

Spatial and Sectoral Reallocation of Firms, Workers and Jobs in the Pandemic and Recovery¹

By

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Abstract

The recession and recovery from the pandemic have been unusual relative to recent recessions on multiple dimensions. A working hypothesis is that the pandemic and recovery have induced restructuring and reallocation of firms, workers and jobs. Such restructuring and reallocation likely reflects the increased shift to remote interaction with consequences for within and between industry reallocation as well as shifts in the spatial distribution of activity. The gold standard data on the pace of firm, job and worker reallocation including business entry and exit needed to evaluate this hypothesis emerges with a lag. Moreover, the restructuring and reallocation is arguably still in its early stages with a number of open questions about what the future will hold. However, statistics on new business applications are both timely and granular and offer early indicators of the nature of restructuring and reallocation to come. In this short note, new business application statistics that are available through the present are combined with the most recent release of job reallocation statistics through the third quarter of 2021 to explore these issues.

¹ University of Maryland and NBER. This paper draws heavily on collaborative research with numerous colleagues (papers cited in the text). The views expressed in the paper are those of the author alone.

The COVID-19 induced recession (henceforth COVID-19 Recession) began with an extraordinarily large contraction in economic activity. The net employment contraction between February and April 2020 exceeded 20 million for total nonfarm employment in the US. Since then, employment as measured by the payroll survey has recovered completely as of April 2022. The massive contraction and recovery have been uneven across businesses with accumulating evidence of restructuring reallocation of firms, workers and jobs. Such restructuring and reallocation are not surprising given the impact of the pandemic on inducing greater remote interaction between businesses and consumers, businesses and workers and between businesses. Working from home (WFH) is not as high as in 2020 but persists at substantially higher levels than pre-pandemic.²

In this short note, I review the most recent evidence on the reallocation of firms, workers and jobs in the US. The gold standard statistics for these measures are produced by the Bureau of Labor Statistics through their Business Employment Dynamics (BED) program and by the US Census through their Quarterly Workforce Indicators (QWI) and Business Dynamic Statistics (BDS). These data programs are based on the processing of comprehensive administrative data tracking the dynamics of firms, jobs and workers. As such these statistics lag the survey-based statistics that underlie the timely tracking of the aggregate labor market. Still, the BED data are available (as of May 2022) through the third quarter of 2021. While this is still relatively early in the dynamics of restructuring and reallocation likely induced by the pandemic, analysis below shows a high pace of job reallocation as well as entry and exit of establishments from the BED.

² Research on COVID-19 as a reallocation shock and its connection to the shift to working from home can be found in Barrero, Bloom and Davis (2021a,b) and subsequent follow up research by these same author teams (see, e.g., <https://wfhresearch.com/>). The novelty in the current paper is to use the latest release of the BED and BFS data to characterize the nature of the restructuring and reallocation in the pandemic.

Moreover, the patterns provide evidence of a substantial increase in both within industry and between industry reallocation.

A more timely and granular perspective on the restructuring and reallocation in the pandemic and post-pandemic recovery emerges from tracking new business applications from the Business Formation Statistics (BFS). BFS statistics are available through April 2022 and provide early indicators of the nature and magnitude of the restructuring and reallocation being induced by the pandemic. Analysis by Asturias et al. (2021) and Haltiwanger (2022) shows that innovations in new business applications are a leading indicator for subsequent fluctuations in real activity including subsequent worker and business turnover. As discussed below, the latter partly stems from the fact that young businesses are very volatile so that a surge in business formation begets future dynamism. This link between young business activity and dynamism has been explored at length (see, e.g., Davis and Haltiwanger (2015, 2019), Decker et al. (2020)). Relatedly, evidence shows that employer startups play an important role in job creation, innovation, and productivity growth (Haltiwanger et al. 2013; Alon et al. 2018; Acemoglu et al. 2018; and Guzman and Stern, 2020).

The patterns of new business applications in the pandemic are striking. After an initial sharp decline from late March through May, new business applications started to surge by June 2020. This surge has continued through April 2022. Overall, calendar year 2021 is the highest year on record for new business applications since 2004 (the first year the BFS is available).³ The surge in new business applications in 2020, 2021 and through early 2022 includes a surge in applications for both likely employer and likely nonemployer businesses. These patterns

³ The surge in new business applications in the BFS are matched by other sources such as the Startup Cartography Project (SCP) as reported in Fazio et al. (2021). The latter covers only 8 states but offers rich and novel findings into how these patterns vary across narrow geographic areas. See further discussion below in section III.

contrast sharply with the patterns in the Great Recession. In the Great Recession, new applications for likely employers as well as actual employer business startups declined sharply.⁴

The BFS statistics permit granular characterization of the changing pace of business formation on both detailed industry and spatial dimensions. Five 3-digit NAICS industries account for about 50% of the surge in applications. Specifically, Nonstore Retailers (e-commerce), Truck Transportation, Professional, Scientific and Technical services, Administrative and Support Services and Personal Services. There has also been a spatial shift in business applications. Some of this has been between regions, some within states and some within metropolitan areas. The New York City Area provides an interesting case study. Manhattan (New York County) averaged a growth rate of 1.4% of new business applications from 2010-19 but this declined to -1.7% from 2019 to 2020. In contrast, the surrounding counties experienced a large increase in the growth in applications in 2019-20 relative to the average from 2010-19. For example, Kings County (where Brooklyn is located) had an average growth rate of 3.9% from 2010-19 and this increased to 14.9% from 2019-20. All surrounding counties had difference in growth rates exceeding 9% from the average 2010-19 to 2019-20 period.

The paper proceeds as follows. Section II provides a description of the data sources used in the analysis. Section III presents the main results providing insights on the basic patterns, the contrast between the patterns in the COVID-19 recession and the Great Recession, and the sectoral and geographic differences in applications during the pandemic. Section IV provides interpretation and implications of these patterns in the context of concluding remarks.

II. Description of Business Employment Dynamics (BED) and Business Formation Statistics (BFS)

⁴ Detailed analysis of the differences between the Great Recession and the pandemic can be found in Dinlersoz et al. (2021) and Haltiwanger (2022).

