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Why was Labor Productivity Growth So High during the COVID-19 Pandemic? The Role of Labor Composition

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IZA

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Abstract

In the first few weeks of the COVID-19 recession, around 20 million people lost their jobs, with half of those losses occurring in the last two weeks of March 2020. On the tail of these unprecedented job losses, labor productivity grew at an annualized rate of 11.2 percent in 2020q2 and the average hourly wage increased sharply. I examine how these phenomena are related. Because most of the job losses were in low-wage industries or among low-wage workers in high wage industries, labor quality increased substantially. I find that this increase in labor quality accounted for nearly two-thirds of labor productivity growth in 2020q2, and that about 25 percent of the increase in labor quality was due to the change in the distribution of workers across sectors, mainly because of the massive job losses in Leisure and Hospitality and other low-wage sectors.

JEL: J11, J24
Keywords: labor quality, labor composition, labor productivity, COVID-19 pandemic

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1. Introduction

Much has been written about the impact of the COVID-19 pandemic on the labor market.[1] The job losses that occurred in late March and early April 2020 were unprecedented. Between mid-March and mid-April of 2020, private sector payroll employment, as measured by the Bureau of Labor Statistics' Current Employment Statistics (CES) survey, declined by about 20 million jobs. But certain industries and demographic groups were hit harder than others.

The vast majority of these job losses—about 17.4 million of the nearly 20 million jobs lost—were in service-providing industries. This amounted to about a 16.2-percent decline in employment in just a few weeks. In contrast, goods-producing industries lost 2.4 million jobs, amounting to a smaller, but still large, decline of 11.4 percent. Within services, employment in the Leisure and Hospitality sector declined from 16.1 million in March to 8.5 million in April—a decline of 47.1 percent. Other sectors that saw large decreases in employment between March and April are Retail Trade (2.3 million), Professional & Business Services (2.2), Health & Education (2.6), and Other Services (1.3). Because the declines in employment were concentrated in low-wage sectors, there was a sharp increase in the average hourly wage of $1.36, from $28.67 in March 2020 to $30.03 in April. This one-month increase of 4.7 percent is more than 50 percent larger than the increase of $0.86 for the one-year period between March 2019 and March 2020.

Data from BLS's household survey, the Current Population Survey (CPS), show the impact of the pandemic on different demographic groups and tell a story that is consistent with the CES data. The CPS data show that between February and April,[2] employment among high school dropouts and high school graduates fell by 26 percent and 21 percent. In contrast, employment of college graduates fell by just 6 percent. Women lost jobs at a higher rate than men. And younger workers, both men and women, lost jobs at a higher rate than older workers. Around 30 percent of 20-24-year-olds lost their jobs between February and April, compared with 13 percent of 45-54-year-olds. Job losses were about the same for 20-24-year-old men and women. But among older workers, job losses were much higher for women than for men.

[1] See, for example, Bartik, et al (2020) and Groshen (2020). Handwerker, et al (2020) summarizes a number of these early papers.

[2] I compare April to February because pandemic-related job loss started showing up in the CPS data for March, whereas the CES data showed a much smaller decline between February and March. The difference is likely due to the difference in reference periods (the week that includes the 12th of the month in the CPS versus the pay period that includes the 12th of the month in the CES).

In Q1, the onset of the pandemic, labor productivity declined slightly by 0.8 percent. But in Q2, when output and total hours worked labor fell sharply, labor productivity grew by 11.2 percent. This high growth rate was caused by hours declining at a much faster pace than output. Productivity continued to increase in Q3 by 4.2 percent, however these gains were a result of a sharp rebound in both output and hours, where gains in output were faster than gains in hours. It may seem puzzling that labor productivity growth was so strong in the middle of a pandemic. But we can shed light on these numbers by looking at the three components of labor productivity growth: the growth of total factor productivity (TFP); the change in capital intensity (weighted by capital's cost share); and the change in labor composition (weighted by labor's cost share). Thus, labor productivity can be written as:

$$\dot{LP} = \dot{TFP} + s_K\left(\frac{\dot{K}}{K} - \frac{\dot{H}}{H}\right) + s_L\frac{\dot{LC}}{LC} \quad (1)$$

where *K* is capital input, *H* is total hours worked, *LC* is labor composition ("quality"), and s_K and s_L are the cost shares of capital and labor. The "dots" indicate growth.

Figure 1 provides some insight as to possible drivers of 2020q2 labor productivity growth. In Figure 1, we see that there were sharp declines in investment and industrial capacity utilization, both of which imply a decline in capital input, although the sharp decrease in hours worked suggests that capital intensity increased. The increase in the labor composition index suggests that labor composition played a major role in labor productivity growth, which contrasts with previous recessions.

Of the three recessions since 2000, the 2001 recession was the least severe in terms of job losses, although some sectors were hit very hard (travel-related industries). Although it is difficult to see in the indexes, there were several quarters in 2001-2002 with annualized labor productivity growth rates of greater than 5 percent (6.9 percent in 2001q2, 5.0 percent in 2001q4, and 8.9 percent in 2002q1). In those high-productivity-growth quarters, the increase in the labor composition index grew only slightly faster than long run trends. In addition, there was a modest (compared to other two 21st century recessions) decline in investment and industrial capacity utilization.

During the Great Recession, there were several strong quarters of labor productivity growth, which grew by 5 percent during 2009 (in 2009q2-2009q4, labor productivity grew at annualized rates of 8.7 percent, 5.4 percent, and 6.7 percent).[3] At the same time there were significant declines in both capacity utilization and investment, but only a slight increase in the labor composition index.

[3] Based on revisions as of August 6, 2021.

The COVID-19 recession was quite different from the previous recessions. As with the Great Recession, there were sharp declines in investment and capacity utilization. But unlike the Great Recession, both recovered quickly. Investment actually exceeded pre-pandemic levels in 2020q4. The labor composition index also behaved quite differently in the COVID-19 recession, increasing at an unprecedented rate of 3.0 percent (12.1 percent annualized) in 2020q2. Labor composition's contribution to labor productivity growth was 7.2 percent (12.1 percent × labor share of 0.59) and accounted for 64 percent of 2020q2 growth.

Additional insights about the COVID-19 recession can be found in the quarterly utilization-adjusted TFP estimates that are posted on the SF Fed website as a research series. Although those data indicate that 2020q2 labor productivity growth of "only" 8.5 percent, which is lower than the official estimate of 11.2 percent, it is possible to identify the contributions of the three components in equation (1). The SF Fed data show that TFP growth was −16.8 percent, the contribution of capital deepening was 21.4 percent and the contribution of labor quality (composition) was 4.1 percent (a 6.5 percent growth rate × labor share of 0.63).[4] The large decline in TFP was due mainly to a decrease in capital and labor utilization. After adjusting for utilization, TFP growth was +1.4 percent. Putting these pieces together implies that the contribution of capital deepening to labor productivity growth was 3 percentage points. The increase in labor quality accounted for nearly half of the 2020q2 increase in labor productivity, which is a much larger portion than in any previous quarter, although somewhat smaller than what I found.

