Addressing the Demand for Time Series and Longitudinal Data on Occupational Employment

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Motivation

- Among the important potential effects of increased off-shoring are changes in the occupational composition of U.S. employment
  - Time series data on occupational employment would be useful for studying these effects in the aggregate
  - Longitudinal data on the mix of jobs at individual enterprises would be useful for understanding the dynamics of off-shoring at the level of the individual firm
- Our paper: evaluate the OES as a source of time series and longitudinal data on occupational employment [Sturgeon (2006), NAPA (2006)]

Today's Presentation

(1) Describe the OES survey

(2) Can we use historical OES data to construct occupational employment time series?

(3) How we might redesign the OES for time series and longitudinal analysis

(4) Concluding thoughts

(1) Describe the OES survey

- The Occupational Employment Statistics (OES) survey is designed to produce detailed point-in-time estimates of staffing patterns and wages
- The OES publishes cross-sectional estimates from data collected over a three-year period
  - Through 2001, estimates based on three annual panels
    - 400,000 estabs with Oct, Nov, or Dec reference date
  - Since 2002, estimates based on six semi-annual panels
    - 200,000 estabs with May or Nov reference date
- For the private sector, large certainty establishments are surveyed only once every three years

OCCUPATIONAL TITLE AND DESCRIPTION OF DUTIES		NUMBER OF EMPLOYEES IN SELECTED WAGE RANGES (Report Part-time Workers According to an Hourly Rate)												
		A	B	C	D	E	F	G	H	I	J	K	L	T
	Hourly (part-time or full-time)	under $6.75	$6.75 - 8.49	$8.50 - 10.74	$10.75 - 13.49	$13.50 - 16.99	$17.00 - 21.49	$21.50 - 27.24	$27.25 - 34.49	$34.50 - 43.74	$43.75 - 55.49	$55.50 - 69.99	$70.00 and over	Total Employment
	Annual (full-time only)	under $14,040	$14,040 - 17,679	$17,680 - 22,359	$22,360 - 28,079	$28,080 - 35,359	$35,360 - 44,719	$44,720 - 56,679	$56,680 - 71,759	$71,760 - 90,999	$91,000 - 115,439	$115,440 - 145,599	$145,600 and over	

Management Occupations

(Managers in this section have other managers/supervisors reporting to them.)

Chief Executives - Determine and formulate policies and provide the overall direction of companies or private and public sector organizations within the guidelines set up by a board of directors or similar governing body.	A	B	C	D	E	F	G	H	I	J	K	L	T
11-1011													

General and Operations Managers - Plan, direct, or coordinate the operations of companies or public and private sector organizations. Duties include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse in nature to be classified in any one functional area of management or administration.	A	B	C	D	E	F	G	H	I	J	K	L	T
11-1021													

(2) Can Existing OES Data Be Used to Construct Annual Time Series?

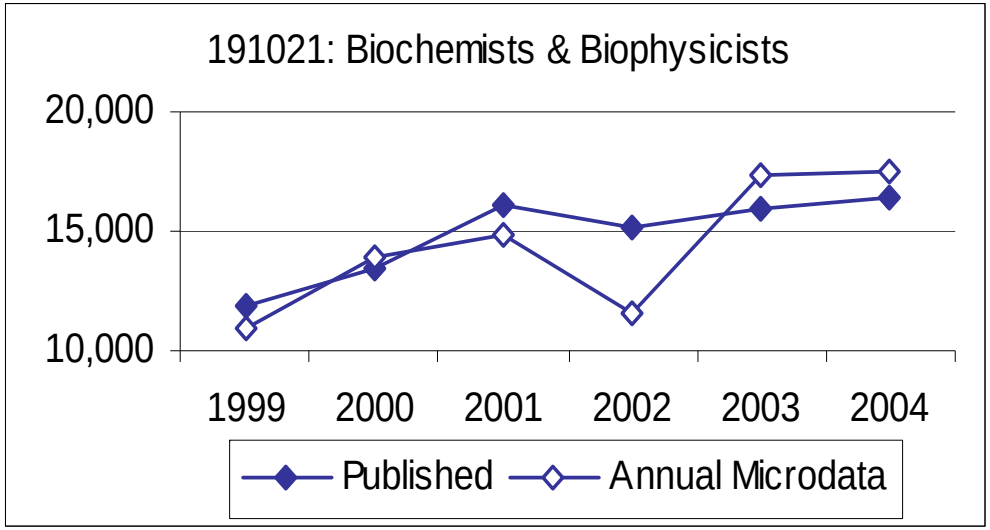
- BLS makes very clear that the OES is not designed to produce occupational time series
  - Estimates are produced with three years of data
  - Changes in occupational classification (SOC in 1999)
  - Changes in survey operations
  - …
- In our previous research, we created annual time series (1996-2004) of occupational employment from the OES November panels
  - We created time series for 19 occupations (and 13 industries)

(2) Can Existing OES Data Be Used to Construct Annual Time Series?

