Search, Matching and Employment with Two-sided Limited Information About Skills

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Motivation

- High & rising youth unemployment in many countries

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- Consistent with frictions that constrain demand for young workers

Economic Environment

- Workseekers with heterogeneous skills & firms with heterogeneous productivity
- Hiring/firing is costly or there is a wage floor
- Workseekers & firms imperfectly observe workseekers' skills

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- Hiring/firing is costly or there is a wage floor
- Workseekers & firms imperfectly observe workseekers' skills
- Implications of information frictions:
  - Distorted search & hiring choices
  - Highest for workers with most frictions
  - Lower total employment and earnings
- Ambiguous relationship between level of skill & effect of frictions

Research Program

- Experimentally manipulate information about workseekers' skills observed by
  - Workseekers
  - Firms, directly
  - Firms, via workseekers
- Measure
  - Workseekers' search & employment
  - Firms' hiring & WTP for information
- Focus on hidden type, not hidden action, models

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  - Very high youth unemployment
  - Formal education weakly correlated with measured skills
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  - Very high youth unemployment
  - Formal education weakly correlated with measured skills
  - Firms anecdotally report difficulty evaluating skills
- Sample
  - aged 18-29
  - completed high school
  - “disadvantaged background”
  - actively searching for work
  - no previous formal employment

Experiment

- Assess
  - Numeracy
  - Communication (oral & written)
  - “Concept formation”
  - Grit
  - Focus
  - Planning

Experiment

- Randomly assign workseekers to
  - Control: no feedback on assessment results
  - Private: receive feedback on assessment results
  - Public: receive feedback on assessment results that can be shared with firms

THE WORLD BANK Partner logo -> [redacted]

REPORT ON CANDIDATE COMPETENCIES

name.. surname..
ID No. id..

This report provides information on assessments conducted by [redacted], a South African organisation that connects employers looking for entry-level talent to young, high-potential work-seekers with a matric or equivalent. [redacted] has conducted more than 1 million assessments and placed candidates with over 250 top companies in retail, hospitality, financial services and other sectors. Assessments are designed by psychologists and predict candidates' productivity and success in the workplace. This report was designed and funded in collaboration with the World Bank. You can find more information about this report, the assessments and contact details at www.assessmentreport.info. «name» was assessed at [redacted] on 13 September, 2016.

«**name**» completed assessments on English Communication (listening, reading, comprehension), Numeracy, and Concept Formation:

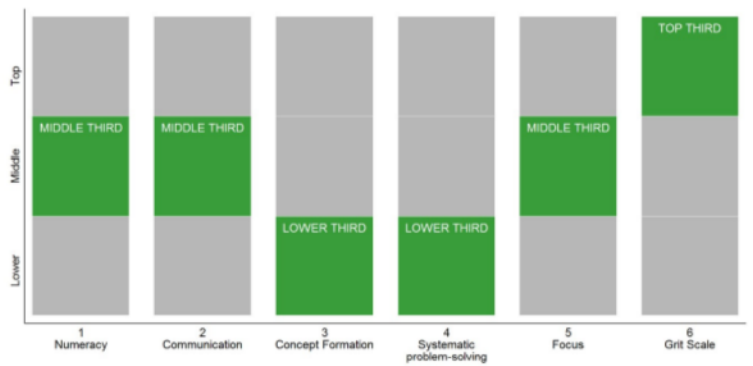
1. The Numeracy tests measure candidates' ability to apply numerical concepts at a National Qualifications Framework (NQF) level, such as working with fractions, ratios, money, percentages and units, and performing calculations with time and area. This score is an average of two numeracy tests the candidate completed.
2. The Communication test measures a candidate's grasp of the English language through listening, reading and comprehension. It assesses at an NQF level, for example measuring the ability to recognise and recall literal and non-literal text.
3. The Concept Formation Test is a non-verbal measure that evaluates candidates' ability to understand and solve problems. Those with high scores are generally able to solve complex problems, while lower scores indicate an ability to solve less complex problems.

