



**WHAT FACTORS EXPLAIN THE DROP IN DISABILITY INSURANCE ROLLS  
FROM 2015 TO 2019?**

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CRR WP 2023-7  
May 2023

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## **Abstract**

In 2015, the number of individuals receiving Social Security Disability Insurance (DI) benefits began to drop for the first time in two decades. This drop was caused by a wave of terminations, as beneficiaries aged into the Old-Age and Survivors Insurance (OASI) program, combined with a steep decline in the incidence rate (the number of new DI awards relative to the insured population). Yet, the forces driving down the incidence rate remain poorly understood. Prior studies suggest that three factors could have played a role: 1) a strong economy following the Great Recession; 2) demographic shifts due to population aging and the decline in manufacturing; and 3) policy changes at the Social Security Administration (SSA). Using data provided by the SSA's Office of Disability Programs, this study examines how each of these factors contributed to the drop in the incidence rate.

The paper found that:

- A strong economy accounted for about half of the drop in the incidence rate.
- Policy changes – specifically the retraining of Administrative Law Judges – also accounted for about half the drop.
- Population aging put slight upward pressure on the incidence rate.
- In terms of the total number on the disability rolls, the impact of aging on terminations far exceeds its impact on new awards.

The policy implications are:

- The time may have come to somewhat rebalance the goals of DI from encouraging labor force participation to protecting vulnerable people.
- Congress may want to consider merging the DI and OASI trust funds.

## Introduction

In 2015, the number of individuals receiving Social Security Disability Insurance (DI) benefits began to drop, reversing an upward trend that had persisted for two decades. Policymakers have wondered whether this downward trend is likely to continue, especially since the reversal has had large positive implications for the program's finances. In 2015, when DI rolls were at their peak, the Social Security Trustees Report projected that the DI fund would deplete its reserves in 2016; that did not occur, instead the 2023 Trustees Report projected that the fund would never deplete its reserves over the 75-year horizon.<sup>1</sup>

Fundamentally, this recent drop in DI rolls is due to an acceleration of terminations, as beneficiaries age into the OASI program, combined with a steep decline in the incidence rate (the number of new DI awards relative to the insured population). Yet, the forces driving down the incidence rate remain poorly understood. Prior studies suggest that three broad factors could be playing a role. First, a strong economy following the Great Recession made DI less attractive to prospective applicants with some residual work capacity. Second, demographic shifts, due to population aging and the decline in manufacturing, reduced the number of workers eligible for DI. And third, policy changes at the Social Security Administration (SSA) – specifically, the closure of field offices and retraining of Administrative Law Judges (ALJs) in 2010 – increased the difficulty of applying for benefits and reduced the share of applicants who were accepted.

The goal of this study is to determine what share of the drop in the incidence rate, from 2010 to 2019, is attributable to each of these three factors. Using data on applications and awards provided by the SSA's Office of Disability Programs, we find that a strong economy and policy change each account for about half of the total drop. Although population aging is reducing the DI rolls through its impact on terminations, it is also putting slight upward pressure on the incidence rate. Currently, the number of terminations exceeds the number of new awards, so overall the DI rolls are declining.

The rest of this paper proceeds as follows. The next section provides background on the design of the DI program. The third section motivates our analysis by highlighting trends in the number of beneficiaries over the past 30 years and reviewing what is known about these trends. The fourth section introduces factors that have been proposed to explain the decline in the

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<sup>1</sup> The Board of Trustees, Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds (2015 and 2023).

incidence rate. The fifth section outlines the data and methodology for our analysis, while the sixth section displays the results. The final section concludes that cyclical forces, demographic shifts, and policy change have all played a meaningful role in the recent trajectory of the DI program.

## **Background**

The DI program is intended to provide a basic level of income to people who cannot work due to disability or illness.<sup>2</sup> In practice, however, the design of the program reflects a tension between twin goals: on the one hand, to protect vulnerable people; and on the other, to encourage labor force participation.

To be insured under the program typically requires at least 10 years of work history, with at least five of those years having occurred in the last 10 before disability onset.<sup>3</sup> Insured workers who experience a disability must undertake a lengthy application process in order to be considered for benefits. First, an SSA field office confirms the worker's insured status and checks that the worker has not engaged in Substantial Gainful Activity (SGA) during the past year. In 2023, SGA is defined as earning more than \$1,470 per month.<sup>4</sup>

Next, a medical examiner at a state-administered Disability Determination Services (DDS) office conducts a medical review. At this stage, the worker must meet several criteria. The disability must be expected to last for at least a year or result in death; and it must either be on SSA's "listing of impairments" (conditions that immediately qualify the worker for DI), or it must be severe enough to preclude the worker from performing *any* job in the national economy (with consideration for age, education, and work history, but without regard for geography).<sup>5</sup>

Workers who are denied benefits have the option to appeal, but the appeals process depends on the applicant's state of residence. Those living in one of 10 "prototype" states proceed directly to a hearing before an Administrative Law Judge (ALJ).<sup>6</sup> Those living in "non-

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<sup>2</sup> For an excellent introduction to the DI program, see Maestas, Mullen, and Strand (2021).

<sup>3</sup> Workers who experience a disability before age 31 can qualify with fewer years of work, and the Supplemental Security Income (SSI) program pays benefits to children who have a disability and live in a household with limited income or resources.

<sup>4</sup> SGA increases to \$2,460 for workers who are blind.

