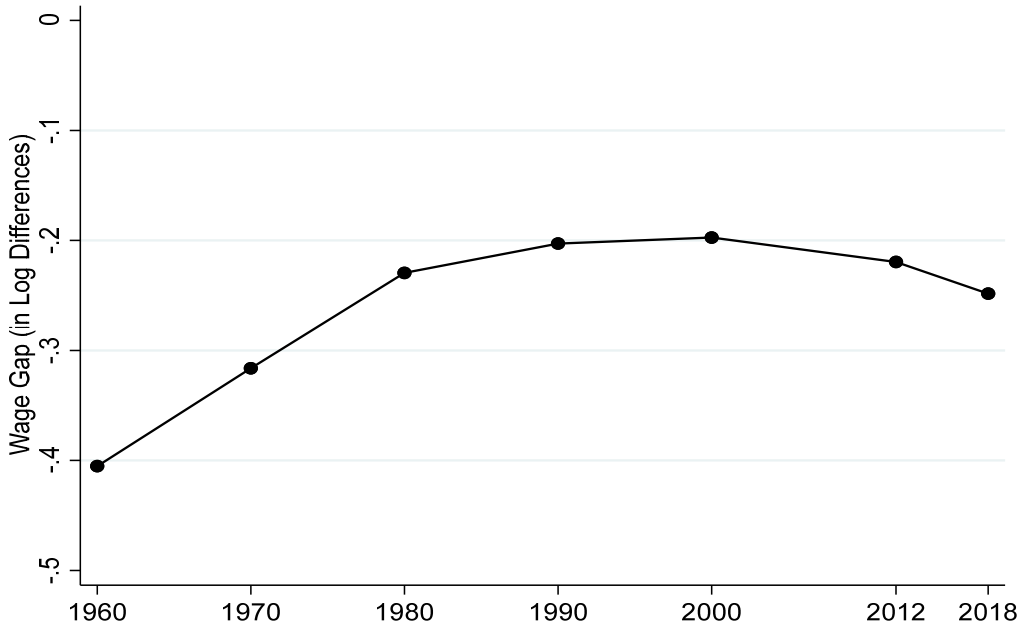
Task Based Discrimination

Erik Hurst, Yona Rubinstein, Kazuatsu Shimizu

July 2021

Demographically Adjusted Black-White Wage Gap



- **Black-White Wage gap fell from 1960 to 1980**
- **Racial wage gap stagnated since.**

- *Census/ACS Data: Men 25-54, Control for* ***age and education***

Puzzle?

- **Since 1980, measures of racial skill gaps have continued to narrow along some dimensions.**
  - NLSY: Average racial AFQT gap (conditional on education) fell from -1.0 to -0.6 standard deviations between 1979 and 1997 cohorts.
- **Since 1980, survey-based measures of discriminatory preferences of Whites have continued to narrow.**
  - GSS: In 1980, over 60% of White respondents reported being against interracial marriage. The number was about 10% in 2010.

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  - o NLSY: Average racial AFQT gap (conditional on education) fell from -1.0 to -0.6 standard deviations between 1979 and 1997 cohorts.

- **Since 1980, survey-based measures of discriminatory preferences of Whites have continued to narrow.**
  - o GSS: In 1980, over 60% of White respondents reported being against interracial marriage. The number was about 10% in 2010.

- **Why have racial wage gaps stagnated since 1980 despite these changes?**

This Paper

- Introduce a unified framework that integrates racial skill gaps and various notions of discrimination into a task-based model of occupational sorting.
- Allow racial skill gaps and discrimination to vary by task requirement of job.
- For example, on can imagine that:
  - "Taste-based" discrimination may operate more through tasks that require interactions with customers/co-workers.
  - "Statistical" discrimination may operate more through tasks where there exits large racial differences in underlying required skills.
- **By classifying occupations based on tasks performed, may be better able to distinguish between underlying causes of racial wage gaps.**

What We Do

- Document a new set of facts about racial gaps in the task requirements of occupational choice. [**Part 1**]
- Develop a task-base model of occupational sorting with two groups who face differing amounts of discrimination and who differ in task-specific skills (which could result from current/past discrimination). [**Part 2**]
- Use the estimated model to show how well-documented changes in task returns affect racial wage gaps. [**Part 3**]
- Use the estimated model to isolate the importance of discrimination in explaining changes in racial wage gaps over time (this will be a lower bound). [**Part 4 – Not Today**]

Data

Describe Occupations by their Task Content

- **Use 4 task measures – 3 of which are drawn from Autor-Dorn 2013**

  o "*Abstract*", "*Routine*", "*Manual*", and "*Contact*"

- **Data come from DOT/O*NET**
- **Measure occupations at 3-digit levels**
- **Hold task contents constant over time (extremely large persistence in the data)**

Describe Occupations by their Task Content

- **Use 4 task measures – 3 of which are drawn from Autor-Dorn 2013**

1. ***Abstract*** – occupation requires analytical flexibility, creativity, problem solving or complex interpersonal communications.

   - *Occupations high in Abstract*: Accountants, software developers, high school teachers, professors, judges, and various medical professionals, engineers, and managers.

Describe Occupations by their Task Content

- **Use 4 task measures – 3 of which are drawn from Autor-Dorn 2013**

2. ***Routine*** – occupations require repetitive tasks or precise attainment of set standards.

    - *Occupations high in Routine*: Secretaries, dental hygienist, bank tellers, dressmakers, x-ray technology specialists, pilots, drafters, auto mechanics, and various manufacturing occupations.

Describe Occupations by their Task Content

- **Use 4 task measures – 3 of which are drawn from Autor-Dorn 2013**

3. ***Manual*** – occupations requires eye, hand, and foot coordination.

  - *Occupations high in Manual*: Athletes, police, fire fighters, drivers, skill construction, and landscapers.

Describe Occupations by their Task Content

- **<u>New task measure</u>: Based on insights from Becker**

4. ***Contact*** – occupation requires social interactions with co-workers or customers.

- *Occupations high in Contact*: Health care workers, waiters/waitresses, lawyers, sales clerks, sales associates, various teachers, various managers, etc.

Why add *Contact*? Ex-ante, may think that certain types of discrimination may be more salient when interactions with others are more prevalent. (*Model estimates will confirm this ex-post*).

Tasks Are Not Zero Sum Within an Occupation (z-score units)

- ***Civil Engineer***

  Abstract: 2.30 Manual: 0.59 Contact: 0.09 Routine: 1.22

- ***School Principals/Superintendents***:

  Abstract: 1.74 Manual: -0.79 Contact: 1.11 Routine: -1.38

- ***Retail Sales Clerks***:

  Abstract: -0.63 Manual: -0.69 Contact: 1.71 Routine: -0.84

- ***Mail Carrier:***

  Abstract: -0.80 Manual: -0.71 Contact: 0.01 Routine: -1.48

Racial Differences in Sorting into Occupations with Different Task Contents

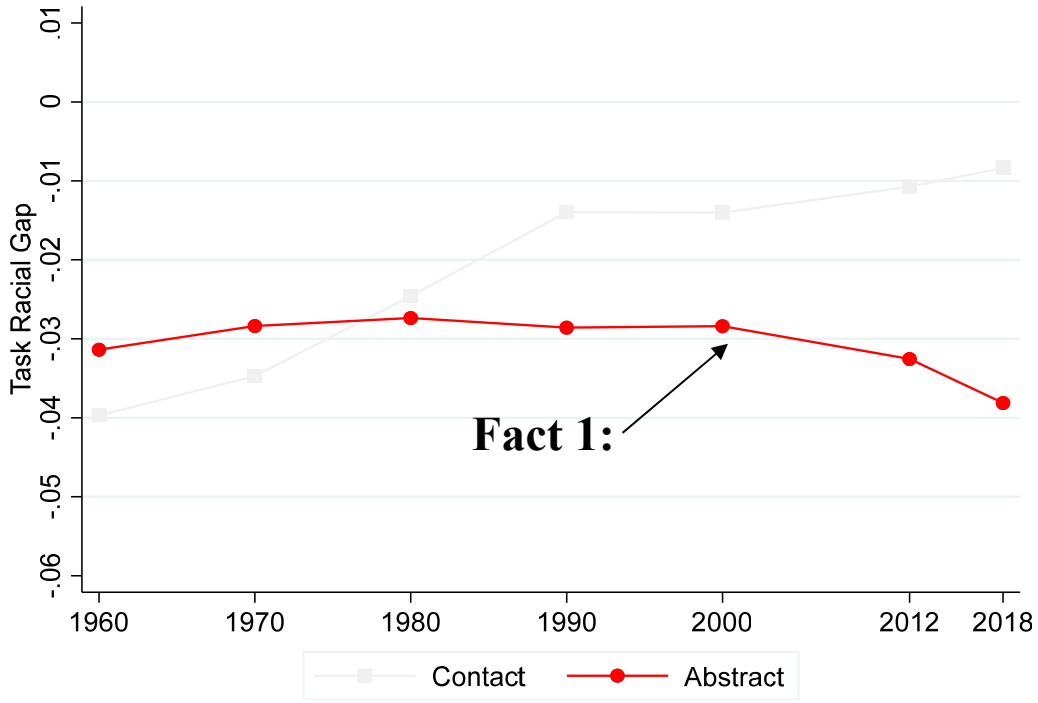
Do Racial Groups Sort into Occupations that Require Different Tasks?

$$Black_{ijt} = \alpha_t + \sum_k \beta_{kt}\tau^k_{ijt} + \Gamma_{kt}X_{it} + \epsilon_{ijt}$$

- Run the above regression on sample of Black and White men age 25-54 in Census/ACS data.
- Each ***i*** works in an occupation ***j*** that is associated with a bundle of tasks.
- τ^k_{ijt} is the z-score value of task ***k*** for the occupation ***j*** that individual ***i*** works in during period ***t***.
- Regression assesses whether Black men ($Black_{ijt}$) systematically work in occupations that require different tasks (conditional on age and education).