«**name**» also completed tasks and questionnaires to assess their soft skills:

4. The Planning Ability Test measures how candidates plan their actions in multi-step problems. Candidates with high scores generally plan one or more steps ahead in solving complex problems.
5. The Focus Test assesses a candidate's ability to distinguish relevant from irrelevant information in potentially confusing environments. Candidates with high scores are generally able to focus on tasks in distracting surroundings, while candidates with lower scores are more easily distracted by irrelevant information.
6. The Grit Scale measures whether candidates show determination when working on challenging problems. Those with high scores generally spend more time working on challenging problems, while those with low scores choose to pursue different problems.

«name»'s results have been compared to a large benchmark group of young (age 18-34) South Africans assessed by [redacted]. All candidates have a matric certificate and are from socially disadvantaged backgrounds. The benchmark group is 5,000 for cognitive skills and 400 for soft skills.

«name» scored in the «tercile_num» THIRD of candidates assessed by [redacted] for Numeracy, «tercile_lit» THIRD for Communication, «tercile_cft» THIRD for Concept Formation, «tercile_tol» THIRD for Planning Ability, «tercile_troop» THIRD for Focus and «tercile_grit» THIRD for the Grit Scale.



DISCLAIMER: This is a confidential assessment report for use by the person specified above. The information in the report should only be disclosed on a "need to know basis" with the prior understanding of the candidate. Assessment results are not infallible and may not be entirely accurate. Best practice indicates that any organisation's career management decisions should depend on factors in addition to these assessment results. [redacted] cannot accept responsibility for decisions made based on the information contained in this report and cannot be held liable for the consequences of those decisions.

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REPORT ON CANDIDATE COMPETENCIES
-Personal Copy-

This report contains results from the assessments you took at [redacted] in Phase 1 and Phase 2. These results can help you learn about some of your strengths and weaknesses and inform your job search.

You completed assessments on English Communication (listening, reading and comprehension) and Numeracy today in Phase 2. In Phase 1, you completed a Concept Formation assessment which asked you to identify patterns.

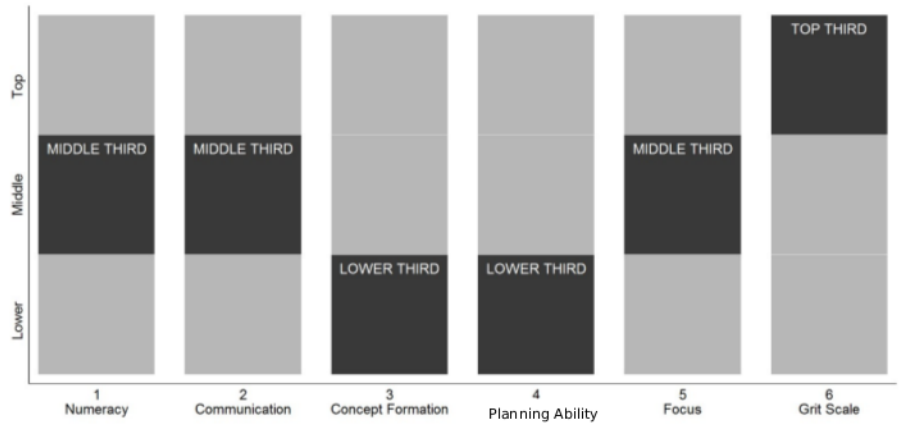
1. The Numeracy tests measure various maths abilities. Your score is the average of the two maths tests you did today at [redacted]
2. The Communication test measures English language ability through listening, reading and comprehension.
3. The Concept Formation test measures the ability to understand and solve problems. Candidates with high scores can generally solve complex problems, while lower scores show an ability to solve less complex problems.

You also did some games and questionnaires to measure your soft skills:

4. The Planning Ability Test measures how you plan your actions in multi-step problems. Candidates with high scores generally plan one or more steps ahead in solving complex problems.
5. The Focus Test looks at your ability to pick out which information is important in confusing environments. Candidates with high scores are able to focus on tasks in distracting situations.
6. The Grit Scale measures candidates' determination when working on difficult problems. Candidates with high scores spend more time working on the problems rather than choosing to pursue different problems.

Your results have been compared to a large group of young South African job seekers who have a matric certificate, are from socially disadvantaged backgrounds and have been assessed by [redacted]

You scored in the MIDDLE THIRD of candidates assessed by [redacted] for Numeracy, MIDDLE THIRD for Communication, LOWER THIRD for Concept Formation, LOWER THIRD for Planning Ability, MIDDLE THIRD for Focus and TOP THIRD for the Grit Scale.



