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Abstract

Despite concerns that the enormous economic and health consequences of the COVID pandemic would increase Social Security disability benefit claiming, applications dropped during the first nine months of the pandemic. This paper uses Social Security Administration data on new program applicants and current beneficiaries to characterize age and impairment changes among applicants in the post-COVID-19 period and trends in death rates among Disability Insurance and Supplemental Security Income recipients. In the post-COVID-19 period, program disability applicants were nearly half a year younger than usual and recipients experienced death rates that were 15% to 24% higher than earlier years. Neither differences in telework rates nor excess mortality appeared to explain these results. Additional research is necessary to track these patterns across additional pandemic variants.

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Introduction

The COVID-19 pandemic represents a major health and economic shock to Americans' well-being that may have profound implications for Social Security program participation. On the health side, COVID-19 led to more than 500,000 excess deaths through January 2021 alone (1). Further, many adults avoided routine and elective medical care due to access barriers or concerns about disease (2). The pandemic affected the economy through early job loss, unemployment and stimulus benefits, and the unprecedented ability to work from home. Stressful economic events are known to trigger mental health problems, cardiovascular disease, and other SSDI qualifying conditions (3-6). In previous recessions, workers turned to disability insurance as an alternative income stream (7, 8).

The implications of COVID-19 for the long-term demand for Social Security disability benefit programs are unclear. In the first nine months following the pandemic's onset, applications for Disability Insurance (SSDI) and Supplemental Security Income (SSI) dropped, with claiming rates averaging 3.8 fewer applications per 100,000 eligible Americans (9). It is unknown whether this is due to improvements in work capacity due to telework, crowd out from stimulus payments and unemployment benefits, or difficulties applying for benefits when local Social Security offices were closed. COVID-19's adverse health effects alone have uncertain implications for disability program reliance, since deaths result in program exit, while new health conditions may increase demand for benefits. However, the major increase in remote work triggered by the pandemic may enable workers who would otherwise turn to SSDI to remain working, reducing demand for benefits.

In this paper, I describe changes in the average age and impairment category of new applicants and death rates among current beneficiaries during the first nine months of the pandemic compared to earlier years.

Data

The primary outcomes of interest are characteristics of new SSDI, SSI, and concurrent applicants and deaths among current recipients from the Social Security 831 and Numident files spanning January 2015 through December 2020. Specifically, I examine applicants' average age and the share of applicants in the three most common impairment groups (arthritis and arthroplasty, back pain, anxiety and affective disorders) and all others. Since state-level beneficiary counts were not available for 2020, mortality rates are the number of beneficiaries dying in each calendar year as a share of the 2019 beneficiary population. Widow(er)s and adult children are excluded.

Control variables come from annual Integrated Public Use Microdata Series' Current Population Surveys and include sex, race, and educational distributions of the eligible population (18 to 64 for SSDI and concurrent benefits, 18 and older for SSI).

Since access to telework is hypothesized to be an important factor driving demand for disability insurance, CPS occupation codes are used to classify jobs held as of March 2020 as teleworkable or nonteleworkable using crosswalks from McFall and Hsu (2020) in order to compare outcomes in states with higher and lower rates of potential telework (10).

The pandemic's severity could also influence both demand for benefits and deaths among recipients. Since many policies responding to the pandemic were implemented nationally or varied at hyper-local levels of geography, I use excess

deaths in the first nine months of the pandemic estimated by Woolf et al. (2021) to classify states as higher or lower disease severity (1). Due to data quality, North Carolina's excess mortality is uncharacterized.

Table 1 reports unweighted summary statistics. After "all other impairments," back problems are the most common reason for SSDI application (18%) and affective disorders/anxiety for SSI (28%) and concurrent benefits (22%). Applicants for SSI and concurrent benefits are markedly younger than SSDI recipients on average (39.4 and 44.4 years versus 50.2 years). Quarterly death rates range from 0.55/1,000 SSI beneficiaries to 1.8/1,000 concurrent beneficiaries.