The rest of the paper examines the role of labor composition in the sharp increase in labor productivity in 2020q2. Section 2 describes my data and methodology, which are similar to BLS's official labor composition measure. And Section 3 shows how labor composition differs across major sectors and examines the role of reallocation.

2. Methods and Data

BLS publishes estimates of labor composition, at the aggregate level and by industry, in its annual TFP statistics. These annual estimates are usually sufficient because, even during periods of rapid changes, labor composition is usually not a significant driver of labor productivity growth. However, the rapid changes experienced in the US economy in 2020, created a need to look at these trends at a higher frequency.

[4] I will refer to the SF Fed's measure as labor quality and my measure as labor composition.

My measure of labor composition, which is conceptually the same as the official BLS labor composition measure, is calculated as the growth of "labor input" minus the growth of aggregate labor hours. The growth in labor input is equal to the weighted sum of hours growth across demographic cells, where the weights for each age × education × sex cell are each cell's share of total labor costs.[5] Labor composition growth is given by:

$$Labor\ Comp\ Growth_q = \sum_{c \in C} \bar{s}_{c,q} \cdot \ln\left(\frac{H_{c,q}}{H_{c,q-1}}\right) - ln\left(\frac{\sum_{c \in C} H_{c,q}}{\sum_{c \in C} H_{c,q-1}}\right)$$

where $H_{c,q}$ is total hours worked by workers in demographic cell *c* in quarter *q* and $\bar{s}_{c,q}$ is the average labor cost share weight, which is defined as:

$$\bar{s}_{c,q} = \frac{1}{2}\left(s_{c,q} + s_{c,q-1}\right)$$

where

$$s_{c,q} = \frac{\sum_{i \in c} \widehat{w}_{i,c,q} \cdot H_{i,c,q}}{\sum_{i \in C} \widehat{w}_{i,q} \cdot H_{i,q}}$$

and $\widehat{w}_{i,c,q}$ are predicted values from a wage equation. Thus, the labor composition index increases when the hours worked by high-wage workers grow faster (or decline more slowly) than hours worked by low wage workers.[6]

Data

For this study I use data from the monthly Current Population Survey (CPS), which is the only data source that can be used to construct a high-frequency measure of labor composition. Below I describe the data and discuss how I addressed issues with the data.

The CPS collects information on employment, hours worked, usual weekly hours and earnings, industry, and occupation for the week that includes the 12th of the month. It also collects demographic characteristics (age, education, and gender). I divided the data into 50 demographic cells: 5 age categories, 5 education categories, and 2 gender classifications.[7] Although it would have been desirable

[5] Because I am generating quarterly estimates, rather than annual, it was necessary to modify the BLS methodology. As will be shown later, the results are very similar.

[6] This is a modified version of the methodology used in BLS's annual TFP growth statistics. The main differences are that I estimated wages using a wage regression rather than using the median wage for each cell, and I combined a number of cells to accommodate the smaller sample sizes encountered when generating quarterly statistics. A discussion of some of the issues with estimating labor composition can be found in Zoghi (2010).

[7] The BLS TFP methodology also includes class of worker (self-employed vs. wage & salary) as a stratifying variable. As noted above, I excluded self-employed workers from my sample so that I could benchmark industry hours totals to published LPC estimates. I did experiment with including self-employed workers, and the results were essentially the same.

to use more finely defined demographic cells, the relatively small size of the quarterly CPS samples limit the number of cells that are feasible. Even within this structure, it was necessary to combine very small cells with larger cells.[8]

Information on earnings is collected only in 2 of the 8 CPS rotation groups, known as the Outgoing Rotation Groups (ORGs, which are months in sample 4 and 8).[9] To generate wage rates for the other months in sample, I estimated a wage regression for each reference quarter using the ORG data from that quarter and the previous quarter,[10] and used the coefficients to generate predicted values. I used these predicted values for all observations, even those with actual data.

The CPS collects hours worked on second jobs every month. But industry on the second job is collected only in the ORGs, and the CPS does not collect wages for second jobs. For analytical purposes, I treat second jobs as separate observations so that each observation represents a job rather than a person. Because industry on second jobs is available only in the ORG data I used the ORG weights, which are approximately 4 times as large as the Basic CPS final weights, for second jobs.[11]

I restricted my sample to private wage and salary workers. This allows me to control total hours worked by supersector to the official estimates used by the LPC program.[12] Finally, I seasonally adjusted the labor composition index and rebased the indexes so that 2000q1 = 100.[13]

Figure 2 shows the labor composition index and indexes of labor input and labor hours for the 2000-2020 period. Typically, we do not expect to see rapid increases in labor composition, because shifts in worker experience, skills and education tend to occur gradually over time. The exceptions occur during periods of rapid change such as recessions because job losses tend to be concentrated in lower-wage workers. In the three recessions that occurred during this period we see large declines in both

[8] For example, the small number of young workers with college degrees were combined with workers in the next age category. And because some of the supersectors are small, it was necessary to further combine at least some additional cells in those industries. To make the industry measures comparable to the aggregate measure, I maintained the industry-specific combining of cells in all calculations.

[9] Sampled households are in the CPS for 4 consecutive months, out of the sample for 8 months, and back in the sample for another 4 months. The questions on earnings and the additional questions on second jobs are asked in these "outgoing" rotations because they are more burdensome.

[10] Independent variables include age, age squared, education, gender (also interacted with age and age-squared), supersector, and occupation.

[11] I used the Basic CPS final weights for the main job of respondents in the ORGs.

[12] It is important to control to industry totals because the CPS weights account for the distribution of workers by demographic characteristics but not by industry.

[13] I also experimented with seasonally adjusting the growth rates rather than the indexes. Interestingly, seasonally adjusting the growth rates results in a smoother series but a faster increase in the labor composition index. The sharp increase in 2020q2 was muted slightly, but the story virtually identical. I opted to seasonally adjust the index (rather than the growth rate), because doing so resulted in long-run growth rate being closer to that of the official BLS index and the SF Fed labor quality index.

labor input and labor hours, with labor hours falling by more than labor input. In the 2001 recession, the decline in labor hours was only slightly larger than the decline in labor input, resulting in a slight increase in the labor composition index. The Great Recession saw a somewhat larger increase in the labor composition index. In contrast, in 2020q2, hours worked dropped by significantly more than labor input, which caused the sharp increase in the labor composition index. The index declined after 2020q2 but remained above the pre-pandemic level (and above trend) through the end of the year.

