

Administration Above Administrators:
The Changing Technology of Healthcare Management
Online Appendix

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1 Measuring administrative labor costs

Our estimates of administrative labour spending relies on Occupational Employment Statistics (OES) from the Bureau of Labor Statistics (BLS). The OES is an annual database that presents national aggregate statistics on employment and wages for over 800 occupations by industry.

It should be noted that industries are classified using the Standardized Industrial Code (SIC) system in the OES dataset prior to 2002, and North American Industry Classification System (NAICS) thereafter. As such, it was necessary to perform two crosswalks:

- First, a crosswalk from NAICS to SIC on the post-2002 OES data to establish time-series with a single, consistent industry identifier.
- Second, a crosswalk from SIC back to NAICS for consistency with the 3-digit NAICS used in the Input/Output (I/O) tables produced by the Bureau of Economic Analysis (BEA).

In our analysis we have classified workers in traditional ‘white-collar’ occupation groups as administrative, identified using the Standard Occupational Classification (SOC) codes included in the OES dataset. The occupational codes have been standardised to ensure consistency over the time horizon of our analysis – the details of this standardisation process are included in the replication

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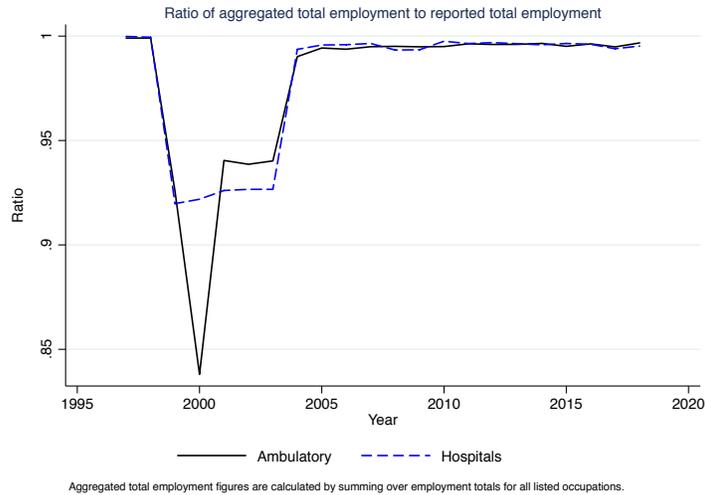
package. The broad occupation categories included in this definition are summarised in Table 1 below – a comprehensive list of each individual occupation included in our administrative definition is provided in Table 3 at the end of this document.

Furthermore, there are some years (namely, 1999-2003) in the OES data for which the reported industry total employment differs from the aggregated employment of all occupation categories in said industry – as illustrated by Figure 1. In order to account for this discrepancy, the data have been interpolated for each broad occupation category and industry over this period.

Table 1: Occupation categories included as administrative labor inputs

Occupation	Broad SOC Codes
Managers (excluding blue-collar fields)	11-0000
Business/Financial Occupations	13-0000
Computer/Mathematical Occupations	15-0000
Social Scientists & Related Workers	19-3000
Legal Occupations	23-0000
Media Occupations	27-3000
Sales & Related Occupations	41-0000
Office & Administrative Occupations	43-0000

Figure 1: Ratio of aggregated total employment to reported total employment



2 Measuring non-labor administrative costs

Our estimates of non-labor administrative inputs are reliant on data from the I/O tables produced by the BEA, namely those pertaining to the use of commodities by industry after the reallocation of inputs associated with redefined secondary production. These tables provide an insight into how industries interact with one another and the rest of the economy, drawing data from a range of sources such as the Economic Census, the Service Annual Survey and the Quarterly Census of Wages and Employment. For the purposes of our analysis, we have classified several of these non-labor inputs as administrative – see Table 2 below for more detail on the specific inputs included in our definition.

Table 2: Spending categories included as non-labor administrative inputs

Input Name	IO Code
Printing & related support activities	323
Data processing, internet publishing, & other information services	514
Insurance carriers & related activities	524
Legal services	5411
Computer systems design & related services	5415
Miscellaneous professional, scientific, & technical services	5412OP
Administrative & support services	561

3 Rescaling labor costs to account for discrepancy across sources

It should be noted that there is a discrepancy between the aggregate wage burden industries face, as implied by the OES data, and the ‘Employee Compensation’ input in the I/O tables. However, the OES figures are closely in-line with the ‘Gross Annual Payroll’ reported in the Service Annual Survey (SAS), from which the I/O tables are derived.

The SAS asks firms in service industries to report input purchases, and is customized to each sector. The BEA then assigns these inputs to another industry’s output, adjusted using a bi-proportional balancing (RAS) approach. Our estimates rely on the BEA’s mapping, so any changes, errors, or improvements in that mapping will flow through to our results.