New Facts: Racial Gaps in the Task Content of Jobs

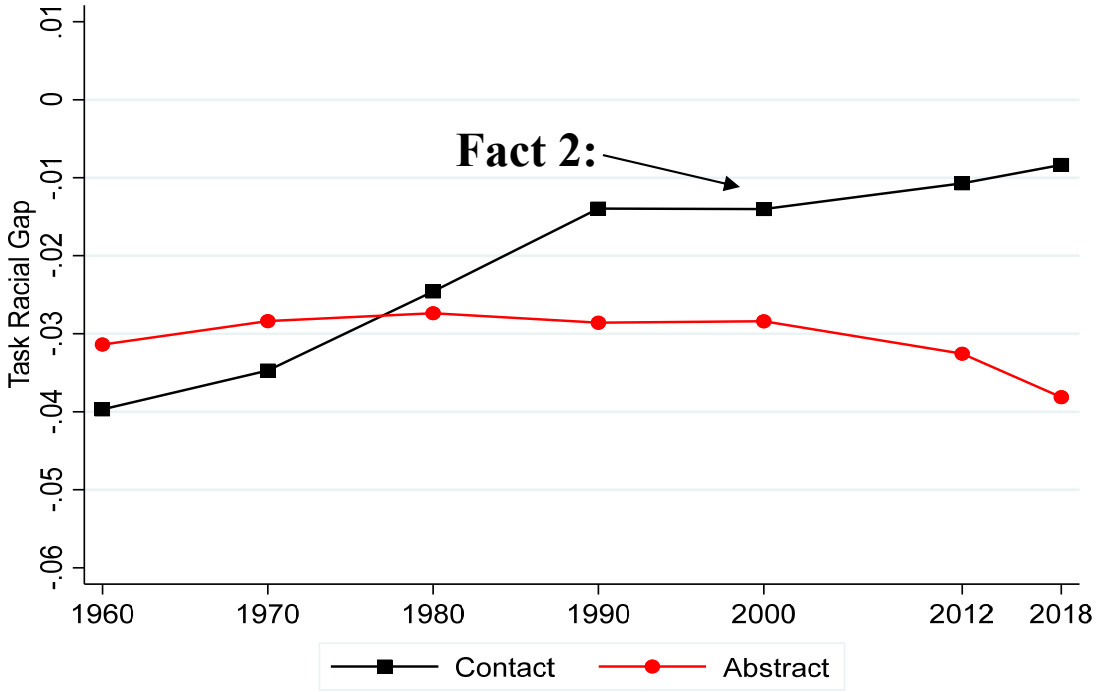
$$Black_{ijt} = \alpha_t + \sum_k \beta_{kt} \tau^k_{ijt} + \Gamma_{kt} X_{it} + \epsilon_{ijt}$$



- **Fact 1: No convergence in *Abstract* tasks from 1960 to 2018.**
- **1 standard deviation increase in *Abstract* task content of jobs reduces propensity individual in that job is Black by about 3 percentage points.**

New Facts: Racial Gaps in the Task Content of Jobs

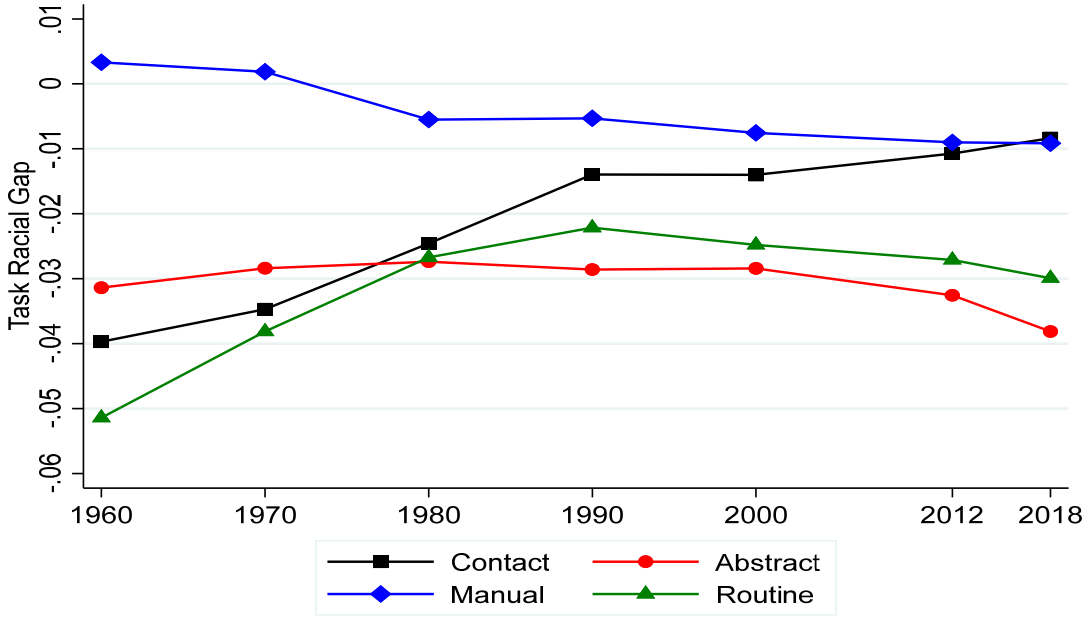
$$Black_{ijt} = \alpha_t + \sum_k \beta_{kt} \tau^k_{ijt} + \Gamma_{kt} X_{it} + \epsilon_{ijt}$$



- **Fact 2: Large convergence in *Contact* task from 1960 to 2018.**

Racial Gaps in the Task Content of Jobs

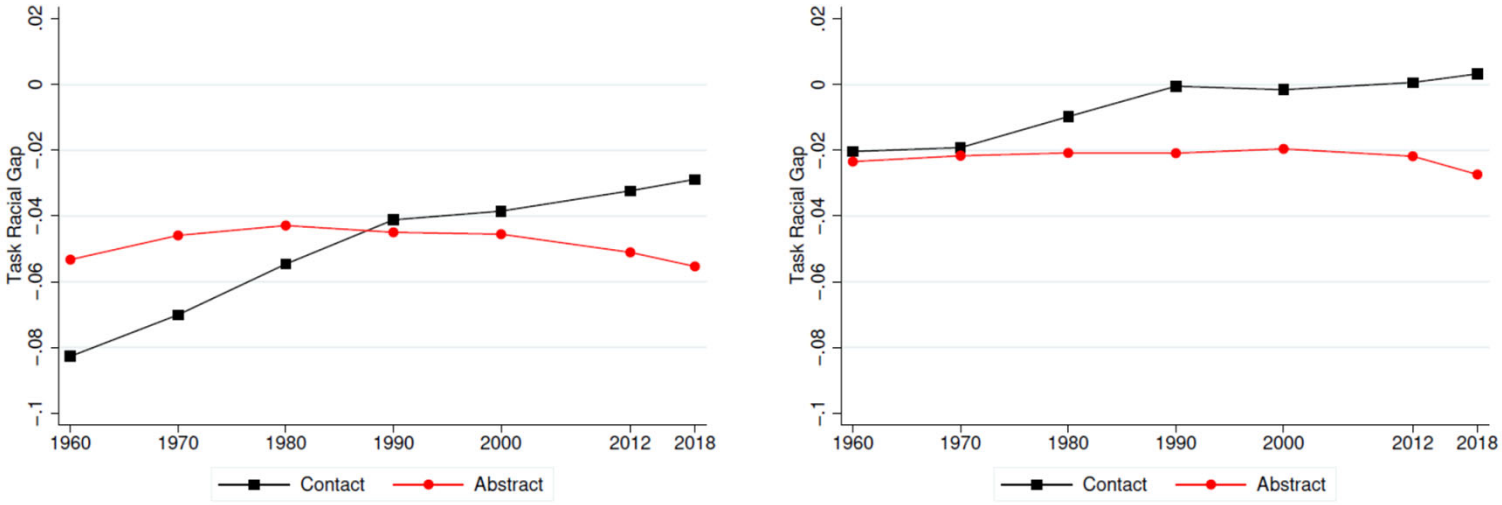
$$Black_{ijt} = \alpha_t + \sum_k \beta_{kt} \tau^k_{ijt} + \Gamma_{kt} X_{it} + \epsilon_{ijt}$$