Comparison to Other Measures of Labor Composition

As noted above, the SF Fed posts estimates of quarterly utilization-adjusted TFP (and its components) on its website as a research series. The methodology for their labor quality measure is based on Aaronson and Sullivan (2001), which differs from my methodology and the methodology used by the BLS TFP program. The SF Fed estimates of labor quality growth are calculated as the growth in average wages holding the return to demographic characteristics constant.[14]

Figure 3 compares the two quarterly labor composition indexes, along with the BLS TFP Program's index. Note that the for the TFP index, which is annual, I centered it on Q2 to make it easier to see the differences in 2020. All three indexes exhibit similar long-run growth. The average compound growth rates from 2000q1 through 2019q4 are 0.43 percent per year for my measure, 0.41 percent for the SF Fed measure, and 0.38 for the BLS TFP measure. The main differences show up in 2020. Both quarterly measures exhibit a sharp spike in 2020q2, with my modified BLS labor composition measure exhibiting a larger spike (growth of 3 percent vs. 1.6, which translate to annualized growth rates of 12.1 and 6.5 percent). Comparing the average values of the indexes for 2019 and 2020, the growth in the labor composition indexes are 2.0 percent for my modified BLS measure, 1.4 percent for the SF Fed measure, and 1.6 percent for the BLS TFP measure.

Taking a closer look at the SF Fed data reveals a couple of inconsistencies with other data that suggest that capital deepening played a smaller role in Q2 labor productivity growth and that labor quality played a larger role. The SF Fed data show only a slight decline in the growth rate of capital in 2020q2 followed by a sharp slowing of capital growth in Q3, which is not consistent with the changes in investment for Q2 and Q3 observed in the BEA data.[15] And the SF Fed estimate of labor quality growth,

[14] Aaronson and Sullivan calculate the average wage as an hours-weighted mean, where the wage for each observation is the predicted value from a wage regression. Because there is no reason to prefer the coefficients from one quarter over the other, they estimate wage regressions for both the current and prior quarter, calculate growth rates using each set of coefficients, and then take the geometric mean of the two growth rates.

[15] It is worth keeping in mind that short-term declines in investment can have only a limited effect on labor productivity, because investment is a relatively small portion of the capital stock.

which is an hours-weighted average wage holding the returns to demographic characteristics constant, is not consistent with the observed wage changes. The 6.5 percent annualized growth in labor quality, which translates into a one-quarter increase of 1.6 percent, is considerably smaller than the observed increase in the average hourly wage of 4.7 percent between March and April.[16] The BLS Employment Situation news release for April 2020 noted that "…the increases in average hourly earnings largely reflect the substantial job losses among lower-paid workers; this change, along with earnings increases, put upward pressure on the average hourly earnings estimates." Given that the CES average hourly wage also is an hours-weighted measure, one would expect the two wage growth measures to be similar. It seems likely that the lower growth in the SF Fed labor quality measure may be due to the dampening effect of using predicted wages to measure the growth in the average wage.

3. Labor Composition by Major Industry

Figures 4a-4d show the labor composition index for 14 major sectors. I'll start out by noting some general trends and discussing how the labor composition index behaved during the Great Recession. I will then focus on the early months of the COVID-19 pandemic.

The first thing to note about Figures 4a-4d is that the trends in labor composition over the 2000-2019 period vary quite a bit by sector. The labor composition index increased in most sectors, with the exceptions being Utilities and Transportation. The largest increases were in Nondurable Manufacturing; Information; Finance, Insurance & Real Estate (FIRE); and Health & Education. Both Construction and Durable Manufacturing exhibited a ratcheting up of the labor composition index around the time of the Great Recession. In Construction, the index increased from around 100 to 105 between 2007q4 and 2010q1. Looking at occupation data from the Occupational Employment and Wage Statistics (OEWS) survey, total employment in construction declined by 26 percent. Employment in high-wage occupations declined by less than the overall decline (14 – 20 percent depending on the occupation), while employment in low-wage occupations fell by more (34 – 50 percent depending on the occupation).[17]

We see a similar pattern in Durable Manufacturing, where the labor composition index increased from around 105 in 2007q1 to around 110 in 2009q1. The published OEWS data do not breakdown Manufacturing into durable and nondurable but looking at Manufacturing as a whole reveals a similar, though less dramatic, pattern. Between 2007 and 2009, employment in Manufacturing

[16] The CES average hourly wage is an hours-weighted measure.

[17] High-wage occupations include Management, Business and Financial Operations, and Architecture and Engineering, while low-wage occupation include Helpers, Security, Food Services, and Cleaning and Maintenance—occupations that are more-easily outsourced.

declined by about 11 percent. Employment in high-wage occupations fell by less (1-6 percent depending on the occupation), while low-wage occupations declined by more (10-18 percent depending on the occupation).

These patterns are consistent with firms shedding employees during the recession and increased outsourcing of low-wage jobs in the recovery. But other than these two major sectors, there were no sharp changes in labor composition during the Great Recession. Most other major sectors exhibited a steadier increase in the labor composition index, which matched the increase in the overall labor composition index.

The labor composition index behaved quite differently during the COVID-19 recession in 2020. As we saw in Figures 1 and 2, the aggregate labor composition index spiked upward in 2020q2. In contrast to the Great Recession, labor composition growth differed considerably across major industries. As can be seen in Figures 4a-4d, there were significant spikes in the labor composition index in a few sectors in 2020q2. These include Durable and Nondurable Manufacturing, and Other Services. There were smaller, but notable, spikes in Retail Trade; Information; Health & Education; Construction; and Professional & Business Services. Several other major industries saw upward ticks that do not look noticeably different from normal quarter-to-quarter variation: Mining & Other Natural Resources; Wholesale Trade; FIRE; and, perhaps surprisingly, Leisure & Hospitality.

The large increase for Other Services is likely because this sector includes a range of more-detailed industries that vary in skill intensity. High-skill industries fall mainly into the Repair and Maintenance category (automobile, electronic and precision equipment, and commercial and industrial machinery), which were less likely to be affected by shutdowns and consumer hesitancy. The low-skill industries include Personal Care Services, Laundry Services, Private Household Services, and Religious & Civic Organizations, which were more likely to be impacted. Professional & Business Services is another sector that includes both high-wage industries (professional, scientific and technical services) and low-wage industries (for example, employment services, security, landscaping, and building services). The lack of a noticeable 2020q2 spike in the labor composition indexes of several major industries (Mining, Construction, Wholesale Trade, Transportation, Utilities, and Leisure & Hospitality) indicates that job losses were distributed fairly evenly across skill levels. The lack of a labor composition spike in Leisure & Hospitality combined with the fact this major sector accounted for about one-third of job losses suggests that changes in the distribution of workers across sectors may have contributed to the spike in the labor composition index and to the sharp increase in labor productivity growth.

4. Labor Composition's Contribution to Labor Productivity Growth

As noted in the introduction, 64 percent of the second quarter growth in labor productivity was due to changes in the composition of the labor force that resulted primarily from severe job losses among low-wage workers. The variation across major sectors suggests that job-loss-induced changes in the distribution of workers across sectors may have contributed to the increase in the labor composition index. To explore this further, I calculated an alternative labor composition index that is equal to the weighted average of the sector indexes, where the weights are equal to the industry labor cost shares.[18] This index accounts for within-sector changes in the labor composition indexes, but not changes in the distribution of workers across sectors. Figure 5 compares this index, labeled "Weighted Sector," to the index shown in Figures 1 and 2, labeled "Demographic Cells (No Sector). Both indexes are rebased so that 2019q4 = 100. Thus, the difference in the growth of the two indexes is the portion attributable to changes in the distribution of employment across sectors.

