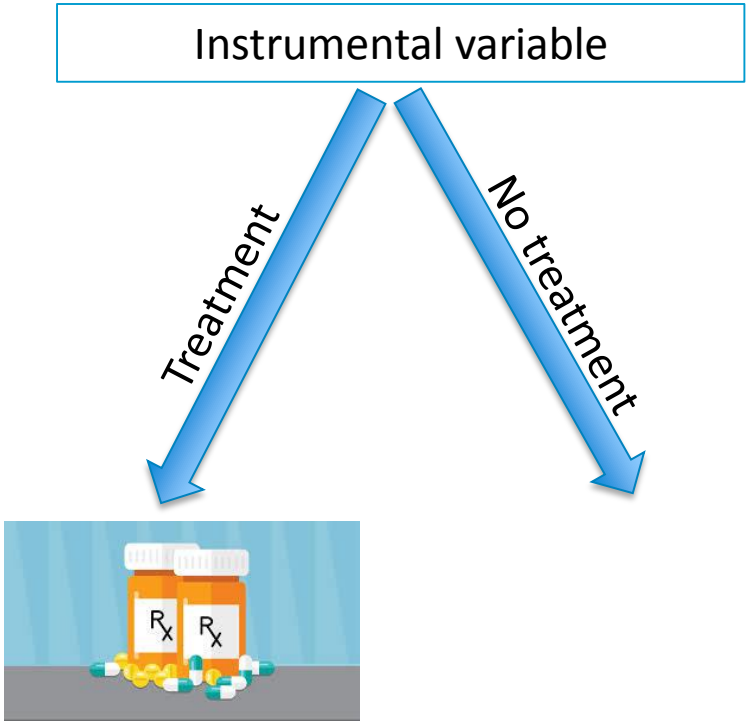
Randomized Controlled Trial



Observational study



Selection bias

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- Time-invariant unobserved individual effects are correlated with productivity and probability of separating from the job

Physician fixed effects

- Within-physician probability of separating from the job is correlated with unobservable variables which are also correlated with productivity

Instrument for productivity with clinical FTE of other psychiatrists and psychologists at the same medical center who haven't joined or left in the current or previous two months

Descriptive statistics

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Variable	Mean	Std. Dev
age	48.56	11.47
female indicator	0.55	0.50
veteran status	0.07	0.25
tenure	10.27	8.42
separation in current month or next three months	0.023	0.15
RVU per FTE	223.65	161.71
total clinical FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	52.39	25.34
Retention to salary ratio	0.0003	0.0056
Relocation to salary ratio	0.0005	0.0069
Recruitment to salary ratio	0.0013	0.0118
EDRP to salary ratio	0.0036	0.0213
log of wage	4.17	0.44
local unemployment	4.92	1.11
private wage trend	0.23	1.21
mean quit rate of nurses with up to 5-year tenure	0.04	0.02
ratio of HR manager FTEs to medical staff FTEs	0.02	0.01
ratio of HR assistant FTEs to medical staff FTEs	0.01	0.00
FTE weighted average tenure of HR managers	15.11	2.54
FTE weighted average tenure of HR assistants	10.68	3.57

Naïve fixed-effects regression

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Variable	Estimate	Standard Error	P-value	
Intercept	-0.14	0.06	0.02	**
RVU per FTE	-0.00004	0.000004	0.00	***
EDRP to salary ratio	0.00	0.02	0.86	
Relocation to salary ratio	-0.16	0.07	0.03	**
Recruitment to salary ratio	-0.31	0.09	0.00	***
Retention to salary ratio	-0.26	0.16	0.10	*
tenure	0.01	0.00	0.00	***
tenure squared	0.00	0.00	0.02	**
FTE weighted average tenure of HR managers	0.00	0.00	0.01	***
FTE weighted average tenure of HR assistants	0.00	0.00	0.75	
ratio of HR manager FTEs to medical staff FTEs	0.38	0.27	0.17	
ratio of HR assistant FTEs to medical staff FTEs	0.34	0.54	0.53	
mean quit rate of nurses with up to 5-year tenure	0.05	0.06	0.44	
private wage trend	0.01	0.01	0.17	
log of wage	0.01	0.01	0.72	
local unemployment	0.00	0.00	0.85	

Fiscal year and fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level. P-value=<0.1*, P-value=<0.05**, P-value=<0.01***

Poll question #2

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If we want to measure a causal effect, which one is desirable?

