Setting Occupational Target Demand

2025-07-29

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Using reported occupational shares of industry employment from the Bureau of Labor Statistics' Occupational Employment and Wages dataset and the industry Value Added (quarterly data available from 2005 and annual data available from 1999).

Assume that the baseline de-trended demand for occupation i in the economy D_i is:

$D_i = \sum_{j=1}^{n} \bar{d}_{ij} = 1$

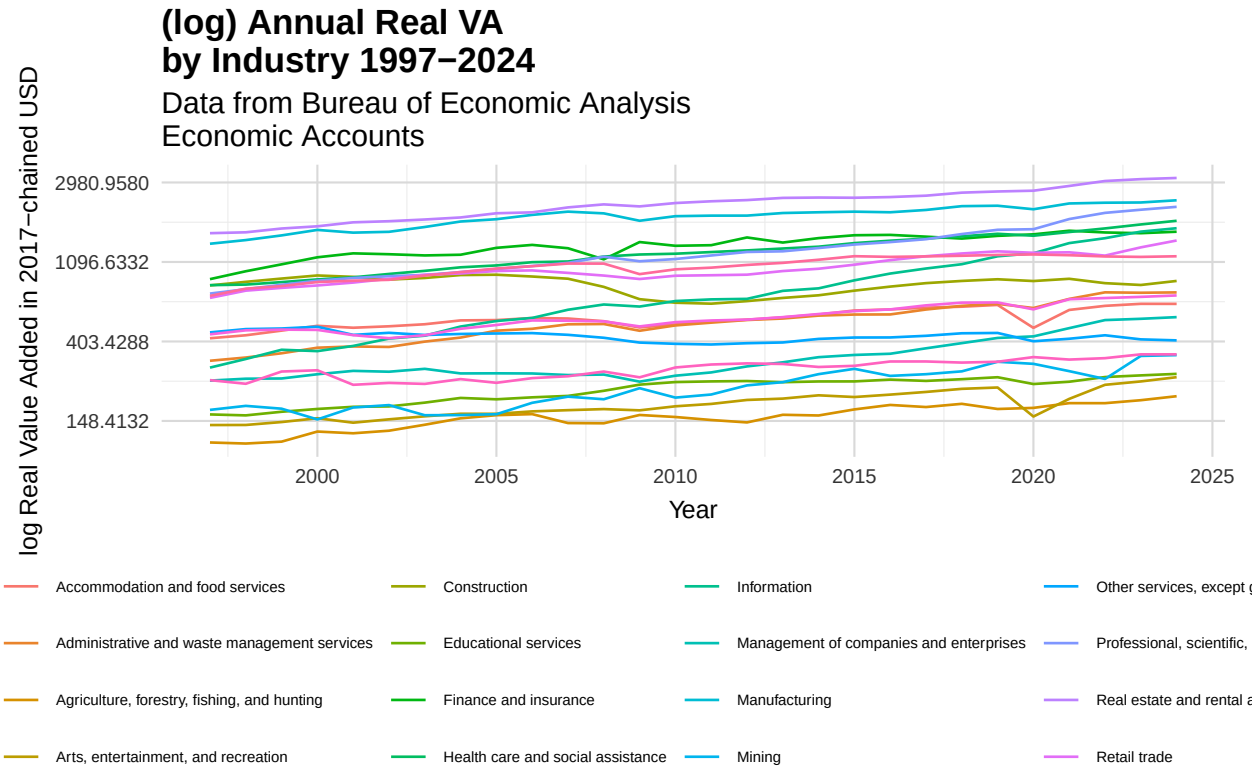
where the de-trended fluctuating demand (ie. demand at time t for occupation i) is:

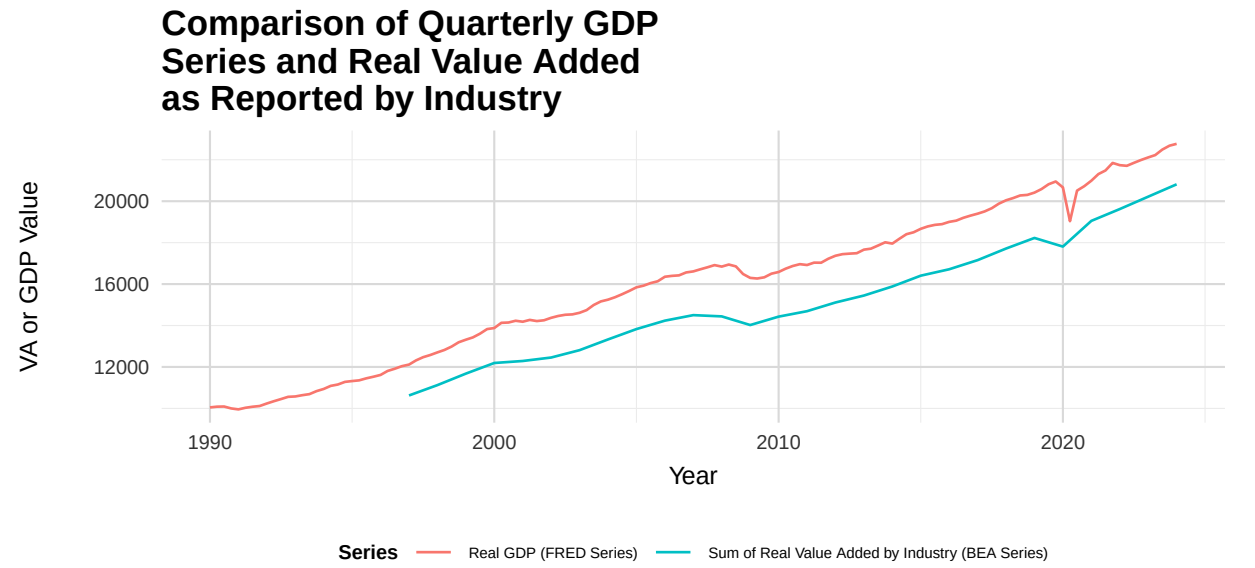
$D_{it} = \sum_{j=1}^{n} \hat{d}_{ijt}$

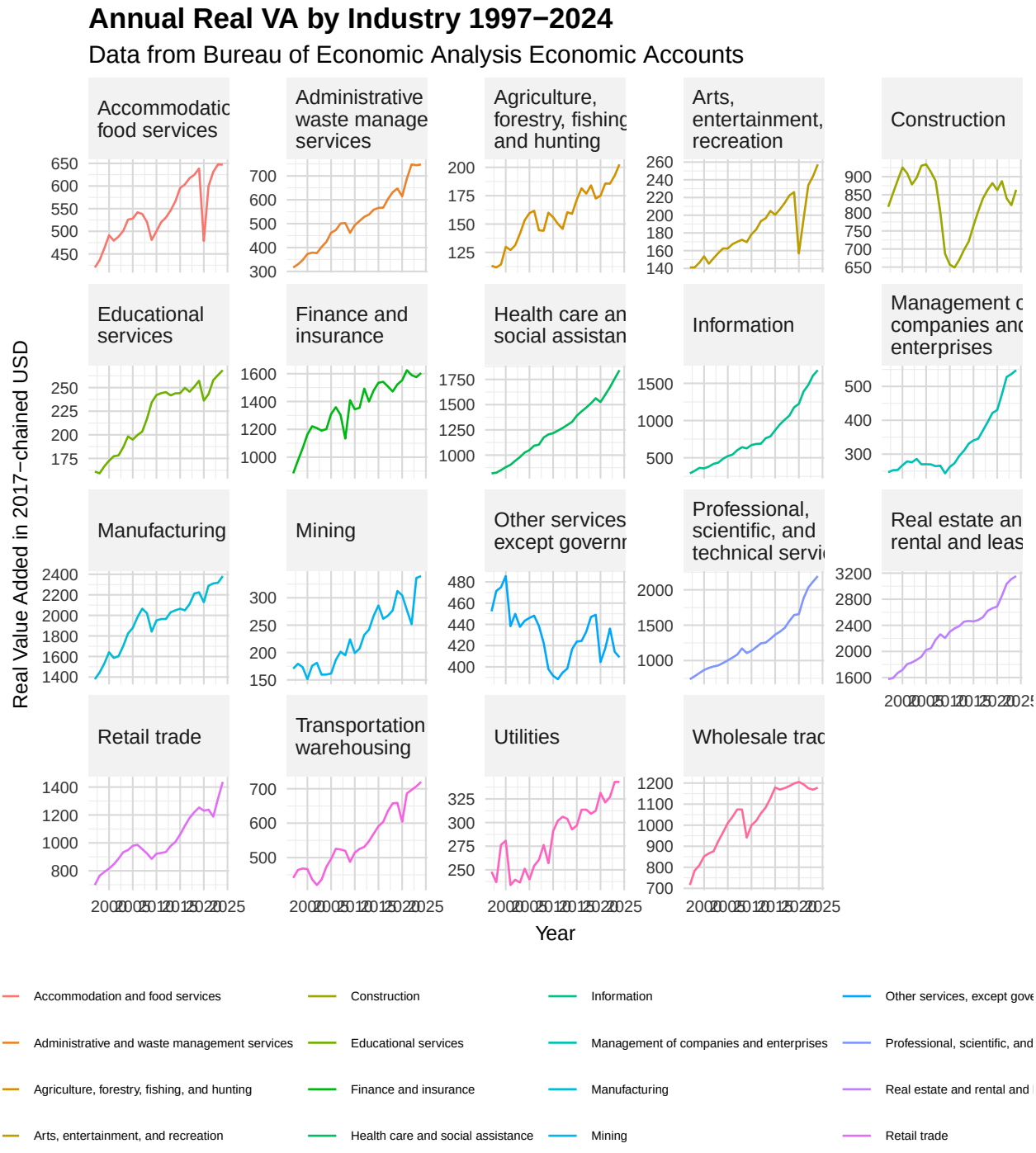
$\hat{d}_{ijt} = \sum_{j=1}^{n} \bar{d}_{ij} \theta_{jt}$

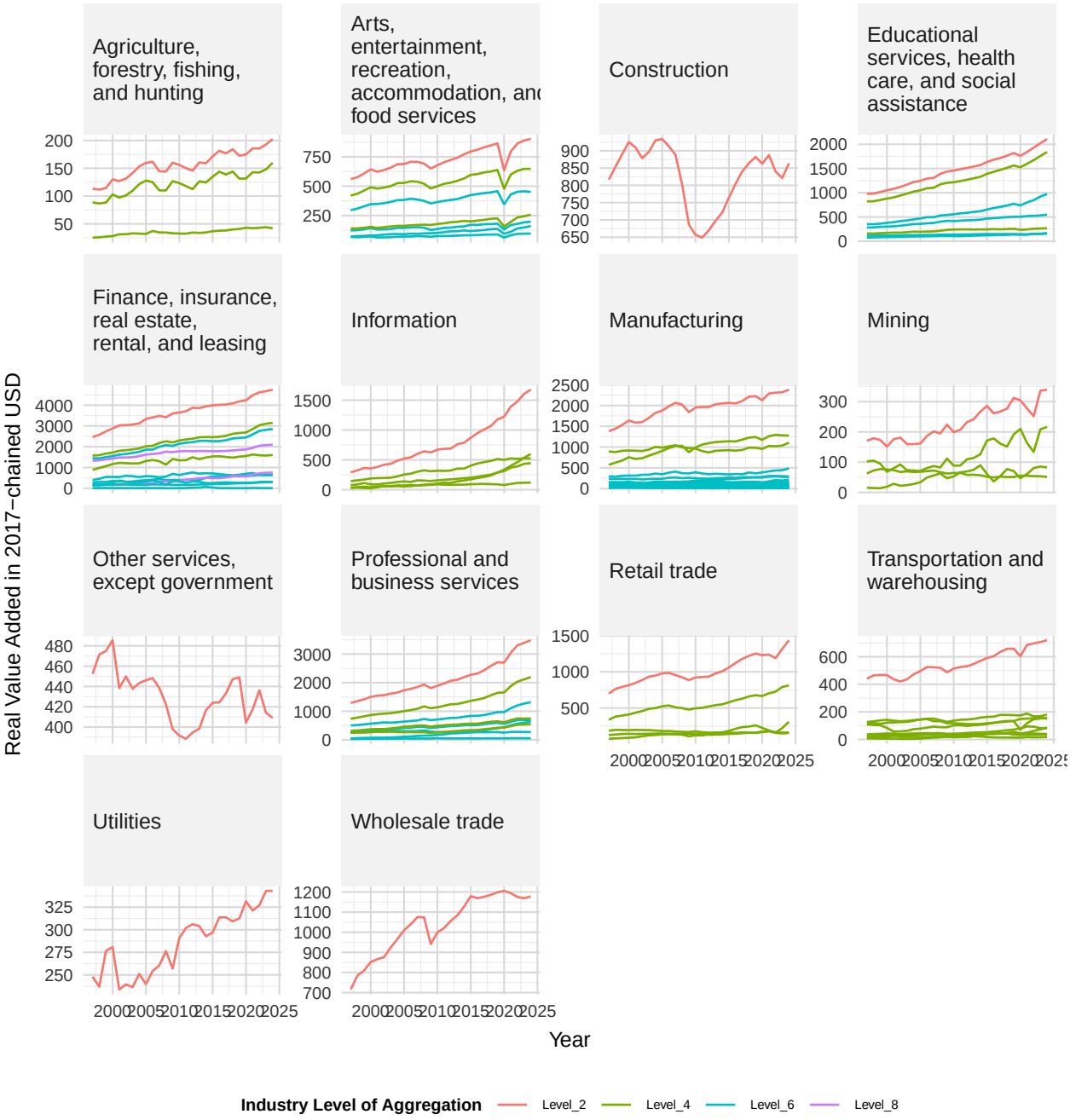
in which $\bar{d}_{ij}$ is the average share of occupation i in industry j and θ_{jt} is the de-trended value-added of industry j at time t. Thus, we obtain occupation-specific fluctuations in demand dependent on their "exposure" or the share of a specific occupation in industry j. We de-trend the value added in the same way as in the GDP series such that we obtain the fluctuation around a mean.