Between 2020q1 and 2020q2, the labor composition index grew by 3.0 percent. While the weighted-supersector index grew by 2.3 percent. This implies that within-sector changes in the labor composition indexes accounted for 75 percent of the 2020q2 increase and that the shift in employment shares away from low-wage sectors accounted for 25 percent.

Thus, the 11.2 percent growth in labor productivity can be attributed to within-sector changes in the labor composition index (about 5.4 percentage points), changes in the distribution of workers across sectors due to job losses in low-wage sectors (about 1.8 percentage points), and other factors such as capital intensity (about 4 percentage points). Given that some sectors are composed of high-wage and low-wage industries, some of the within-sector changes in the labor composition index are due to changes in the distribution of employment across industries within these sectors. Thus, my estimates for sectors underestimate the impact of changes in the distribution of workers across industries.

It is worth noting that the large increase in the labor composition index for Q2 was preceded by a larger-than-average increase of 0.8 percent (3.4 percent annualized) in 2020q1. Although most of the 2020q1 job losses occurred in the last two weeks and were not reflected in the establishment survey's employment estimates, employment estimated from the CPS showed a decline of about 2.8 million

[18] The industry weights are an average of the current and previous quarter cost shares. I examined the impact of holding the weights constant at the 2019q4 level and it did not make much difference. It is likely due to the fact that the CPS showed substantial job losses between the February and March (about 2.8 million workers).

people between March and April. As with Q2, the increase indicates that it was primarily low-wage/low-skill workers who lost their jobs in Q1.[19]

In 2020q3, story was somewhat different. Labor productivity grew at an annualized rate of 4.2 percent, while the labor composition index fell by an annualized 6.8 percent (contributing −4.1 percentage points). This large difference is likely due to increased utilization of capital and to a lesser degree a rebound in investment. It is also likely that businesses made changes to their production processes to mitigate the impact of social distancing recommendations. About 70 percent of the decline in the labor composition index was due to within industry changes in labor composition and that 30 percent can be attributed to hiring in low-wage industries. It is worth noting that the labor composition index remained above the pre-pandemic level (and above the pre-pandemic trend line). Average private-sector employment increased by around 2.4 million jobs in the third quarter, with 95 percent of the increase due to hiring in Services industries with two major industries, Retail Trade and Leisure & Hospitality, accounting for 55 percent of the increase in Services.

5. Summary and Conclusions

The COVID-19 recession, which started in March of 2020, saw unprecedented job losses. In a span of just a few weeks, around 20 million jobs were lost—most of them in low-wage services sectors. As a result, labor quality as measured by the labor composition index increased sharply. This increase in the labor composition index accounted for about 64 percent of the 11.2 percent increase in labor productivity in 2020q2. Of the 7.2 percentage point growth attributable to labor composition, about 75 percent (5.4 percentage points) is due to within-sector changes and 25 percent (1.8 percentage points) due to changes in the distribution of workers across sectors.

[19] The reference period for the CPS is the week that includes the 12th of the month, which was March 8-14. A person classified as "employed" if he or she worked at least one hour during the reference week. Therefore, people who lost their jobs in the first week of March would show up as not employed during the CPS reference week (unless they immediately found another job). In contrast, the reference period for the CES is the pay period that includes the 12th of the month. Pay periods can be weekly, bi-weekly, semi-monthly, or monthly, and a worker included in the payroll employment total if he or she was paid for at least one hour during the pay period. Therefore, in cases where the pay period includes the first week of March, any workers who lost their jobs in the first week of March would be included in payroll employment. They would also be included in the CES employment total if they did not work during the pay period but were paid.