- Covariate balance
- Covariate imbalance
- Don't know

Instrumental variables: Covariate balance

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Variable	Below median RVU per FTE (1)	Above median RVU per FTE (2)	Above median FTE of other psychologists and other psychiatrists (3)	Below median FTE of other psychologists and other psychiatrists (4)
age	47.24	49.88	48.03	49.10
female indicator	0.57	0.52	0.56	0.53
veteran status	0.07	0.07	0.06	0.07
tenure	9.63	10.91	10.75	9.78
EDRP to salary ratio	0.00	0.00	0.00	0.00
Recruitment to salary ratio	0.00	0.00	0.00	0.00
Retention to salary ratio	0.00	0.00	0.00	0.00
Relocation to salary ratio	0.00	0.00	0.00	0.00
log of wage	4.04	4.30	4.18	4.16
N	147416	147415	147415	147416

First-stage fixed effects regression

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Variable	Estimate	Standard Error	P-value	
Intercept	-16.11	36.49	0.66	
total clinical FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	-1.03	0.11	0.00	***
EDRP to salary ratio	50.63	30.03	0.09	*
Relocation to salary ratio	-214.73	85.88	0.01	**
Recruitment to salary ratio	-320.32	82.29	0.00	***
Retention to salary ratio	271.77	141.71	0.06	*
tenure	17.49	1.50	0.00	***
tenure squared	-0.19	0.04	0.00	***
FTE weighted average tenure of HR managers	-1.56	0.84	0.06	*
FTE weighted average tenure of HR assistants	1.23	0.46	0.01	***
ratio of HR manager FTEs to medical staff FTEs	-395.59	343.09	0.25	
ratio of HR assistant FTEs to medical staff FTEs	-111.34	615.65	0.86	
mean quit rate of nurses with up to 5-year tenure	1.15	59.76	0.98	
private wage trend	2.16	6.50	0.74	
log of wage	36.15	6.16	0.00	***
local unemployment	0.50	1.87	0.79	

Fiscal year and fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level. P-value=<0.1*, P-value=<0.05**, P-value=<0.01***

Two-stage least squares fixed effects

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Variable	Estimate	Standard Error	P-value	
Intercept	-0.12	0.06	0.05	**
RVU per FTE	0.00027	0.0001	0.01	**
EDRP to salary ratio	-0.02	0.03	0.54	
Relocation to salary ratio	-0.08	0.08	0.32	
Recruitment to salary ratio	-0.21	0.09	0.02	**
Retention to salary ratio	-0.38	0.18	0.03	**
tenure	0.01	0.00	0.00	***
tenure squared	0.00	0.00	0.00	***
FTE weighted average tenure of HR managers	0.00	0.00	0.08	*
FTE weighted average tenure of HR assistants	0.00	0.00	0.18	
ratio of HR manager FTEs to medical staff FTEs	0.59	0.30	0.05	**
ratio of HR assistant FTEs to medical staff FTEs	0.13	0.58	0.82	
mean quit rate of nurses with up to 5-year tenure	0.05	0.06	0.41	
private wage trend	0.01	0.01	0.22	
log of wage	-0.01	0.02	0.60	
local unemployment	0.00	0.00	0.81	

Fiscal year and fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level. P-value=<0.1*, P-value=<0.05** , P-value=<0.01***

Size of the effect

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- We use the estimates to predict a hypothetical increase in turnover under VHA policy that proposes to cut appointment times from 30 minutes to 20 minutes, increasing productivity by 50% (111 RVU per FTE)
- The estimated effect is 3 percentage point increase in the probability of separation
- The effect is sizeable compared to 2.3 percentage points baseline probability of separation

