

# Setting Occupational Target Demand

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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:

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

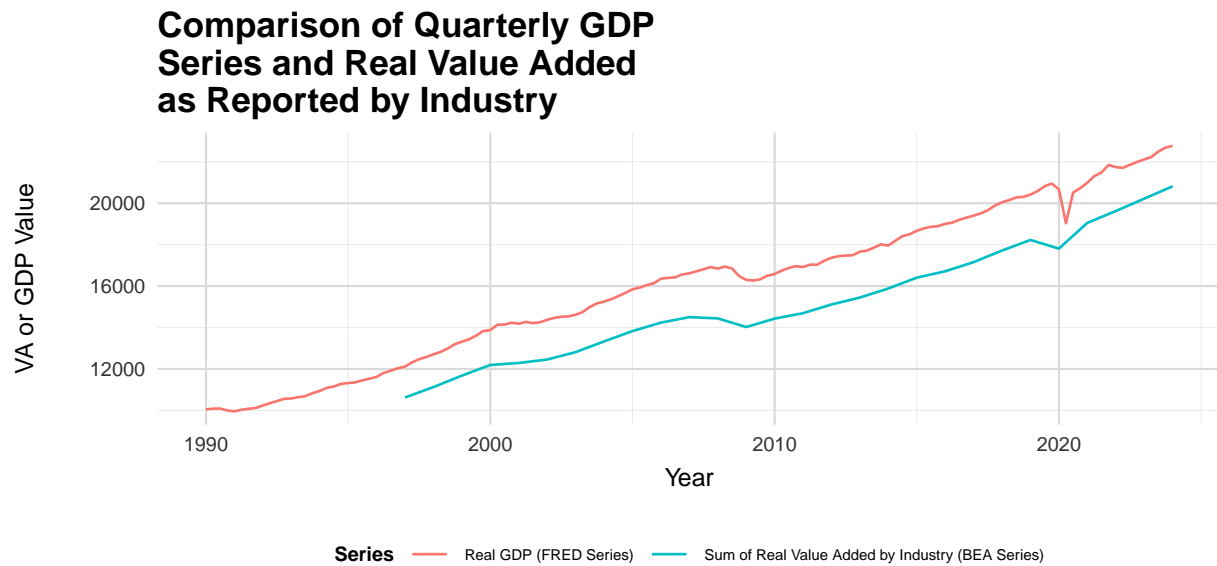
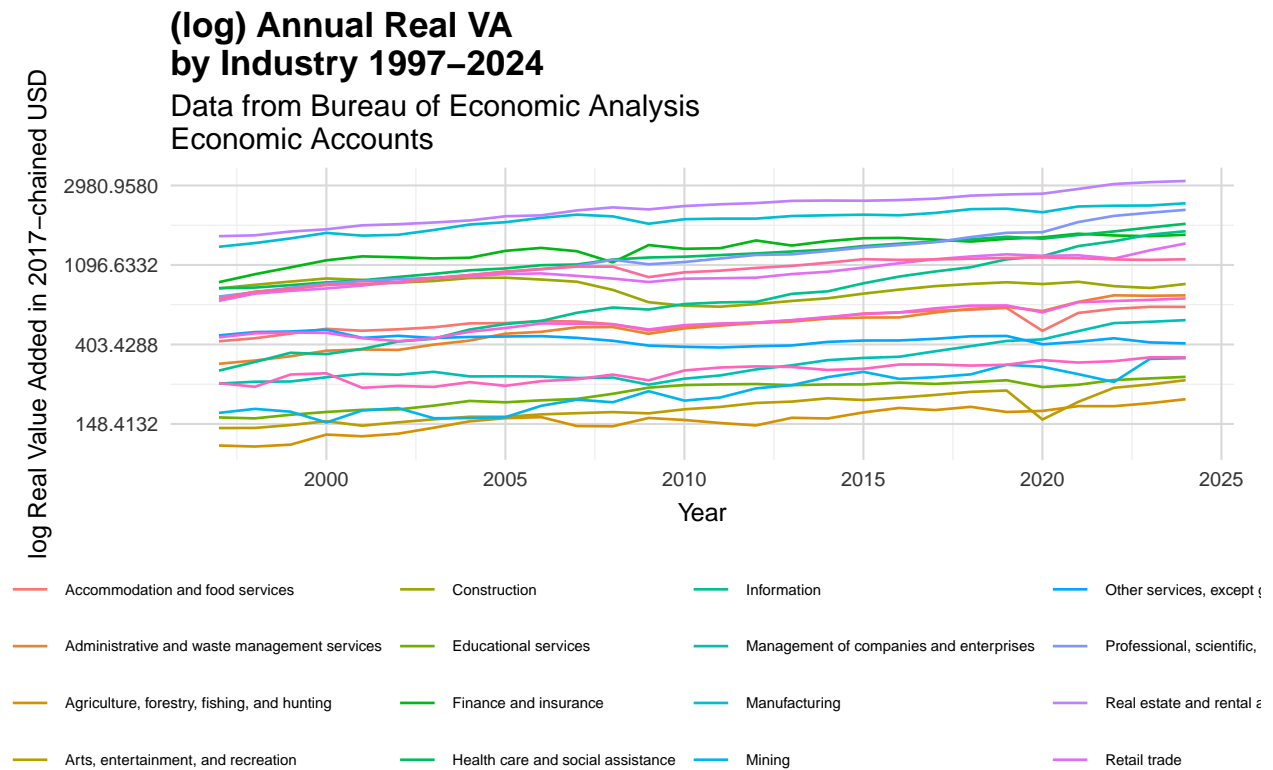
where the de-trended fluctuating demand (ie. demand at time  $t$  for occupation  $i$ ) is:

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

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

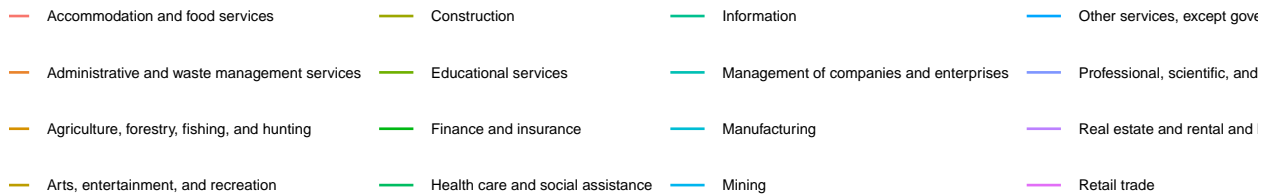
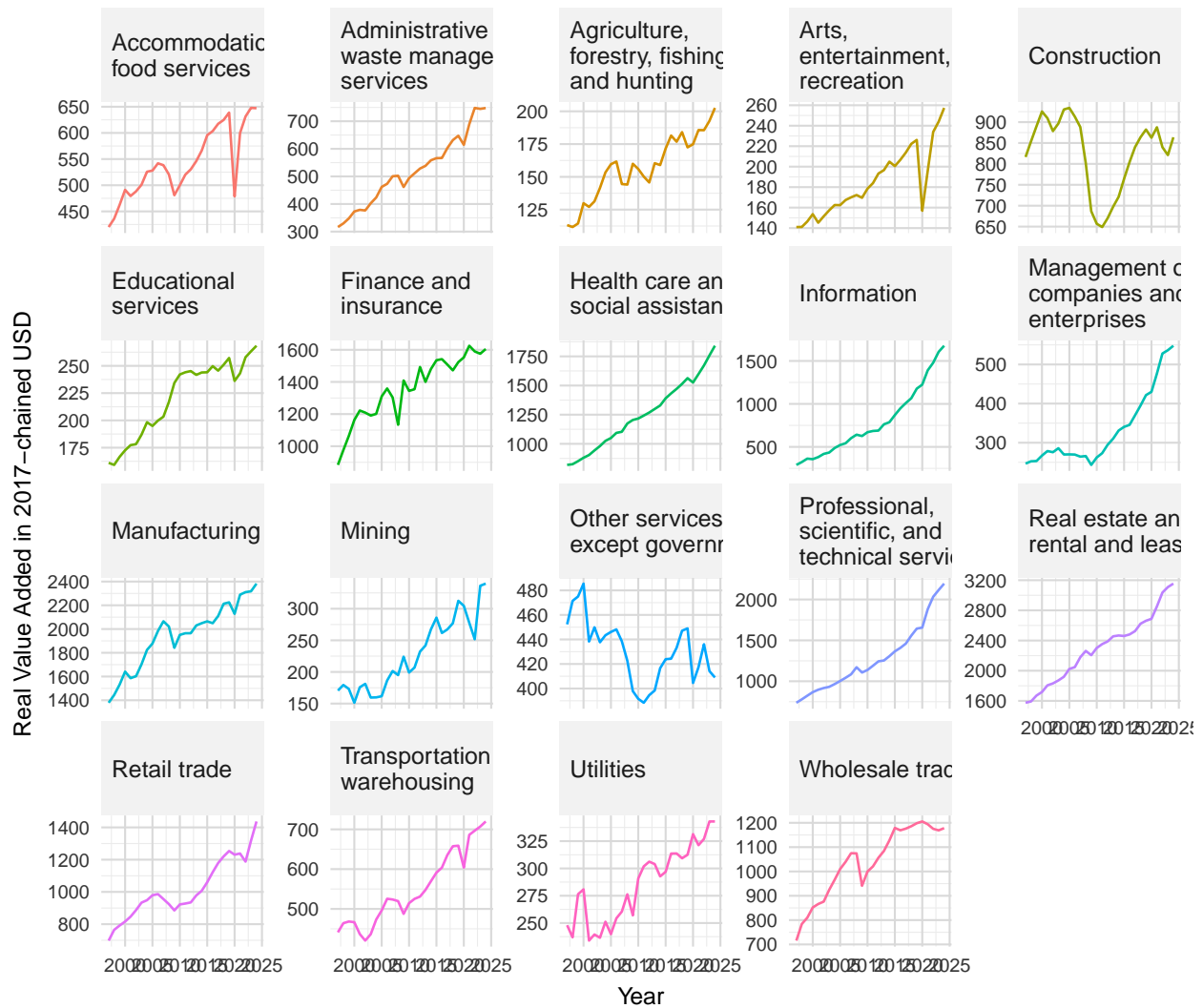
in which  $\bar{d}_{ij}$  is the average share of occupation  $i$  in industry  $j$  and  $\theta_{jt}$  is the de-trended value-added of industry  $j$  at time  $t$ . Thus, we obtain occupation-specific fluctuations in demand dependent on their “exposure” or the share of a specific occupation in industry  $j$ . 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



