

# **The Use of O\*NET Data in Labor Market Studies: An Overview**

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**David Autor**

**Massachusetts Institute of Technology  
and National Bureau of Economic Research**

**National Academies O\*NET Panel**

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# Unique Value of O\*NET for Labor Market Research

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- **Three key strengths**
  1. **Unique tool for measuring what people do at their jobs**
    - Rather than simply what education or training they possess (e.g., highest degree held)
  2. **Rich set of scales – Something for everyone**
  3. **A means to compare job tasks, requirements and activities across hundreds of occupations:**
    - There are ~450 occupations in standard U.S. survey data sets
    - There are ~850 occupations in the O\*Net
    - Impossible to meaningfully compare job tasks, requirements, activities at this level of disaggregation
    - O\*Net provides dimensionality reduction – Reduce these hundreds of occs to a few common scales

# Agenda

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## **1. Recent research contributions**

- Timely, important, policy-relevant
- One example: Analyzing the impact of computerization on job skill demands

## **2. Strengths of the O\*Net as a research tool**

## **3. Weaknesses and limitations of the O\*Net as a research tool**

## **4. Avenue for improving O\*Net's value:**

- Short term: Shovel-ready
- Longer term: Will require expertise, investment, retooling

## **5. Summary**

- The accomplishment so far
- The potential

## How has O\*Net Used in Research?

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- **Four key applications in recent research**
  1. Assessing the effect of technical change on skill demands:
    - Distinguishing routine from non-routine tasks (Autor, Levy and Murnane 2003, and many recent papers).
  2. Analyzing the effect of immigration on native wages:
    - Distinguishing language-intensive from non-intensive tasks (Cortes 2008; Peri and Sparber, forthcoming; Card, 2009).
  3. Understanding the closing of the gender wage gap:
    - Are women moving into non-routine tasks more rapidly than men? (Black and Spitz-Oener, 2007)
  4. Benchmarking the effect of offshoring on U.S. employment:
    - Classifying whether jobs require in-person interactions (Blinder 2008, Grossman-Rossi-Hansberg, 2008).