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Measurement

- Survey workseekers after $3-4$ months & $10-12$ months
  - Beliefs about self & the labor market
  - Search effort & effectiveness
  - Employment status & “quality”

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Treatment Effects

- Estimate models of the form

$$Y = \text{Private} \cdot \beta_1 + \text{Public} \cdot \beta_2 + \mathbf{S} + \mathbf{X} \cdot \mu + \epsilon$$

- Conditioning variables **X** selected by modified Lasso
- Cluster standard errors at treatment assignment unit
- Aggregate outcomes into family-level indices
- Prespecify estimating equations, variable & index definitions

Treatment Effects

	Beliefs about			Search		Employment	
	own skills	return to search	earnings	effort	effective-ness	status	quality
Public treatment	0.706***	0.079***	0.002	0.011	0.030	0.132***	0.018
	(0.036)	(0.025)	(0.029)	(0.031)	(0.034)	(0.025)	(0.027)
Private treatment	0.558***	0.045*	0.012	0.013	0.031	0.047	0.014
	(0.033)	(0.026)	(0.027)	(0.033)	(0.031)	(0.029)	(0.025)
# respondents	6367	6367	6367	6367	6367	6367	6367
# clusters	81	81	81	81	81	81	81
R-squared	0.293	0.055	0.306	0.083	0.046	0.115	0.015
Control group mean	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000
p: Public = 0	0.000	0.003	0.950	0.739	0.369	0.000	0.515
p: Private = 0	0.000	0.091	0.655	0.698	0.311	0.108	0.563
p: Public = Private	0.000	0.189	0.672	0.936	0.977	0.001	0.900
p: Public = Private = 0	0.000	0.010	0.871	0.918	0.527	0.000	0.769

All regressions include randomization block fixed effects and baseline values of the outcome; education; all cognitive and noncognitive assessment results; beliefs about all cognitive assessment results; age; gender; and employment status. Heteroskedasticity-robust standard errors clustered by treatment day are shown in parentheses. Lower rows of the tables show p- and q-values for linear combinations of coefficients. The q-values adjust for multiple testing over all outcomes in the same family following Benjamini et al. (2006). *; **; and *** denote significance at the 10; 5; and 1 percent levels respectively.

Treatment Effects on Employment

	Employment status			Employment quality			
	Currently working	Worked since treatment	Hours in last week	Earnings in last week	Wages in last week	Written permanent contract	Wants to stay in job
Public treatment	0.052***	0.052***	1.339**	49.635***	1.782**	0.004	-0.039*
	(0.012)	(0.010)	(0.571)	(17.892)	(0.830)	(0.003)	(0.021)
Private treatment	0.011	0.031**	0.525	43.855**	1.009	0.005	-0.035
	(0.012)	(0.013)	(0.513)	(18.183)	(1.013)	(0.003)	(0.021)
# respondents	6365	6365	6356	6347	6333	6333	2012
# clusters	81	81	81	81	81	81	81
R-squared	0.041	0.089	0.034	0.027	0.022	0.004	0.045
Control group mean	0.309	0.671	8.794	155.163	8.731	0.009	0.179
q: Public = 0	0.001	0.001	0.014	0.116	0.211	0.500	0.211
q: Private = 0	0.771	0.142	0.771	0.158	0.210	0.177	0.177
q: Public = Private	0.005	0.193	0.236	1.000	1.000	1.000	1.000
q: Public = Private = 0	0.001	0.001	0.044	0.038	0.167	0.241	0.183