The BED statistics are derived from a longitudinal version of the Quarterly Census of Employment and Wages (QCEW). The QCEW micro data have almost universal coverage of private sector establishments derived from statistics reported by establishments as part of the administration of Unemployment Insurance in the US. Statistics in the BED include job creation, job destruction and their components classified in terms of establishment openings, expansions, contractions and closings. Some of the openings and closings are transitory – especially in the pandemic. The BED also includes classification of openings into reopenings and establishment births (new establishments that have had zero activity of the prior 4 quarters). Similarly, the BED decomposes establishment closings into those that reflect temporary closures and establishment exits (the establishment has no activity in the four quarters after closure). Given these definitions, establishment exits, or deaths are only available with a lag compared to the other statistics. It also takes some time for BLS to receive and process the QCEW micro data so that the most recent BED statistics are for the third quarter of 2021.⁵

The BFS series are available weekly from 2006:w1 through the present and monthly from 2004:m7 through the present.⁶ The weekly series include total applications (BA), high propensity applications (HBA), applications with planned wages (WBA), and applications for corporations (CBA) at the national and state level (all not seasonally adjusted). The monthly series include all the same application series and some formation series. For the latter, actual new employer business formations from these applications over the next four and eight quarters

⁵ The gold standard statistics for actual new employer business startups are from the US Census Bureau's Business Dynamic Statistics (BDS). The BDS permits distinguishing between new establishments of existing firms vs new firms. Haltiwanger et al. (2013) emphasizes this important distinction. The most recent BDS release is through 2019. The BFS statistics are integrated with the micro data underlying the BDS (the Longitudinal Business Database – LBD). This integration yields the BFS statistics on startups that emerge from the applications. Such statistics are available up through 2019. After 2019, the BFS includes projected startups from the startups. See further discussion below and Haltiwanger (2022) for more detail.

⁶ As of the writing of this paper, the weekly series is available through 2022:w18 (through May 7, 2022) and the monthly series is available through 2022:m4.

(BF4Q and BF8Q) as well as projections for new business formations (PBF4Q and PBF8Q) are released at the national, sectoral, and state level. The BFS data are very timely: weekly data are released for a given reference week on the Thursday after the reference week and monthly data are released within two weeks of the end of the reference month. The NHBA series used in this paper is constructed directly from the difference between BA and HBA.

Applications designated likely employers (HBA) include applications that have at least one of the following indicators on the application: (i) are from corporations, (ii) indicate hiring an employee (iii) indicate a first wages paid/planned date, and (iv) in certain detailed industries that have a high propensity for becoming employer businesses. Overall, HBA have less than a 50% likelihood of becoming employer businesses within 8-quarters after application, but fluctuations in HBA (see Haltiwanger (2022)) closely track actual employer startups. The elasticity of actual startups in the subsequent eight quarters from applications in each month is close to one at the national, industry and state level. Applications denotes as likely nonemployers (NHBA) have a low probability of becoming employer businesses of only 3.8%. However, as shown in Haltiwanger (2022), fluctuations in NHBA closely track fluctuations in nonemployers.

Two annual additional releases yield additional insights for the BFS. County level total business applications is released in July for the prior year (back to 2006). Three-digit NAICS industry statistics at a weekly frequency in February for the prior year.

III. *Evidence on Reallocation in the Pandemic*

A. *Job Reallocation*

This section starts with some basic facts about the nature of reallocation in the pandemic and recovery using the latest release of the BED statistics through 2021:3. Jobs created and

destroyed by establishment openings, closings, births and deaths are shown in Figure 1 from 2019:Q1 through 2021:3. Early in the pandemic there is an enormous surge in job destruction from establishment closings and deaths. Almost 3 million jobs were destroyed by establishment closings in the 2020:2. More than half of this was temporary closings, but establishment exits accounted for about 1.2 million of the 3 million. Establishment openings surged in the 2020:3 reflecting mostly reopenings, but establishment births have been increasing steadily from 2020:3 through 2021:3.⁷

The overall pace of job reallocation (Figure 2) measured as the sum of job creation and destruction rates increased in the pandemic (measured as the six quarter period from 2020:2-2020:3) to rates not observed since the late 1990s.⁸ The evident downward trend in reallocation prior to the pandemic has been the subject of much attention (see, e.g., Davis and Haltiwanger (2014)). Excess reallocation (the job reallocation rate minus the absolute value of the net growth rate) also increased in the pandemic with an increase in both within and between industry reallocation rates (see Figure 3).⁹ Most job reallocation is within industry but between industry excess reallocation increased to almost 2 percent of total employment in the pandemic.

B. New Business Formation

The patterns of new business applications (BA, HBA, and NHBA) from 2004:m7 through 2022:m4 are shown Figure 4. The upward trend in NHBA and the downward trend in HBA

⁷ Figure 1 draws upon the same source data as Figures 1 and 3 from Decker and Haltiwanger (2022). The latter paper has a more extensive analysis of the relationship between the BED and BFS statistics for the recent period.

⁸ For expositional purposes it is instructive to aggregate the quarterly BED series to 6-quarter intervals in Figures 2-3.

⁹ By design, the six-quarter interval permits excess reallocation to be positive even if quarterly job creation and destruction are not simultaneous. This approach is especially insightful for the between industry excess measure since the reallocation of jobs across industries is likely not simultaneous within quarters. For the within industry excess measure, it is still instructive, but it may (like the overall reallocation measure itself) reflect temporary layoffs and recalls.

from 2004:m7 through 2020:m2 are evident.¹⁰ At the outset of the pandemic there is a sharp decline in BA, HBA and NHBA in March through May 2020. However, by June 2020 the number of applications of all types exceeds any month from January 2019 through February 2020. The surge in applications of all types peaks in July 2020 but the numbers in August 2020 to April 2022 exceed the number of applications in all prior months back to 2004:m7 for BA and NHBA and in all prior months back to 2007:12 for HBA. While the focus of this note is primarily applications that will yield new employer businesses, the surge in NHBA is interesting in its own right. This likely reflects an increase in individuals going out on their own in the pandemic (see Abraham et al. (2021) for a discussion of the rising Gig Economy in the US).

The surge in new business applications (particularly for likely new employers) in the pandemic contrasts sharply with the patterns in Great Recession. This is evident in Figure 4 especially for applications for likely employers (see Haltiwanger (2022) for a more detailed analysis). Several factors likely underlie this difference. First, financial conditions are dramatically different across these episodes. The financial crisis that is at the root of the Great Recession included a decline in housing prices, a decline in net worth for households, and substantial challenges for bank balance sheets. Small business lending collapsed over this period. Some of this reflected likely reflected demand side factors but Davis and Haltiwanger (2019) identify a credit supply channel that adversely impacted young businesses. In contrast, financial markets have been robust in the COVID-19 Recession and recovery with housing prices rising and financial intermediaries much healthier in this period.