## **Example of the O\*NET in Recent Research: Job Tasks and Technical Change**

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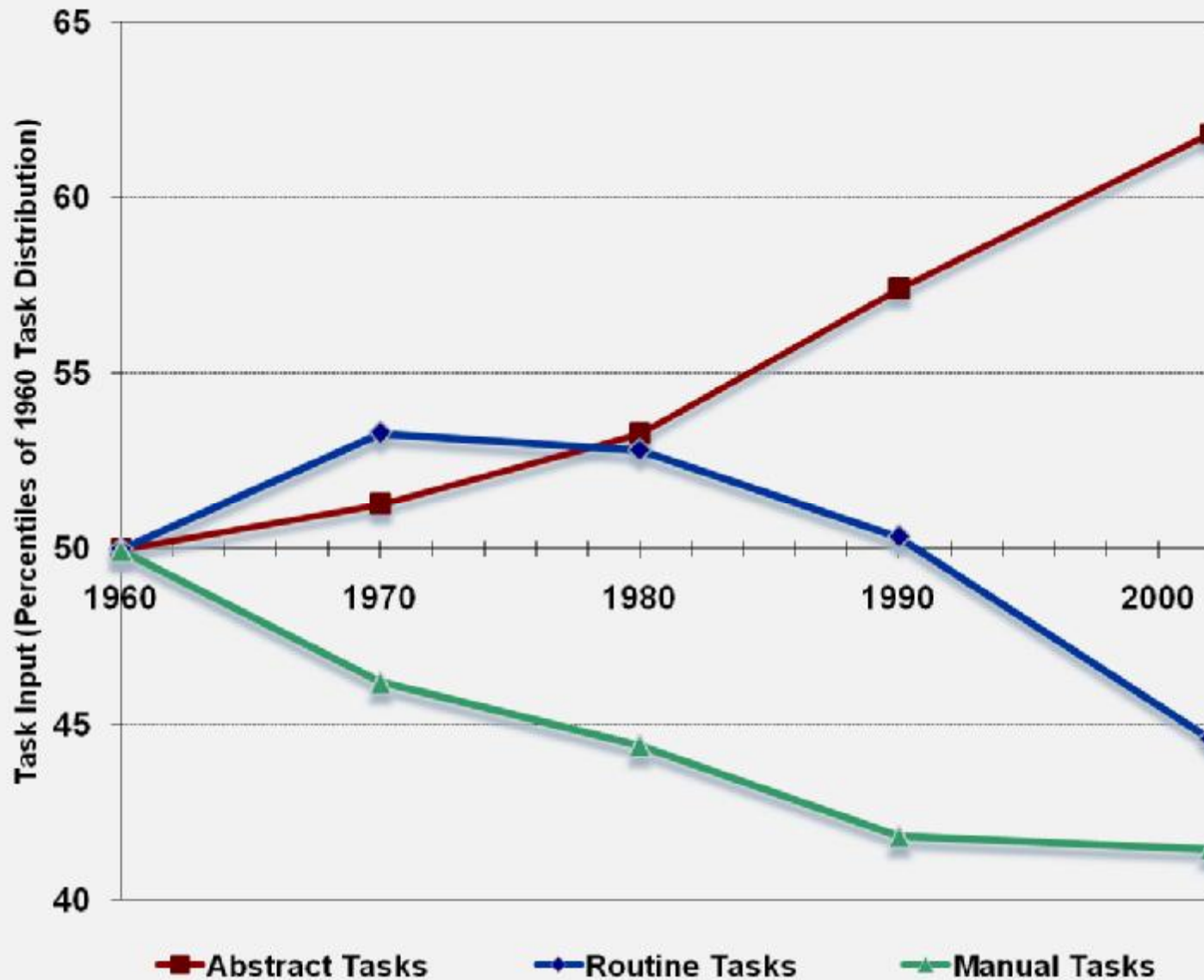
- **Historic rise of earnings inequality in U.S. and Europe in 1980s and 90s:**
  - Led to proliferation of work on ‘Skill-Biased Technical Change.’
  - But exactly what ‘skills’ are we talking about?
  - Study of ‘Job Tasks’ as a means to analyze changes in job skill demands.
- **Examples:**
  - Wolff (2002), Autor, Levy and Murnane (2003), Goos and Manning (2008).

## Example of the O\*NET in Recent Research: Job Tasks and Technical Change

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- **Work using DOT and O\*Net has been extremely influential for Skill Biased Technical Change debate.**
- **Basically changed the debate from:**
  1. **'In the Computer Era, The More Education the Better' *to***
  2. **Computerization displaces 'routine tasks'**
    - **Complements**
      - **High-skilled technical and professional workers *and***
      - **Low-skill in-person services.**