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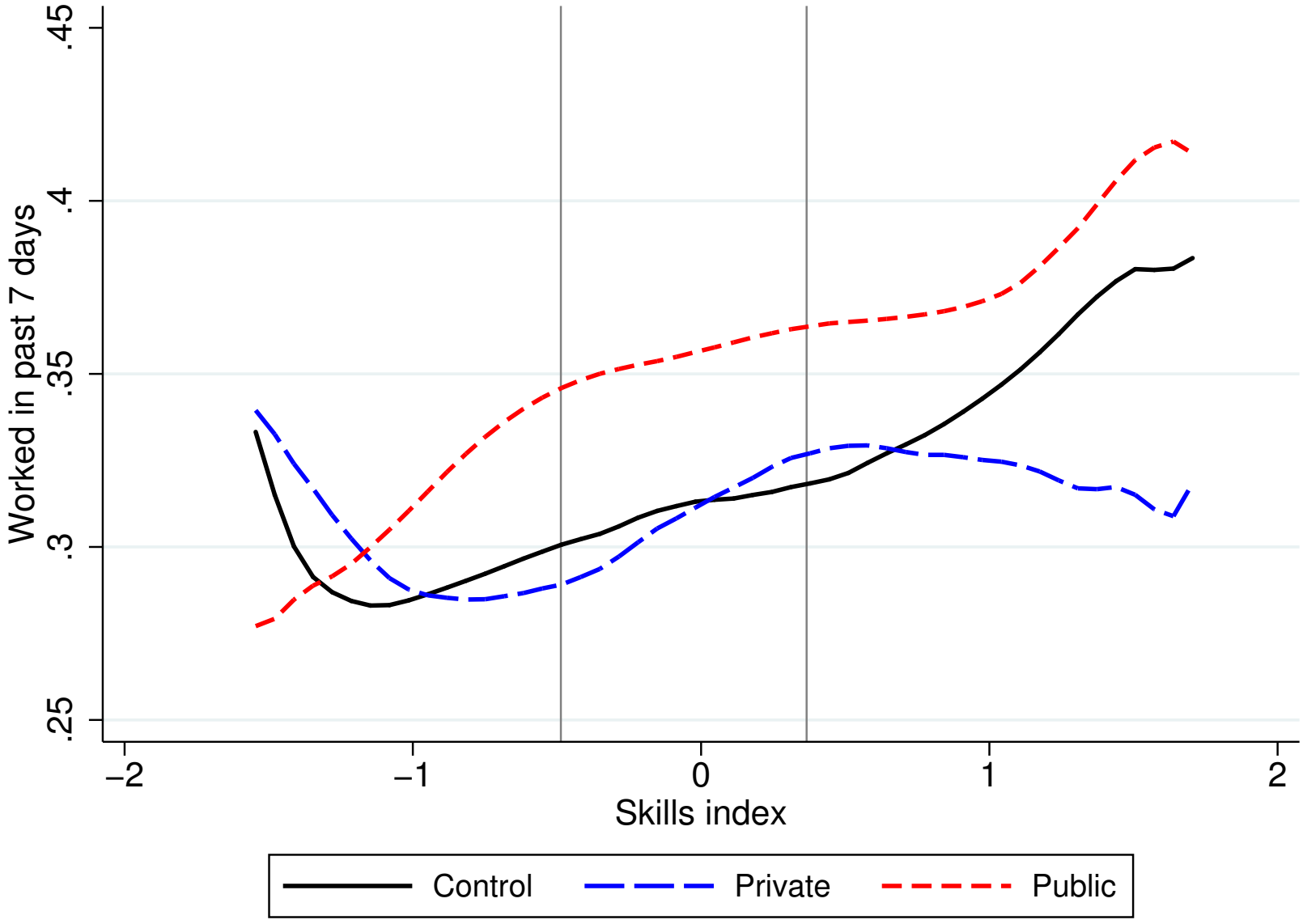
Decomposing Earnings Effects

- Effect on earnings depends on
  - Effect on employment
  - Effect on inframarginal workers' earnings
  - Level of marginal workers' earnings
- Second and third components not separately identified
- Bounding exercises suggest third effect dominates in public group