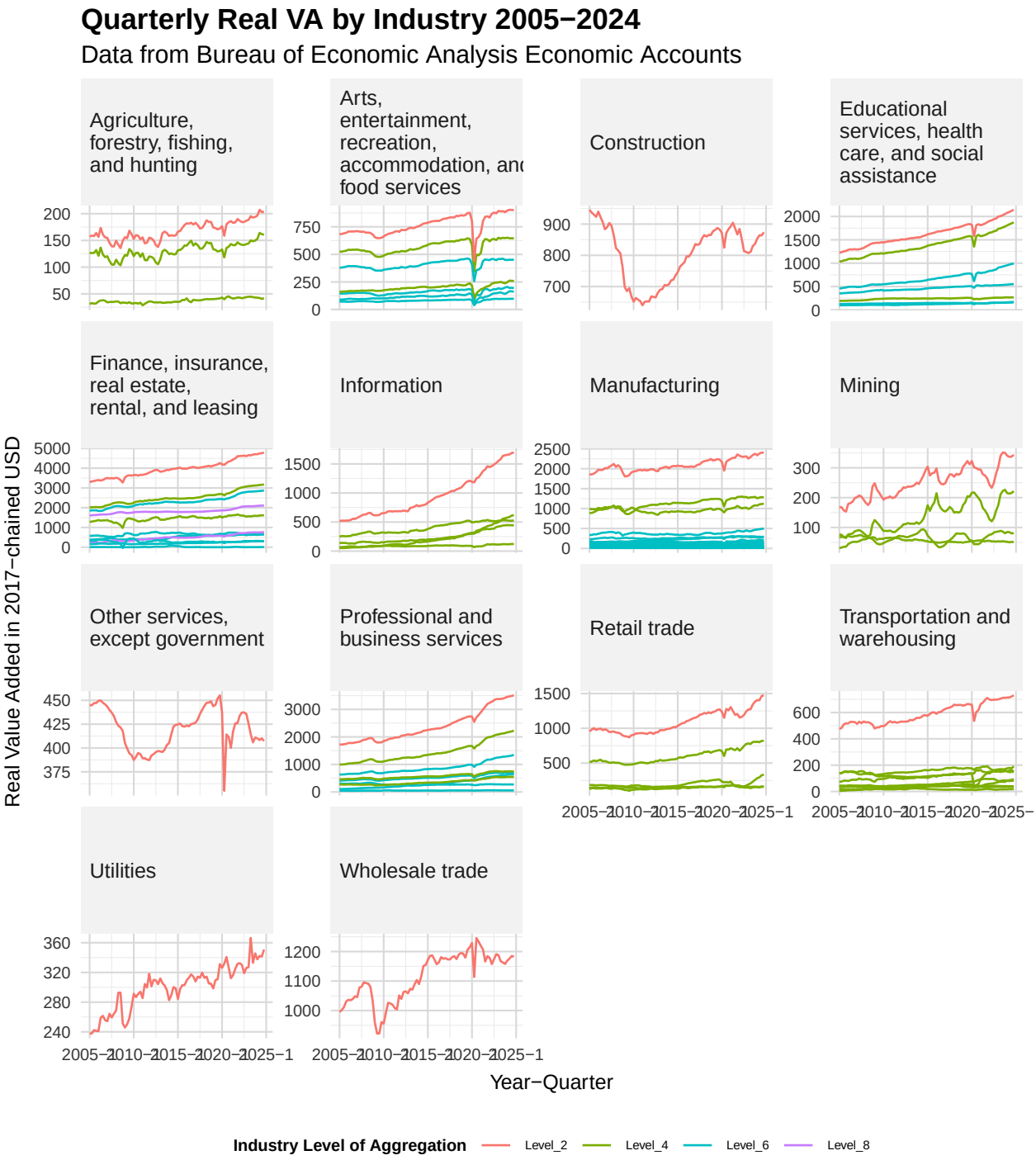
Value Added by Industry






Annual Real VA by Industry 1997−2024
Data from Bureau of Economic Analysis Economic Accounts
Accommodatic food services
Administrative waste manage services
Agriculture, forestry, fishing and hunting
Arts, entertainment, recreation
Construction
Educational services
Finance and insurance
Health care an social assistan
Information
Management c companies and enterprises
Manufacturing
Mining
Other services except governr
Professional, scientific, and technical servi
Real estate an rental and leas
Retail trade
Transportation warehousing
Utilities
Wholesale trad
Real Value Added in 2017−chained USD
Year
Accommodation and food services
Administrative and waste management services
Agriculture, forestry, fishing, and hunting
Arts, entertainment, and recreation
Construction
Educational services
Finance and insurance
Health care and social assistance
Information
Management of companies and enterprises
Manufacturing
Mining
Other services, except gove
Professional, scientific, and
Real estate and rental and
Retail trade