## Autor, Levy and Murnane (2003): Trends in U.S. Job Task Content 1960 – 2002

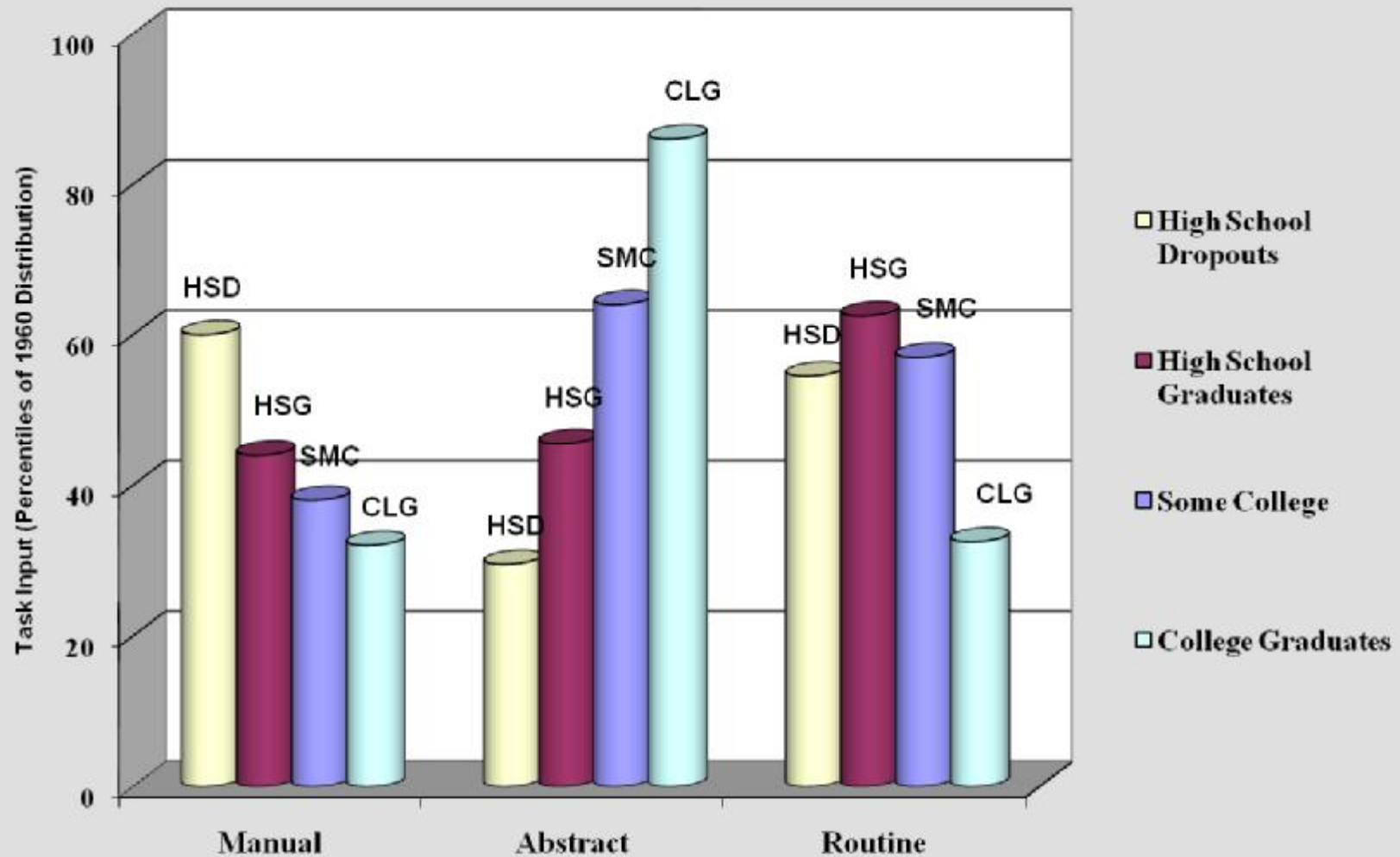


## Example of the O\*NET in Recent Research: Job Tasks and Technical Change

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- **Reevaluation of prevailing view would probably not have been possible without DOT/O\*Net. Why?**
  - Economists' worldview:
    - Skill *equals* education *equals* wages.
  - This conception makes it hard to consider a conceptual framework that is not 'monotone' in education/wages.
  - DOT/O\*Net helped to overcome this bottleneck by offering a means to categorize jobs that did not depend exclusively on education/wages.

# The O\*NET in Recent Research: Task Input by Education Level



Source: Autor-Levy-Murnane, 2003

## **Example of the O\*NET in Recent Research: Job Tasks and Technical Change**

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- **Much of this work used the Dictionary of Occupational Titles (predecessor to O\*Net).**
- **But this has changed:**
  - Goos, Manning and Salomons (2009) use O\*Net linked to harmonized occupations to analyze changes in occupation structure across 16 European countries.
  - Their work confirms hypotheses previously explored only using U.S. data.
- **O\*Net increasingly used internationally**
  - Either as a job classification tool directly or as a model for other data collections efforts

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# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

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- **Three key strengths**
  - 1. Unique tool for measuring what people do at their jobs**
  - 2. Rich set of scales – Something for everyone**
  - 3. A means to compare job tasks, requirements and activities across hundreds of occupations**

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# **Strengths, Weaknesses and Issues in the Use of O\*NET for Research**

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- **Limitations and areas for improvement**
  1. **Scales have no intrinsic units or cardinality**
  2. **Large set of categories that appear overlapping, non-distinct and (presumably) expensive to collect**
  3. **Intrinsic redundancy**
  4. **Questions that only an expert can answer**
  5. **Lack of longitudinal information on occupations**
  6. **Lack of basic statistical details at level of occupations**
  7. **Absence of links to person-level characteristics (wish list)**