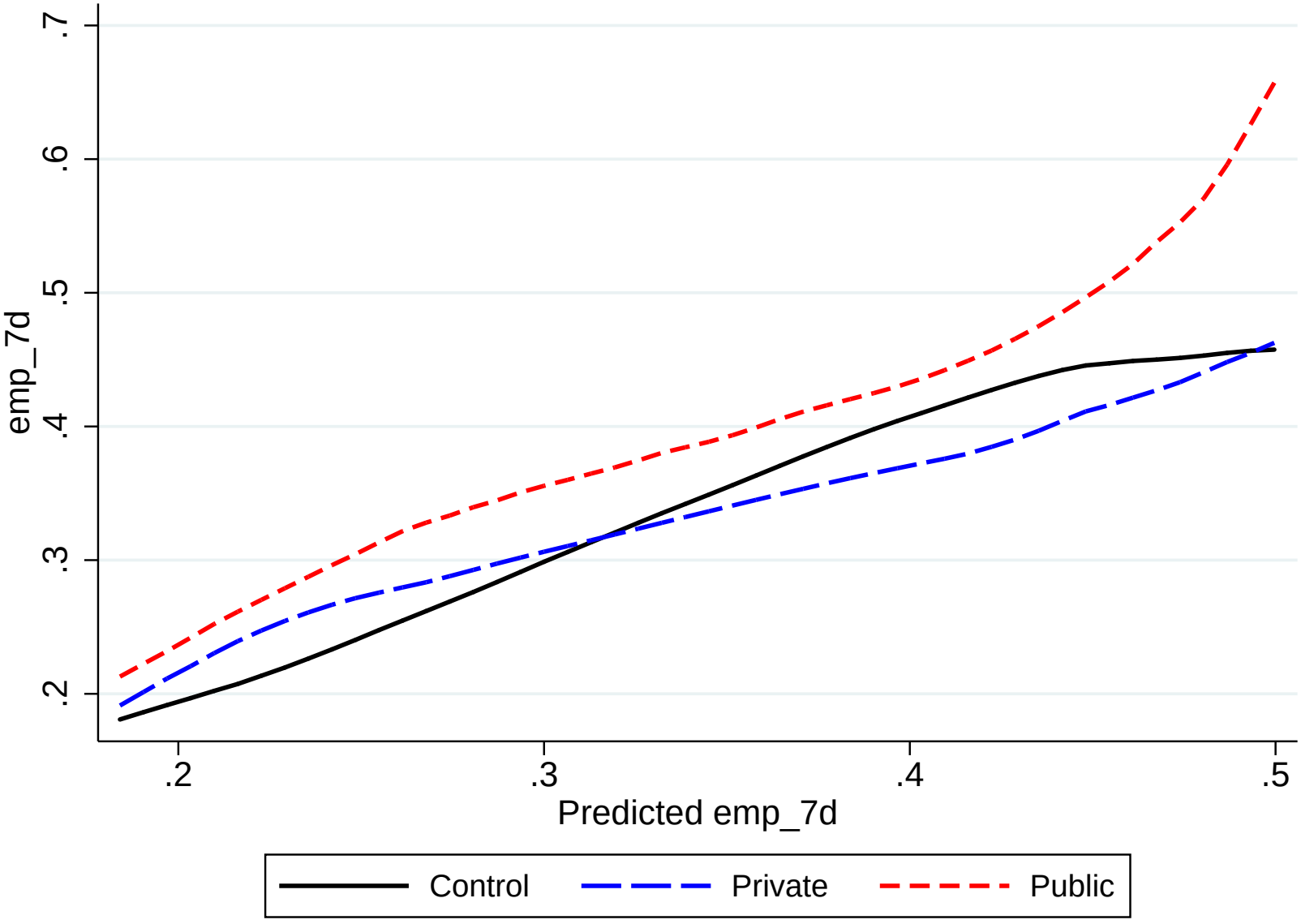
Treatment Effect Heterogeneity

- Examine treatment effect heterogeneity by
  - Aggregate skills
  - Latent employment outcomes
  - Difference between skills & baseline beliefs
  - Education, work history, gender, risk & time preferences, etc.
- Tests are underpowered without second follow-up survey

Heterogeneity by Skill



Heterogeneity by Employability



Conclusion

- Experimental results consistent with information frictions
- Information frictions don't vary with skills or "employability"
  - But these comparisons are underpowered without second follow-up survey
- Employment results emphasize demand-side frictions ahead of supply-side frictions
  - But results do not rule out supply-side frictions
  - Employment effects may be driven by changes in search
  - No measured effects on search behavior may reflect short-term adjustment

Next Steps

- Further experiments in design/progress
  - Audit study, randomizing use of public reports
  - Lab-in-the-field games to measure firms' WTP for information
  - Randomize firms' ongoing access to information
- Estimate GE model of labor market with two-sided limited information