- Issue #1: Weights
  - Given the large number of OES sampling cells, there are a significant number of empty cells in an individual panel. Existing survey weights are not suitable for annual estimates.
  - We also see the employment by size distribution in the OES varies considerably from year to year (resulting, in part, from an uneven distribution of large certainty establishments from year to year)
  - Both require weight adjustments

(2) Can Existing OES Data Be Used to Construct Annual Time Series?

- Our adjusted weights appear to perform adequately for the 19 aggregate occupations
- For detailed occupations, the annual estimates are volatile
- Figure 1 in our paper presents annual time series for the ten occupations identified by Jensen & Kletzer (2009) as the most off-shorable



(2) Can Existing OES Data Be Used to Construct Annual Time Series?

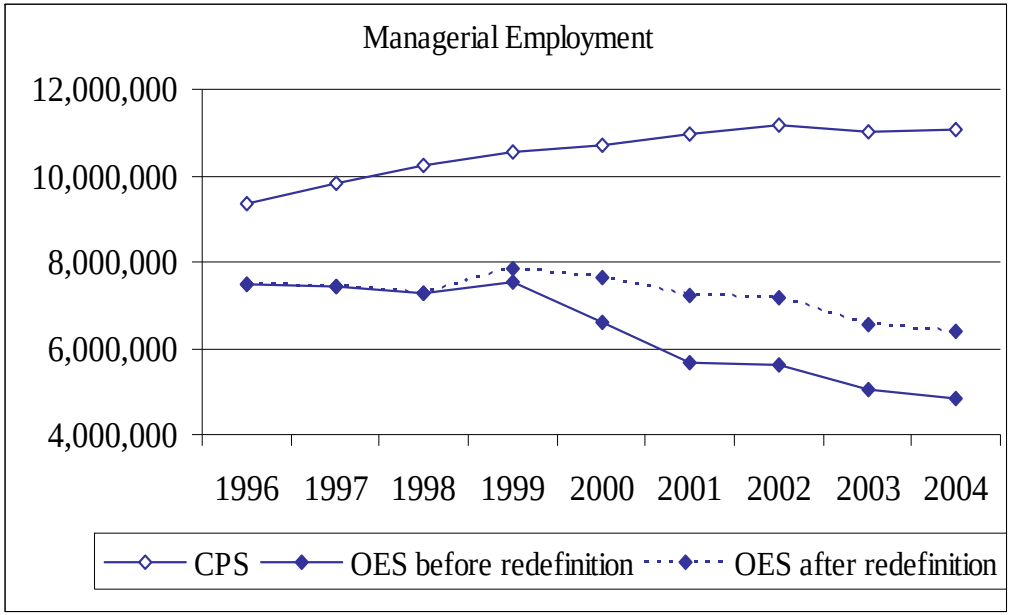
- Issue #2: Breaks in occupation and industry classifications
  - Of the 769 detailed occupations included in the SOC when introduced in 1999, only 374 could be cross-walked to occupations that existed in the old OES classification
  - We created time series for 19 aggregate occupations (relying on a concordance developed by Matt Dey)

(2) Can Existing OES Data Be Used to Construct Annual Time Series?

- Issue #3: Changes in survey operations

  Example: implementation of the SOC in 1999 was accompanied by new training in SOC principles. 1999 also introduced new unstructured survey forms submitted by small establishments.