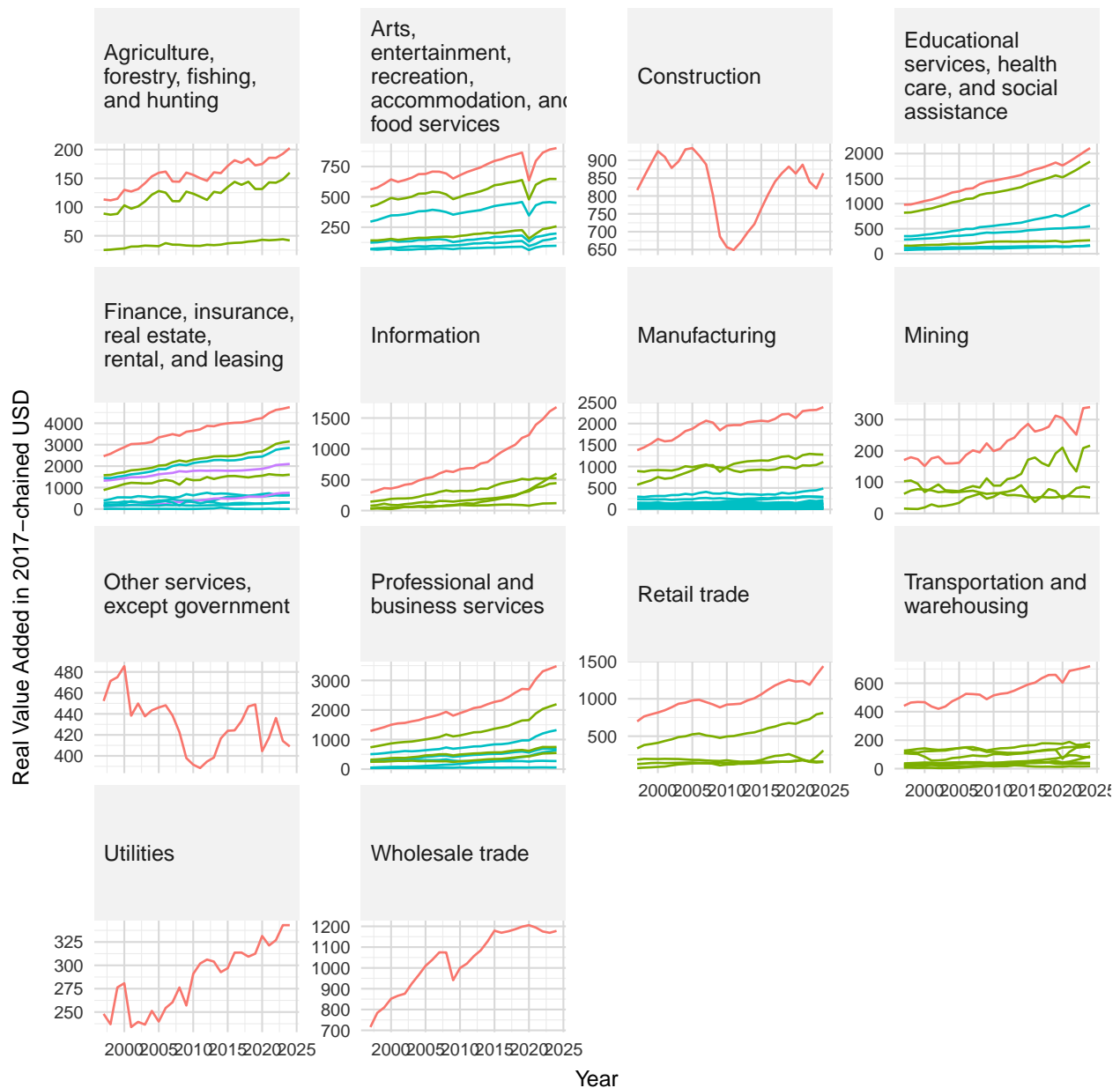
# Annual Real VA by Industry 1997–2024

Data from Bureau of Economic Analysis Economic Accounts



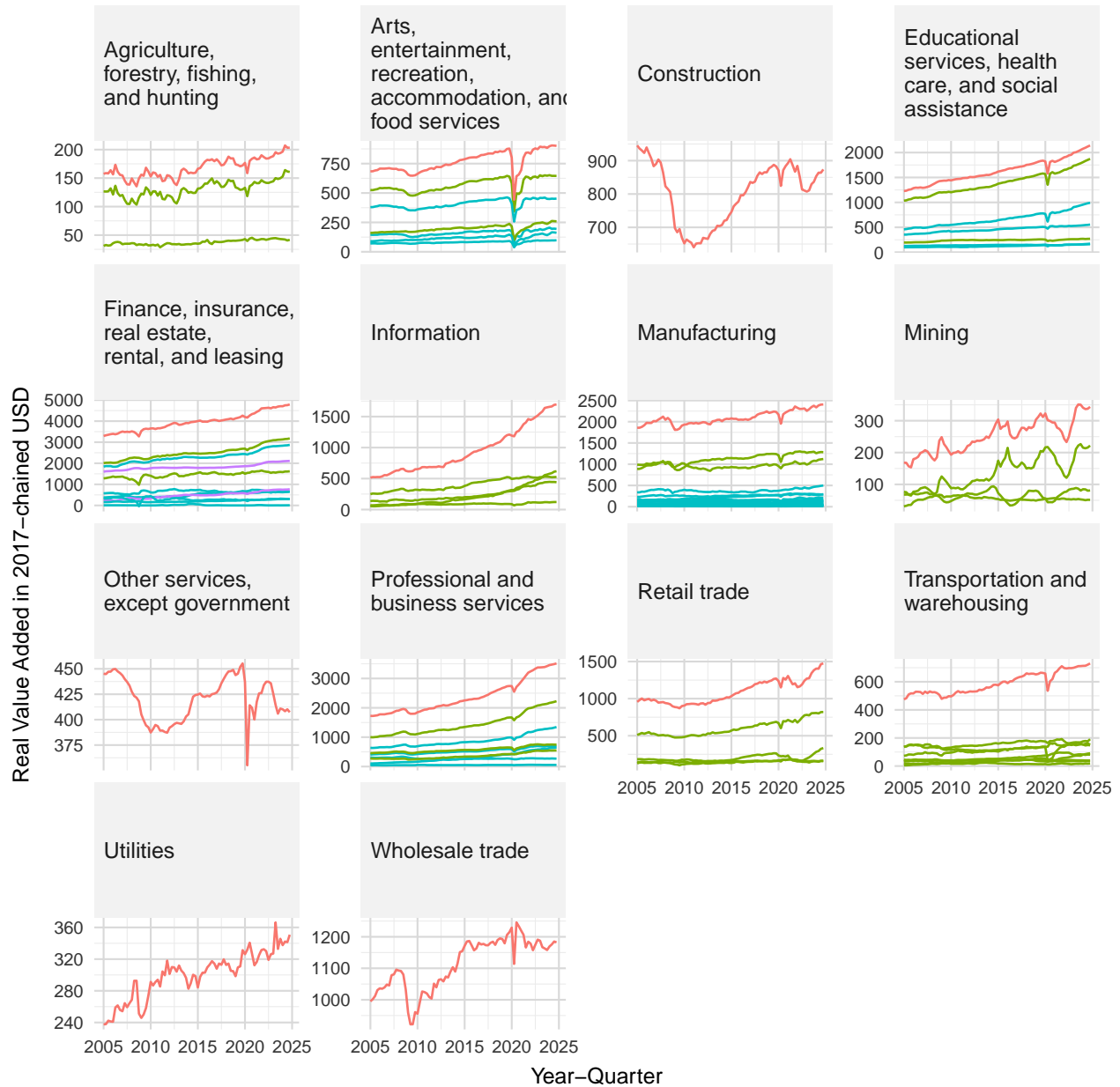
# Annual Real VA by Industry 1997–2024

Data from Bureau of Economic Analysis Economic Accounts