<sup>5</sup> Workers who meet these criteria are awarded DI benefits starting on the sixth month after disability onset – with initial benefits enhanced to account retroactively for the application period – and are eligible for Medicare after a two-year waiting period.

<sup>6</sup> The prototype states are: Alabama, Alaska, California (LA North and West only), Colorado, Louisiana, Michigan, Missouri, New Hampshire, New York, and Pennsylvania.

prototype” states appeal for reconsideration to the same DDS office that made the initial decision. If they are denied a second time, they can obtain a hearing before an ALJ. If the ALJ still denies benefits, then the applicant can take their case to the Appeals Council, or even to federal court, but most do not. Consequently, the processing time for SSDI applications can be lengthy. Those whose initial applications are accepted typically wait less than five months for a decision (around one-third of applicants); but rejected applicants who appeal (around half of all applicants) often wait much longer.<sup>7</sup>

Once on the DI rolls, beneficiaries receive a monthly benefit equivalent to their Primary Insurance Amount under the Old-Age and Survivors Insurance (OASI) program, without an actuarial reduction for early claiming. Few beneficiaries ever return to work despite policies encouraging them to do so (Maestas 2019).<sup>8</sup> Instead, they leave the program upon death or at their Full Retirement Age (FRA) when they automatically transfer to the OASI program.<sup>9</sup>

### **Trends in DI Rolls from 1990 to the Present**

From 1990 to 2015, the number of DI beneficiaries steadily increased due to three factors (see Figure 1). First, policy reforms in 1984 expanded the definition of disability and gave applicants and medical providers more influence over the decision process. Second, disability rates rise with age, and the baby boom population was aging into the more lenient eligibility criteria for benefits. Lastly, the secular rise in female labor force participation increased the fraction of women eligible for benefits, and they too aged into the more lenient eligibility criteria. At the same time, a strong labor market during much of this period put countervailing pressure on the number of new applications.<sup>10</sup> Ultimately, the number of new DI awards each year always exceeded the number of beneficiaries leaving the program due to death or retirement (see Figure 2).

Recent data suggest that the trajectory of the program has shifted. First, the early 2000s saw an acceleration of beneficiaries leaving the DI program, increasingly aging into the OASI program. Second, and more importantly, the number of new DI awards has been dropping

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<sup>7</sup> Autor et al. (2015); and Maestas, Mullen, and Strand (2021).

<sup>8</sup> In 2019, less than one percent of DI beneficiaries left the program because they returned to work (Social Security Administration 2022).

<sup>9</sup> The amount of benefits received does not change at the Full Retirement Age, only the source of funding for those benefits.

<sup>10</sup> Liebman (2015) and Technical Panel on Assumptions and Methods (2015).

continuously since 2010. Had the number of new awards continued to grow at its prior trajectory, then the DI rolls would not have gone down after 2015 even with more people leaving the program. This drop in new awards is not due to a contraction of the insured population, which actually grew by almost 3 percent from 2010 to 2019. Instead, it is due to a decline in the incidence rate, or the likelihood that eligible workers apply for and are awarded benefits (see Figure 3).<sup>11</sup>

### **What Factors Might Explain the Declining Incidence Rate?**

A number of prior studies have highlighted factors that could be contributing to the steep decline in the incidence rate.<sup>12</sup> These factors can be grouped into three broad categories:

#### *Business Cycle Effects*

The most obvious explanation is the business cycle: since many workers with disabilities retain some work capacity, the long and costly DI application process became less attractive when unemployment rates dropped following the Great Recession.<sup>13</sup> Indeed, Figure 4 highlights the counter-cyclical nature of the DI program, with applications and unemployment tracking each other closely.<sup>14</sup> As noted earlier, prior research has long documented a relationship between cyclical unemployment and DI applications.<sup>15</sup> Most studies use state-level data on DI applications and exploit local variation in the business cycle from the 1980s through the Great

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<sup>11</sup> The insured population has climbed steadily since the 1990s, so any recent reverse in the incidence rate is attributable to the number of new DI awards.

<sup>12</sup> See SSA Office of Retirement and Disability Policy (ORDP) (2019) for a summary of these potential explanations.

<sup>13</sup> A strong economy also shifts the applicant pool toward those with more severe health conditions, raising the allowance rate (Cutler, Meara, and Richards-Shubik 2012; Liebman 2015; Maestas 2019; and Maestas, Mullen, and Strand 2021).

<sup>14</sup> Throughout, we use SSA fiscal years as our unit of time and measure applications for DI with the number of claims that receive an initial determination, either favorable or unfavorable, in that fiscal year. In recent years, the number of claims that are dismissed on technical grounds due to fraudulent or incomplete files has increased substantially (authors' calculations from the Annual Statistical Report on the Social Security Disability Insurance Program 2020; and Foote, Grosz, and Rennane 2018). Additionally, to account for processing time, determinations made in the first three months of a fiscal year are assumed to represent applications from the prior fiscal year. Similarly, the unemployment rate is measured on a fiscal-year basis.

<sup>15</sup> Stapleton et al. (1988); Cutler, Meara, and Richards-Shubik (2012); Liebman (2015); Maestas, Mullen and Strand (2015); and Maestas, Mullen, and Strand (2021).