- **Paper shows all tasks. We will focus on *Contact* and *Abstract* in talk.**
- **No much interesting is happening with *Manual*.**
- ***Routine* trends lie in between *Contact* and *Abstract* tasks.**

Task Gaps in the "South" vs Other Regions Over Time

Figure 3: Census/ACS Task Content of Occupations: South Region vs Other Regions



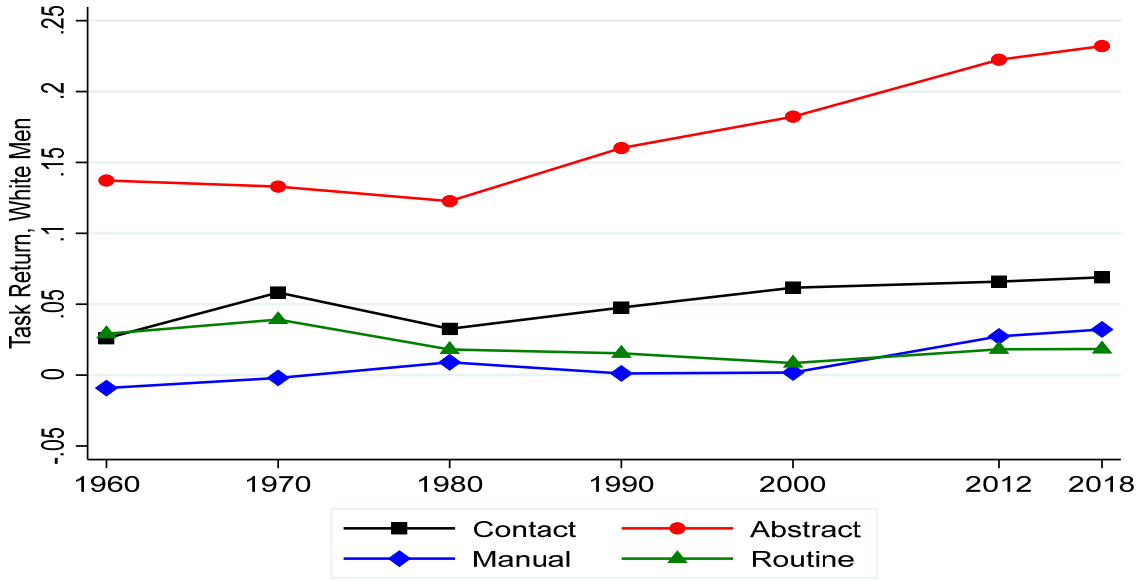
PANEL A: SOUTH REGION

PANEL B: ALL OTHER REGIONS

Fact 3: Convergence in "Contact" tasks much larger in the South.

Changing Wage Returns to Tasks Over Time: White Men

$$w_{ijt} = \alpha_t^g + \sum_k \beta_{kt}^g \tau_{ijt}^k + \Gamma_{kt}^g X_{it} + \epsilon_{ijt}.$$



- **Fact 4: Returns to *Abstract* tasks rose relative to all other tasks (this is known – David Autor and various co-authors)**
- **Rising *Abstract* returns will favor Whites relative to Blacks.**

- w_{ijt} is the average hourly wage of individual ***i*** working in occupation ***j*** during period ***t***.

A Task Based Model of Discrimination

Model Overview: Race Neutral Part

- Occupations are defined by their task content. Task returns can change over time.
- Individuals draw a set of skills from some known distributions. Each skill determines the efficiency units in a given task. If there are K tasks, individuals will get K skill draws.
- Aggregate forces move around the demand (or productivity) for occupations over time in a race neutral way.
- There will be a meaningful notion of labor supply (a home sector).
- Model will be a multi-dimension Roy sorting model.

Race Neutral Part of Model: Skills are Perfectly Observed

- Build on Autor and Handel (2013)
- Occupations (***j***) are a combination of tasks (***k***) where relative importance of tasks differ across occupations.
- Denote task content of occupation ***j***: $\Lambda_j = (\lambda_{j1}, ...\lambda_{jK}) \in \Re_+^K$
- Denote the skill-endowment of worker ***i*** :

$$\Phi_i = \{\phi_{i1}, ..., \phi_{iK}\} \in \Re_+^K$$

- We assume ϕ_{ik} drawn from a Frechet distribution with shape parameter θ and scale parameter ***1. (Assume constant across tasks k)***

Race Neutral Part of Model: Skills are Perfectly Observed

- Occupational production function (in logs) for worker *i* in year *t*:

$$y_{ijt} = \alpha_{jt} + \sum_{K} \lambda_{jkt} \phi_{ikt}$$

- Worker log wages: $w_{ijt} \equiv p_{jt} + y_{ijt} = A_{jt} + \sum_{K} \lambda_{jkt} \phi_{ikt} = A_{jt} + \sum_{K} \beta_{kt} \tau_{jkt} \phi_{ikt}$

- $A_{jt} = p_{jt} + \alpha_{jt}$ is a race neutral demand/productivity for an occupation

Race Neutral Part of Model: Skills are Perfectly Observed

- Occupational production function (in logs) for worker *i* in year *t*:

$$y_{ijt} = \alpha_{jt} + \sum_{K} \lambda_{jkt} \phi_{ikt}$$

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- Separate λ_{jkt} into a part that that varies by occupation but is constant over time (τ_{jkt}) and part that is constant across occupation but varies over time (β_{kt}).
- The former will be pinned down by DOT/ONET data while the latter will be disciplined by time series of task returns.

Race Neutral Part of Model: Skills are Perfectly Observed

- Occupational production function (in logs) for worker *i* in year *t* :

$$y_{ij} = \alpha_j + \sum_K \lambda_{jk}\phi_{ik}$$

- Worker log wages: $w_{ij} \equiv p_j + y_{ij} = A_j + \sum_K \lambda_{jk}\phi_{ik} = A_j + \sum_K \beta_k \tau_{jk}\phi_{ik}$

- Worker utility: $u_{ij} = w_{ij} + \log \nu_{ij}$

- Where ν_{ij} is drawn from a Frechet distribution with shape parameter ψ and scale parameter 1 (constant across groups).

Model Overview: Race Difference Part

- Two race groups (g) – Black (b) and White (w).
- Blacks can face taste-based discrimination in a Beckerian sense associated with each task: δ_{bkt}^{taste}
- Blacks draw skills from distributions that differ in mean levels relative to Whites. Relative mean skill level of Blacks by task denoted: η_{bkt}
- Skills can be noisily observed by firms. If racial gaps in mean skills exist, can lead to statistical discrimination: δ_{bkt}^{stat} [**Suppress for today**]
- Allow Black and White men to have differential preferences for the home sector (plays little role in our analysis…ignore for rest of talk).

Racial Difference Part of Model

1. Allow task specific differences in skill endowments for Blacks:

$$\Phi_{bi} = \left\{ \eta_{bk_1} + \phi_{ik_1}, ..., \eta_{bK} + \phi_{iK} \right\} \in \Re_+^K$$

- η_{bk} = task specific racial differences in skill (set $\eta = 0$ for Whites)

2. Allow for task level **taste-based discrimination (assuming skills are observed without error)**:

$$w_{ibj} = A_j + \sum_K \lambda_{jk} (\delta_{bk}^{taste} + \eta_{bk} + \phi_{ik})$$

- δ_{bk}^{taste} = task specific "discrimination" parameter ($\delta_k^{taste} = 0$ for Whites)

Optimal Occupational Choice: The Role of Sorting

- Optimal occupational choice of worker *i* in group *g* is:

$$j^*_{gi} = \arg\max_{j=1,\ldots J,H} \{u_{gij}\}$$

- Differential task returns induce differential occupational sorting patterns.

- **Tasks where Blacks face high relative discrimination or larger average skill gaps will result in them sorting less into jobs that require that task.**

- **Blacks that sort into the task will have a higher skill draw associated with that task (ϕ_{ik}) relative to Whites in that task.**

Summary: Notation (time subscripts suppressed)

- Worker *i* defined by (1) their race, (2) their task specific skill draws (ϕ_{ik}'s), (3) their occupational preference draws (v_{ij}).