## Quarterly Real VA by Industry 2005–2024

Data from Bureau of Economic Analysis Economic Accounts



## Occupation-shares of industry

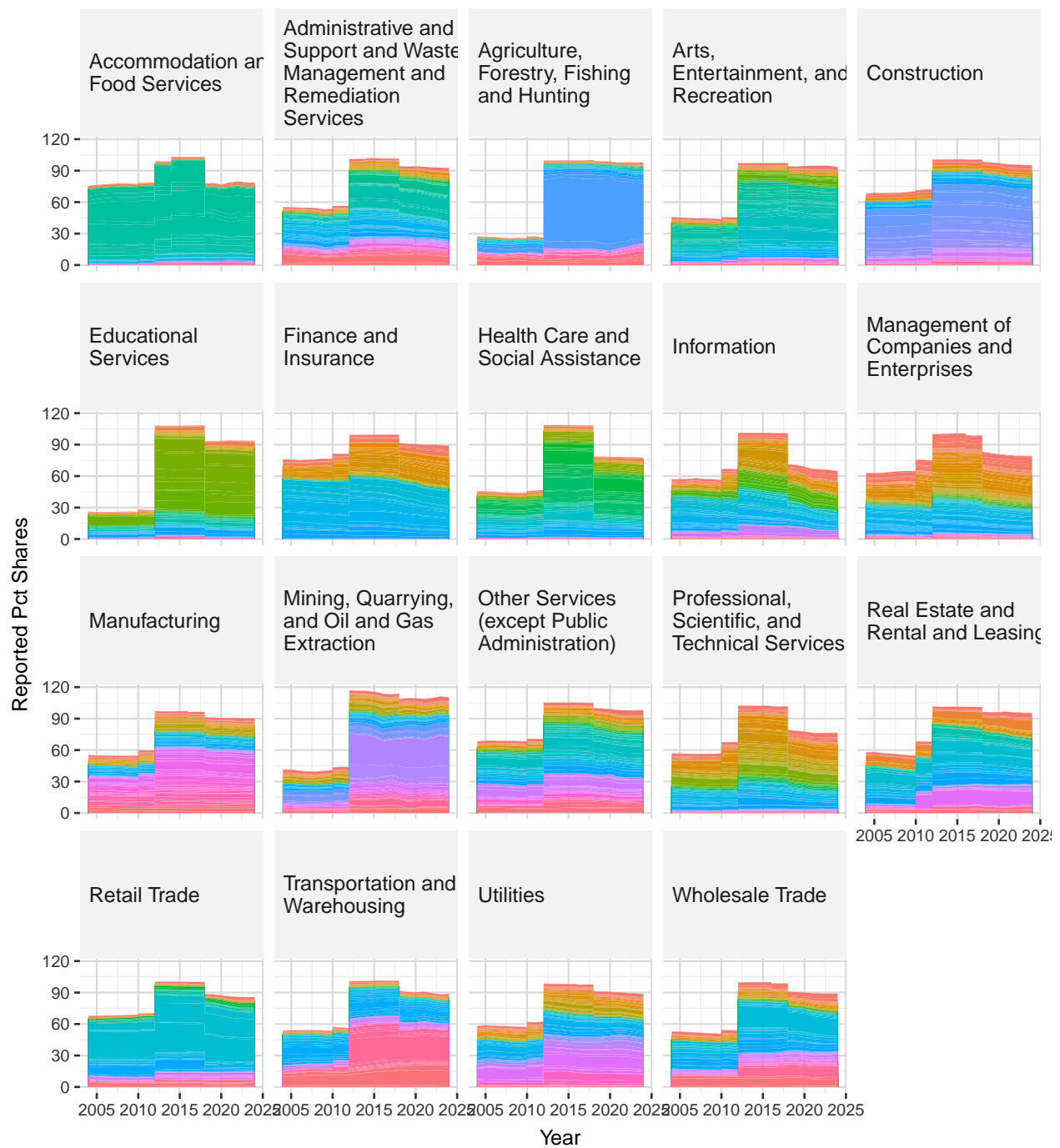
We use annual occupational shares of employment from the Occupational Employment and Wage Statistics database from the US Bureau of Labour Statistics to derive our *dij*.