Annual Real VA by Industry 1997−2024
Data from Bureau of Economic Analysis Economic Accounts
Agriculture, forestry, fishing, and hunting
Arts, entertainment, recreation, accommodation, and food services
Construction
Educational services, health care, and social assistance
Finance, insurance, real estate, rental, and leasing
Information
Manufacturing
Mining
Other services, except government
Professional and business services
Retail trade
Transportation and warehousing
Utilities
Wholesale trade
Real Value Added in 2017−chained USD
Year
Industry Level of Aggregation
Level_2
Level_4
Level_6
Level_8



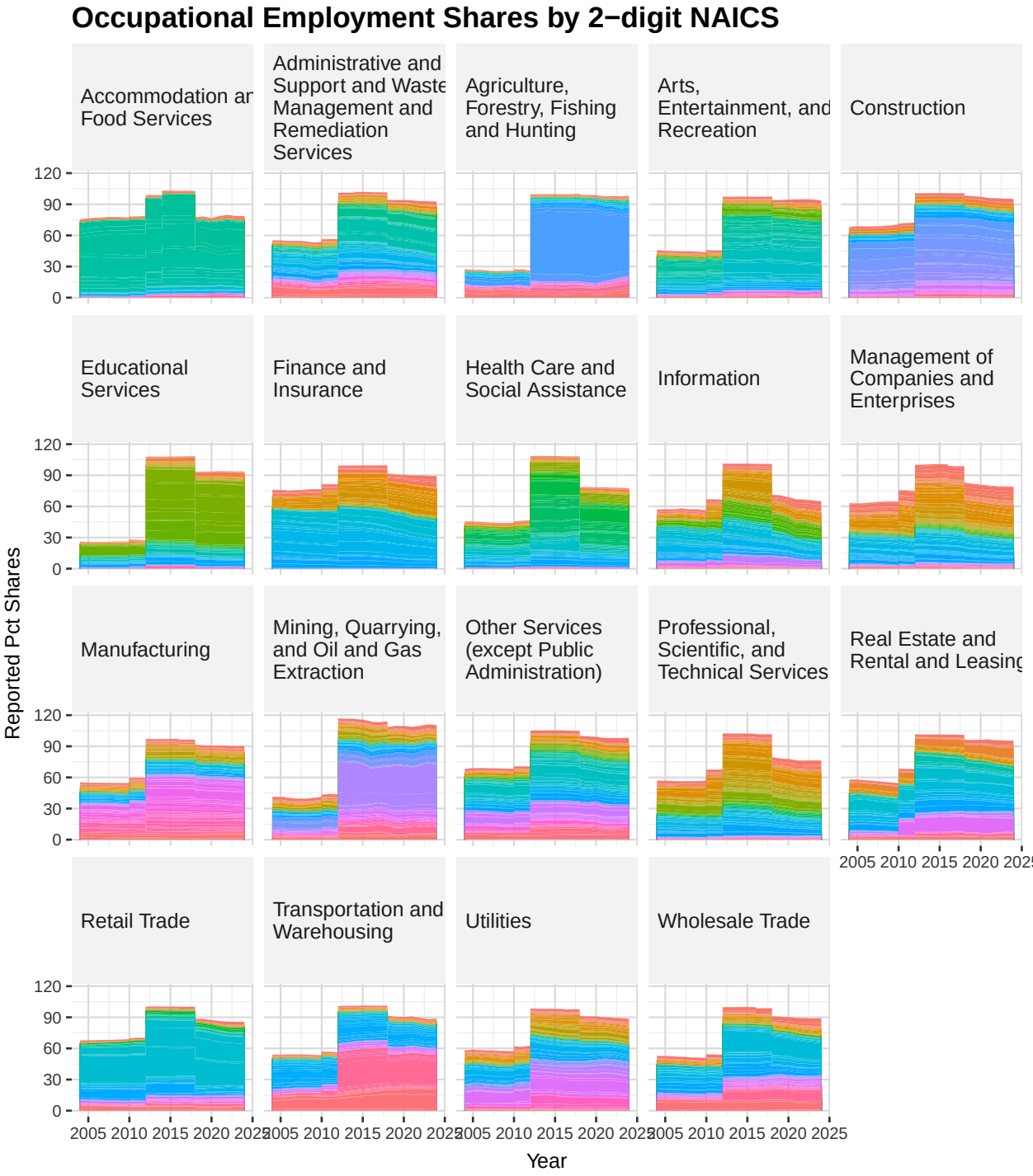
Occupation-shares of industry

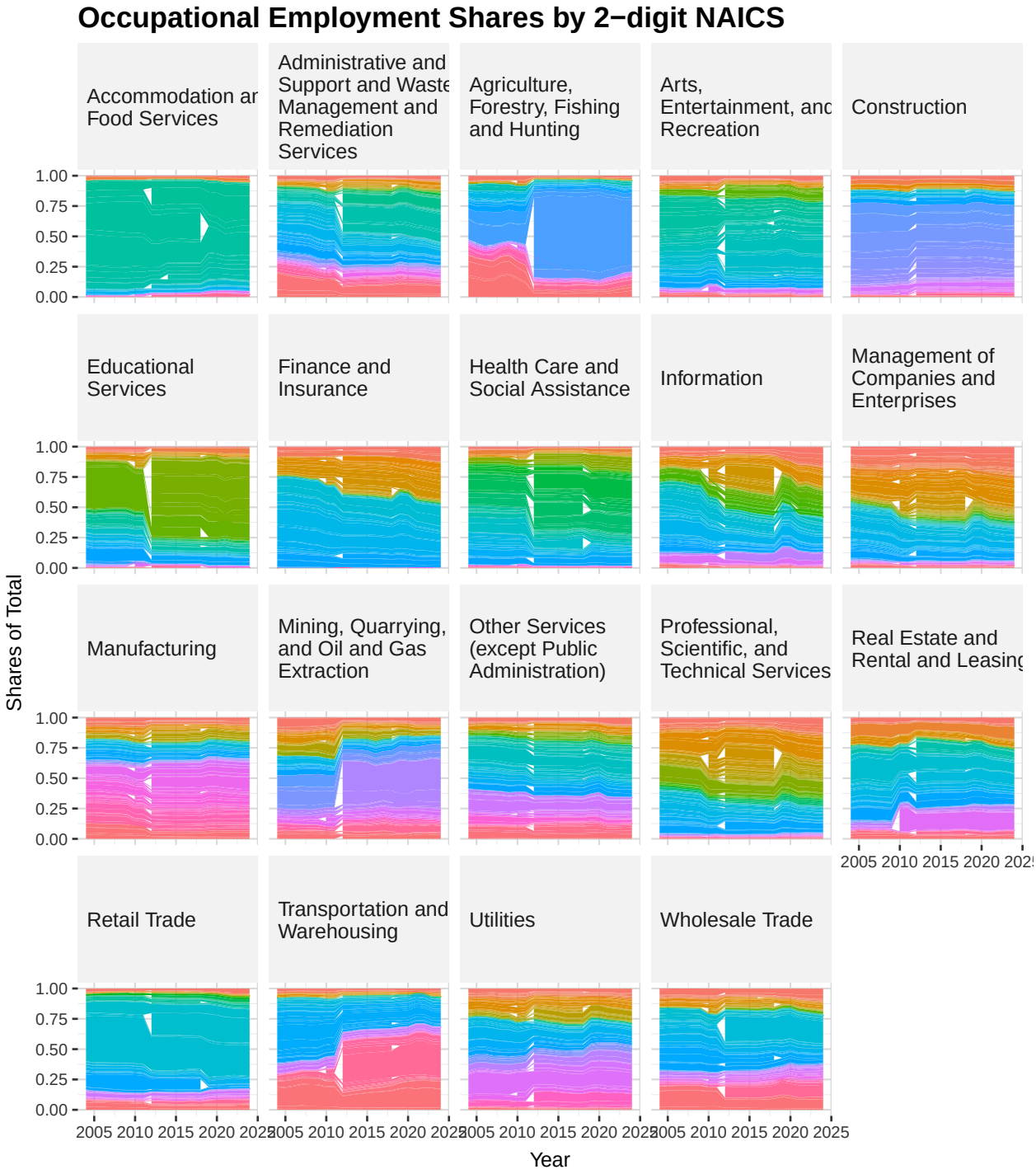
We use annual occupational shares of employment from the Occupational Employment and Wage Statistics database from the US Bureau of Labour Statistics to derive our $\bar{d}ij$.

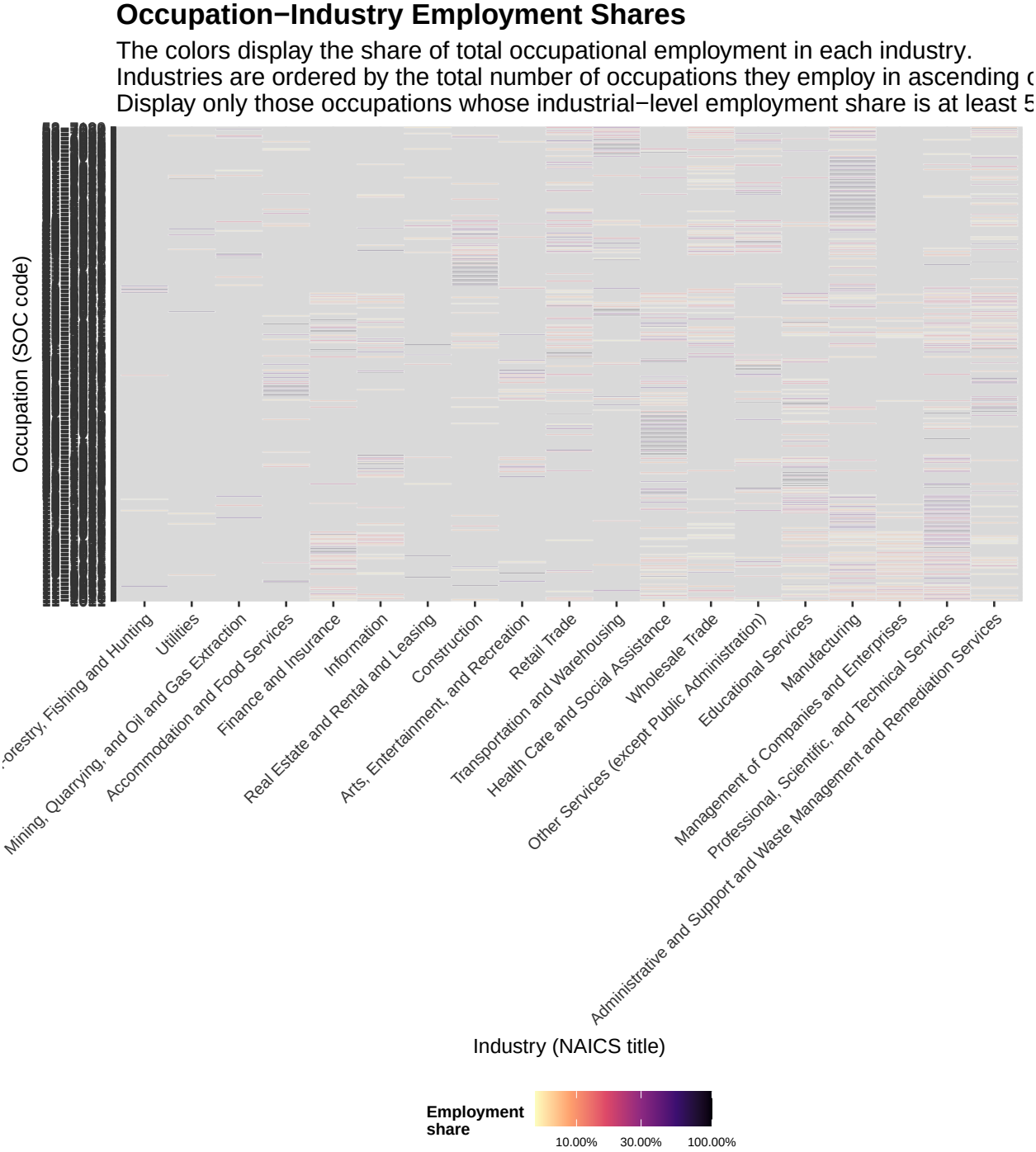
Excludes public administration. The first figure shows the "reported percent total" from the OEWS data. The discrepances in reporting is almost certainly due to a reshuffling of occupational codes in 2010 and 2018.