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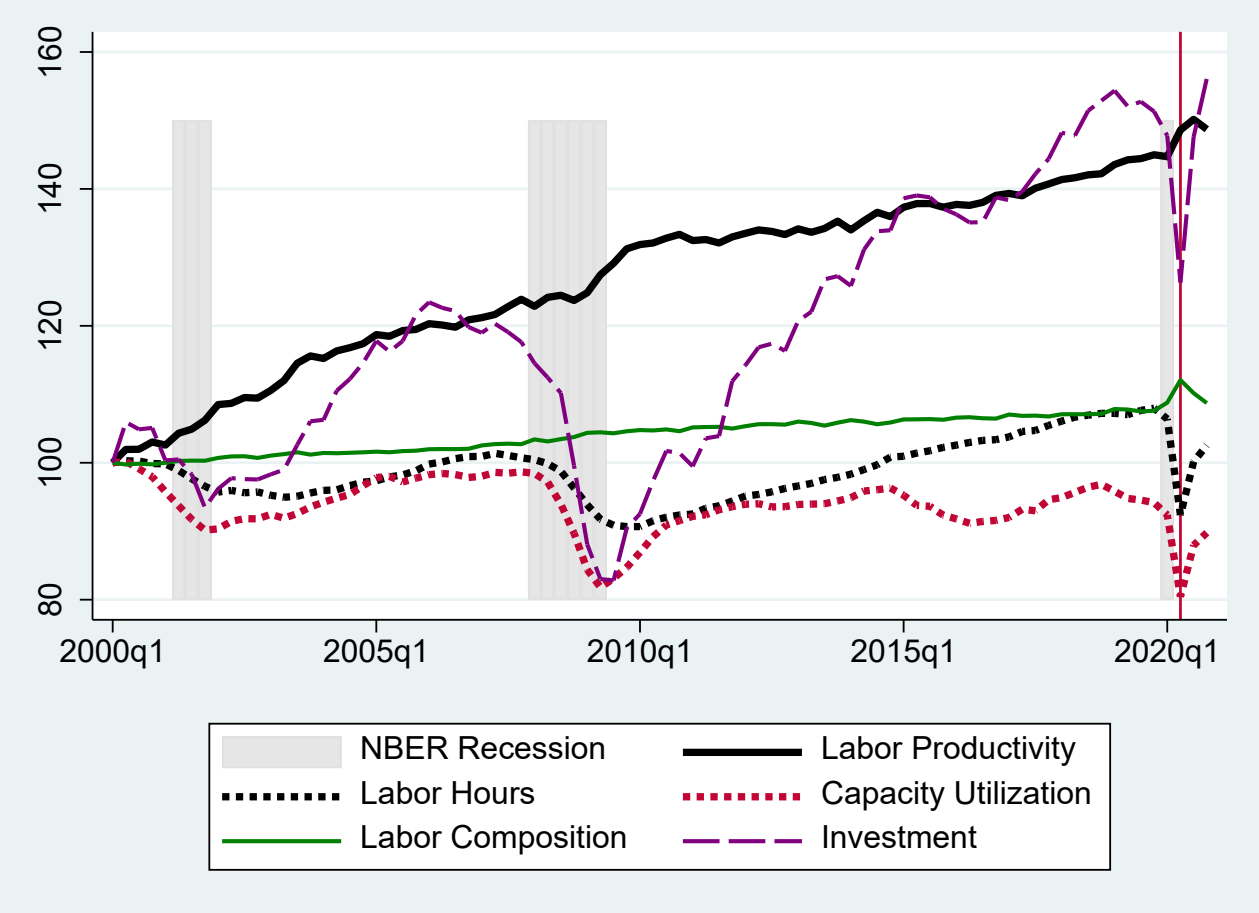
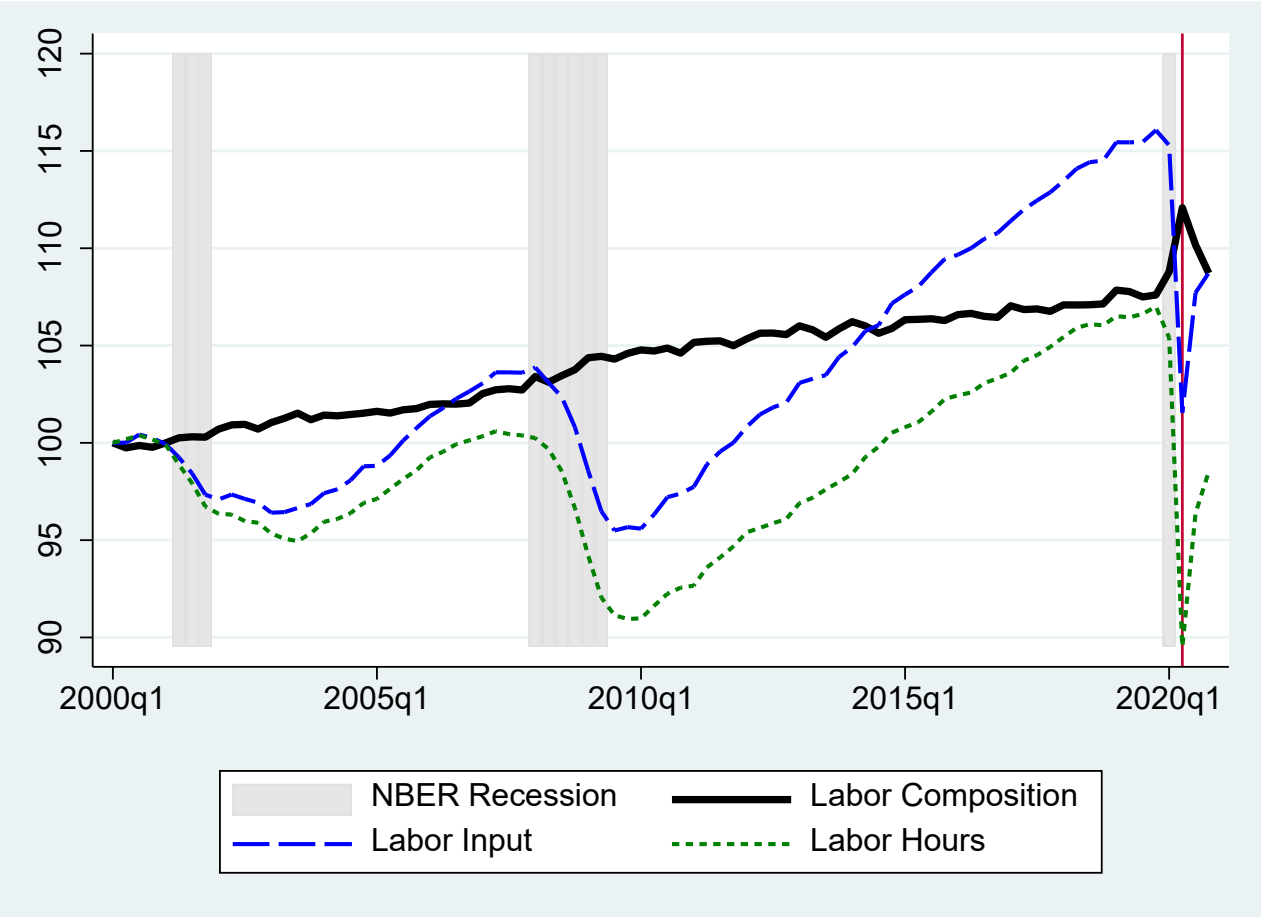
Figure 1: Indexes of Labor Productivity, Labor Composition, Industrial Capacity Utilization, and Investment



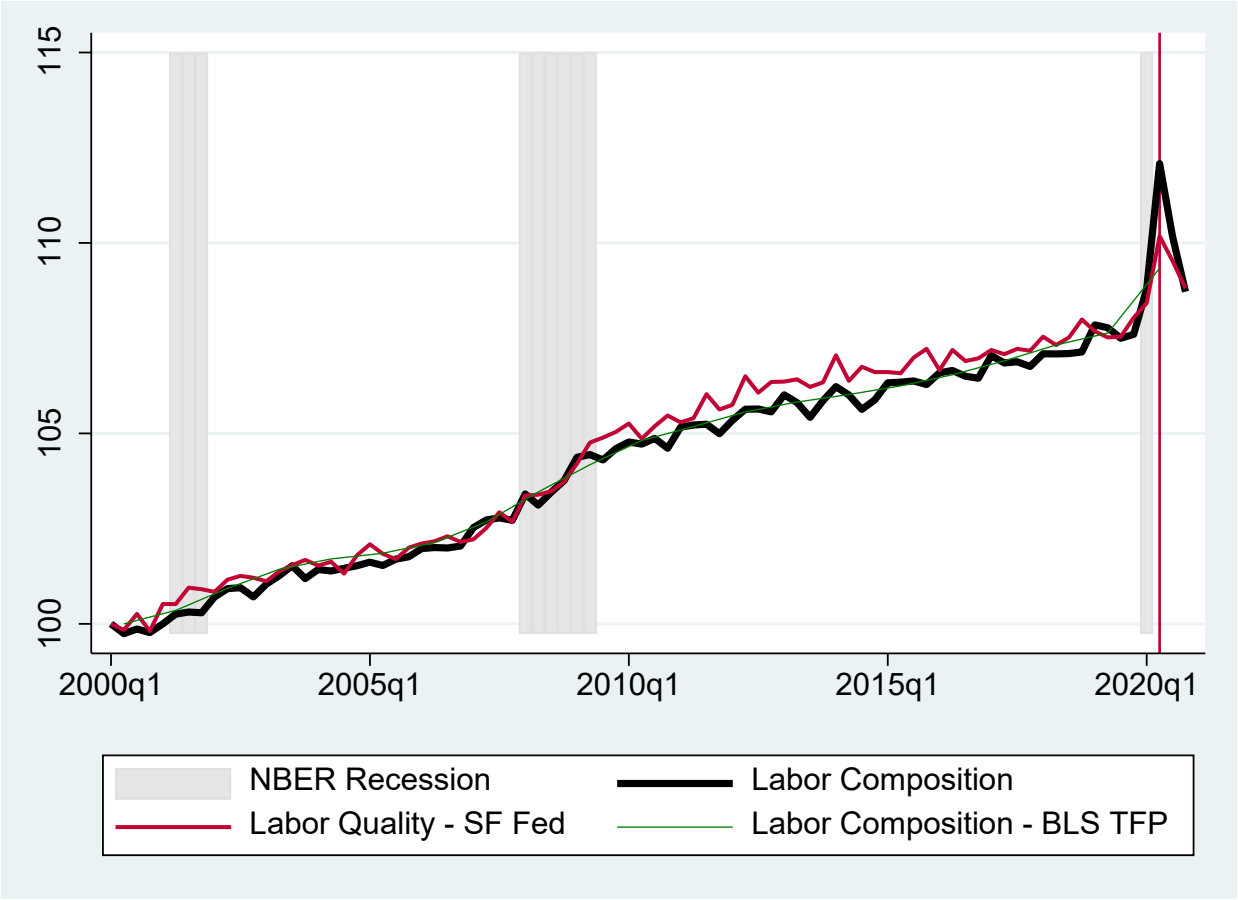
Source: Labor composition index: author's calculations from CPS data. Labor productivity and labor hours: BLS's Labor Productivity and Costs program. Investment: Bureau of Economic Analysis. Capacity utilization: Federal Reserve Board of Governors via FRED.