Estimation strategy

*Applicant **c**haracteristics*

To estimate the COVID-19-related changes to applicant characteristics, I regress each of the disability outcomes, DI for state S and quarter t on state racial and educational composition, state fixed effects, an indicator for quarter four versus all others (there is a regular drop in applications and deaths during the fourth quarter of every year), a linear time trend and an indicator for the pandemic period (April to December 2020):

$$DI_{st} = \alpha COVID_{st} + \beta Demo_{sy} + Q4 + S + Y + \varepsilon_{qt} \qquad (1)$$

Equation 1 is weighted by eligible population (adults age 18 to 64 for SSDI and concurrent and 18 and older for SSI) . Standard errors cluster at the state level in all models. An event study model examining time from the start of COVID-19 was initially planned, however available data were underpowered to separately identify a full vector

of time from COVID-19 dummy variables. Thus, I focus on the single post-COVID-19 indicator in lieu of a full event study. A priori, it seemed possible that states might make diverse changes to their policy environments in response to COVID-19, yielding a rich set of potential natural experiments to evaluate or control variables to include. In practice, there was less variation than anticipated, and differences largely correlated with other state characteristics, so the included state fixed effects capture the broader social policy environment.

While evaluating individual state policies was not possible, I look at whether any COVID-19 relationship varies in states that had a higher versus lower share of workers in teleworkable jobs at the start of the pandemic and in states with higher versus lower excess mortality rates during the pandemic. Teleworkable occupations were classified based using definitions from Helppie-McFall and Hsu (2020) and excess deaths use Woolf et al. (2021) calculations. These models modify Equation (1) to include either a COVID*High Telework interaction term, where High Telework indicates states with above median (44% of jobs) shares of teleworkable jobs at the pandemic's start, or with a COVID*High Excess Mortality interaction. High Excess Mortality states experienced death rates that were 169.9 or more per 100,000 higher than would be expected during the first nine months of the pandemic.

Recipient death rates

COVID-19 likely influenced the composition of disability benefit recipients through mortality effects in addition to potential changes in applications. Since mortality is relatively uncommon among disability program participants, ranging from 0.62 deaths per 1,000 SSI recipients per quarter to 2.14 deaths per 1,000 concurrent recipients per

quarter, I estimate very parsimonious models to avoid over-fitting the data. In these models, I regress death rates for each group of recipients D_{st} on an indicator for quarter 4 of each year to control for cyclicality in mortality rates, indicators for the COVID-19 period and years 2015 – 2017, and state fixed effects:

$$D_{st} = \alpha COVID_{st} + \beta 2015\_2017_{st} + Q4 + S + \varepsilon_{qt} \qquad (2)$$

Standard errors clustered at the state level. Quarter 1 of 2020 is omitted since COVID-19 deaths began in this quarter but likely not until late February or early March. Death rates per 1,000 2019 benefit recipients are calculated using counts of deaths by state from the Social Security Administration. I use 2019 as a normalization year because 2020 recipient data are not available, precluding the calculation of actual death rates in all study years. Observations are weighted by 2019 recipients. As with the applicant characteristics, I reestimate Equation (2) with interaction terms testing for differential changes in mortality rates in areas with higher telework capacity, where recipient family members might be less likely to contract COVID-19 and work and bring home, and areas with higher excess mortality, where beneficiaries may have faced greater COVID-19 health risks as well as more difficulty accessing health care due to crowded hospitals and physician offices.

Results

Applicant characteristics

During the first nine months of the pandemic, disability insurance applicants became younger on average by 0.51 years for SSI, 0.73 for SSDI, and 0.44 for concurrent, all representing drops of more than 10% (Table 2). There were no

consistent patterns in underlying impairments for the major disease categories (Table 3), but modest and statistically significant increases in the share of applicants falling into the "all other impairments" category for all types of disability benefit applications.