Secondly, the COVID-19 Recession has induced a change in the structure of the U.S. economy towards more remote activity and this provides incentives for new businesses to

¹⁰ In fact, HBA is greater than NHBA from 2004 through 2008 when NHBA begins to be larger than HBA.

explore such potential opportunities. The restructuring component of the surge in business applications can be investigated by examining the changing sectoral and spatial composition of new business applications. Some aspects of the sectoral reallocation have already been shown using the BED. The BFS is timelier and offers more granularity than the BED so I turn to using the BFS for these questions now.

The surge in new business applications in the pandemic has been uneven across industries. The top panel of Figure 5 shows the monthly patterns of applications for likely new employers for the five 3-digit NAICS industries with the largest change in applications from 2018-19 to 2020-21. These five industries account for 50% of the overall surge in applications over this time. The largest change is for Nonstore Retailers (NAICS 454) which increased its number of applications by about 650K over this period. The remaining top five (Professional, Scientific and Technical Services (NAICS 541), Truck Transportation (NAICS 484), Administrative and Support Services (NAICS 561) and Personal Services (NAICS 812) all exhibited increases of more than 200K over this period.

These patterns imply that the pandemic surge in business applications is associated with intensified restructuring on several dimensions. For one, entry by itself an important component of restructuring in terms of business turnover. Second, the uneven patterns across sectors that change rapidly over a short period of time suggests that the restructuring has an important between sector component. The sectors with especially high business application rates provide guidance about the nature of this restructuring. The dramatic rise in sectors such as Nonstore Retail is consistent with the shift towards remote interactions between businesses and consumers.

The uneven pattern across industries is more dramatic in the BFS than the BED. It will take some time for the impact of the uneven pattern in business applications to be fully realized

in the job reallocation statistics. As emphasized by Haltiwanger (2022), there is a nontrivial lag between the timing of applications and actual business entry. Moreover, as discussed below, young businesses exhibit a high pace of firm, worker and job turnover. This implies that a surge in entry in one period manifests itself in terms of higher future firm, worker and job turnover. Haltiwanger (2022) provides evidence on these dynamics using bivariate VAR analysis.

The surge in new business applications in the pandemic has also been uneven across locations. The top panel of Figure 6 shows the average annual growth rates in new business applications from 2010-2019.¹¹ Areas that stand out as higher than average growth include the South (including urban areas such as Atlanta Georgia), Southwest (including urban areas such as Austin, Houston and Dallas Texas), the Northwest (including urban areas such as Seattle Washington) and the West (including urban areas such as the San Francisco Bay area).

In 2019-20, average growth accelerated substantially consistent with Figure 4. The surge was especially dramatic in the South but less so in urban areas such as the Seattle and San Francisco Bay areas. Figure 7 helps illustrate this pattern showing the change in growth rates between the two subperiods. Using the Census Bureau's 2010 percent of population urban by county, there are distinct patterns across counties within and between states. For example, states such as California and Washington had strong positive correlations between the growth rate of applications and percent of the population urban across counties within state in the 2010-19 period (0.37 and 0.46 respectively). However, these correlations turned negative in 2019-20. The correlation in the change in the growth rates and percent population urban across counties are -0.12 and -0.30 for California and Washington. Not all states exhibited this pattern. For example, the states of Georgia and Texas exhibit positive correlations (0.15 and 0.17) across

¹¹ The BFS county statistics have only been released through 2020. In July 2022, county statistics for 2021 will be released.

counties within state between the change in growth rates of new business applications and the percent population share.

Looking more granularly at the changing patterns within metropolitan areas, the New York City area offers an interesting case study. Figures 8 and 9 show the same information as Figures 6 and 7 focusing on the counties in New York. Manhattan (New York County) averaged a growth rate of 1.4% of new business applications from 2010-19 but this declined to -1.7% from 2019 to 2020. In contrast, the surrounding counties experienced a large increase in the growth in applications in 2019-20 relative to the average from 2010-19. For example, Kings County (where Brooklyn is located) had an average growth rate of 3.9% from 2010-19 and this increased to 14.9% from 2019-20. All surrounding counties had difference in growth rates exceeding 9% from the average 2010-19 to 2019-20 period. The patterns for New York City highlight these structural changes have been within metropolitan areas.

C. Establishment Births, New Firms (Startups) and New Business Applications

Combining the BFS and BED data suggests that the surge in business applications is being reflected in new establishment births. As discussed in Decker and Haltiwanger (2022), caution is needed in comparing BED establishment births with new firms as establishment births can be associated with existing firms. Establishment birth of existing firms are also of interest as indicators of restructuring and reallocation but distinct implications. Figure 10 provides perspective on these issues by depicting indices tracking new business applications for likely employers (HBA), projected startups from new business applications (see Haltiwanger (2022)) and establishment births.¹² All of the series exhibit substantial increases in the 2020:3-2021:4 period relative to 2019. Establishment births increase with a lag compared to new business

¹² The BFS data have been aggregated to the quarterly frequency to be comparable to the BED statistics for this figure.

applications which is not surprising. In interpreting the projected startups in Figure 10, it is important to note that these are projected startups over the subsequent 8 quarters from the timing of the application.

VI. *Concluding Remarks*

The pandemic has been associated with a sharp contraction and rapid recovery. Unlike recent recessions, the pandemic has been associated with a surge in applications for new businesses. Based on historical patterns, this surge in applications should result in a surge in new employer and nonemployer businesses. Early signs of this are showing up in the administrative data through 2021:3 with a surge in establishment births. The gold standard statistics on actual startups are not yet available for the pandemic but the surge in establishment births is consistent with an increase in actual new firms. In addition, statistics on projected startups also exhibit a surge.

Accompanying the surge in business formation and new businesses are early signs of an increase in the pace of the reallocation of jobs across establishments. This has included an increase in the pace of reallocation of jobs across establishments within and between industries. Between industry differences have been even more dramatic in the surge in new business applications. Five 3-digit NAICS industries account for 50% of the surge in new business applications. The restructuring and reallocation of business activity across firms and jobs includes an important spatial component. New business applications have not grown as rapidly in key urban areas such as Seattle and San Francisco as other parts of the respective states where these urban areas are located. In addition, there has been a shift in new business application within metropolitan areas from downtown areas to surrounding counties (e.g., in New York City).

The patterns of restructuring and reallocation are consistent with the shift towards greater remote interaction between businesses and consumers, businesses and businesses and businesses and workers. The evidence presented here are likely just the early signs of this restructuring and reallocation. As noted, the statistics on job reallocation lag business formation statistics.