Figure 2: Indexes of Labor Input, Labor Hours, and Labor Composition



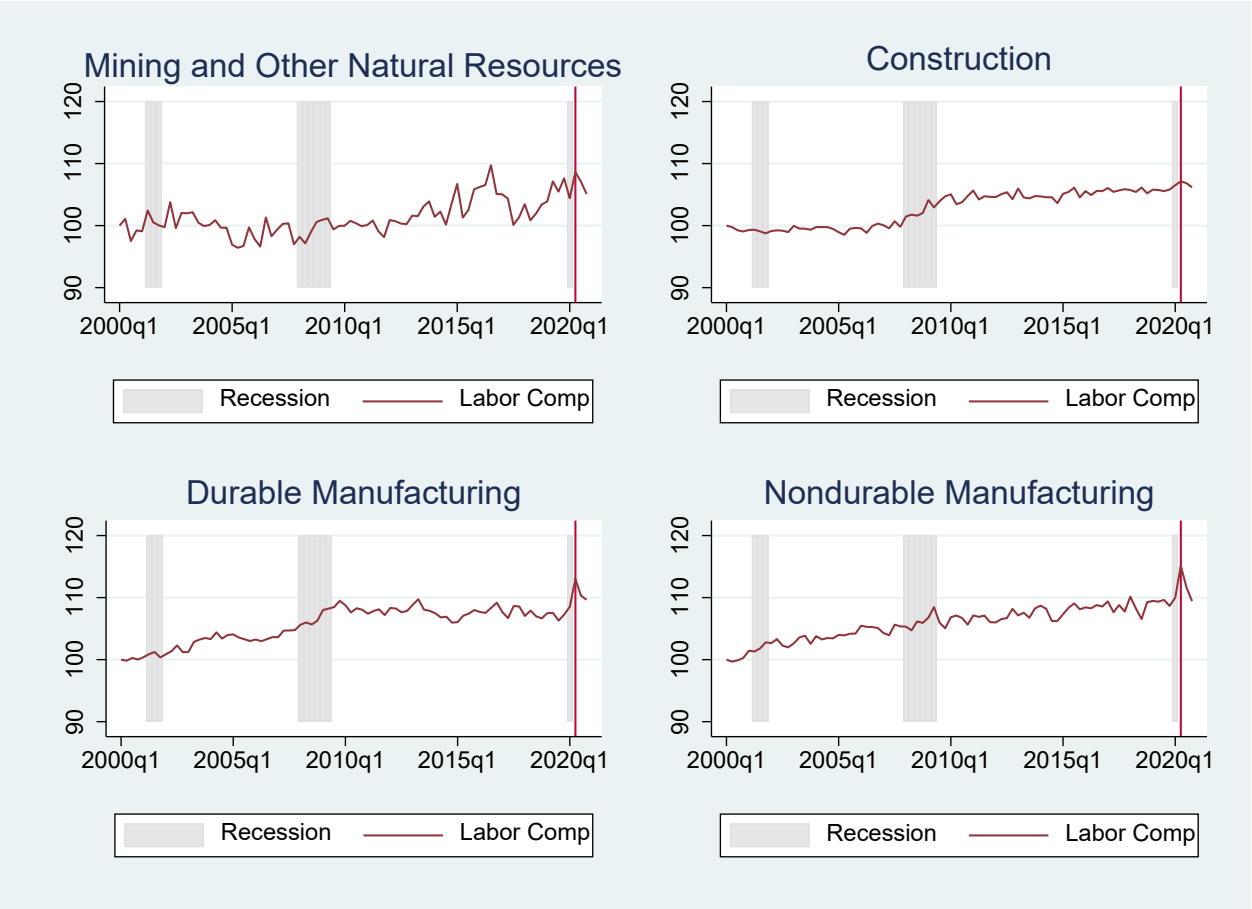
Source: Author's calculations from CPS data.

Figure 3: Comparison of Alternative Measures of Labor Productivity and Labor Composition