Potential mechanisms

I compare outcomes in high and low telework (40% versus 47% of jobs on average could be done at home) and high and low excess mortality states, where excess deaths during the pandemic averaged 198 per 100,000 versus 132 per 100,000. The drop in average applicant age for SSI was concentrated in higher-telework states (Table 4), no other age effects varied with telework, which could be protective, or excess death rates, which could indicate riskier health environments. Neither telework nor excess mortality consistently explained any shifts in the composition of impairments (Table 5).

Recipient death rates

Compared to the 2018 to 2019 reference period, all-cause mortality increased for disability benefit recipients during COVID-19 (Table 6). I estimate that deaths increased by 0.13 per 1,000 SSI recipients (24%), 0.29 per 1,000 DI recipients (21%), and 0.26 per 1,000 concurrent recipients (15%). In comparison, the overall U.S. mortality rate increased by 16% in 2020 relative to 2019. As with the applicant models, I do not find consistent, statistically significant differences in the mortality rates across areas with more telework or higher excess death. However, point estimates are negative (indicating less of an increase in death rates) for SSI and concurrent beneficiaries in areas with higher telework and positive for all subgroups of beneficiaries in areas

above-median excess mortality. There was an additional, statistically significant increase in mortality for SSI recipients only in these states.

Discussion

This paper adds to a growing literature examining changes in program participation during the COVID-19 pandemic. Despite many concerning factors for disability programs, applications fell during the first nine months of the pandemic. I show that, in addition, those who are applying are getting younger. It also is possible that applicants are getting sicker since the increasing share of applications in the "all other impairments" category includes many conditions with medical presentation that can be more easily verified than the more subjective and common reasons for application.

Death rates increased by 15% to 24% among disability benefit recipients relative to 2018/2019, with rates for both SSI and DI recipients considerably surpassing the increased mortality rates for the U.S. population overall. Further, issues with the quality of death reporting in other contexts has been highlighted as a problem during COVID-19 (11). Delays accessing funeral homes, Social Security field offices, and even COVID-19-related deaths of other family members may imply that the increase in mortality is a lower bound estimate and additional deaths will emerge in future quarters or data updates. It will be important to continue monitoring trends in the composition of applicant and recipient characteristics through the delta and omicron variants and concurrent removal of state and federal income support programs, especially if states begin to adopt more diverse policy responses to COVID-19 that may help to isolate the policies' effects.

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Tables

Table 1: Summary statistics, unweighted

Variable	Mean	Std. Dev.
Share SSI with Arthritis/ Arthroplasty	.03	.07
Share SSI with Back Problems	.11	.08
Share SSI with Affective Disorder	.28	.08
Share SSI with other reason	.58	.09
Share SSDI with Arthritis/ Arthroplasty	.11	.08
Share SSDI with Back Problems	.18	.07
Share SSDI with Affective Disorder	.06	.08
Share SSDI with other reason	.65	.09
Share SSI & SSDI with Arthritis/ Arthroplasty	.04	.09
Share SSI & SSDI with Back Problems	.16	.09
Share SSI & SSDI with Affective	.22	.1
Share SSI & SSDI with other reasons	.58	.1
Average Age of SSI Recipients	39.64	2.26
Average Age of SSDI Recipients	50.18	1.33
Average Age of Concurrent Recipients	44.43	1.64
SSI deathrate per 1,000 2019 SSI recipients	.62	.47
SSDI deathrate per 1,000 2019 SSDI recipients	1.38	.77
Concurrent deathrate per 1,000 2019 concurrent recipients	2.14	1.5
Control Variables		
Share White	.81	.13
Share Black	.1	.1
No high school	.09	.03
High School Diploma	.29	.05
Stratification Variables		
Teleworkable Rate	.44	.06
Above Median Teleworkable Rate	.43	.5
Excess Death Rate (per 100,000)	155.95	51
Above Median Excess Death Rate	.44	.5
Observations	1,224	

State*quarter level data from the Social Security Administration and the Current Population Study, 2015 to 2020.

Table 2: Changes in average age of benefit claimants during the COVID-19 pandemic

	SSI	SSDI	Concurrent
Outcome Mean	40.12	50.11	44.65
(SD)	(1.64)	(1.02)	(1.20)
COVID	-0.51***	-0.73***	-0.44***
	(0.10)	(0.06)	(0.12)
N	1,224	1,224	1,224
r2	0.64	0.61	0.54

Standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01.