However, importantly a surge in new businesses begets future business and worker turnover.

It will likely take a number of years for these changes in the structure of businesses and jobs to sort themselves out. A number of open questions remain. First, how much of this shift to working from home (WFH) and associated shift in remote interaction will stick? Second, what business models and technologies will emerge as the most applicable in this new environment? Third, what will be the implications for the demand for different types of skills? New businesses are likely to play a critical role in the inevitable experimentation dynamics associated with these changes.

In considering potential implications for policy, the fragility of young businesses is important to consider for the future implications of the current surge in new businesses. As discussed above, financial market conditions have been much more favorable for young businesses in the pandemic than the Great Recession. An open question is whether such favorable conditions will continue given the potential adverse effects of contractionary monetary policy being pursued to mitigate rising inflation. In addition, this surge in new businesses and accompanying increase in reallocation in the pandemic is bucking a downward trend in business dynamism and entrepreneurship over the last couple of decades in the US. Davis and Haltiwanger (2015) discuss the evidence and the role of rising frictions to account for these patterns. They discuss the role of occupational licensing, changes in the employment-at-will doctrine, non-competes, and regulatory policy amongst other things for declining dynamism.

The surge in business formation in the pandemic is despite these potential dampening factors that are still very much at work.

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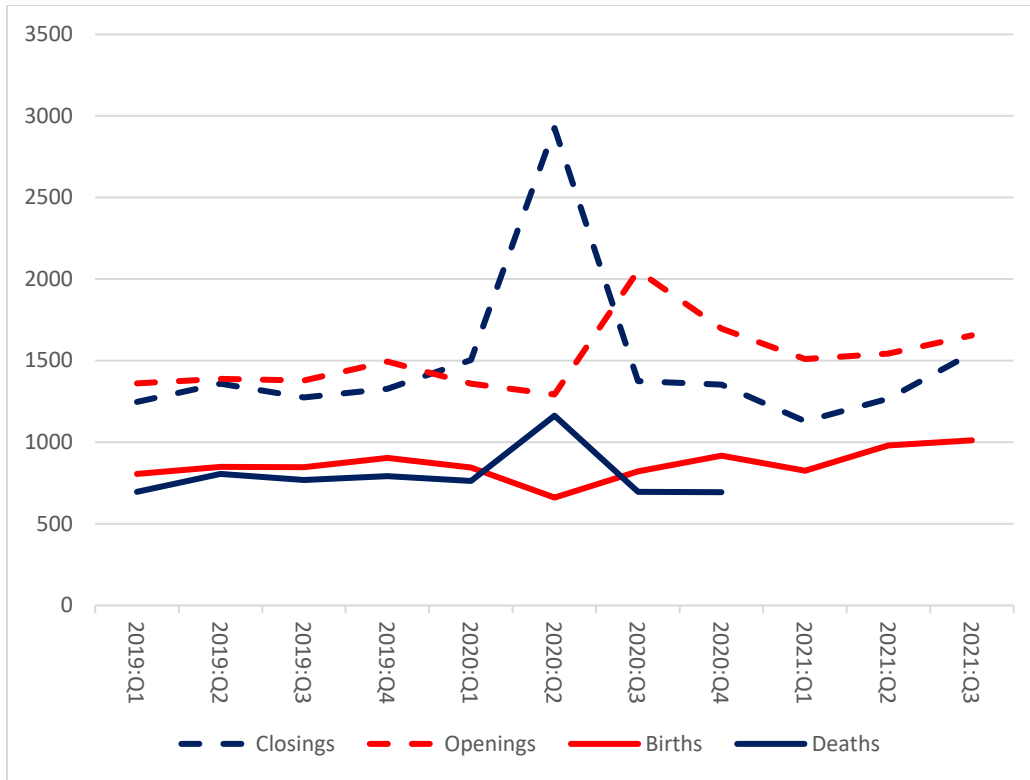
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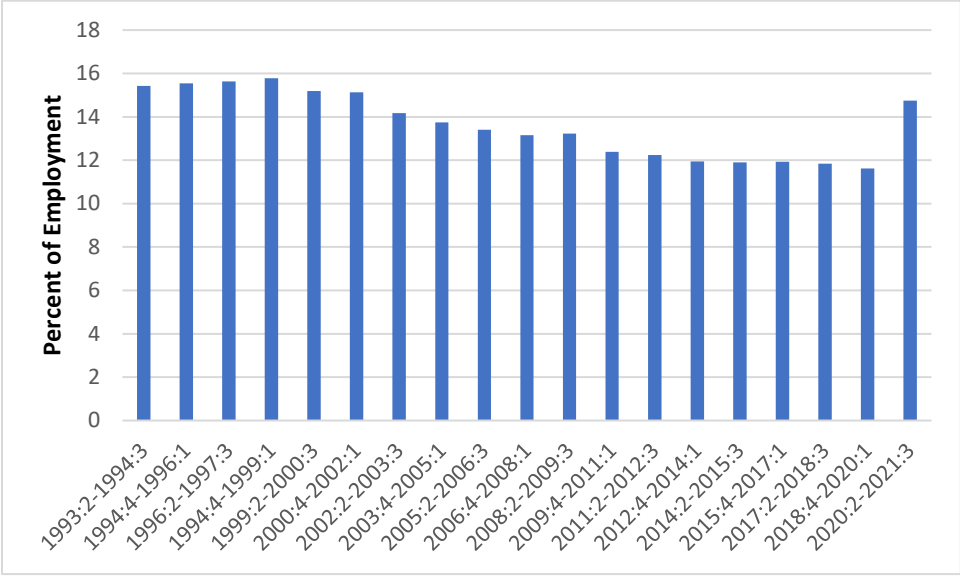
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Figure 1. Job Reallocation from Openings, Closings, Births and Deaths of Establishments



Notes: Tabulations from the BED. This figure uses the same tabulations as in Figures 1 and 3 of Decker and Haltiwanger (2022).

