Mobility pathways: Technical note

This technical note supports the analysis in the blog, "New but narrow job pathways for America's unemployed and low-wage workers."

Data

We use the Integrated Public Use Microdata Series (IPUMS) from the Current Population Survey (CPS) to construct a dataset of occupational transitions (without intervening periods of unemployment) with data from 2003-2019. The construction and details of the CPS dataset are described more fully in Realism about Reskilling. Importantly, we do not observe the individual respondent's wage, only their occupation. We overlay Occupational Employment Statistics (OES) occupational median wage data to capture the likely earnings of a worker.

The CPS micro data samples present occupational information at the Occupational Census Code 2010 (OCC 2010) level, while the OES estimates of total employment and median wage are presented in Standard Occupation Classification Codes 2018 (SOC 2018).[1] To make all the pieces compatible and comparable, we translate both the 2010 Occupational Census Codes and the 2018 Standard Occupation Classification Codes into an adjusted Standard Occupation Classification System (onwards referred to as SOCXX), characterized by less granularity than the original.

Upward mobility rates

The probability of increasing one's wage after a transition varies inversely with the median wage of the starting occupation. To develop a meaningful definition of an upward transition that accommodates the features of our data, we estimate expected wage change after transition given starting occupation wage level. We then model this expectation across the wage spectrum to give an expected wage for anyone transitioning. We define an upward transition as one likely to yield a higher wage than the expected wage. The upward transition rate, then, is the share of all transitions made by workers in any demographic group or workers in any industry or occupation that are upward.

More formally, we estimate for initial occupation, *a*, and destination occupation, *b*:

$$\log\big(E(destination\ wage|a)\big) \sim \log(initial\ wage) + \varepsilon$$

where for *n* occupations,

$$E(destination\ wage|a) = \sum_{b} \left(\frac{t_{a,b}}{t_{a,\cdot}} \times\ wage_b\right)$$

where $t_{a,b}$ is the count of transitions from occupation *a* to *b*, and $t_{a,\cdot}$ is the count of all transitions departing occupation a. We define a transition as upward if

[1] Starting from January 2020, the CPS switched its occupational classification scheme from 2010 Occupational Census Code to 2018 Occupational Census Code (OCC2010 and OCC2018, respectively). In order to make occupational counts comparable before and after this change, we turned OCC2018 into OCC2010 using the Census Bureau Occupation Code List Crosswalk, producing a set of 452 comparable OCC2010 occupations across both periods. This crosswalk allows us to incorporate insights from our historical transitions' dataset into our analysis of quarterly employment change by occupation.

$$E(\widehat{destination}\ wage|a) < wage_b$$

Finally, we compute the share of transitions that are upward out of all transitions made for each demographic group shown in Figure 1.

Reallocation Prospects

Reallocation-Absorption measures show transition-wise distance between separate groups of occupations, namely the of occupations that shrank and the ones that showed resilience over a given period.

To delineate both groups of occupations we compute the change in average employment of each occupation between different quarters using CPS data, classifying those occupations with negative percent employment changes as shrinking and the rest as resilient. We compare quarters to reduce the error of employment estimates by occupation in CPS monthly samples. After the delineation

g={1,2,3,4,5,6,7….G} is the set of resilient occupations.

s={1,2,3,4,5,6,7,8…S} is the set of shrinking occupations.

Then we use historical CPS data to calculate the share of outward transitions directed to resilient occupations of each origin occupation, and the share of transitions into any destination coming from shrinking occupations. For any initial occupation, *a*, and destination occupation, *b*, we calculate:

$$Share\ of\ transitions\ to\ resilient\ occupations_a = \frac{\sum_{g=1}^{G} transitions_{ag}}{\sum_{i=1}^{n} transitions_{ai}}$$

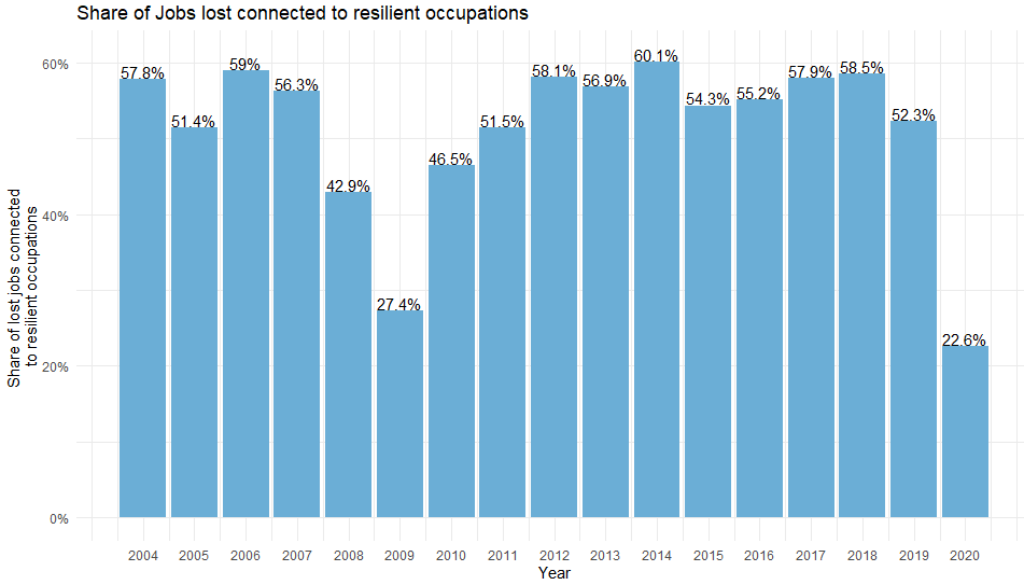
$$Share\ of\ transitions\ from\ shrinking\ occupations\ _b = \frac{\sum_{s=1}^{S} transitions_{sb}}{\sum_{i=1}^{n} transitions_{ib}}$$

To derive an economy-wide measure of the extent to which jobs lost in shrinking occupations could be reallocated into resilient occupations, we weight the share of transitions to resilient destinations of each shrinking occupation by its contribution to the employment loss and aggregate it across all the shrinking occupations, resulting in the share of the employment loss that is transition-wise connected to the resilient occupations.

$$Absorption\ potential = \sum_{s=1}^{S} \frac{\sum_{g=1}^{G} transitions_{sg}}{\sum_{i=1}^{n} transitions_{si}} * \frac{Employment\ loss_s}{Employment\ loss}$$

Delineating the set of shrinking and resilient occupations across every year (third quarter to third quarter changes) between 2004 and 2020 and using the historical transitions data, we estimate that the absorption potential of the economy has reached its lowest level since 2004, which is driven by both a larger number of shrinking occupations and a larger distance between the displaced workforce and the resilient occupations.

Figure 1. The economy's absorption potential is at its lowest level since 2004



Source: Brookings analysis of IPUMS CPS (2003-2020)

Note: The figure shows how the economy's potential to absorb workers displaced in each period has evolved since 2004. The measure is strongly procyclical, but also depends on the transition-wise distance between shrinking and resilient occupations.