- Race neutral driving forces: $\beta_k's$ (task returns)
  A_j (occupation productivities/demands)

- Race specific driving forces: δ_k^{taste} (task-specific "discrimination")
  η_k (task-specific racial skill gap)

- First goal of paper: Identify the role of β_k's and A_j in driving changes in racial wage gap over time vs role of $(\delta_{bk}^{taste} + \eta_{bk})$.
- Second goal of paper: Try to separate δ_k^{taste} from η_k.

Summary: Model Racial Difference

- **Mean Black Wage**: $$\sum_j \pi_{bj}\left(A_j + \left(\sum_K \beta_k \tau_{jk}((\delta_{bk}^{taste} + \eta_{bk}) + \phi_{ik})\right)\right)$$

- **Mean White Wage**: $$\sum_j \pi_{wj}\left(A_j + \left(\sum_K \beta_k \tilde{\tau}_{jk}\phi_{ik}\right)\right)$$

- π_{wj} and π_{bj} : share of white and black men working in occupation j.

- Composite racial gap term $(\delta_{bk}^{taste} + \eta_{bk})$ gives rise to differential task returns between Blacks and Whites conditional on their latent skill ϕ_{ik} .

- Differential task returns induce differential occupational sorting ($\boldsymbol{\pi}$'s).

Model Identification Part 1:

Distinguish Race Neutral Driving Forces from Race Specific Driving Forces

Identifying the Composite Race Gap

- Identifying the ($\beta_{kt}'s$, $A_{jt}'s$):
  - Data on sorting of *White men* into each occupation j in each year.
  - Average wages of *White men* in each occupation j in each year.
  - Task returns for *White men* in each year.
  - Task composition of occupations (τ_{jk}).

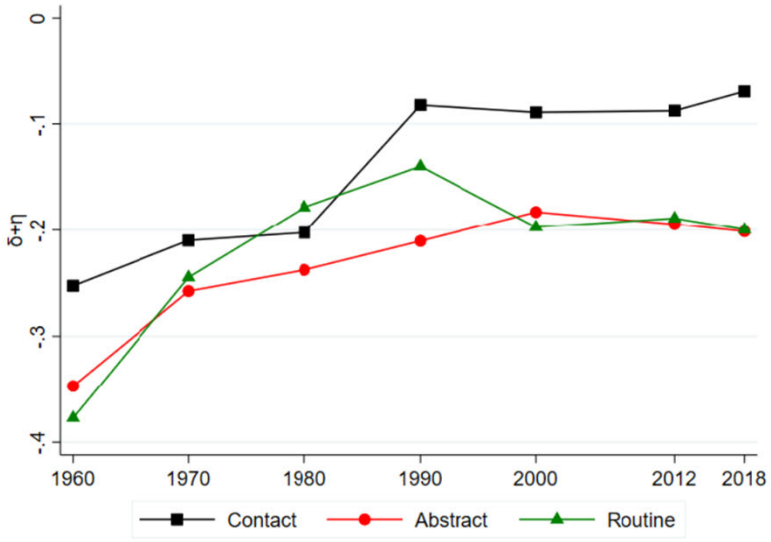
- Identifying the composite race specific term: ($\delta_{bk}^{taste} + \eta_{bk}$)
  - Average racial task gaps for each task in each year.
  - Average overall racial wage gap in each year.

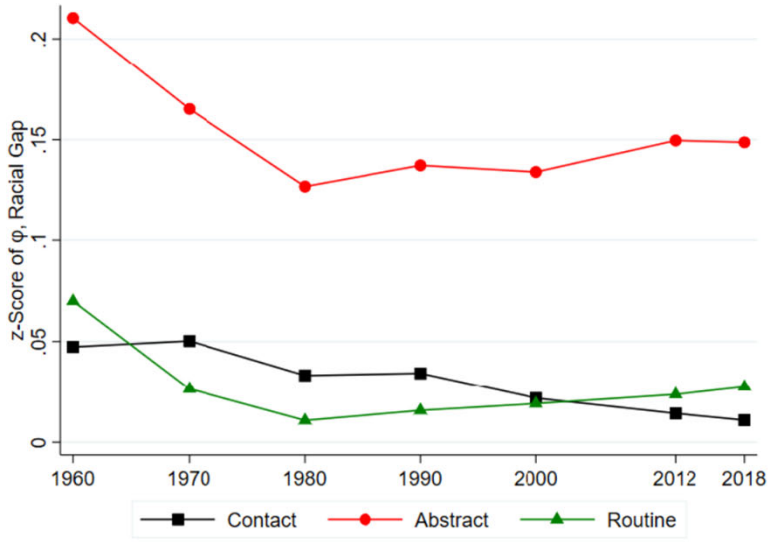
- Estimate shape parameters of Frechet distributions: θ and ψ.

- Papers provides a broader model where employers observer worker skills with error.

Model Estimates of Race Specific Factors and Selection

Figure 6: Model Estimates of $\eta_{bkt} + \delta^{taste}_{bkt}$ and the Racial Gap in ϕ_{ikt}





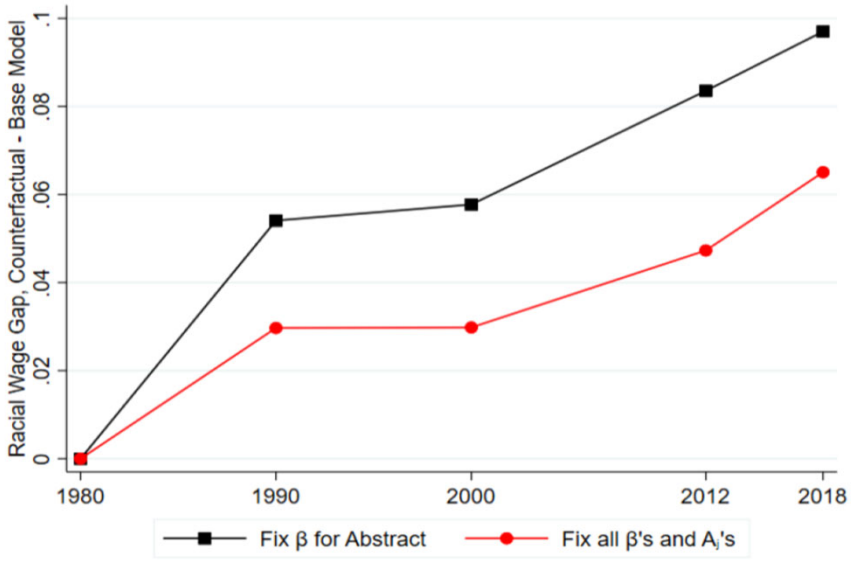
PANEL A: TRENDS IN $\eta_{bkt} + \delta^{taste}_{bkt}$

Trends in Race Specific Factors

PANEL B: TREND IN RACIAL GAP IN ϕ_{ikt}

Trends in Task Selection

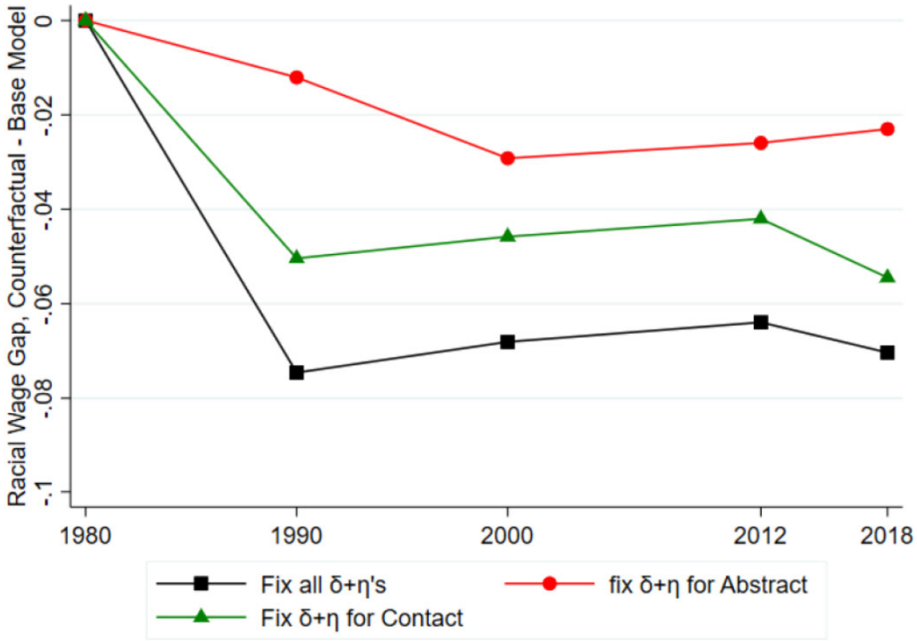
Why Has the Racial Wage Gap Stalled Post 1980?
Role of Task Prices