Recession. They all find that DI applications are positively associated with the unemployment rate, although the estimates vary due to the different periods studied.<sup>16</sup>

### *Demographic Shifts*

Another potential factor is population aging. As discussed previously, the retirement of the baby boomers is accelerating the rate at which DI beneficiaries leave the program. It is also putting pressure on the incidence rate, but in an *upward* direction. Specifically, the average age of the population targeted by DI is still rising, as mid- and late-boomers have not yet reached full retirement.<sup>17</sup> Moreover, application rates increase with age (see Figure 5).<sup>18</sup> Consequently, the average age of DI applicants has increased since 2009 (see Figure 6).<sup>19</sup> An older applicant pool also implies a higher allowance rate for benefits, since applicants above age 50 are subject to more lenient eligibility criteria. Ultimately, population aging is affecting the DI rolls through two channels that currently offset each other: more recipients leaving the program *and* upward pressure on the incidence rate. The question for this study is which channel dominated from 2010 to 2019?

Some have also pointed to the changing industry composition of the workforce as an explanation for the declining incidence rate. The shift from manufacturing to service industries may mean that fewer workers end up with health conditions that qualify for DI. Figure 7 uses the *Current Population Survey* to plot the share of workers in physically intensive industries from 1990 to 2019.<sup>20</sup> The physically intensive share declined during the 1990s and early 2000s – from 35 to 27 percent – but leveled out in 2010 and has actually increased slightly again.<sup>21</sup> So,

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<sup>16</sup> Appendix Table A1 compares the estimates from these papers. Additionally, Maestas, Mullen, and Strand (2021) use restricted individual-level data to establish a relationship between the state unemployment rate and DI *awards* during the Great Recession.

<sup>17</sup> See Appendix Figure A1. We define the eligible population as 18 to 64 year-olds who are not yet receiving Social Security benefits.

<sup>18</sup> We calculate the age gradient in DI applications using data on the number of applications by age provided by the SSA's Office of Disability Policy, and eligible population counts by age from the *Current Population Survey*. For simplicity, Figure 5 shows the age gradient in DI applications in 2019; Appendix Table A2 calculates the gradient separately for each year between 2001 and 2019. Although the baseline rate of DI application varies over the business cycle, the difference between age groups is reassuringly constant over time.

<sup>19</sup> Part of the increase is also due to the business cycle, since younger, healthier workers stay in the labor force when unemployment is low.

<sup>20</sup> Physically intensive industries include agriculture, forestry, fisheries, mining, manufacturing, construction, transportation, communications, and other public utilities.

<sup>21</sup> See Appendix Figure A2. As expected, the decrease is driven by the well-documented decline in the manufacturing sector; however, manufacturing employment has stabilized since 2010. Charles, Hurst, and Schwartz



while the decline in manufacturing might have played a significant role in earlier years, it is not relevant during the period that we study.

### *Policy Change*

During the period considered, the SSA made two notable changes to the DI program that could have reduced both the number of applications and the approval rate.<sup>22</sup> Most noticeable to the public, budgetary pressures forced the SSA to close about seven percent of its field offices between 2001 and 2013 (see Figure 8). Although these closures had already begun gradually before 2010, the rate of closure picked up significantly between 2010 and 2013. Since field offices are an important source of in-person assistance and program information, the closures increased the cost of applying and resulted in an 11-percent drop in DI applications in affected zip codes, and an even larger drop in benefit awards (Deshpande and Li 2019).

Moreover, in 2010 the SSA undertook a comprehensive retraining of ALJs to improve consistency in their decisionmaking and reduce appellate approval rates. This retraining did not affect initial allowance rates, which stayed largely flat between 2010 and 2019, but had a profound impact on the final allowance rate (see Figure 9). The exact effect of ALJ retraining on the incidence rate has not yet been determined in the literature.<sup>23</sup> In addition to depressing the allowance rate directly, a tightening of allowance rates could also discourage new applications if marginal candidates believe that their cases have a low likelihood of success.<sup>24</sup>

Ultimately, the goal of this study is to determine the relative importance of these three factors – business cycle, demographic shifts, and policy change – in explaining the recent drop in

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(2019) show similar trends in manufacturing employment and provide an overview of potential factors driving the changes.

<sup>22</sup> Non-DI policy changes may also affect DI applications. Some argue that the Affordable Care Act (ACA) reduced reliance on DI by expanding access to health insurance. However, ACA Medicaid expansions occurred after the drop in the incidence rate, and evidence of their impact is ambiguous at best (see Anand et al. 2019; Maestas, Mullen, and Strand 2014; and Schmitt, Shore-Sheppard, and Watson 2020). Similar arguments can be made regarding recent expansions of Temporary Disability Insurance programs at the state level (Autor et al. 2013; Autor, Duggan, and Gruber 2014).

<sup>23</sup> Suggestive evidence indicates a 10-percentage-point decrease in the appellate allowance rate (Ray and Lubbers 2015; and Social Security Administration ORDP 2019).

<sup>24</sup> The estimated elasticity of DI applications with respect to the approval rate ranges between 0.2 and 0.6. See Bound and Burkhauser (1999) for a review of this literature. More recently, Lahiri, Song, and Wixon (2008) find little effect of state-level variation in allowance rates on applications; other studies focus on the elasticity of applications with respect to benefit levels (Low and Pistaferri 2015).

the incidence rate. The next section describes the data and methodology used to perform this decomposition.

## Data and Methodology

Conceptually, we decompose the drop in the incidence rate by taking the level change in each factor of interest (such as the unemployment rate or number of field offices) and multiplying that change by the marginal impact of each factor on awards. Practically, we implement this approach in four stages.