State*quarter level data from 2015 to 2020. Regressions control for quarter four, state racial shares, state education level shares, year, and include state fixed effects. Standard errors clustered at the state level.

Table 3: Changes in the share of benefit claimants by primary impairment during the COVID-19 pandemic

	SSI	SSDI	Concurrent
Arthritis/Arthroplasty			
Outcome Mean	.02	.12	.03
(SD)	(.05)	(.08)	(.06)
COVID-19	-0.002	-0.03***	-0.003
	(0.003)	(0.006)	(0.09)
Back Problems			
Outcome Mean	.11	.19	.16
(SD)	(.06)	(.06)	(.07)
COVID-19	-0.007*	-0.02***	-0.02
	(0.004)	(0.004)	(0.009)
Affective Disorder/Anxiety			
Outcome Mean	.28	.04	.22
(SD)	(.06)	(.07)	(.08)
COVID-19	-0.001	0.01**	-0.02***
	(0.005)	(0.006)	(0.005)
Other			
Outcome Mean	.59	.65	.59
(SD)	(.07)	(.09)	(.09)
COVID-19	0.01**	0.04***	0.03***
	(0.005)	(0.004)	(0.005)
N	1,224	1,224	1,224

Standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01.

State level data from 2015 to 2020. Regressions control for quarter four, state racial shares, state education level shares, year, and include state fixed effects.

Table 4: Heterogeneity in average age of disability benefit claimants by state characteristics

	SSI	SSDI	Concurrent
Above Median Teleworkable Rate			
Outcome Mean	40.12	50.11	44.65
(SD)	(.04)	(1.02)	(1.20)
COVID-19	-0.13	-0.60***	-0.46***
	(0.14)	(0.11)	(0.16)
COVID-19*High Telework	-0.66***	-0.22	0.04
	(0.19)	(0.17)	(0.25)
N	1,224	1,224	1,224
Above Median Excess Death Rate			
Outcome Mean	40.09	50.11	44.64
(SD)	(1.66)	(1.03)	(1.20)
COVID-19	-0.48***	-0.86***	-0.51***
	(0.17)	(0.11)	(0.15)
COVID-19*High Excess Death Rate	-0.10	0.27	0.07
	(0.22)	(0.17)	(0.26)
N	1,200	1,200	1,200

Standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01.

State*quarter level data from 2015 to 2020. Regressions control for quarter four, state racial shares, state education level shares, year, and include state fixed effects. High-telework states had 44% or more of workers in jobs that could be done via telework at the start of the pandemic. High excess death states had excess death rates of 169.9 or more per 100,000 people during the first nine months of the COVID-19 pandemic. Standard errors clustered at the state level.

Table 5: Heterogeneity in primary Impairment of disability benefit claimants by state characteristics