First-stage: 3 month lookback for instrument

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Variable	Estimate	Standard Error	P-value	
Intercept	-7.88	36.49	0.83	
total clinical FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous three months	-0.8904	0.1151	0.00	***
EDRP to salary ratio	52.57	29.96	0.08	*
Relocation to salary ratio	-206.46	86.47	0.02	**
Recruitment to salary ratio	-309.02	82.99	0.00	***
Retention to salary ratio	271.83	142.39	0.06	*
tenure	16.47	1.52	0.00	***
tenure squared	-0.19	0.04	0.00	***
FTE weighted average tenure of HR managers	-1.55	0.84	0.06	*
FTE weighted average tenure of HR assistants	1.25	0.46	0.01	***
ratio of HR manager FTEs to medical staff FTEs	-401.87	343.57	0.24	
ratio of HR assistant FTEs to medical staff FTEs	-86.10	615.16	0.89	
mean quit rate of nurses with up to 5-year tenure	-4.43	59.61	0.94	
private wage trend	2.99	6.45	0.64	
log of wage	34.93	6.15	0.00	***
local unemployment	0.50	1.88	0.79	

Fiscal year and fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level. P-value=<0.1*, P-value=<0.05** , P-value=<0.01***

2SLS: 3 month lookback for instrument

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Variable	Estimate	Standard Error	P-value	
Intercept	-0.14	0.06	0.03	**
RVU per FTE	0.00022	0.0001	0.07	*
EDRP to salary ratio	-0.02	0.03	0.51	
Relocation to salary ratio	-0.08	0.08	0.30	
Recruitment to salary ratio	-0.22	0.09	0.02	**
Retention to salary ratio	-0.38	0.18	0.03	**
tenure	0.01	0.00	0.00	***
tenure squared	0.00	0.00	0.00	***
FTE weighted average tenure of HR managers	0.00	0.00	0.07	*
FTE weighted average tenure of HR assistants	0.00	0.00	0.23	
ratio of HR manager FTEs to medical staff FTEs	0.60	0.30	0.05	**
ratio of HR assistant FTEs to medical staff FTEs	0.09	0.58	0.88	
mean quit rate of nurses with up to 5-year tenure	0.05	0.06	0.41	
private wage trend	0.01	0.01	0.21	
log of wage	-0.01	0.02	0.65	
local unemployment	0.00	0.00	0.74	

Fiscal year and fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level. P-value=<0.1*, P-value=<0.05** , P-value=<0.01***

Sensitivity analysis by year

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Year	Specification	Variable	Estimate	Standard Error	P-value	
2014	First stage fixed effects	total FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	-1.13	0.23	0.00	***
	2SLS fixed effects	RVU per FTE	0.0006	0.0003	0.06	*
2015	First stage fixed effects	total FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	-0.59	0.18	0.00	***
	2SLS fixed effects	RVU per FTE	0.0014	0.0006	0.02	**
2016	First stage fixed effects	total FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	-0.65	0.15	0.00	***
	2SLS fixed effects	RVU per FTE	0.0010	0.0004	0.02	**
2017	First stage fixed effects	total FTE of other psychiatrists and psychologists who haven't joined or left in the current or previous two months	-0.63	0.20	0.00	***
	2SLS fixed effects	RVU per FTE	0.0006	0.0004	0.12	

Fiscal month effects are included as explanatory variables. Fixed effects regression controls for individual fixed effects. Standard errors are clustered at physician level.
P-value=<0.1*, P-value=<0.05**, P-value=<0.01***

Results for other specialties

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- We also conducted the analysis on the sample of Primary Care Physicians(PCPs) and Optometrists & Ophthalmologists

- The first stage is not significant for PCPs. A possible explanation is that PCPs treat primarily their panel of patients and don't pick up the work of other PCPs

- The first stage is significant for Optometrists & Ophthalmologists, but the full 2SLS results are not significant. This could be due to insufficient power: the sample is about 3 times smaller than for Psychiatrists &Psychologists.

Summary of findings

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- Two-Stage Least Squares indicate that higher physician productivity leads to higher turnover unlike naïve fixed effects regression
- The estimate is significant on subsamples by year and loses significance when we extend the lookback to 3 months
- We don't find a significant effect for PCPs or Optometrists &Ophthalmologists

Limitations & Next steps

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- The instrument is correlated both with individual RVU and FTE. We plan to remove variation in FTE due to annual and sick leave and check if the instrument is still correlated with individual FTE
- Include other covariates in the analysis of Optometrists &Ophthalmologists
- Look for other specialties with a large number of providers

Contact info

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