The first stage estimates the impact of population aging. We begin by calculating age-specific incidence rates in 2010 using administrative data provided by the SSA's Office of Disability Programs.<sup>25</sup> Then we re-weight the age-specific rates by the share of the eligible population in each age group in subsequent years. This exercise yields the counterfactual incidence rate if all the factors, except aging, had remained at their 2010 levels.

The second stage estimates the additional impact of the business cycle in two steps. The first step uses regression analysis to estimate how the unemployment rate affects DI applications. The SSA's Office of Disability Programs provided administrative data on applications, by state and year, between 1990 and 2019.<sup>26</sup> We combine these administrative records with eligible population counts and unemployment rates – by state and year – from the 1990-2019 CPS.<sup>27</sup> The CPS also provides demographic control variables, although these turn out not to be very important in the estimation.

With these data, we run an OLS regression at the state-year level:

$$R_{t,s} = \alpha + \beta_1 U_{t,s} + \beta_2 X_{t,s} + c_s + \varepsilon_{t,s} \quad (1)$$

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<sup>25</sup> We calculate incidence rates for the following eight age groups: 18-29, 30-39, 40-44, 45-49, 50-54, 55-59, 60-61, and 62-64. Population age shares are also calculated for each of the eight age groups in the eligible population, excluding those who are younger than 18 or older than 64.

<sup>26</sup> Note that we cannot use the same regression methodology to directly estimate the impact on awards because many initial rejections go through two levels of appeal, and the outcome is not tracked at the state level in the data provided by SSA's ODP.

<sup>27</sup> The eligible population is defined here as 18 to 64 year-olds not yet receiving Social Security benefits. We choose this denominator, rather than the insured population as measured by the SSA, for two reasons: 1) to maintain consistency with the control variables calculated in the CPS; and 2) to address the unavailability of state-level insured population data. Our eligible population estimates are higher than the insured population, since we do not exclude those with an insufficient work history. Reassuringly, the post-2010 national trends of these two measures look similar (see Appendix Figure A3).

Where  $R_{t,s}$  is the DI application rate in year  $t$  and state  $s$  and  $U_{t,s}$  is the local unemployment rate.<sup>28</sup> The regression also includes state fixed effects ( $c_s$ ) and controls for other characteristics ( $X_{t,s}$ ), such as the age composition of the eligible population in the state, industry mix, education level, female labor force participation (LFP), and race. The hope is that  $\beta_1$  captures the causal relationship between DI applications and unemployment. Of course, this assumption will not hold if other omitted variables also changed during the analysis period, or if the effect of unemployment varies over time. Our approach to both of these issues is to run many versions of the regression, testing the sensitivity of our coefficient to the time period examined.

The second step uses the regression results to estimate how the decline in unemployment translated to a drop in the incidence rate. We multiply  $\beta_1$  by the level change in unemployment nationally between 2010 and year  $t$ :

$$\Delta Application\ rate_{U,t} = \beta_1(U_t - U_{2010}) \quad (2)$$

The resulting drop in applications is then multiplied by an allowance rate to estimate the impact of falling unemployment on the final incidence rate.

$$\Delta Incidence\ rate_{U,t} = \Delta Application\ rate_{U,t} * Allowance\ rate_t \quad (3)$$

A key decision at this stage is what allowance rate to choose. We do not want to take the observed allowance rate between 2011 and 2019 because this reflects the impact of ALJ retraining. For simplicity, we use the observed allowance rate in 2010 (57.5 percent) with an upward adjustment to reflect the impact of population aging since, as discussed previously, older applicants are subject to more lenient eligibility criteria.<sup>29</sup>

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<sup>28</sup> Maestas, Mullen, and Strand (2021) run a very similar regression with lagged as well as contemporaneous unemployment. Since they find that most of the association is with contemporaneous unemployment, we adopt this specification for parsimony.

<sup>29</sup> Specifically, we combine our estimates from the first stage with data on DI applications by age to find the allowance rate by age in 2010. We then re-weight the age-specific allowance rates by the share of the population in each age group in subsequent years. This counterfactual allowance rate may still be an underestimate since individuals who apply for DI during a tight labor market tend to be in worse health and are approved for benefits at a higher rate (Coe and Rutledge 2013; Cutler, Meara, and Richards-Shubik 2012; Maestas, Mullen, and Strand 2015; and Maestas, Mullen, and Strand 2021).

The third stage of the analysis estimates the decline in the incidence rate due to SSA policy change. To begin, we focus on field offices because Deshpande and Li (2019) have already established the marginal impact of closures. Specifically, the authors find that each closure reduced the number of DI awards by 15.5 percent in the zip codes directly affected. Hence, the percentage decrease in the incidence rate due to field office closures can be modeled as:<sup>30</sup>

$$\% \Delta Incidence\ rate_{field\ offices,t} = \sum_{t=2010}^t (0.155 * number\ of\ closures_t * share\ of\ population\ affected\ by\ each\ closure_t) \quad (4)$$

Multiplying this percentage change in the incidence rate by the observed level in 2010 yields the percentage-point decrease in the incidence rate due to field office closures. Data on the number of field office closures is drawn from Figure 8; we use summary statistics from Deshpande and Li (2019) to estimate the share of the total population affected by each closure.<sup>31</sup>

The final policy to be accounted for is ALJ retraining. The challenge here is that we lack convincing empirical evidence on the impact of this policy on final awards.<sup>32</sup> Consequently, we assume that any residual difference between the actual observed incidence rate and the counterfactual incidence rate – accounting for the first three factors already modeled – is the effect of ALJ retraining. We implement this approach by estimating a counterfactual DI incidence rate if population aging, the unemployment rate, and the number of field offices had remained at their 2010 levels:

$$Incidence\ rate_{counterfactual,t} = Incidence\ rate_{2010} + \sum_{x=1}^3 \Delta Incidence\ rate_{x,t} \quad (5)$$

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<sup>30</sup> This approach slightly underestimates the impact of field office closures since Deshpande and Li (2019) also find spillover effects in areas serviced by neighboring field offices, due to longer wait times and administrative congestion. However, it also overestimates the impact if discouraged applicants eventually apply at another field office.