If we look at the shares as a percentage of total reported employment in a particular industry the "shares" are not consistent across the recategorisation - I will need to investigate this again.

We take the mean industry-share of occupational employment reported in the years where majority (>97%) of our occ codes are present (2012-2018 - after and before SOC reorganisation of 2010 and 2018).



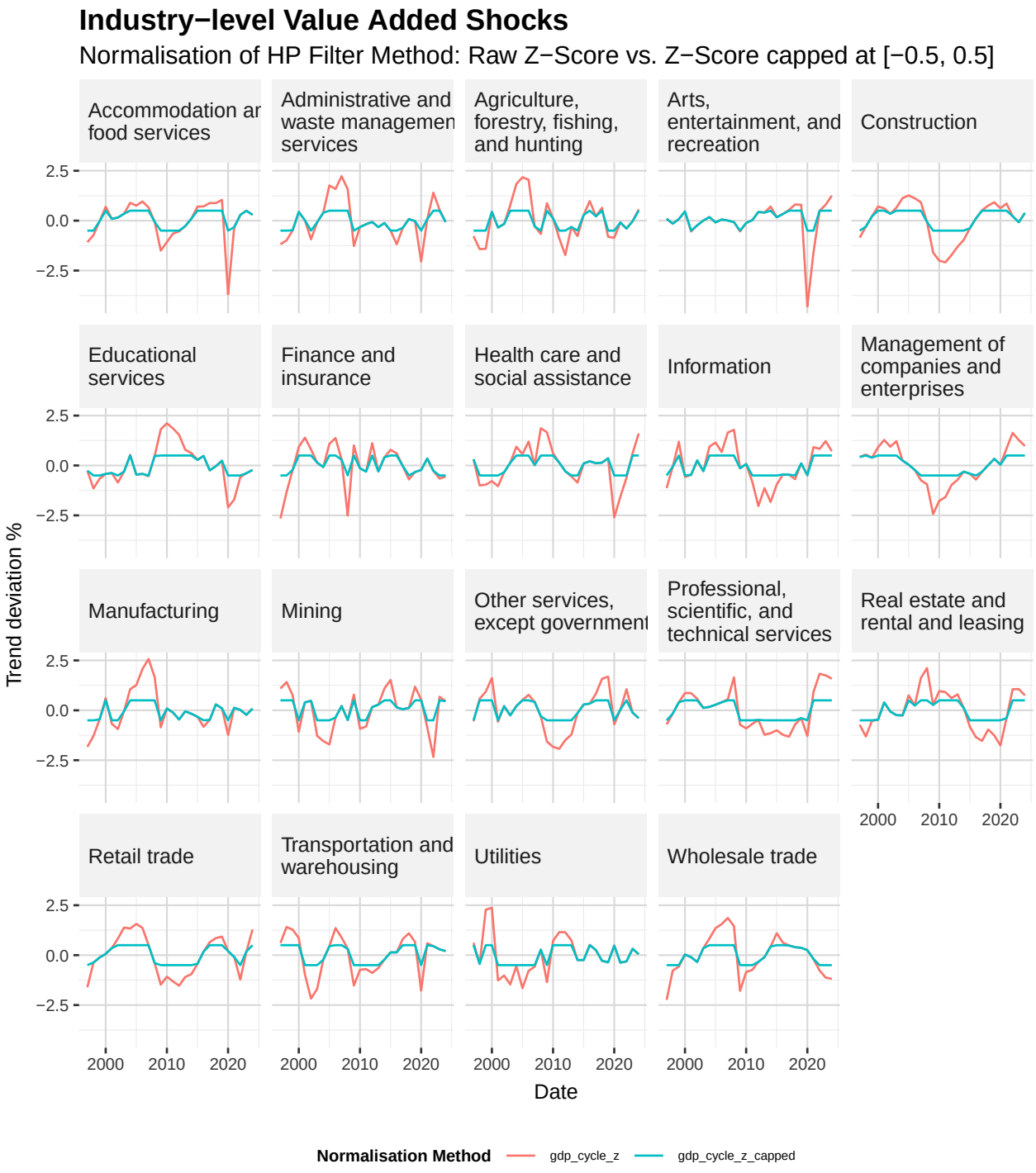

Occupational Employment Shares by 2−digit NAICS
Accommodation ar
Food Services
Administrative and
Support and Waste
Management and
Remediation
Services
Agriculture,
Forestry, Fishing
and Hunting
Arts,
Entertainment, and
Recreation
Construction
Educational
Services
Finance and
Insurance
Health Care and
Social Assistance
Information
Management of
Companies and
Enterprises
Manufacturing
Mining, Quarrying,
and Oil and Gas
Extraction
Other Services
(except Public
Administration)
Professional,
Scientific, and
Technical Services
Real Estate and
Rental and Leasing
Retail Trade
Transportation and
Warehousing
Utilities
Wholesale Trade
Shares of Total
1.00
0.75
0.50
0.25
0.00
2005 2010 2015 2020 2025
Year



[1] "Two occupational categories have a sum of mean shares > 1.1:"