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

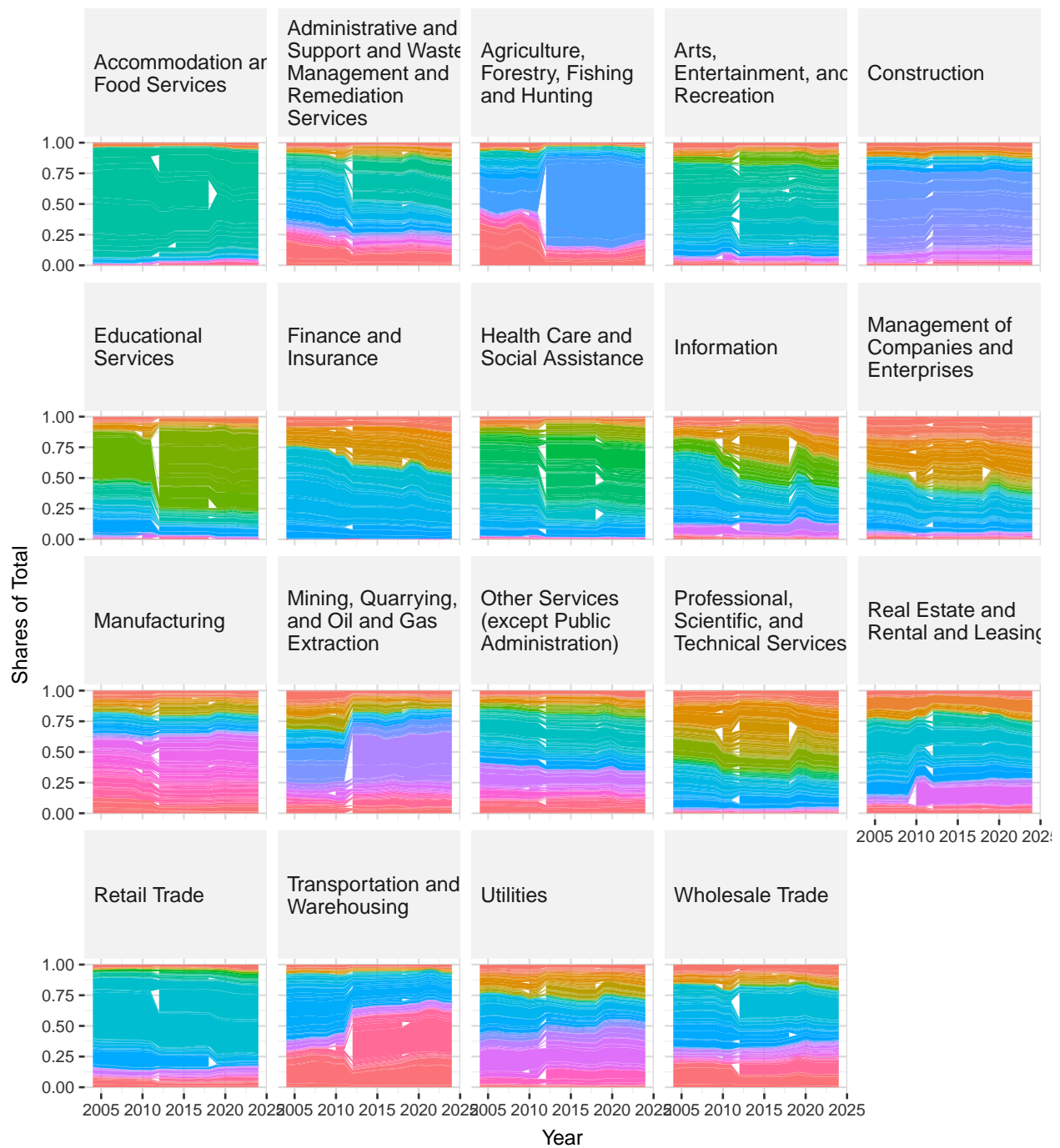
If we look at the shares as a percentage of total reported employment in a particular industry the “shares” are not consistent across the recategorisation - I will need to investigate this again.