As such, in an effort to compensate for this discrepancy, the administrative labour inputs imputed from the OES data have been rescaled as follows:

$$AdministrativeLabourInput = (OESAdministrativeWages) * \frac{I/O\ Employee\ Compensation}{OES\ Aggregate\ Industry\ Wages}$$

4 List of administrative occupations

Table 3: Occupations included as administrative

Code	Occupational title for standardized code
11-*	Managers (excluding blue-collar fields)
11-1011	General managers & top executives
11-2011	Marketing/advertising/public relations managers
11-3011	Administrative Services Managers
11-3021	Engineering, mathematical & natural sciences managers
11-3031	Financial Managers
11-3061	Purchasing Managers
11-3111	Personnel, training & labor relations managers
11-9111	Medical & Health Services Managers
11-9141	Property/real estate managers
11-9199	Managers, All Other
13-*	Business/Financial Occupations
13-1020	Buyers & purchasing agents
13-1041	Compliance officers, except construction
13-1051	Cost Estimators
13-1111	Management Analysts
13-1199	Business Operations Specialists, All Other
13-2011	Accountants & Auditors
13-2031	Budget Analysts
13-2041	Credit Analysts
13-2053	Insurance Underwriters
13-2071	Loan officers & counselors
13-2099	Financial Specialists, All Other
15-*	Computer/Mathematical Occupations
15-1132	Software Developers for Applications & System Software; Computer engineers
15-1141	Database Administrators
15-1181	Computer system, security & network specialists; other computer occupations
15-2011	Actuaries
15-2031	Operations Research Analysts (including other mathematical scientists & technicians, etc.)
15-2041	Statisticians
19-3*	Social Scientists & Related Workers
19-3011	Economists, including market researchers

19-3099	Social Scientists & Related Workers, All Other
23-*	Legal Occupations
23-1011	Lawyers
23-1021	Adjudicators, hearings officers & judicial reviewers
23-2093	Title Examiners, Abstractors, & Searchers
23-2099	Legal Support Workers, All Other
27-3*	Media Occupations
27-3031	Public relations specialists & publicity writers
27-3041	Writers & Editors
27-3099	Media & Communication Workers, All Other
41-*	Sales & Related Occupations
41-1011	First line supervisors, sales & related
41-2011	Cashiers
41-2021	Counter & Rental Clerks
41-2031	Retail Salespersons
41-3021	Insurance Sales Agents
41-4011	Sales Representatives, Wholesale & Manufacturing, Technical & Scientific Products
41-4012	Sales Representatives, Wholesale & Manufacturing, Except Technical & Scientific Products
41-9011	Demonstrators & Product Promoters
41-9022	Real Estate Sales Agents
41-9031	Sales Engineers
41-9091	News, street vendors & phone solicitors
41-9099	Sales & Related Workers, All Other
43-*	Office & Administrative Occupations
43-1011	First-Line Supervisors of Office & Administrative Support Workers
43-2011	Switchboard Operators, Including Answering Service
43-2021	Telephone Operators
43-2099	Other communication & telecommunication equipment workers
43-3011	Bill & Account Collectors
43-3021	Billing & Posting Clerks
43-3031	Bookkeeping, Accounting, & Auditing Clerks
43-3051	Payroll & Timekeeping Clerks
43-3061	Procurement Clerks
43-3071	Tellers
43-4011	Brokerage Clerks
43-4041	Credit Authorizers, Checkers, & Clerks; Loan interviewers & clerks
43-4051	Customer Service Representatives, Correspondence & Order Clerks

43-4061	Eligibility Interviewers, Government Programs
43-4071	File Clerks
43-4081	Hotel, Motel, & Resort Desk Clerks
43-4141	New Accounts Clerks
43-4161	Human Resources Assistants, Except Payroll & Timekeeping
43-4171	Receptionists & Information Clerks
43-4181	Reservation & Transportation Ticket Agents & Travel Clerks
43-5011	Cargo & Freight Agents
43-5021	Couriers & Messengers
43-5031	Police, Fire, & Ambulance Dispatchers
43-5032	Dispatchers, Except Police, Fire, & Ambulance
43-5061	Production, Planning, & Expediting Clerks
43-5071	Shipping, Receiving, & Traffic Clerks
43-5081	Stock Clerks & Order Fillers
43-5111	Weighers, Measurers, Checkers, & Samplers, Recordkeeping
43-6011	Secretaries, except legal & medical
43-6012	Legal Secretaries
43-6013	Medical Secretaries
43-9011	Computer Operators
43-9021	Data Entry Keyers
43-9022	Word Processors & Typists
43-9031	Desktop Publishers
43-9041	Insurance claims & policy examining clerks
43-9051	Mail Clerks & Mail Machine Operators, Except Postal Service
43-9061	Office Clerks, General
43-9071	Office Machine Operators, Except Computer
43-9081	Proofreaders & Copy Markers
43-9111	Statistical Assistants
43-9199	Office & Administrative Support Workers, All Other