PANEL A: HOLDING TASK RETURNS (β'S) FIXED

- Figure shows counterfactual of holding β_{kt}'s (task prices) fixed at 1980 levels.
- **If task prices were held fixed, the racial wage gap would have narrowed by about 7 p.p.!**

Why Has the Racial Wage Gap Stalled Post 1980?
Role of Race Specific Factors



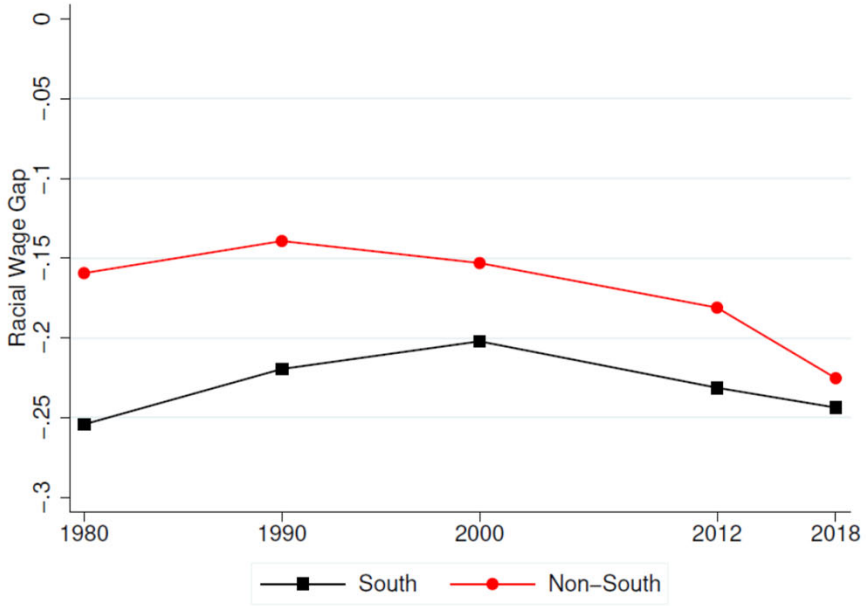
PANEL B: HOLDING δ'S AND η'S FIXED

- Figure shows counterfactual of holding η+δ's fixed at 1980 levels.

- **Declining discrimination – particularly for *Contact* jobs – actually is narrowing racial wage gap by about 7 p.p..**

Model Validation Part 1: Regional Wage Trends

Figure 9: Racial Wage Gaps by Region: Census/ACS Data



- **Racial Wage Gaps in the South vs. Other Regions**

Model implication: Wage gaps should fall more due to changing task returns in places where there was less convergence in race specific factors.

There was less convergences in race specific factors in the Non-South regions.

More convergence in South

Model Validation Part 2: NLSY Wage Gaps Conditional on Time Varying Task/Skill Returns

- Use panel data from the NLSY to measure how racial wage gaps evolve controlling for individual fixed effects and time varying returns to tasks (and skills).

- Will discuss the skill data more in a few slides.

- Exploit both the NLSY-79 and NLSY-97 waves. Restrict sample to Black and White men.

Model Validation Part 2:
NLSY Wage Gaps Conditional on Skills

$$w_{isjt} = \omega^0 + \omega_t^1 D_t Black_i + \Gamma X_{isjt} D_t + \mu_i + \epsilon_{isjt}$$

Table 4: The Evolution of Racial Wage Gaps Over Time in the NLSY: The Importance of Pre-Labor Market Skills

	(1)	(2)	(3)	(4)
Racial Wage Gap: 1990s	0.002	0.020	0.042	0.042
	(0.022)	(0.019)	(0.022)	(0.022)
Racial Wage Gap: 2000s	0.051	0.034	0.094	0.096
	(0.028)	(0.032)	(0.035)	(0.035)
Racial Wage Gap: 2010s	0.029	0.026	0.099	0.109
	(0.038)	(0.039)	(0.043)	(0.043)
Demographic Controls * Year Dummies	Yes	Yes	Yes	Yes
Individual Fixed Effects	No	Yes	Yes	Yes
Pre-Labor Market Skills * Year Dummies	No	No	Yes	Yes
Occupational Tasks * Year Dummies	No	No	No	Yes

Model Validation Part 2:
NLSY Wage Gaps Conditional on Skills

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Racial Wage Gap: 2010s	0.029	0.026	0.099	0.109
	(0.038)	(0.039)	(0.043)	(0.043)
Demographic Controls * Year Dummies	Yes	Yes	Yes	Yes
Individual Fixed Effects	No	Yes	Yes	Yes
Pre-Labor Market Skills * Year Dummies	No	No	Yes	Yes
Occupational Tasks * Year Dummies	No	No	No	Yes

- **The NLSY data find similar trends in racial wage gaps as predicted by model.**

First Counterfactual Summary

- **Why have racial wage gaps stopped converging?**
  - Returns to *Abstract* tasks have been increasing and Black individuals have a comparative disadvantage in *Abstract* tasks.
  - The increasing return to *Abstract* tasks put downward pressure on the racial wage gap convergence (by about 7 percentage points).
  - However, declining race specific factors narrowed the racial wage gap during this period (by about 7 percentage points).
  - The two effects roughly offset.
- **Structural shifts in the economy towards rewarding Abstract tasks disadvantaging Black men relative to White men since 1980.**

Model Identification Part 2:

Distinguishing Among the Race Specific Driving Forces

Overview

- **Use data from NLSY to measure a variety of worker pre-labor market skills.**

- Map the NLSY skill measures into model units.

- Once have the skill measures in model units, can back out the discrimination term.

- Paper talks a lot about measurement error in the mapping procedure. Measurement error less important for some results than others.

Define Skill Measures for NLSY 1979 and 1997 Cohorts

- Examine three pre-labor market skill measures:
  - ***Cognitive Skills*** (s_{cog}): AFQT (Armed Force Qualifying Exam)
  - ***Non-Cognitive Skills*** (s_{ncog}): Measures "conscientious". Take from Deming (2017)
  - ***Social Skill*** (s_{soc}): Measures "extroversion". Take from Deming (2017)
- Similar sampling frame as Census/ACS data – age range 25-37
- *All skill measures also in z-score units.*

Are There Racial Differences in Pre-Labor Market Skills?

	1979 Cohort	*1997 Cohort*
Cognitive Skills (s_{cog})	**-0.92**	**-0.58**
	(0.05)	**(0.01)**
Non-Cognitive Skills (s_{ncog})	-0.02	0.16
	(0.07)	(0.08)
Social Skills (s_{soc})	-0.05	-0.11
	(0.07)	(0.06)
Age/Educ. Controls	Yes	Yes
Occupation Controls	Yes	Yes

- **Black men have, on average, much lower AFQT scores (about one standard deviation lower in 1979). The gap has narrowed recently.**

Use Cross Occupation Variation to Map NLSY Data to Model Analogs for White Men

$$\overline{s}_{wjkt} = a_{kt} + b_{cog,kt}\overline{S}^{NLSY}_{cog,wjt} + b_{ncog,kt}\overline{S}^{NLSY}_{ncog,wjt} + b_{soc,kt}\overline{S}^{NLSY}_{soc,wjt} + \epsilon_{jkt}$$

	Abstract Skills	***Contact Skills***
Cognitive Skills (s_{cog})	**0.16**	0.04
	(0.03)	(0.01)
Non-Cognitive Skills (s_{ncog})	0.05	0.02
	(0.03)	(0.02)
Social Skills (s_{soc})	-0.02	**0.12**
	(0.05)	**(0.03)**

Decomposing Racial Driving Forces

- Step 1: Predict racial skill gaps by occupation in model units using coefficients from White men's equation on prior page.

$$\widehat{s}_{jkt}^{gap} = \hat{b}_{cog,kt}\overline{S}_{cog,jt}^{gap} + \hat{b}_{ncog,kt}\overline{S}_{ncog,jt}^{gap} + \hat{b}_{soc,kt}\overline{S}_{soc,jt}^{gap},$$

- Step 2: Chose η_{bkt}'s that make the model generated racial skill gaps by occupation consistent with the NLSY predicted skill gaps.