Although not immediately relevant for off-shoring, what happened to the employment of managers highlights how improving point-in-time survey estimates may impact time-series estimates



(3) Redesigning the OES for Time Series and Longitudinal Analysis

- We present three options for enhancing the OES sample (other options are also possible):
  (1) A sample to support annual OES time series
  (2) A sample suitable for longitudinal firm-level analysis
  (3) A hybrid of (1) and (2)
- Qualifiers with these three options:
  - Cost estimates are rough
  - Cost estimates are only for data collection; staff costs for editing and processing the data are not included
  - We use 2006 universe data in our simulations

(3) Redesigning the OES for Time Series and Longitudinal Analysis

<u>Option 1: Survey all large establishments every year</u>

- In the May 2006 universe:
  - 30,639 establishments with 250-499 employees
  - 10,894 establishments with 500-999 employees
  - 5,470 establishments with 1000+ employees
- If OES annually surveys all 47,000 establishments with 250+ employees (and accounting for large estabs already in the 3-year survey cycle), this would add 19.6 million (unweighted) employment each year
  - Current sample is 20.0 million per year

(3) Redesigning the OES for Time Series and Longitudinal Analysis

<u>Option 1: Survey all large establishments every year</u>

- What are the costs of surveying all estabs sized 250+?
  - Most OES data collection is done by the states
  - FY09 payments to the states is $21.5 million
  - Money awarded to states is determined by #estabs in the state, the size distribution of the estabs, …
  - As an approximation, assume costs are $50 per small estab, $100 per estab sized 250-499, …, $200 per estab sized 1000+
- We calculate that annually surveying all establishments sized 250+ would cost $3.9 million
  - This is data collection costs only

(3) Redesigning the OES for Time Series and Longitudinal Analysis

Option 2: Survey all estabs in large firms every year

- In the May 2006 universe:
  - 322,525 estabs in 8,295 firms with 1,000-4,999 employees
  - 148,211 estabs in 964 firms with 5,000-9,999 employees
  - 429,140 estabs in 677 firms with 10,000+ employees
- Sampling 429,140 estabs at per-establishment costs would be prohibitively expensive ($18.7 million)
- If large firms are willing to provide electronic data files with job classification of all employees, there should be economies of scale in data collection

(3) Redesigning the OES for Time Series and Longitudinal Analysis

Option 2: Survey all estabs in large firms every year

- Estimates from current OES central office collection (COC) suggests $6,000 per firm
- Mandating COC from all large firms would almost certainly be more expensive
- Assuming $8,000 per firm, collecting data for all estabs from the 677 firms with 10,000+ employees would cost $3.5 million per year
  - $4.8 million per year if cost was $10,000 per firm
  - This is data collection costs only

(3) Redesigning the OES for Time Series and Longitudinal Analysis

Option 2: Survey all estabs in large firms every year

- Collecting data annually from all 429,140 estabs in the 677 firms with 10,000+ employees (accounting for estabs already sampled) would add 14.0 million employment each year to the current OES sample
- We expect this option to do less to reduce the variance of annual OES estimates than option 1
  - Add less employment (14.0 million vs. 19.6 million)
  - Establishments within a large firm are more homogeneous than a random sample of establishments

(3) Redesigning the OES for Time Series and Longitudinal Analysis

<u>Option 3: Survey all large establishments and all establishments in large firms every year</u>

- Assuming $8,000 per firm for COC, and same cost assumptions for large establishment collection, this option would:
  - Cost $6.4 million per year (data collection costs only)
  - Increase the annual sample by 27.8 million employment
- Comparisons (data collection costs only):
  - Option 1: $3.9 million, add 19.6 million employment
  - Option 2: $3.5 million, add 14.0 million employment

(3) Redesigning the OES for Time Series and Longitudinal Analysis

Other thoughts beyond data collection

- Costs cited above are just data collection costs. We also need to think about:
  - Changes in editing and imputation
  - Dual coding future revisions in the SOC
  - Both of these will cost money
- There is also a tension between improving current survey estimates versus maintaining the continuity of time series estimates

(4) Concluding Thoughts

- Two recent studies of the data available for studying services off-shoring have both recommended changes to the OES:
  - Annual time series estimates
  - Firm-level longitudinal data
- Existing OES data are not well suited for studying off-shoring:
  - Variability in estimates created from annual panels
  - Breaks in occupation (and industry) classification systems
  - Survey specific practices

(4) Concluding Thoughts

- We have proposed several options for redesigning the OES sample
  - Collecting data from all large establishments every year
  - Collecting data from all estabs in large firms every year
  - Other options are hybrids & extensions of these two
- Final thought: the value of annual time series relative to the value of firm-level longitudinal data
  - Mission of BLS & OES is to publish aggregate statistics
  - Access to confidential (non-public use) microdata remains an issue for Federal statistical agencies