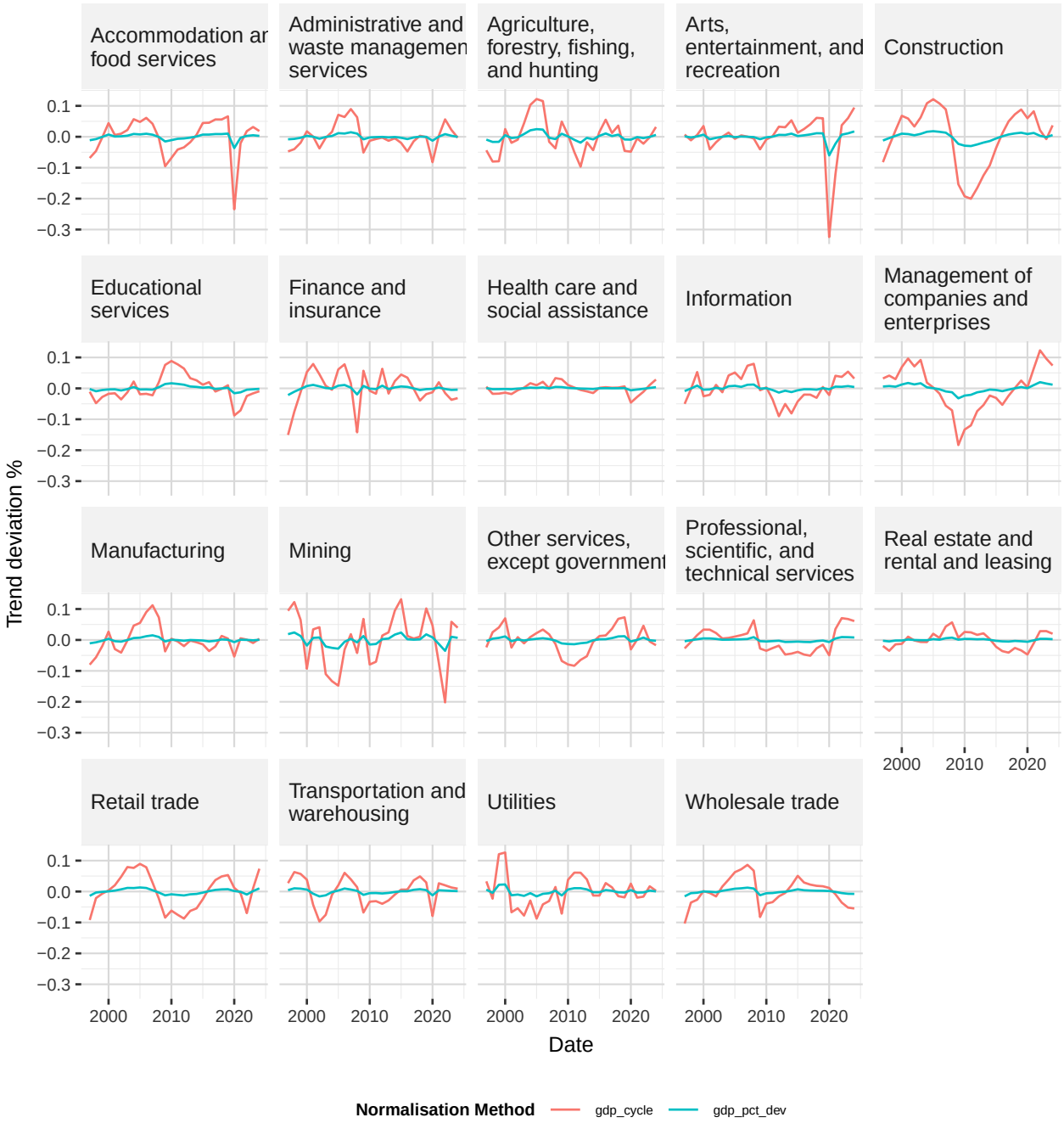
SOC2010 Occupational Code	Occupational Label	Sum of Mean Shares
45-3011	Fishers and related fishing workers	1.537169
37-2021	Pest control workers	1.135526