- Step 3: Once have the η_{bkt}'s, use the model structure to infer the δ_{kt}^{taste}

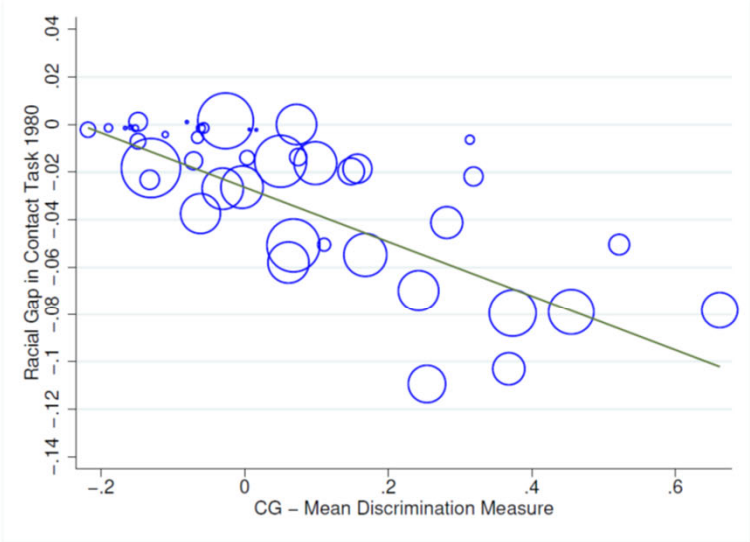
One of the Key Take-Aways of our Decomposition Procedure

- **Using NSLY micro data and our estimated model, we find that changes in the racial gaps in *Contact* tasks are a good proxy for changes in taste-based discrimination.**

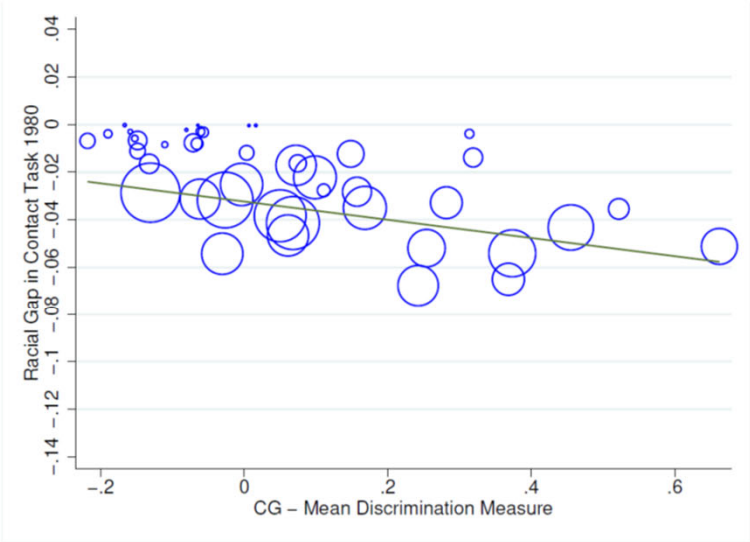
- Estimation Intuition:
  - Social skills in NLSY predict Contact skills.
  - Very little racial gap in Social skills.
  - Therefore, racial differences in skills must not explain racial differences in Contact tasks.

- Question: Do race gaps in *Contact* tasks correlated with survey-based measures of taste-based discrimination?

Race Gap in *Contact* vs. C-G Taste Based Discrimination, 1980 State Variation



PANEL A: CONTACT TASKS



PANEL B: ABSTRACT TASKS

- *Charles-Guryan (CG) create state level measures of taste based discrimination based on survey responses.*

Summary of our Decomposition Results

- We then assess how much of the racial gaps in wages and task gaps can be attributed to: racial task specific skill gaps, task specific taste based discrimination, and task specific statistical discrimination.

- We show that most of the convergence in racial wage gaps (conditional on education) are due to falling taste-based discrimination (between 40 and 70 percent – depending on assumptions).

- Most of the remaining wage gaps can be linked to racial skill gaps (which themselves are likely the result of current/past discrimination).

Conclusion

- We developed a model of task-based discrimination to understand the sources underlying the levels and trends in racial wage gaps since 1960.
- Use this framework to infer the relevancy of discrimination, skills, and changing task prices in explaining racial wage gaps (and task sorting).
- Introduce a new task measure – *Contact* – that correlates strongly with survey-based measures of taste-based discrimination.
- **Since 1980, rising *Abstract* skill premium offset further declines in taste-based discrimination causing a stagnation in the racial wage gap.**

Extra Slides

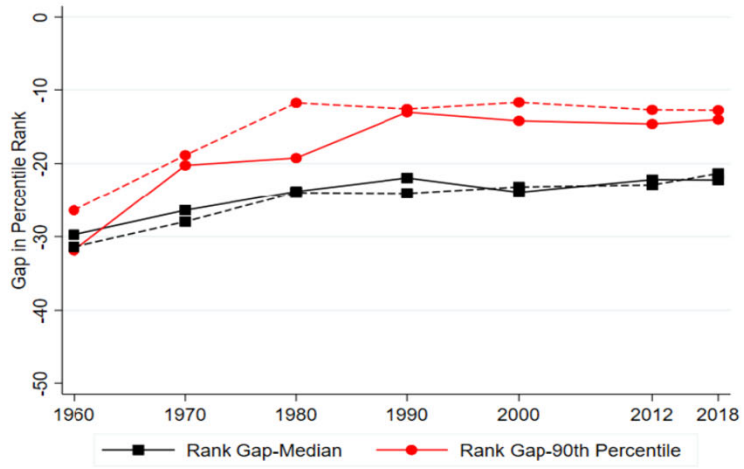
Comparison to Other Statistical Decomposition Methods

	Change in Wage Gap	Task Model Decomposition		JMP Decomposition	
Time Period	Total	β's/A's	$(\delta+\eta)$'s	Distributional Convergence	Positional Convergence
$1960-1980$	0.145	0.054	0.102	0.033	0.112
$1980-2018$	-0.012	-0.065	0.070	-0.034	0.021

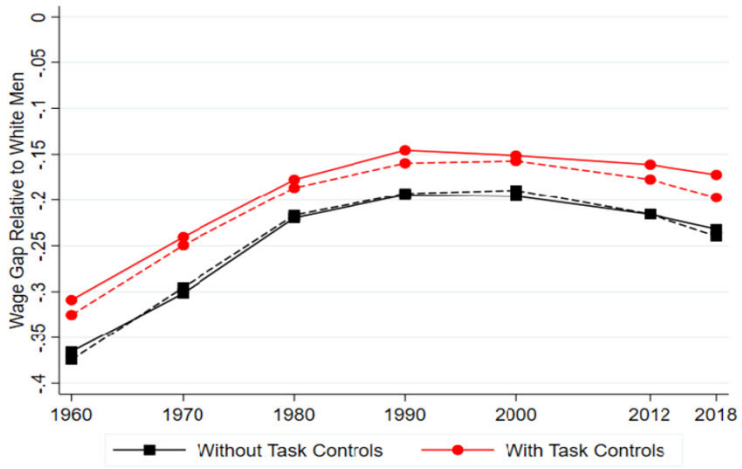
- Compare to decomposition in Juhn-Murphy-Pierce 1991
- Distributional convergence compares wage evolution of Blacks to a Whites with same initial wage.
- Task based model shows that such a comparison may not be valid.