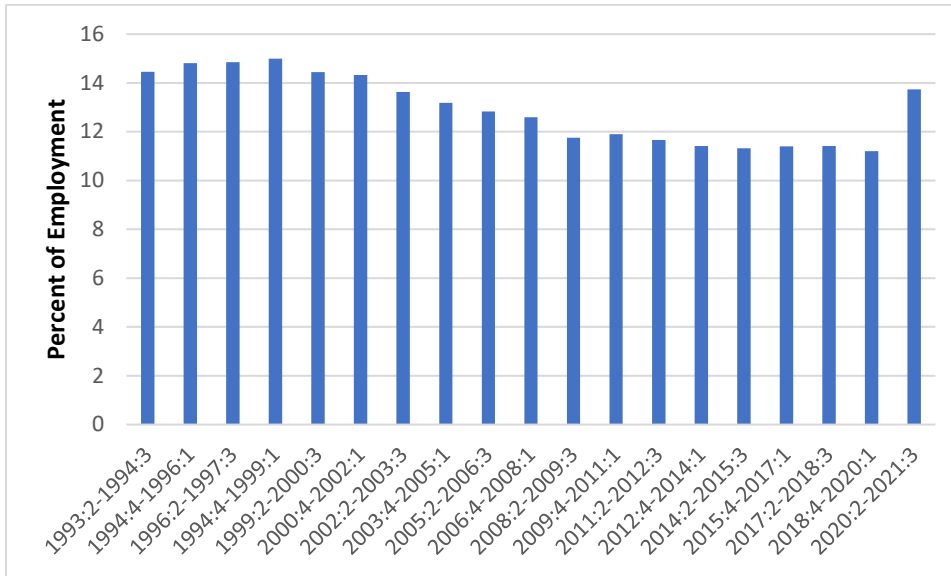
Figure 2. Job Reallocation Rates, Quarterly Averages Across 6-quarter (non-overlapping) Subperiods



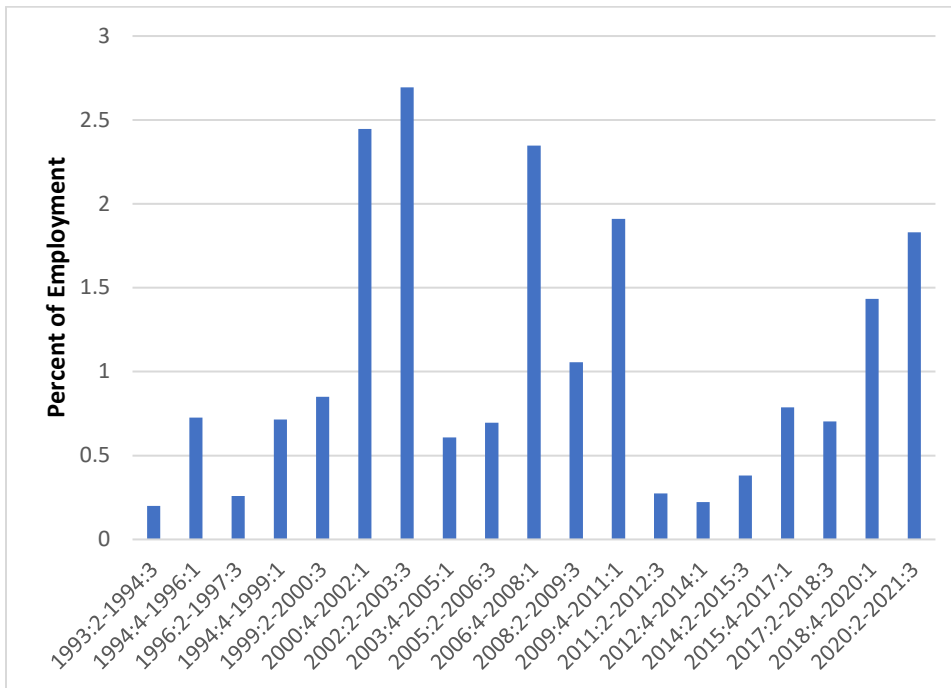
Notes: Tabulations From BED.

Figure 3 Excess Between and Within Reallocation Rates.