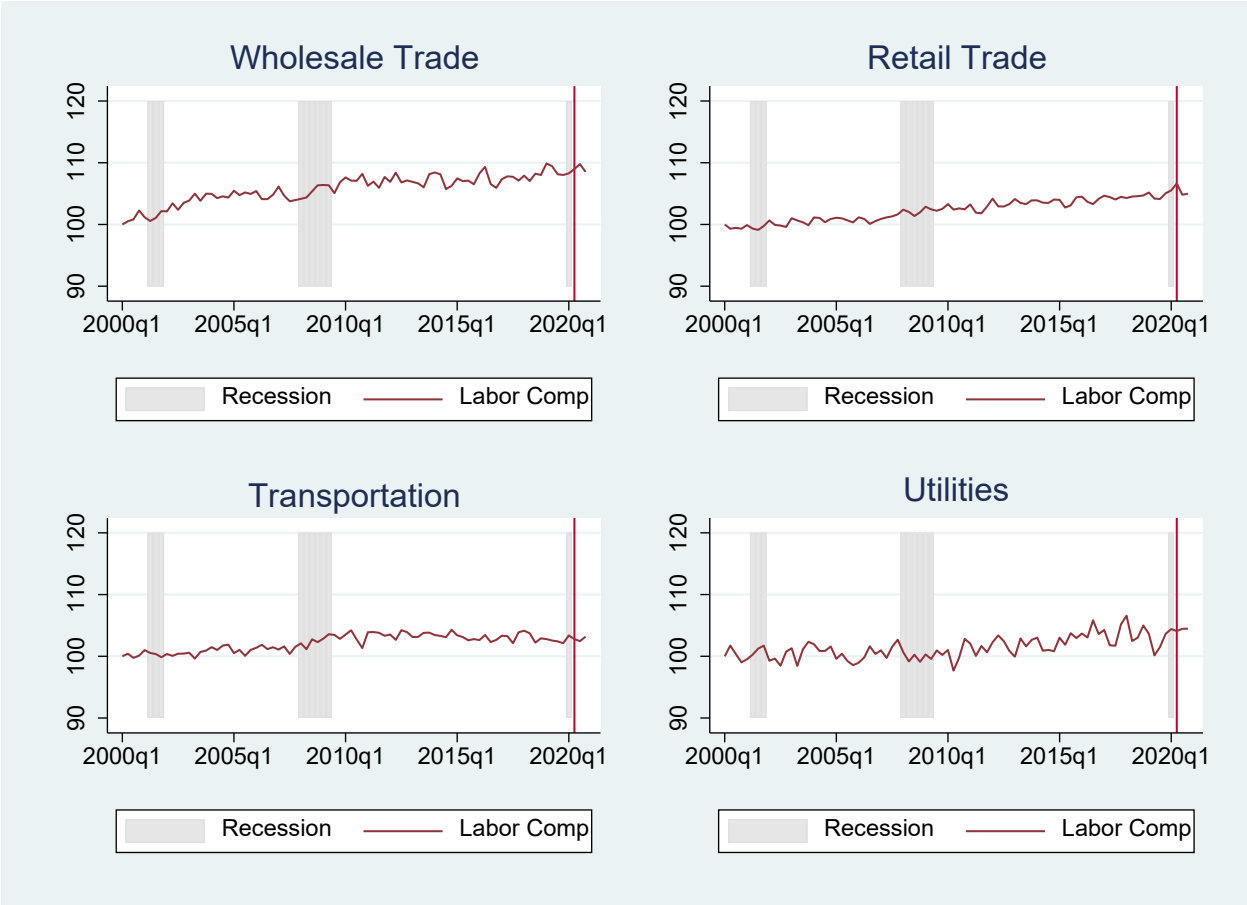
Source: Labor composition index: author's calculations from CPS data. Labor Quality – SF Fed: San Francisco Fed. Labor Composition – BLS TFP: BLS Total Factor Productivity program.

Figure 4a: Indexes of Labor Composition by Sector



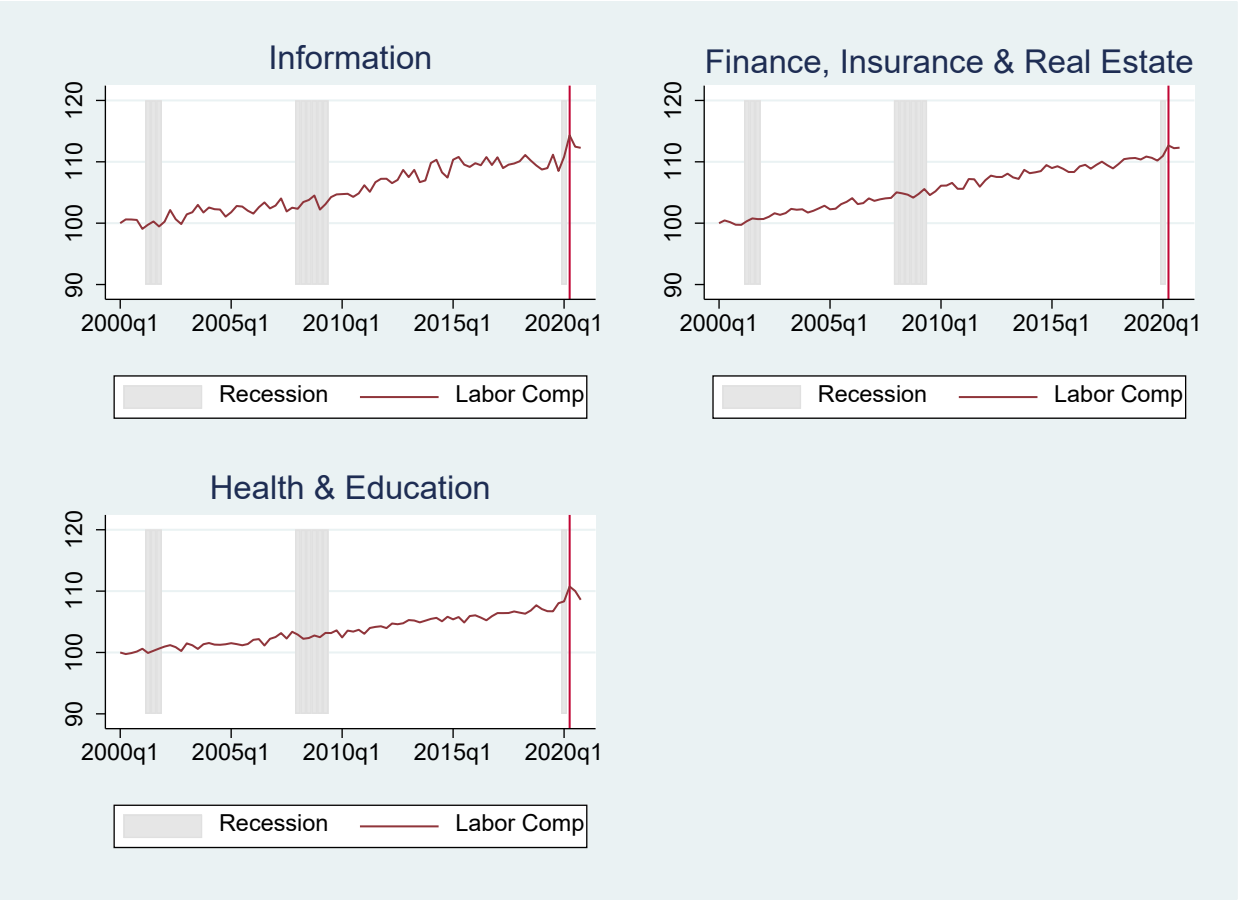
Source: Author's calculations from CPS data.