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

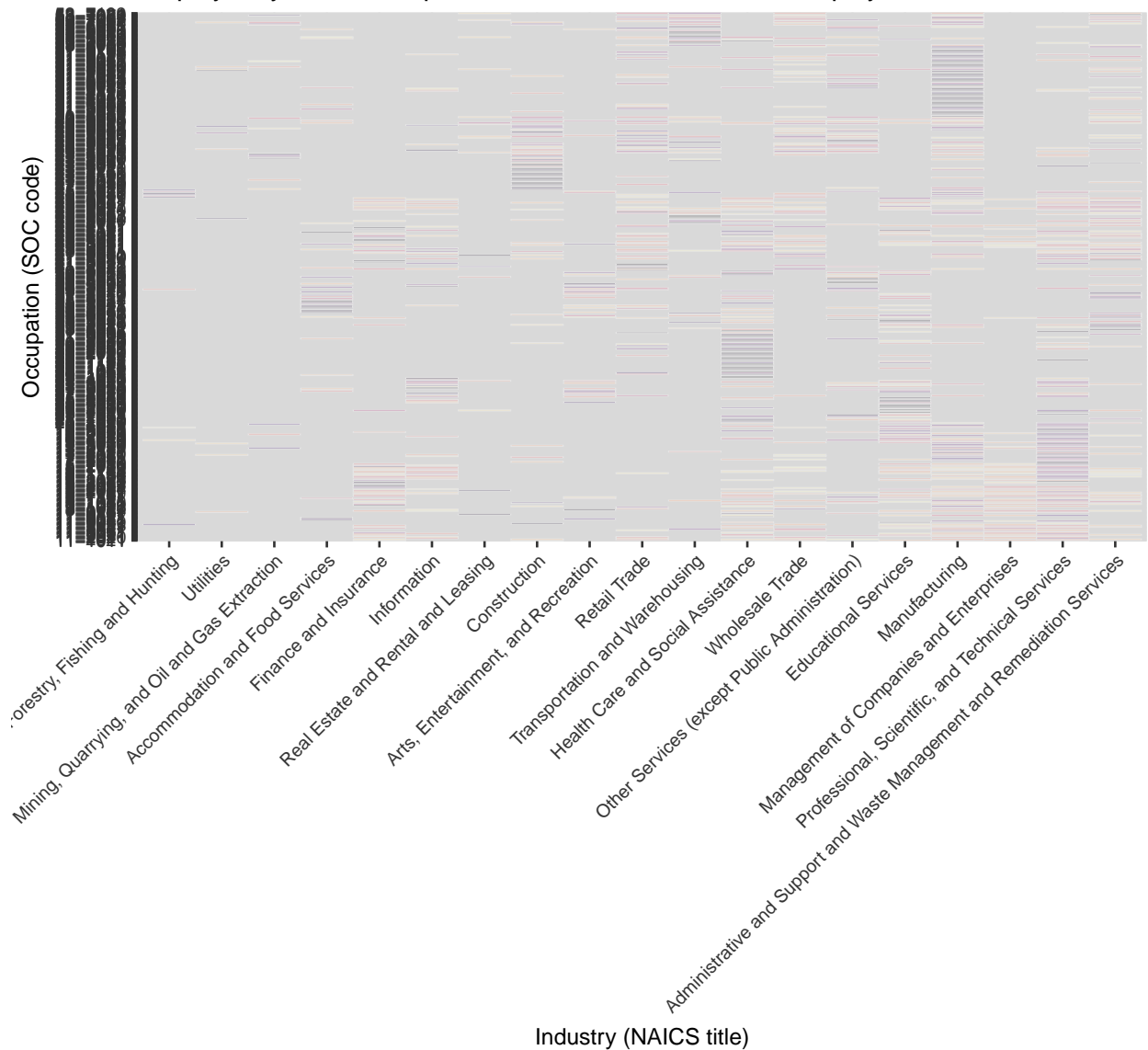


## Occupational Employment Shares by 2-digit NAICS



## Occupation–Industry Employment Shares

The colors display the share of total occupational employment in each industry. Industries are ordered by the total number of occupations they employ in ascending order. Display only those occupations whose industrial–level employment share is at least 5