Model Validation: Matching Non-Targeted Moments

Figure 7: Model Performance Against Non-Targeted Empirical Moments



PANEL A: RACIAL GAP IN PERCENTILE RANK OF WAGES

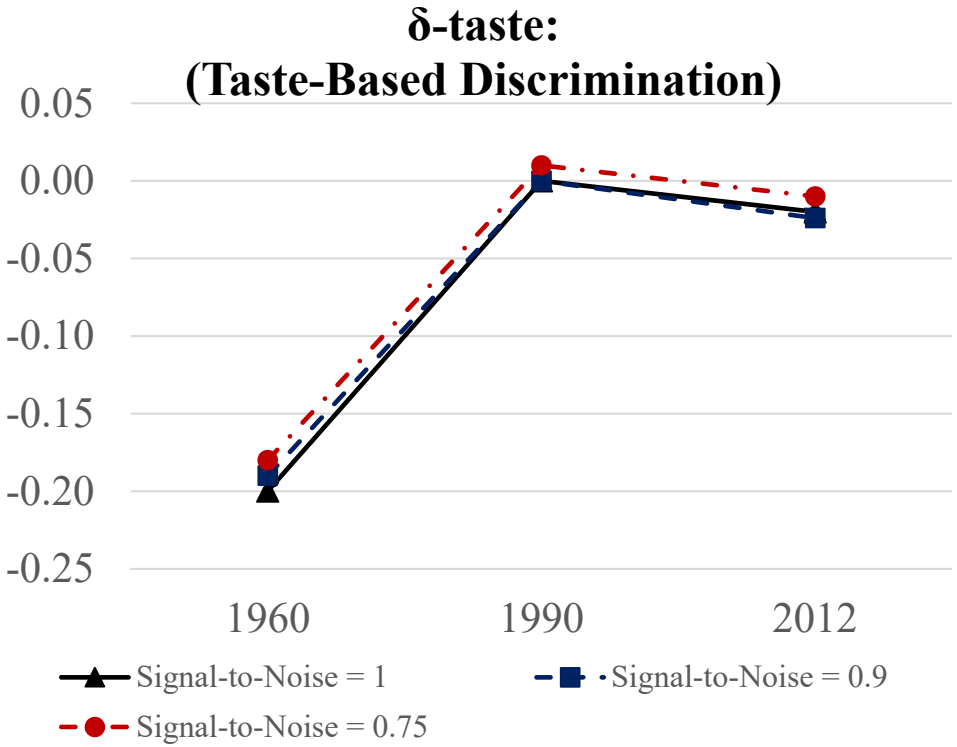


PANEL B: RACIAL WAGE GAPS CONDITIONAL ON TASKS

Can Match Racial Wage Gaps Throughout Distribution

Can Match Racial Wage Gaps Conditional on Tasks

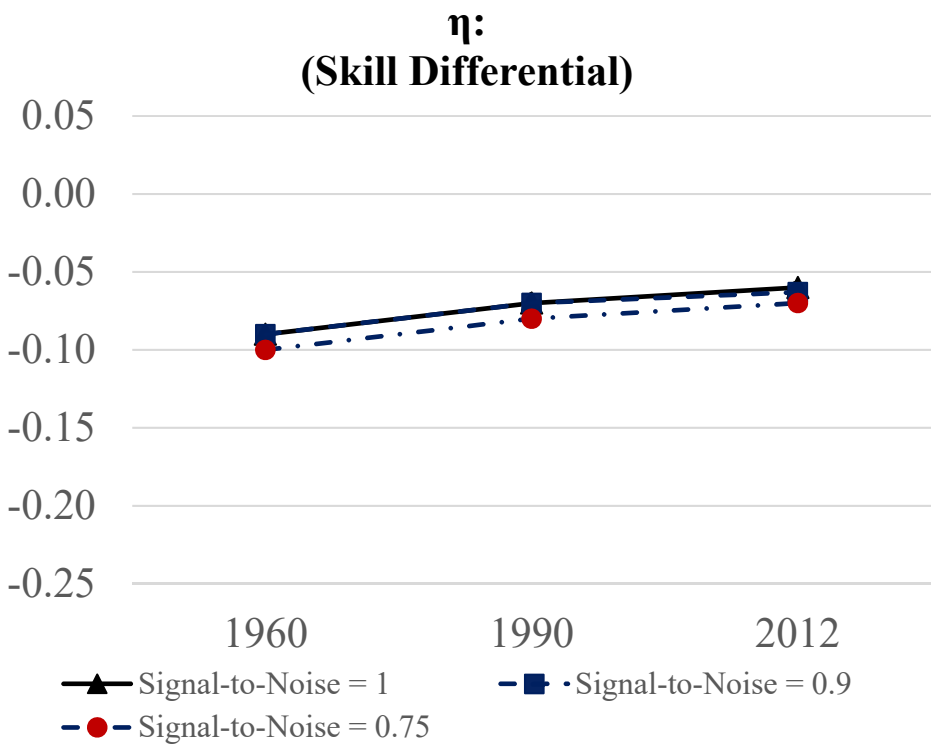
δ-taste for *Contact* tasks, by Signal-to-Noise Assumptions



- **Large Decline in taste-based discrimination for Contact tasks between 1960 and 1990.**
- **No change post 1990.**
- **Signal-to-noise of skills assumptions do not affect importance of *changing δ-taste over time*.**

- **"Signal-to-Noise" runs from 0 ($\sigma = \infty$) to 1 ($\sigma = 0$).**

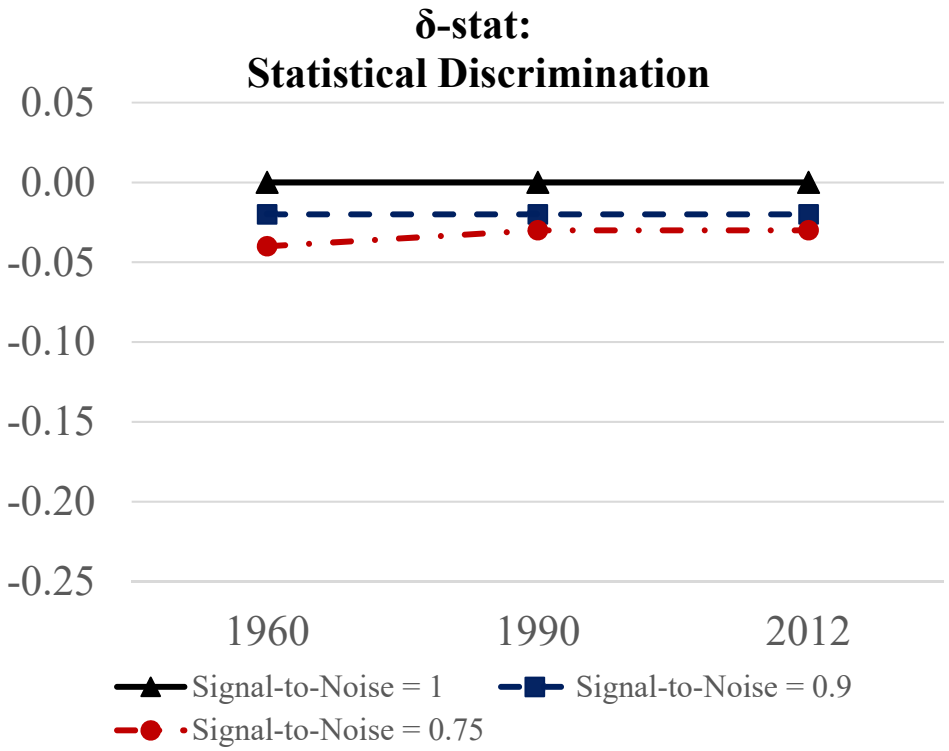
η for *Contact* tasks, by Signal-to-Noise Assumptions



- **Contact skill gap is relatively small compared to taste-based discrimination.**
- **Slight convergence throughout the entire period.**
- **Signal-to-noise of skills assumptions do not affect importance of *changing η over time*.**

- **"Signal-to-Noise" runs from 0 ($\sigma = \infty$) to 1 ($\sigma = 0$).**

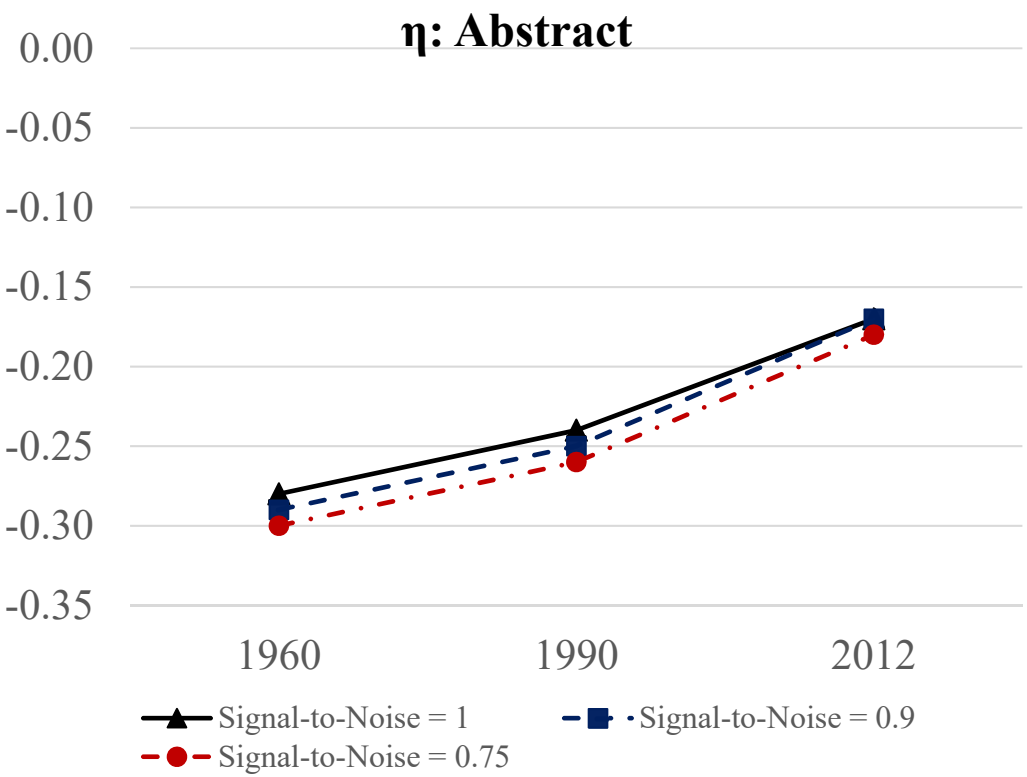
δ-stat for *Contact* tasks, by Signal-to-Noise Assumptions