A. Within (3-digit NAICS) Job Reallocation Rate, 6 quarter horizon, Average quarterly Rates

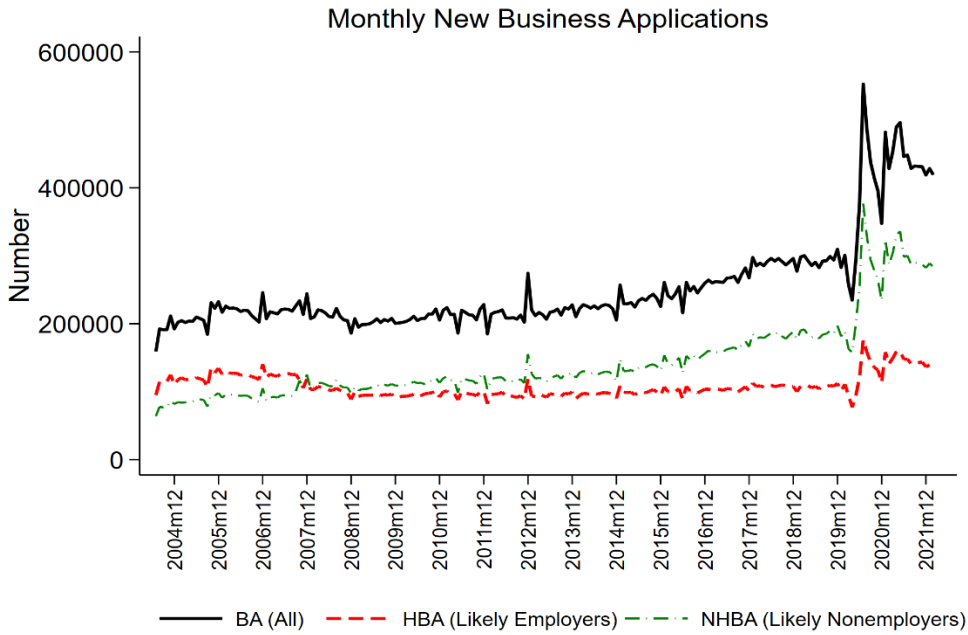


B. Excess Between (3-digit NAICS) Job Reallocation, 6 quarter horizon, Average Quarterly Rates



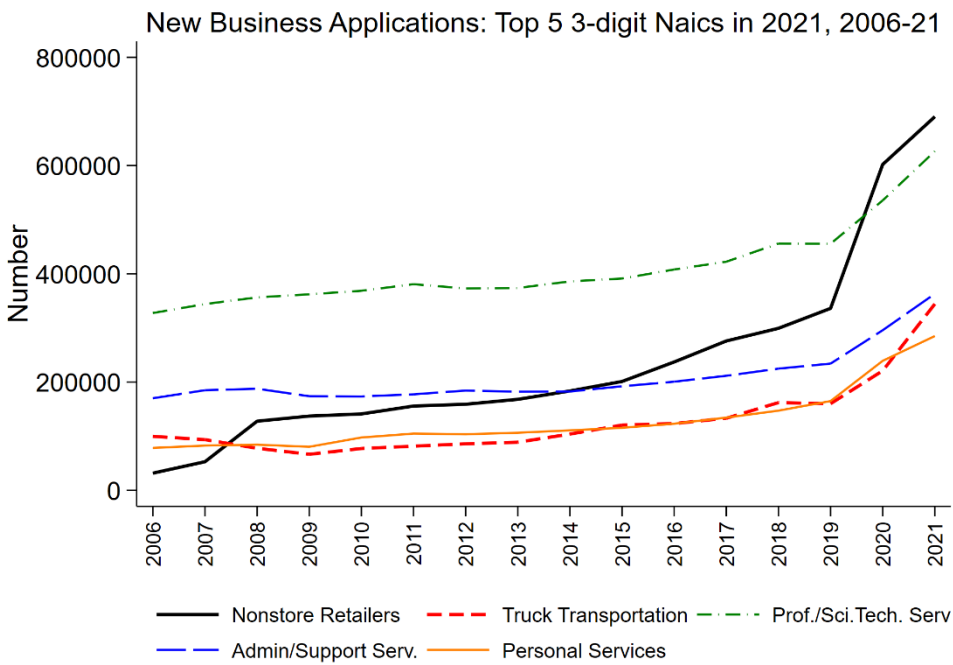
Notes: Tabulations from BED.

Figure 4. Monthly New Business Applications, 2004:7-2022:4.



Notes: Tabulations from BFS.

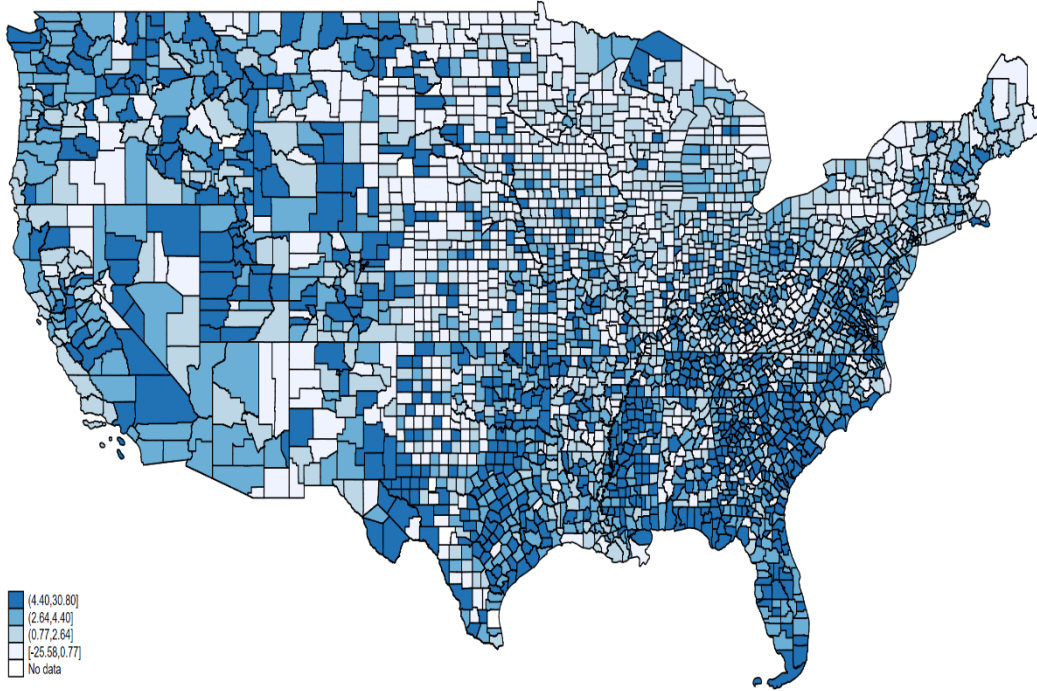
Figure 5. Five 3-digit Industries Account for 50% of Surge in 2020-21