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

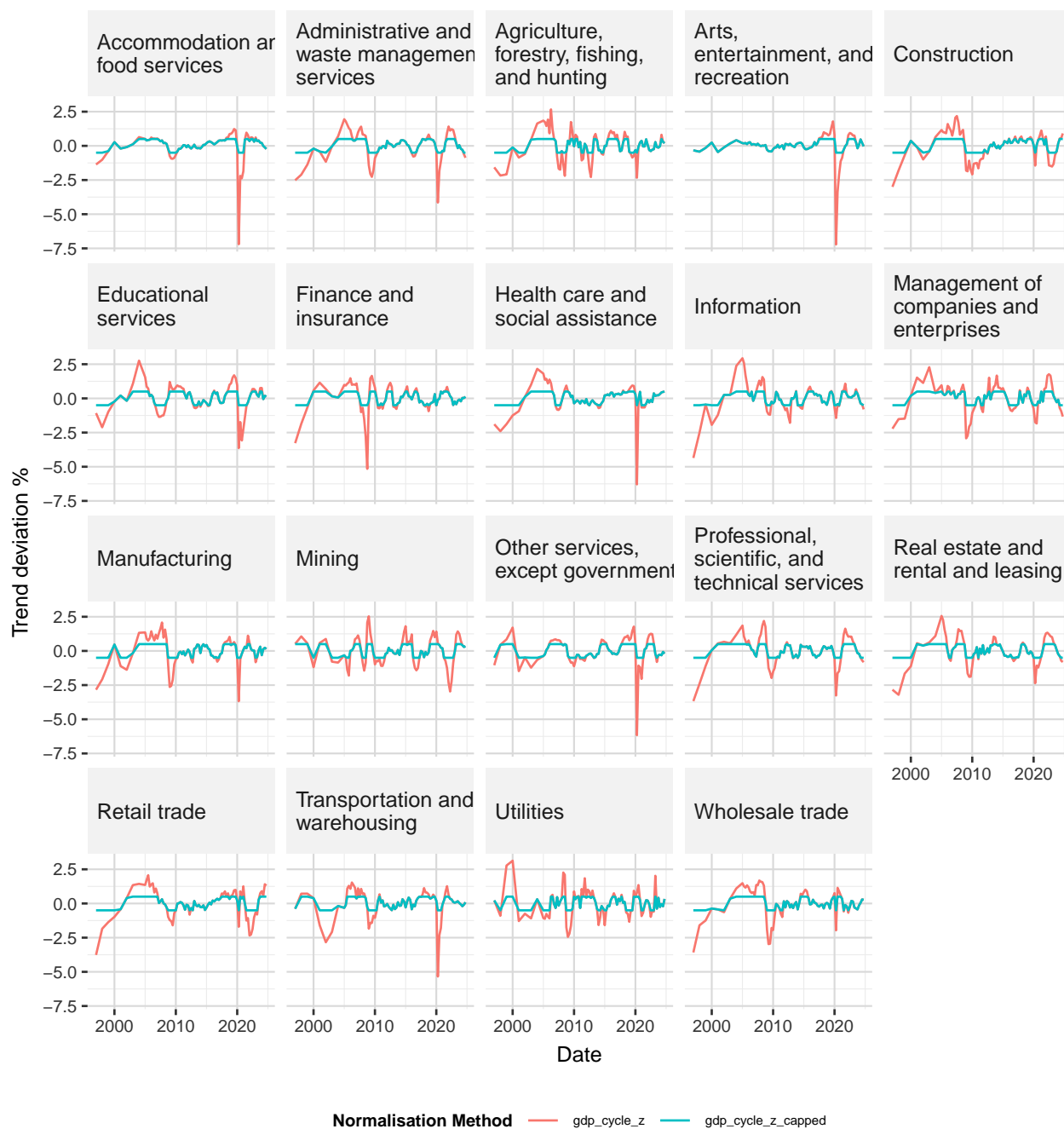
SOC2010 Occupational Code	Occupational Label	Sum of Mean Shares
45-3011	Fishers and related fishing workers	1.537169
37-2021	Pest control workers	1.135526