	SSI	SSDI	Concurrent
Above Median Teleworkable Rate - Arthritis/Arthroplasty			
Outcome Mean	.02	.12	.03
(SD)	(.05)	(.08)	(.06)
COVID	0.0001	-0.03***	-0.01
	(0.004)	(0.009)	(0.009)
COVID*High Telework	-0.005	0.005	0.01
	(0.007)	(0.01)	(0.02)
N	1,224	1,224	1,224
Above Median Excess Death Rate- Arthritis/ Arthroplasty			
Outcome Mean	.02	.12	.02
(SD)	(.05)	(.08)	(.06)
COVID	-0.003	-0.03***	0.008
	(0.005)	(0.007)	(0.01)
COVID*High Excess Death Rate	0.002	0.003	-0.02
	(0.006)	(0.01)	(0.02)
N	1,200	1,200	1,200
Above Median Teleworkable Rate – Back Problems			
Outcome Mean	.11	.19	.16
(SD)	(.06)	(.06)	(.07)
COVID	-0.01**	-0.01**	-0.009
	(0.005)	(0.005)	(0.008)
COVID*High Telework	0.006	-0.02**	-0.009
	(0.007)	(0.008)	(0.02)
N	1,224	1,224	1,224
Above Median Excess Death Rate- Back Problems			
Outcome Mean	.11	.19	.16
(SD)	(.06)	(.06)	(.07)
COVID	-0.006	-0.02***	-0.02
	(0.005)	(0.006)	(0.02)
COVID*High Excess Death Rate	-0.005	0.006	0.02
	(0.007)	(0.009)	(0.02)
N	1,200	1,200	1,200
Above Median Teleworkable Rate – Affective Disorder/Anxiety			
Outcome Mean	.28	.04	.22
(SD)	(.06)	(.07)	(.08)
COVID	0.0054	0.0141	-0.0061
	(0.0052)	(0.0105)	(0.0071)
COVID*High Telework	-0.0114	-0.0017	-0.0153
	(0.0097)	(0.0121)	(0.0101)
N	1,224	1,224	1,224
Above Median Excess Death Rate – Affective Disorder/Anxiety			
Outcome Mean	.28	.04	.22
(SD)	(.06)	(.07)	(.08)
COVID	-0.0003	0.01*	-0.02***
	(0.009)	(0.007)	(0.006)

COVID*High Excess Death Rate	-0.001	0.001	0.007
	(0.01)	(0.01)	(0.01)
N	1,200	1,200	1,200
Above Median Teleworkable Rate – Other Outcome Mean	.59	.65	.59
(SD)	(.07)	(.09)	(.09)
COVID	0.005	0.03***	0.03***
	(0.007)	(0.006)	(0.008)
COVID*High Telework	0.01	0.02*	0.01
	(0.01)	(0.009)	(0.01)
N	1,224	1,224	1,224
Above Median Excess Death Rate – Other Outcome Mean	.58	.65	.59
(SD)	(.07)	(.09)	(.09)
COVID	0.009	0.04***	0.03***
	(0.009)	(0.005)	(0.007)
COVID*High Excess Death Rate	0.004	-0.01	-0.004
	(0.01)	(0.009)	(0.01)
N	1,200	1,200	1,200

Standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01.

State*quarter level data from 2015 to 2020. Regressions control for quarter four, state racial shares, state education level shares, year, and include state fixed effects. High-telework states had 44% or more of workers in jobs that could be done via telework at the start of the pandemic. High excess death states had excess death rates of 169.9 or more per 100,000 people during the first nine months of the COVID-19 pandemic. Excess deaths are not available for North Carolina. Standard errors clustered at the state level.

Table 6: Changes in Death Rate among Disability Benefit Recipients during the COVID-19 Pandemic

	SSI	SSDI	Concurrent
Outcome Mean	.55	1.35	1.76
(SD)	(.42)	(.73)	(1.33)
COVID	0.13***	0.29***	0.26***
	(0.010)	(0.014)	(0.037)
N	1,173	1,173	1,173
Above Median Teleworkable Rate			
Outcome Mean	.55	1.35	1.76
(SD)	(.42)	(.73)	(1.33)
COVID	0.14***	0.27***	0.38***
	(0.01)	(0.02)	(0.09)
COVID*High Telework	-0.02	0.04	-0.20
	(0.03)	(0.03)	(0.13)
N	1,173	1,173	1,173
Above Median Excess Death Rate			
Outcome Mean	.54	1.35	1.75
(SD)	(.41)	(.73)	(1.33)
COVID	0.11***	0.27***	0.17**
	(0.01)	(0.02)	(0.07)
COVID*High Excess Death	0.05**	0.04	0.21
	(0.03)	(0.03)	(0.13)
N	1,150	1,150	1,150

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regressions control for quarter to and years 2015 to 2017, omit the first quarter of 2020, and include state fixed effects. Standard errors clustered at the state level.

Death rate is per 1,000 recipients in 2019 with 2018 to 2019 as the reference period. State*quarter data from 2015 to 2020. Excess deaths are not available for North Carolina.