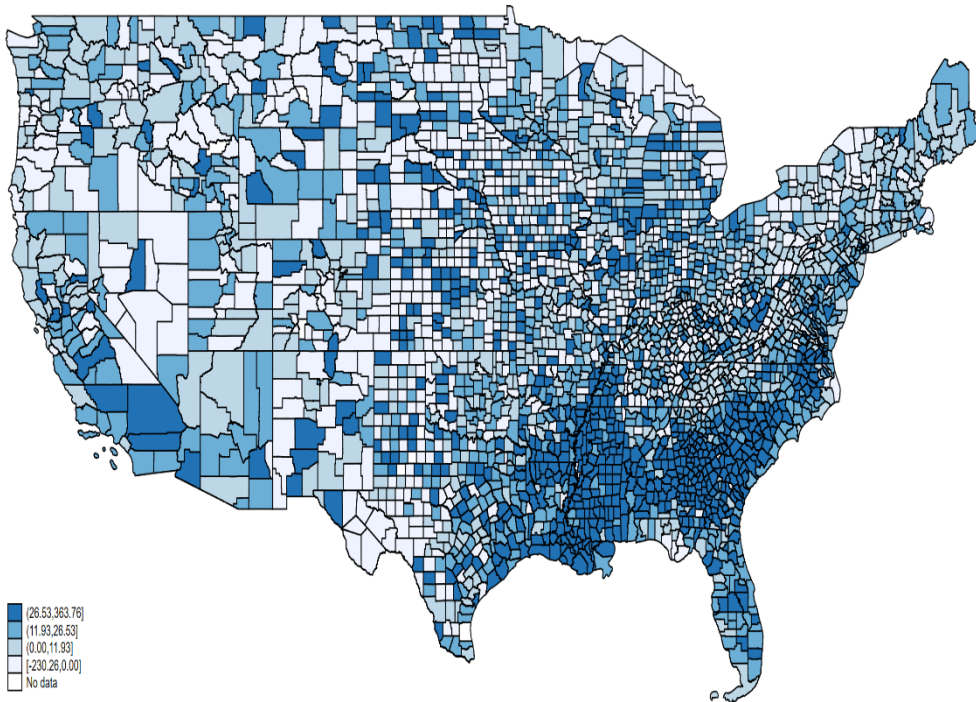
Notes: Tabulations from BFS

Figure 6. Annual Growth Rates of New Business Applications, County

A. Average Annual Growth Rates, 2010-19

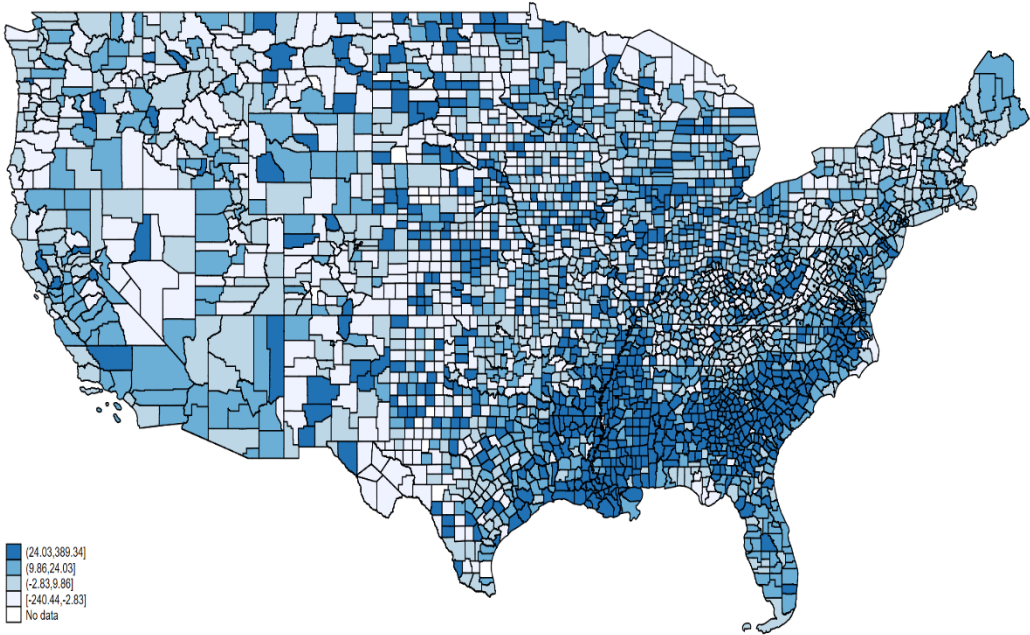


B. Annual Growth Rate, 2019-20



Notes: Tabulations from the BFS

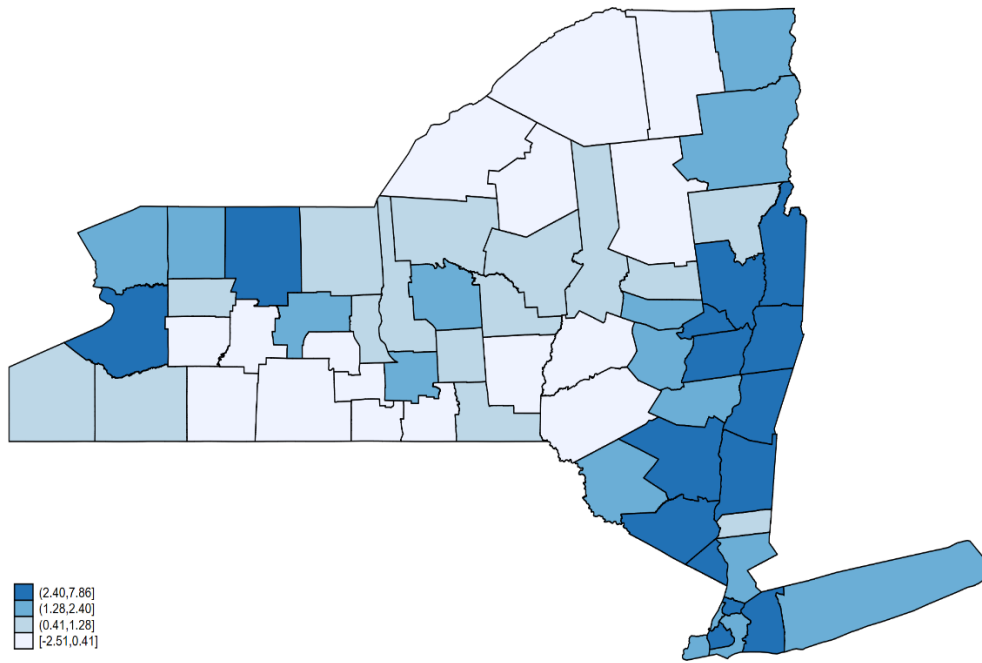
Figure 7. Change in Growth Rates from Annual Average of 2010-19 to 2019-20, US counties



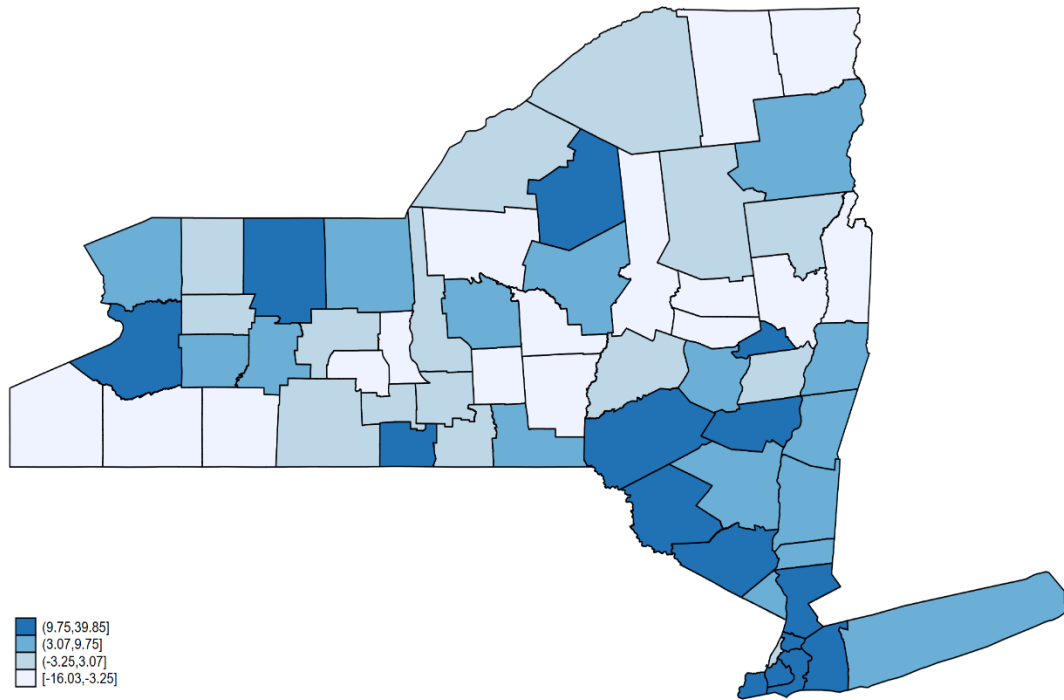
Notes: Tabulations from the BFS.