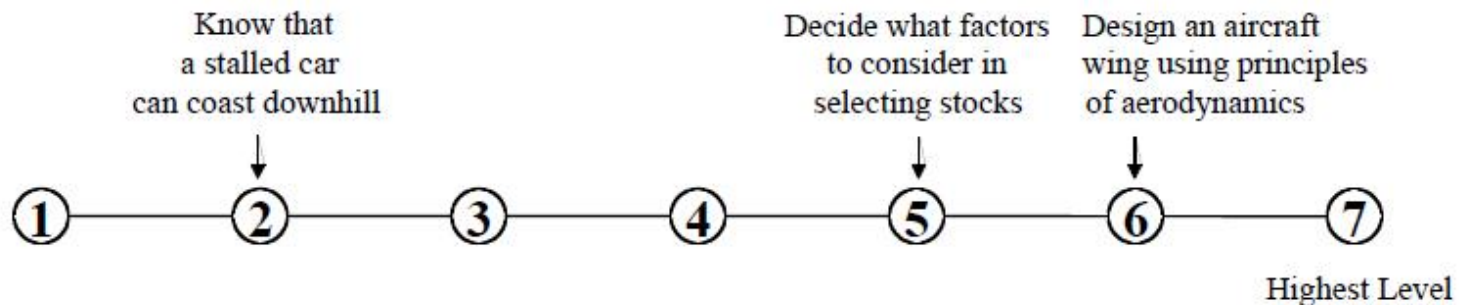
# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

- **Limitation 1:**  
**Scales have no intrinsic units or cardinality**

## 8. Deductive Reasoning

The ability to apply general rules to specific problems to produce answers that make sense.

B. What level of DEDUCTIVE REASONING is needed to perform *your current job*?



- [Example is from the “Abilities” questionnaire ]

# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

- **Limitation 2: Large set of categories that appear overlapping, non-distinct and (presumably) expensive to collect**
- **What is the difference between this “Ability”**

## 4. Written Expression

The ability to communicate information and ideas in writing so others will understand.

B. What level of WRITTEN EXPRESSION is needed to perform *your current job*?

Write a note to remind someone to take food out of the freezer

↓  
①

②

③

Write a job recommendation for a subordinate

↓  
④

⑤

Write an advanced economics textbook

↓  
⑥

⑦

Highest Level

- **And this “Skill”?**

## 3. Writing

Communicating effectively in writing as appropriate for the needs of the audience.

B. What level of WRITING is needed to perform *your current job*?

Take a telephone message

↓

①

②

③

Write a memo to staff outlining new directives

↓

④

⑤

Write a novel for publication

↓

⑥

⑦

Highest Level

# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

- **Limitation 3: Intrinsic redundancy**
- **Few cases where “Level” of Oral Expression is High but its “Importance” is Low (or vice versa)**
- **In practice, correlation between “Importance” and “Level” is over 0.90 in most/all cases**

## 3. Oral Expression

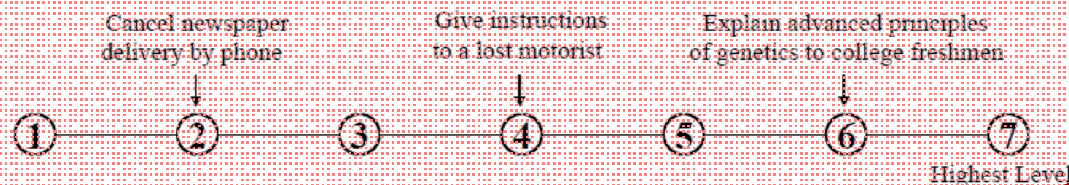
The ability to communicate information and ideas in speaking so others will understand.