<sup>31</sup> Specifically, Deshpande and Li (2019) provide the number of directly affected, indirectly affected, and unaffected zip codes in their analysis, as well as the average population of each type of zip code in 2000. By drawing on these statistics, we implicitly assume that the share of the population affected by each new closure does not change over time.

<sup>32</sup> Simply comparing the allowance rate before-and-after 2010 might not give the correct answer because, as mentioned above, the allowance rate also fluctuates with the business cycle. And we cannot use regression analysis to control for the business cycle, as we did earlier for applications, because appeals are determined on a national basis, rather than state-by-state.

Where  $x$  denotes each of the three factors listed above and  $\Delta Incidence\ rate_x$  represents the change in the incidence rate due to each factor. The impact of ALJ retraining can then be estimated as a residual:

$$\Delta Incidence\ rate_{ALJ,t} = Incidence\ rate_{observed,t} - Incidence\ rate_{counterfactual,t} \quad (6)$$

While this approach has the advantage of simplicity, it will overstate the importance of ALJs if other factors not considered in this study are also driving down the incidence rate.

## Results

Before turning to the main result, Table 1 presents regression results for the relationship between the unemployment rate and DI application rate. Column (1) shows results for the full time period covered by our data (1990-2019), while columns (2) through (5) consider only expansionary periods (1992-2000; 2002-2007; 2010-2019; and all expansion years). Overall, we find that a one percentage-point increase in the unemployment rate is associated with a 0.033 percentage-point increase in the DI application rate.<sup>33</sup> Changing the time period hardly changes this result, and our point estimate is consistent with prior literature.<sup>34</sup>

Figure 10 presents the main result: how much of the drop in the incidence rate is attributable to population aging, the business cycle, field office closures, and ALJ retraining. Specifically, the figure plots counterfactual incidence rates from 2010 to 2019, holding the factors at their 2010 levels and then changing each factor sequentially. For instance, the black line shows that the incidence rate would have risen by 0.02 percentage points due to population aging, between 2010 and 2019, if all the other factors had stayed constant. The red line then adds the impact of the business cycle, which decreased the incidence rate by 0.14 percentage points. The tan line incorporates field office closures, decreasing the counterfactual rate by another 0.01 percentage points.<sup>35</sup> Lastly, the -0.13 percentage-point difference between the tan

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<sup>33</sup> The mean DI application rate was 0.84 percent during this period.

<sup>34</sup> We also test the robustness of our estimates with an alternative specification used in prior studies: regressing the log unemployment rate on the log of the DI application rate. We find that the DI application rate increased by 0.3 percent for every 1 percent increase in the unemployment rate (see Appendix Table A2). Appendix Table A3 benchmarks our results against prior literature.

<sup>35</sup> The effect of field office closures is small because they only affected about three percent of the population during our analysis period.

line and the actual observed incidence rate reflects the effect of ALJ retraining. Ultimately, the business cycle and ALJ retraining emerge as the two most important factors driving down the incidence rate in recent years.<sup>36</sup>

One final question is whether the increase in new DI awards due to population aging exceeds the number of age-related terminations. In 2019, we estimate that aging increased the number of new awards by around 30,000. Meanwhile, an additional 186,000 DI beneficiaries transitioned to the OASI program that year, relative to 2010. Consequently, population aging is currently reducing the DI rolls overall. The magnitude of this downward pressure – around 156,000 fewer beneficiaries in 2019 – is still slightly less than the impact of the business cycle or ALJ retraining (around 200,000 fewer beneficiaries in 2019 due to each factor).

## **Conclusion**

Since 2015, the DI rolls have steadily dropped due to an acceleration of terminations as beneficiaries age into the OASI program, and a steep decline in the incidence rate. Since this dramatic reversal has notably improved the program’s finances, a key question facing policymakers is whether the decline is likely to persist?

This study decomposes the recent drop in the incidence rate into the portions attributable to the business cycle, demographic shifts, and policy change at the SSA. We find that a strong economy following the Great Recession accounts for about half of the drop in the incidence rate, and policy change accounts for the rest. In particular, the retraining of Administrative Law Judges, which reduced the benefit allowance rate, had a significant impact.

Although population aging is reducing the DI rolls through its impact on terminations, it is also putting slight upward pressure on the incidence rate. Currently, the impact on terminations outweighs the impact on new awards, so the overall effect on the DI rolls is negative.