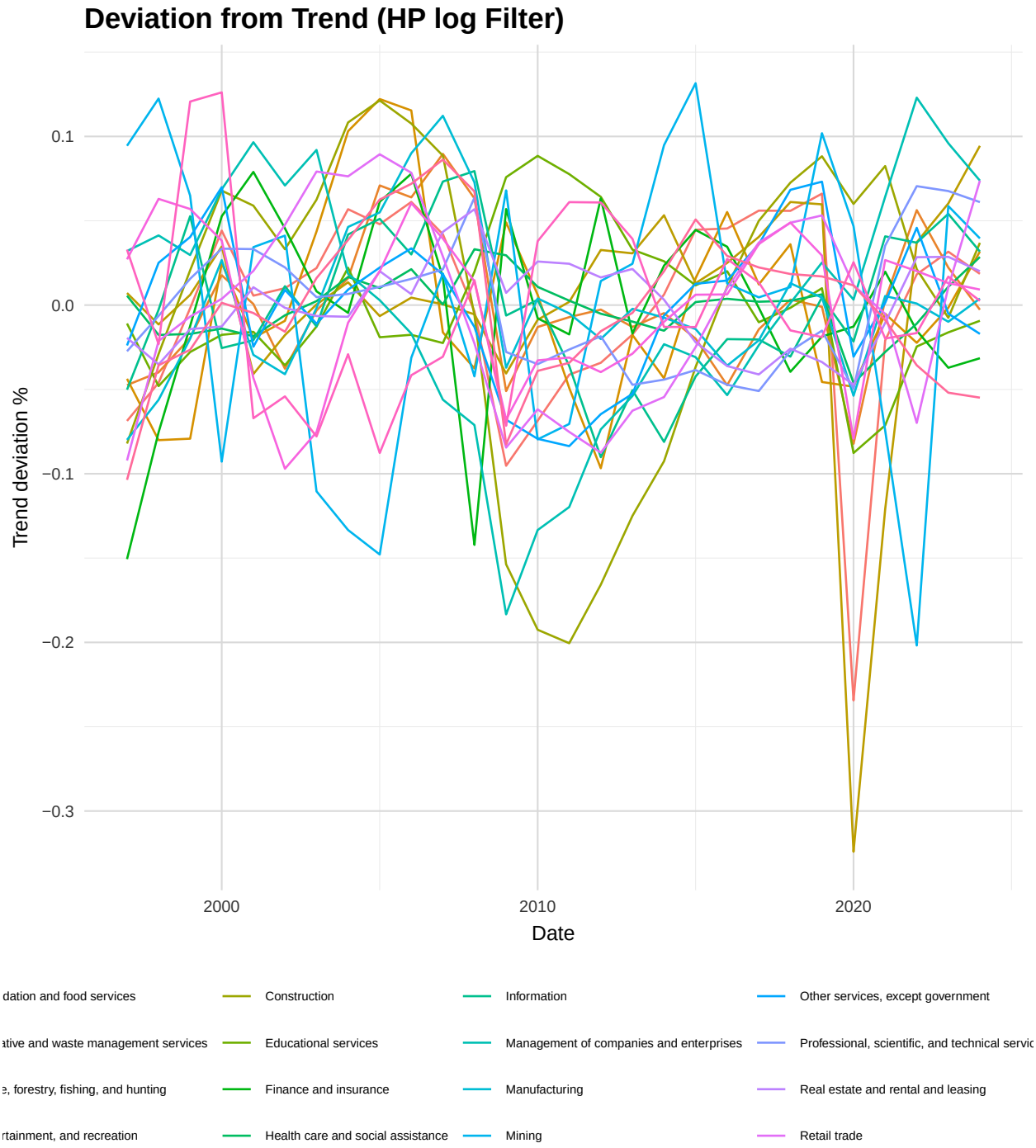
Bringing them together



Industry−level Value Added Shocks

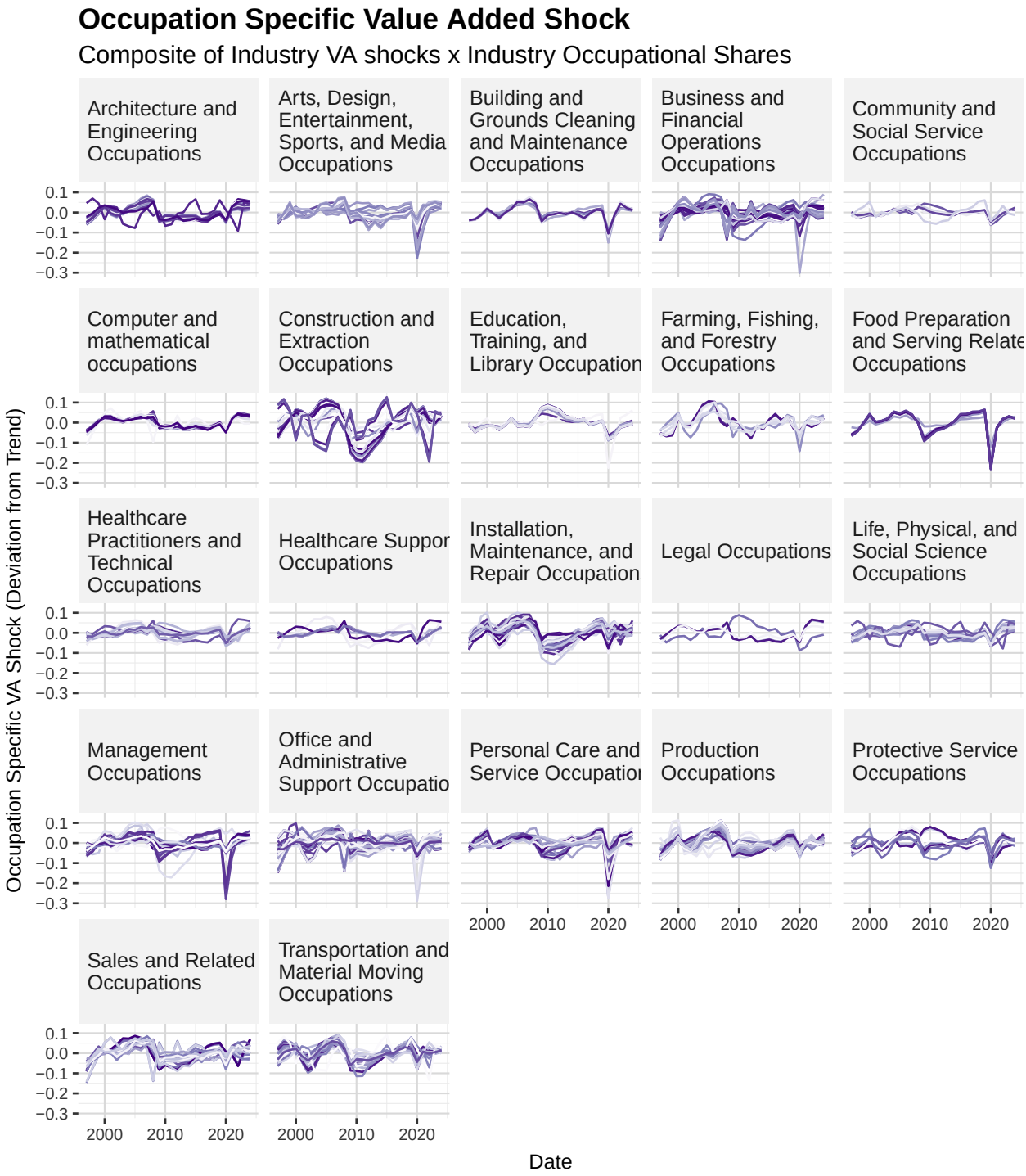
Normalisation of HP Filter Method: Raw HP Filter vs. Percent Deviation





Important future work should aim to accommodate shifts in labor productivity of different industries and/or shifting industry-specific occupational shares to account for additional sources of structural transformation beyond those explored in this work.

Important note is that we are missing information on occupation code 13-2081 (Tax examiners and collectors, and revenue agents) which are present in our occupational network but not in our VA data as they are only employed in public administration. VA information does not exist for public administration. For now, I will use the shocks to 13-2082 as the shocks to 13-2081 though we might consider changing this. For example, we could potentially abstract to say that public administration fluctuations should depend on just GDP fluctuations (ie. we use the HP-filtered GDP series that we were originally using as the direct shock to occupations employed only in public administration).


Occupation Specific Value Added Shock
Composite of Industry VA shocks x Industry Occupational Shares
Architecture and Engineering Occupations
Arts, Design, Entertainment, Sports, and Media Occupations
Building and Grounds Cleaning and Maintenance Occupations
Business and Financial Operations Occupations
Community and Social Service Occupations
Computer and mathematical occupations
Construction and Extraction Occupations
Education, Training, and Library Occupation
Farming, Fishing, and Forestry Occupations
Food Preparation and Serving Relate Occupations
Healthcare Practitioners and Technical Occupations
Healthcare Suppor Occupations
Installation, Maintenance, and Repair Occupation
Legal Occupations
Life, Physical, and Social Science Occupations
Management Occupations
Office and Administrative Support Occupatio
Personal Care and Service Occupatior
Production Occupations
Protective Service Occupations
Sales and Related Occupations
Transportation and Material Moving Occupations
Occupation Specific VA Shock (Deviation from Trend)
0.1
0.0
−0.1
−0.2
−0.3
2000
2010
2020
Date