## Bringing them together

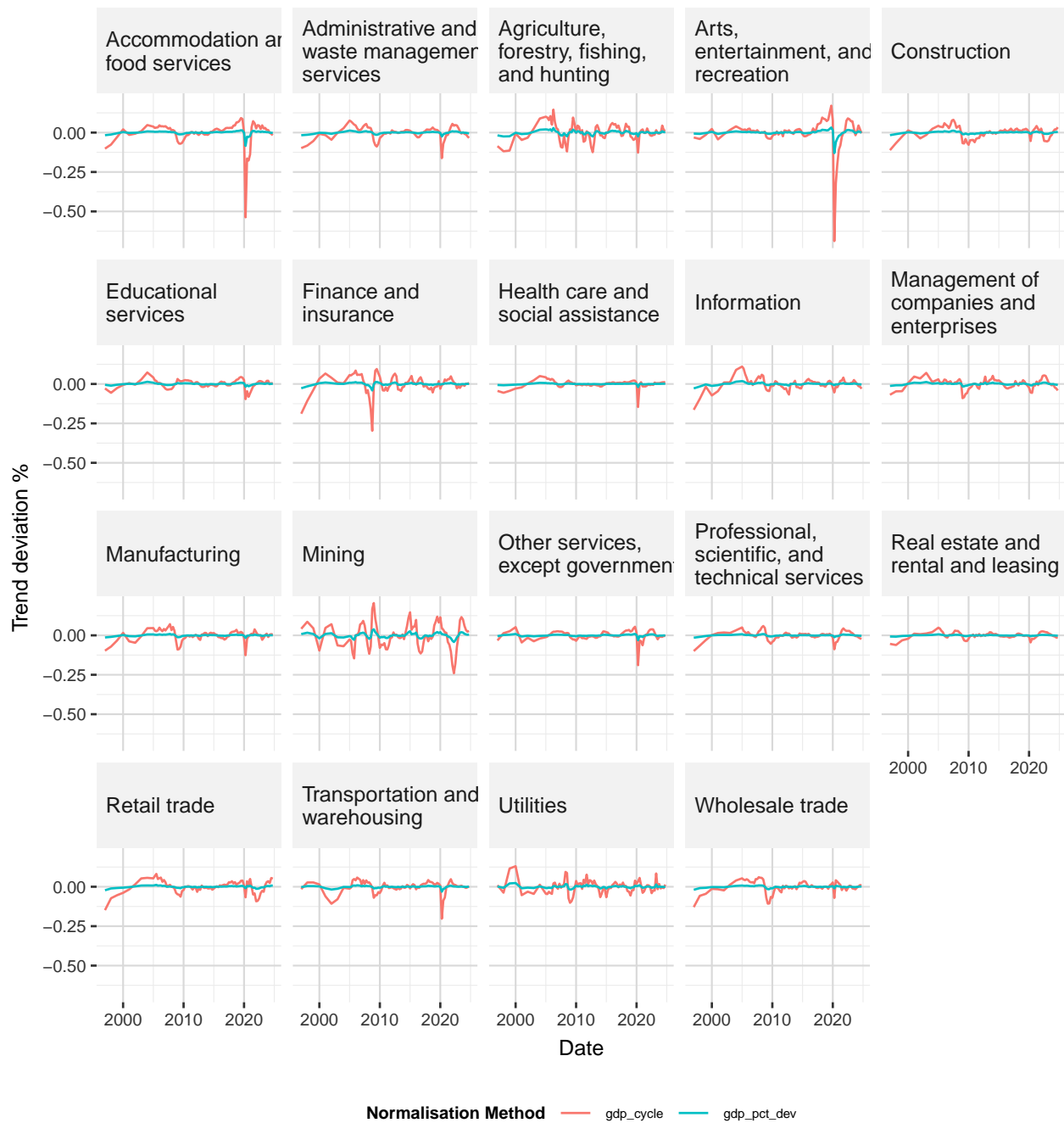
### Industry-level Value Added Shocks

Normalisation of HP Filter Method: Raw Z-Score vs. Z-Score capped at  $[-0.5, 0.5]$

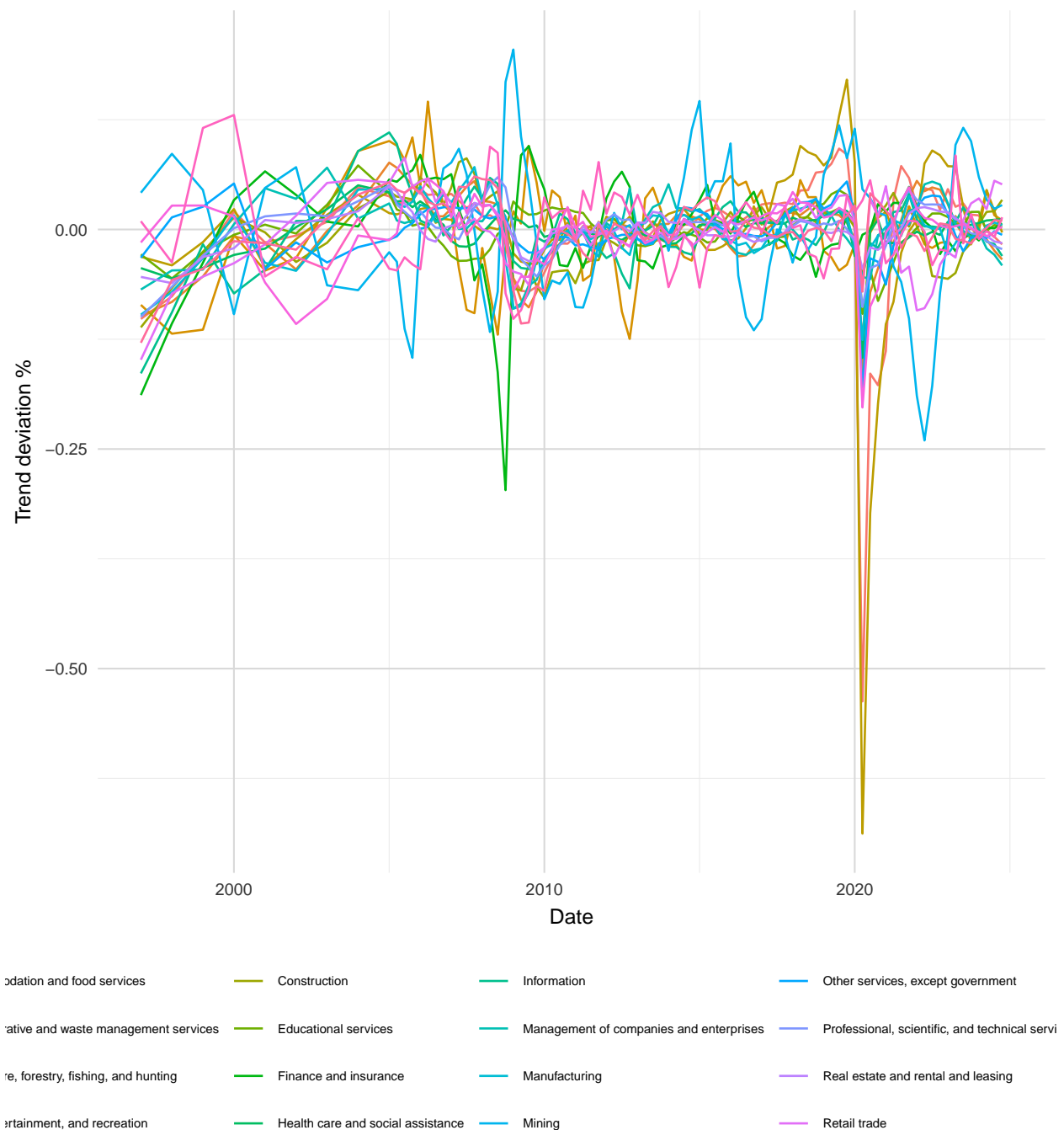


## Industry-level Value Added Shocks

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



## Deviation from Trend (HP log Filter)



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