These results suggest that cyclical forces, demographic shifts, and policy change have all played a meaningful role in the recent trajectory of the DI program. Of course, strong

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<sup>36</sup> Although the exact numbers are somewhat sensitive to the underlying modelling assumptions, the conclusion holds for a reasonable range of parameters. For example, we re-estimated the counterfactuals assuming a stronger relationship between unemployment and DI applications (specifically we use the estimate from Table 1 for expansion years); as well as the weaker relationship found in Maestas, Mullen, and Strand (2021). We also tested the sensitivity of the results to different allowance rates. These sensitivity tests are available from the authors upon request.

employment has always reduced DI incidence. The difference between the current period (2010-2019) and the earlier one (1990-2009) is that policy changes are reinforcing the cyclical effect today whereas in the earlier period population aging, the rise in female labor force participation, and the expanded definition of disability were often counteracting the employment effect.<sup>37</sup>

As always, these results are subject to caveats. Our results would overstate the importance of ALJ retraining if other factors not considered here are also driving down the incidence rate. And, more importantly, we end our analysis before the COVID-19 pandemic. Although the incidence rate continued to decline during the pandemic, economic conditions, population health, and the policy environment also changed markedly. Most notably, SSA closed all its field offices for a period of two years, coinciding with a sharp drop in DI applications. Hence, the future trajectory of the DI program will depend on the longer-run implications of the pandemic as well as the other factors explored in this study.

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<sup>37</sup> Recessionary periods in the early 1990s, early 2000s, and 2008-2009 were notable exceptions, with high unemployment driving up the incidence rate.

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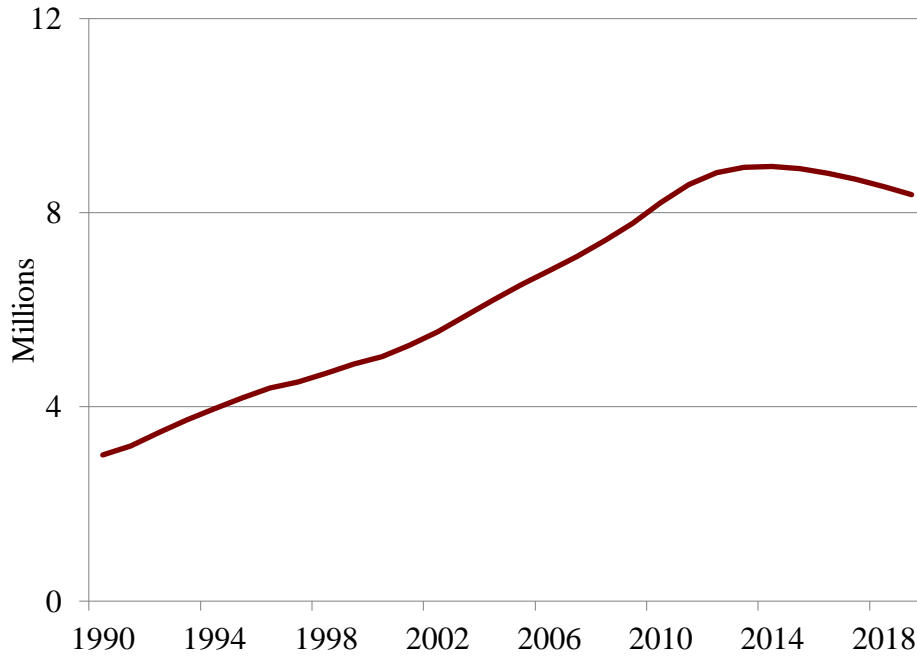
Table 1. *Regression Results for the Relationship Between the Unemployment Rate and DI Application Rate, 1990-2019*

|                                      | (1)                 | (2)                 | (3)                 | (4)                | (5)                                     |
|--------------------------------------|---------------------|---------------------|---------------------|--------------------|---|
|                                      | Expansion periods   |                     |                     |                    |   |
| Application rate                     | 1990-2019           | 1992-2000           | 2002-2007           | 2010-2019          | All expansion years<br>(including 1990) |
| Unemployment rate                    | 0.033***<br>(0.005) | 0.026***<br>(0.008) | 0.033***<br>(0.007) | 0.029**<br>(0.012) | 0.037***<br>(0.006)                     |
| Percent with a BA degree             | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| Percent Black                        | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| Female LFP                           | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| Age composition (five-year brackets) | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| Industry mix                         | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| State FE                             | Yes                 | Yes                 | Yes                 | Yes                | Yes                                     |
| Observations                         | 1,530               | 459                 | 306                 | 510                | 1,326                                   |
| R-squared                            | 0.46                | 0.67                | 0.24                | 0.67               | 0.48                                    |
| Number of states                     | 51                  | 51                  | 51                  | 51                 | 51                                      |

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05. Regressions include the District of Columbia and are weighted by the state population in 2000. The denominator includes those between the ages of 18 and 64 not receiving Social Security benefits.