Figure 8. Annual Growth Rates for New Business Applications, Counties in New York

A. Annual Average Growth from 2010-19

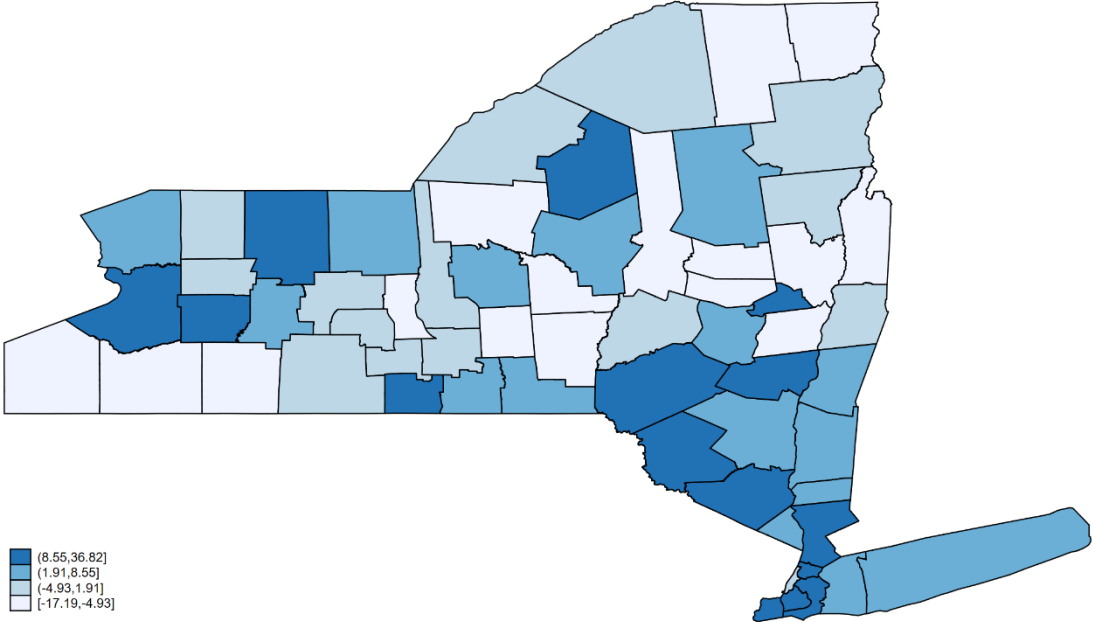


B. Annual Growth Rate from 2019-20



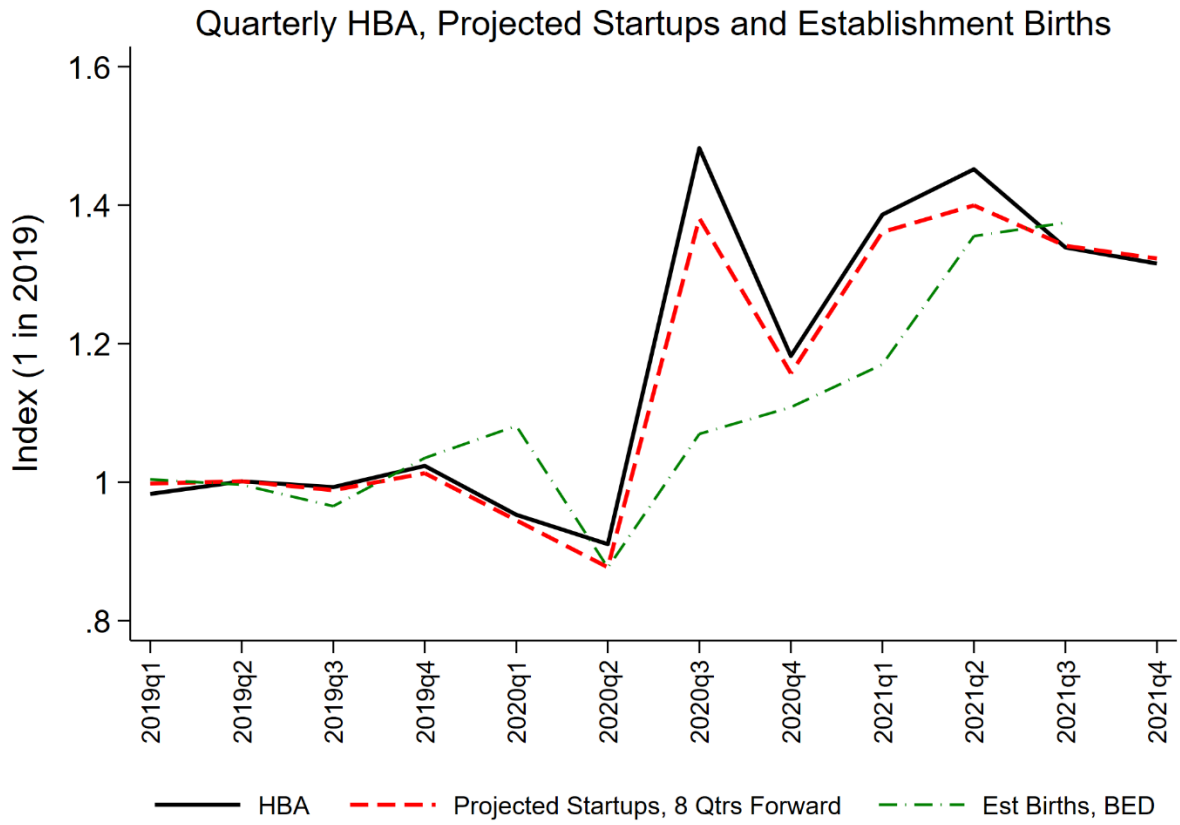
Notes: Tabulations from the BFS

Figure 9. Change in Growth Rates from Annual Average of 2010-19 to 2019-20, New York counties



Notes: Tabulations from the BFS.

Figure 10. New Business Applications, Projected Startups and Establishment Births



Notes: Tabulations from BFS and BED.