Figure 4b: Indexes of Labor Composition by Sector



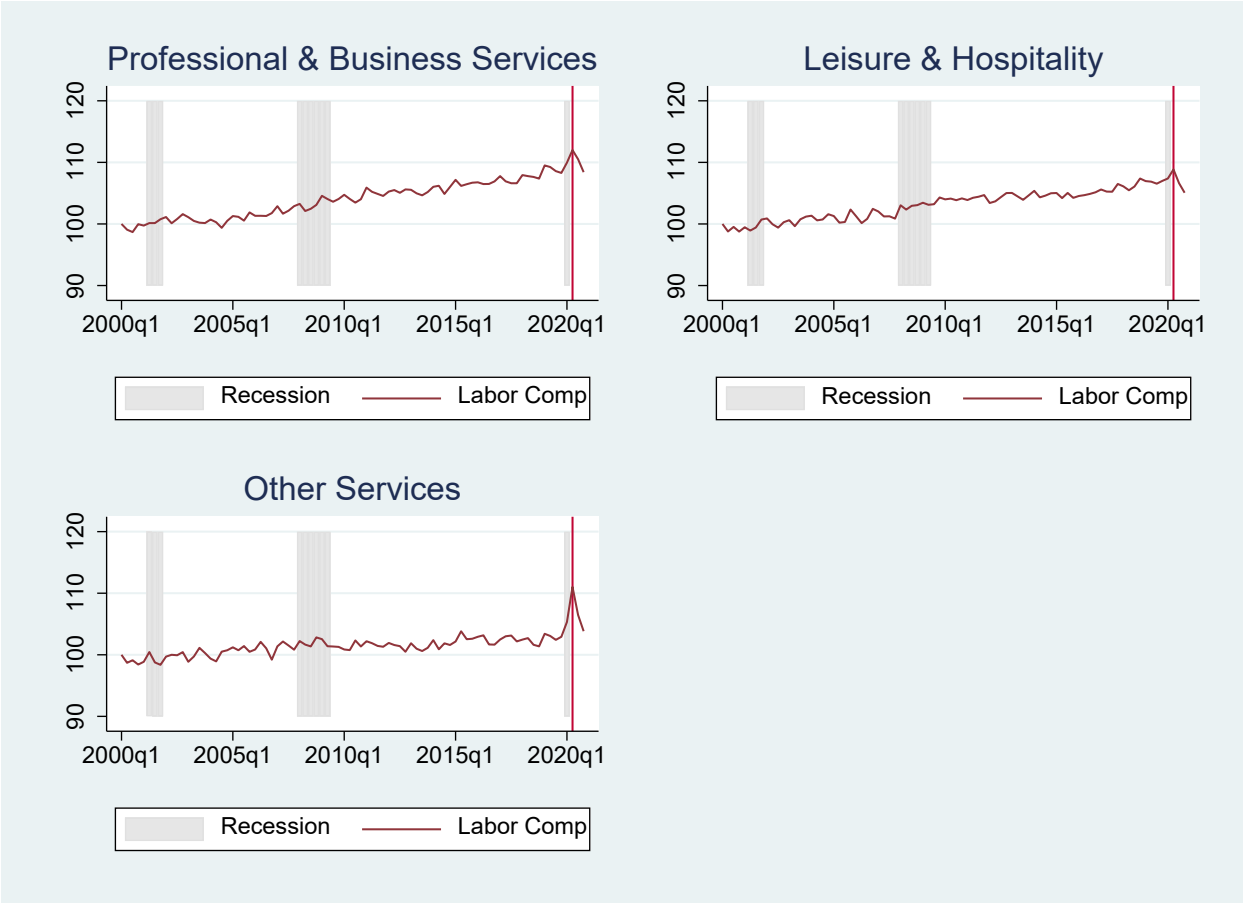
Source: Author's calculations from CPS data.

Figure 4c: Indexes of Labor Composition by Sector



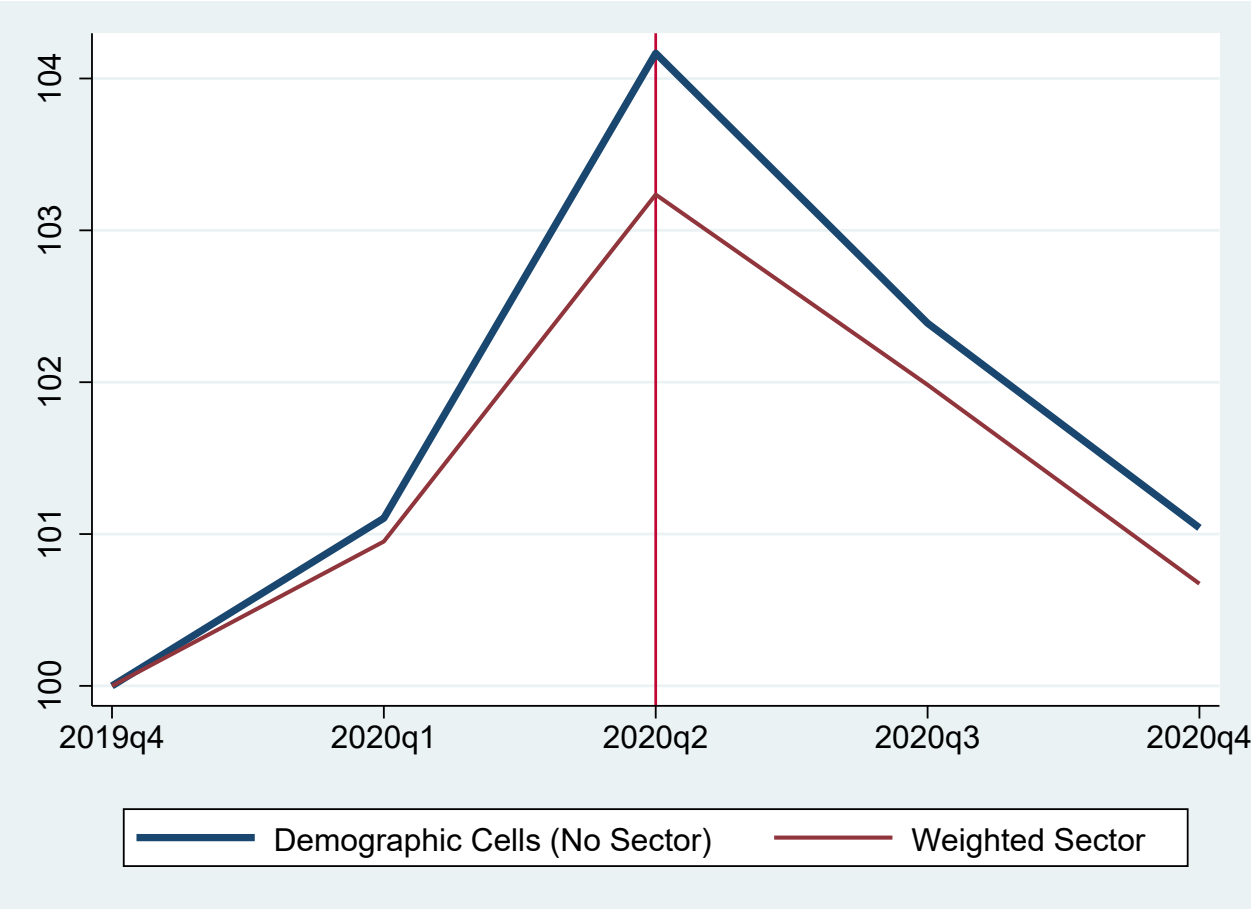
Source: Author's calculations from CPS data.

Figure 4d: Indexes of Labor Composition by Sector



Source: Author's calculations from CPS data.

Figure 5: Decomposition of Labor Composition Indexes for 2020



Source: Author's calculations from CPS data.