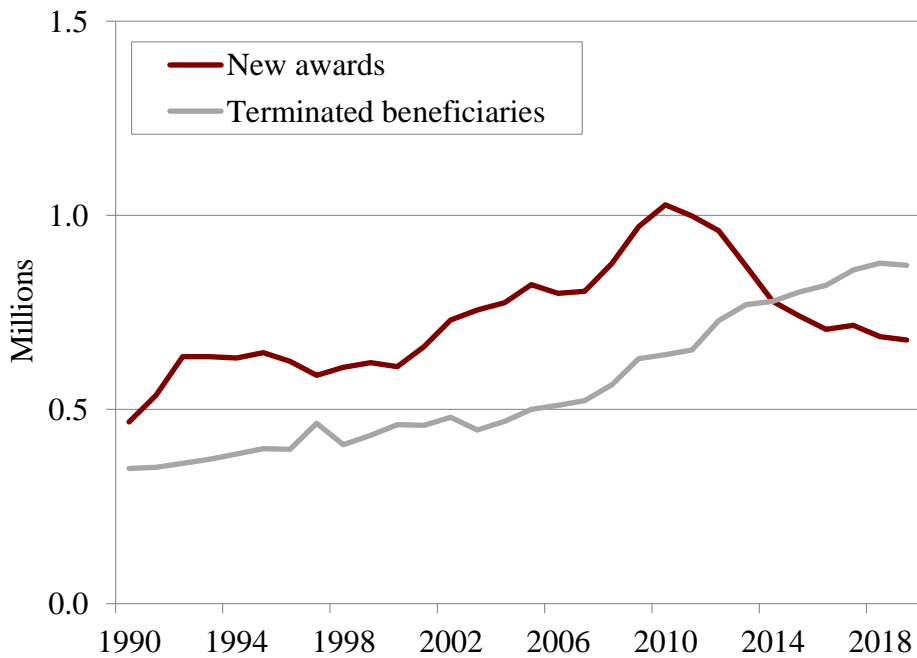
Source: Authors' estimates from data provided by the SSA's Office of Disability Programs and the *Current Population Survey* (2001-2020).

Figure 1. *Number of DI Beneficiaries, 1990-2019*



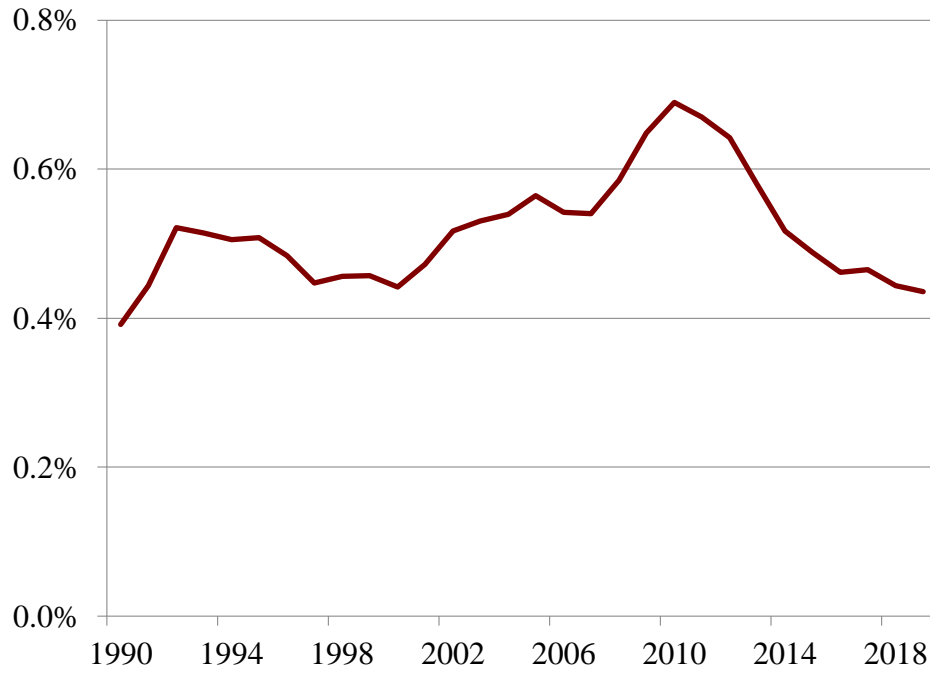
Source: Annual Statistical Report on the Social Security Disability Insurance Program (2021).

Figure 2. *Number of New Awards and Terminated Beneficiaries, 1990-2019*



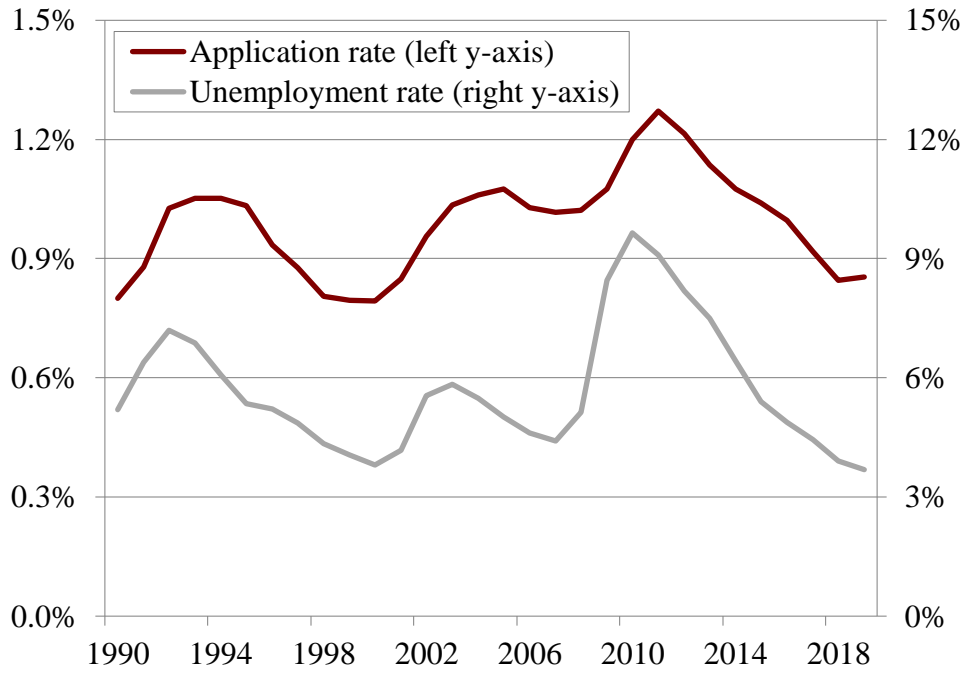
Source: Annual Statistical Report on the Social Security Disability Insurance Program (2021).