- **Because the skill gaps are small, we find little evidence of statistical discrimination for Contact tasks.**
- **Estimates are close to zero and relatively constant over time.**

- **"Signal-to-Noise" runs from 0 ($\sigma = \infty$) to 1 ($\sigma = 0$).**

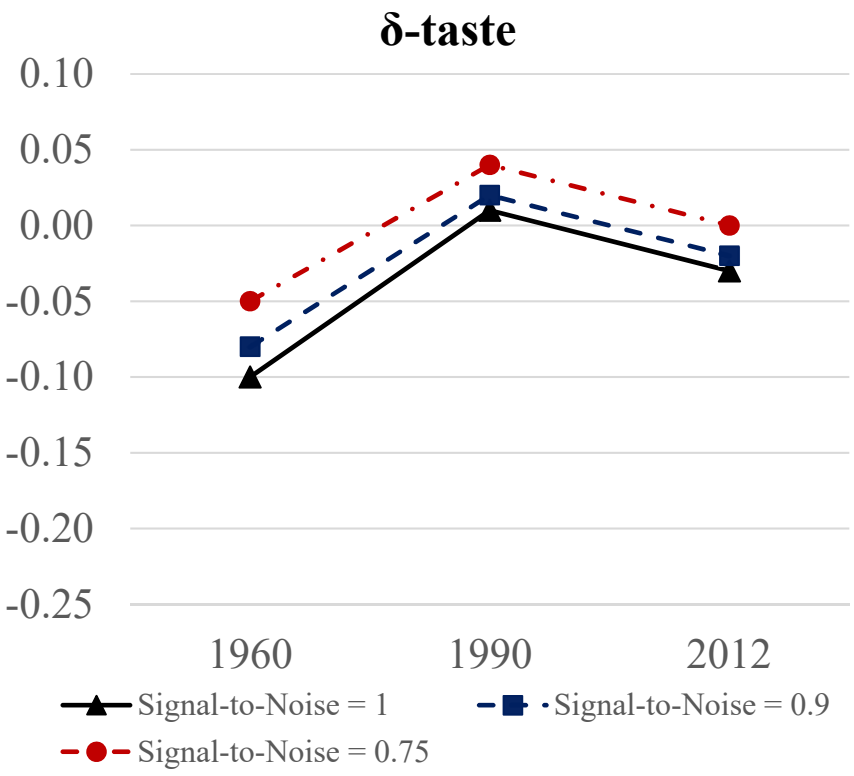
η for *Abstract* tasks, by Signal-to-Noise Assumptions

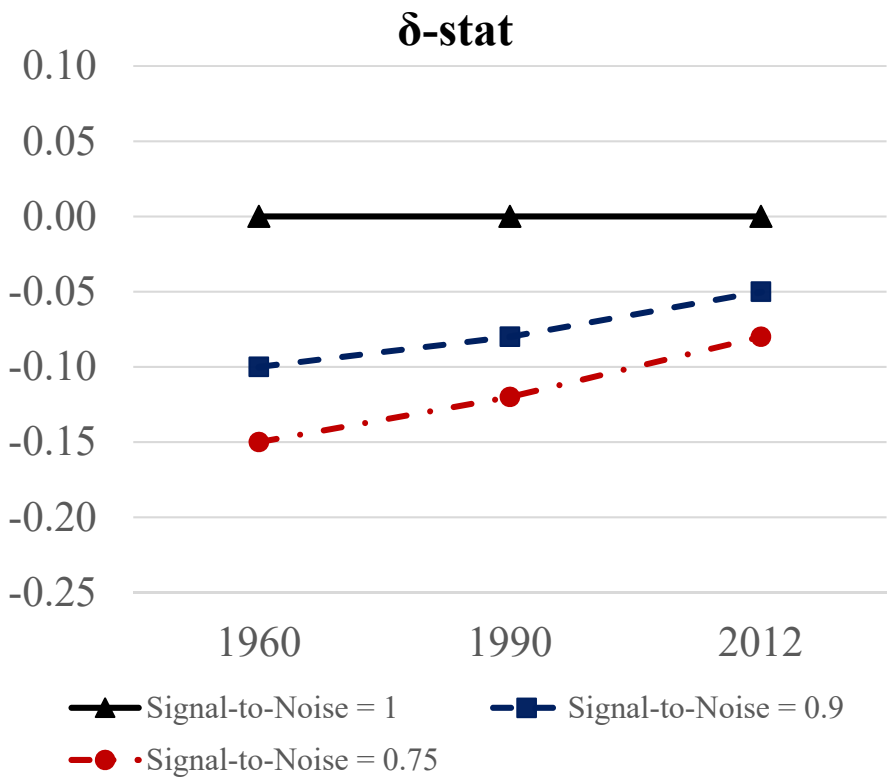


- **"Signal-to-Noise" runs from 0 ($\sigma = \infty$) to 1 ($\sigma = 0$).**

- **Large racial skill gap in Abstract tasks – stems from large racial gaps in AFQT scores.**
- **Large convergence in racial skill gap for Abstract tasks over time (stemming from the convergence in AFQT scores.**
- **Signal-to-noise of skills assumptions do not affect importance of *changing η over time*.**

δ's for *Abstract* tasks, by Signal-to-Noise Assumptions

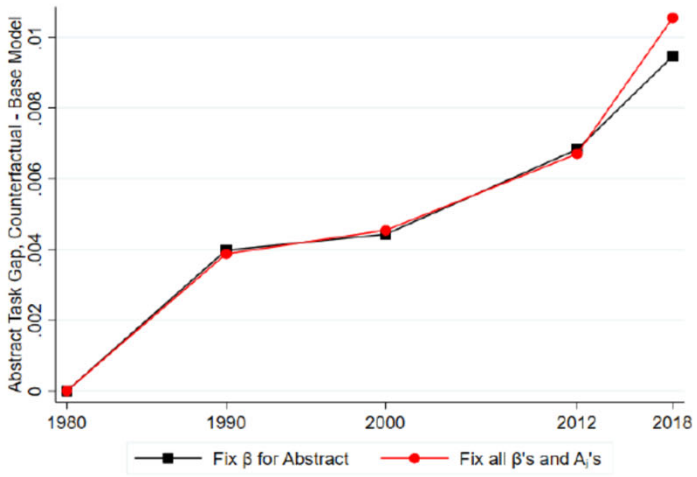




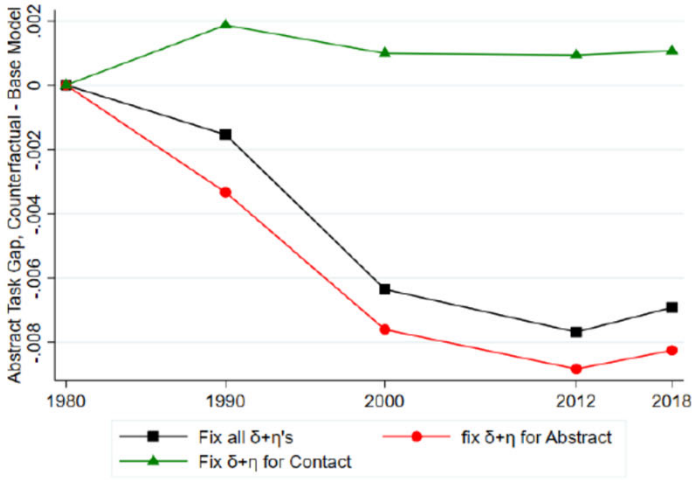
- **A little bit of noise can lead to large statistical discrimination in Abstract tasks**

Counterfactual Abstract Task Gap

Figure 10: Counterfactual Racial Task Gaps 1980 - 2018



PANEL A: HOLDING TASK RETURNS (β'S) FIXED



PANEL B: HOLDING δ'S AND η'S FIXED

- **Abstract Gap would have narrowed post-1980. However, increasing task returns drew more White men into the occupation.**

Explaining Changing Racial Wage Gaps Over Time

	1960-1990	1960-2012
Panel A: $\sigma = 0$		
δ_{bkt}^{taste} for *Abstract* and *Contact* tasks	58%	47%
η_{bkt} for *Abstract* and *Contact* tasks	10%	34%
δ_{bkt}^{taste} for all tasks	99%	84%
η_{bkt} for all tasks	12%	37%
A_{jt}'s and β_{kt}	-2%	-12%