A. How important is ORAL EXPRESSION to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

B. What level of ORAL EXPRESSION is needed to perform *your current job*?



# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

- Limitation 4: Questions only an expert can answer**

## 40. Gross Body Equilibrium

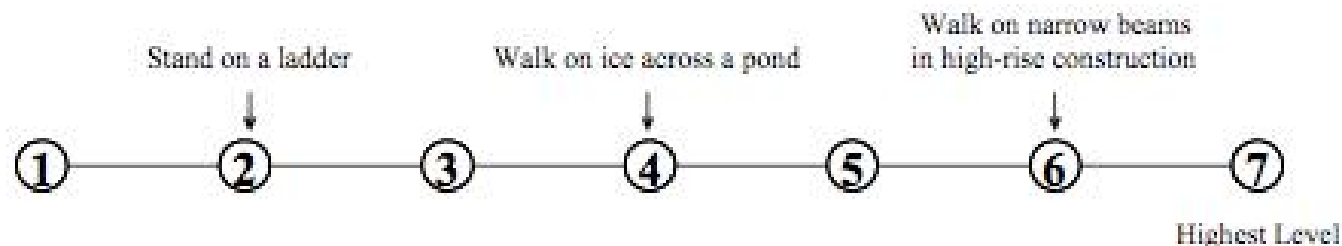
The ability to keep or regain your body balance or stay upright when in an unstable position.

A. How important is GROSS BODY EQUILIBRIUM to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

B. What level of GROSS BODY EQUILIBRIUM is needed to perform *your current job*?



# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

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- **Putting these together...**
  - Large set of overlapping categories
  - Intrinsic redundancy
  - Questions that only an expert can answer
- 1. Considerable burden on survey respondents**
  - No respondent can answer all scales
- 2. Presumably high non-response rates**
  - Understanding this is a high priority for panel
- 3. High cost per observation means**
  - Small number of observations per occupation
  - Slower refresh rate
  - Sample goes out of date
- **Net effect: Degradation of quality, validity, cost-effectiveness**

# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

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- **Limitation 5: Lack of longitudinal information on occupations**
  - Is information provided on when an occupation was surveyed?
  - Or how it has changed between surveys?
- **Longitudinal picture critical to understanding how job requirements are changing in U.S. economy**
  - This need is central for both researchers and practitioners

# Strengths, Weaknesses and Issues in the Use of O\*NET for Research

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- **Limitation 6: Lack of basic statistical details at level of occupations**
  - What is the sample size for each question?
  - In addition to the mean, what is *variance* of responses within a question?
- **This basic statistical information could and should be shared**
  - Means (averages) are not as 'meaningful' without knowing:
    1. Precision of these means
    2. Intrinsic variability within the category
  - Both could be readily calculated from O\*Net microdata
    - o No cost since these are statistics calculated from O\*Net data

## Strengths, Weaknesses and Issues in the Use of O\*NET for Research

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- **Limitation 7: Absence of links to person-level characteristics**
- **For researchers, information on job characteristics much more useful if paired with info on respondents in those jobs:**
  - Education
  - Age, gender, race
  - Hourly pay
  - *e.g. Current Population Survey style questions*
- **This again underscores what's missing from means:**
  - If two workers in same occupation use *different* skills and abilities do they receive systematically different pay?
  - No way to know this from O\*Net

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# Recommendations for Improvement

- **Near term**

1. Keep and make available successive waves of data.
2. Refresh data on a regular basis. 5 years is fine.
3. Make available survey micro-data *or* at least additional stats:
  - Mean, SD, Median, 25<sup>th</sup> percentile, 75<sup>th</sup> percentile
4. Make available micro-data on demographics of respondents *or* at least summary stats:
  - Education, gender, race, age, income (in brackets)
5. Make available data on sampling:
  - Number of observations. Response rate. Date range of responses
6. Make data downloads simpler, more user-friendly

## Recommendations for Improvement

- **Longer term**

1. Prune, simplify, rationalize content model
2. Vastly simplify questions so that actual people, not experts, can describe their jobs
3. Clarify and improve sampling frame
4. Prevent proliferation of tiny occupations (saps resources)
5. Formalize and institutionalize mechanism for consistent re-sampling of occupations on quinquennial basis.

# Summary

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- 1. O\*Net has substantial, growing role in labor market research**
  - Skill-demands debate
  - Offshoring debate
  - Immigration debate
- 2. There is no other comprehensive, contemporary research instrument that provides comparable information**
- 3. These unique virtues increase the social value of helping O\*Net to reach its research potential (without raising costs)**
  - a) Greater precision of questions/concepts
  - b) Reduction of duplication
  - c) Addition of longitudinal info on occupations as instrument evolves
  - d) Reporting additional stats: Sample size, variances
  - e) Linking to person-level data