Figure 3. *DI Incidence Rate, 1990-2019*



Source: Annual Statistical Report on the Social Security Disability Insurance Program (2021).

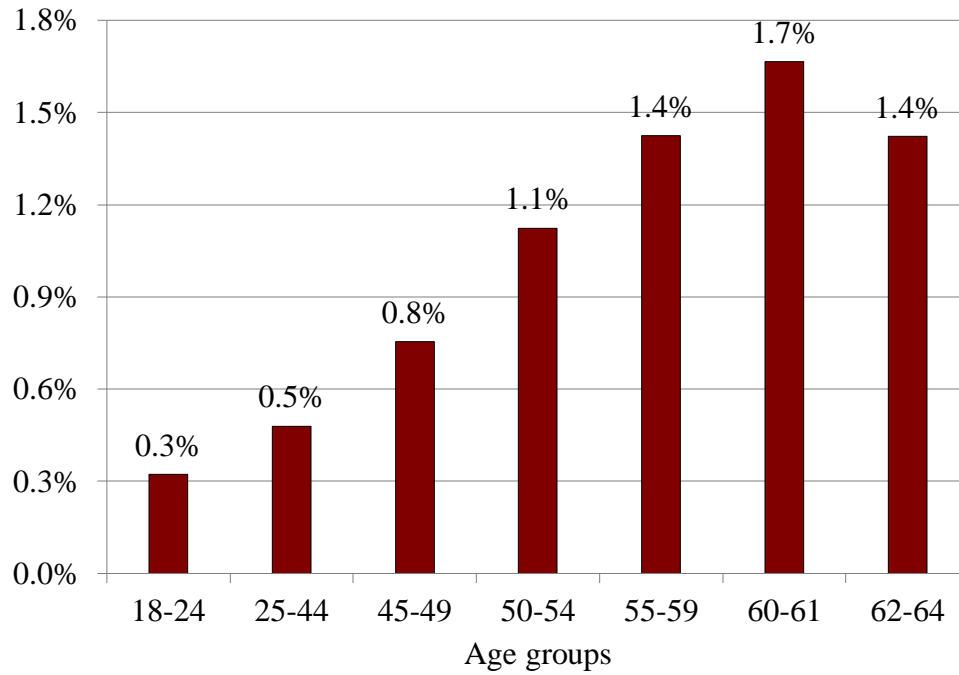
Figure 4. *DI Application Rate and Unemployment Rate, 1990-2019*



Notes: The application rate is total fiscal year determinations divided by the insured population. The unemployment rate is measured as the average during the fiscal year.

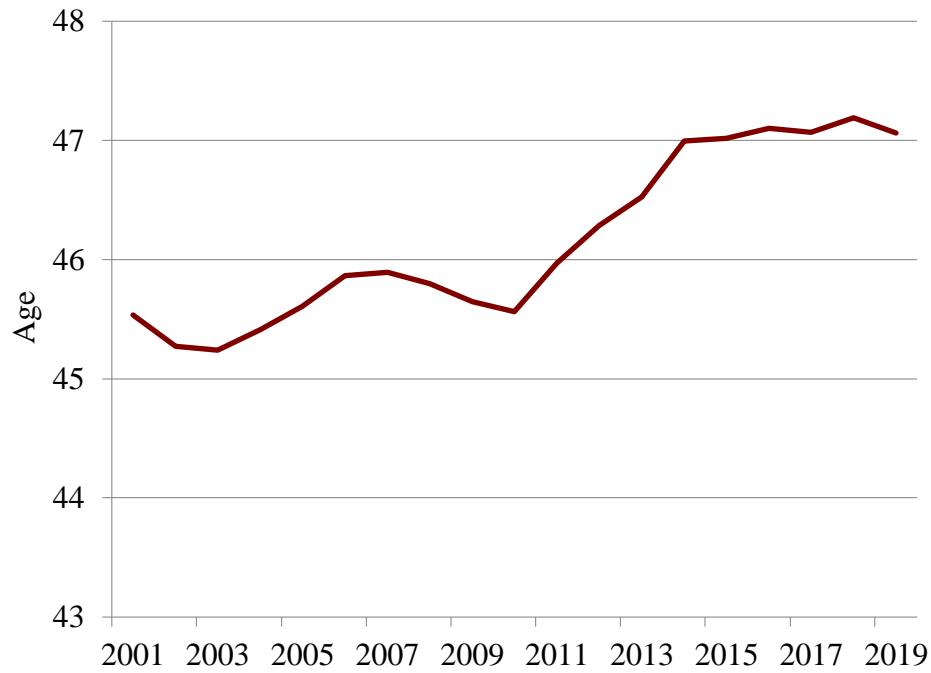
Sources: Authors' calculations from administrative data provided by the SSA's Office of Disability Programs and the *Current Population Survey* (CPS) (1990-2019).

Figure 5. *DI Application Rate by Age Group, 2019*



Sources: Authors' calculations from administrative data provided by the SSA's Office of Disability Programs and the CPS (2019).

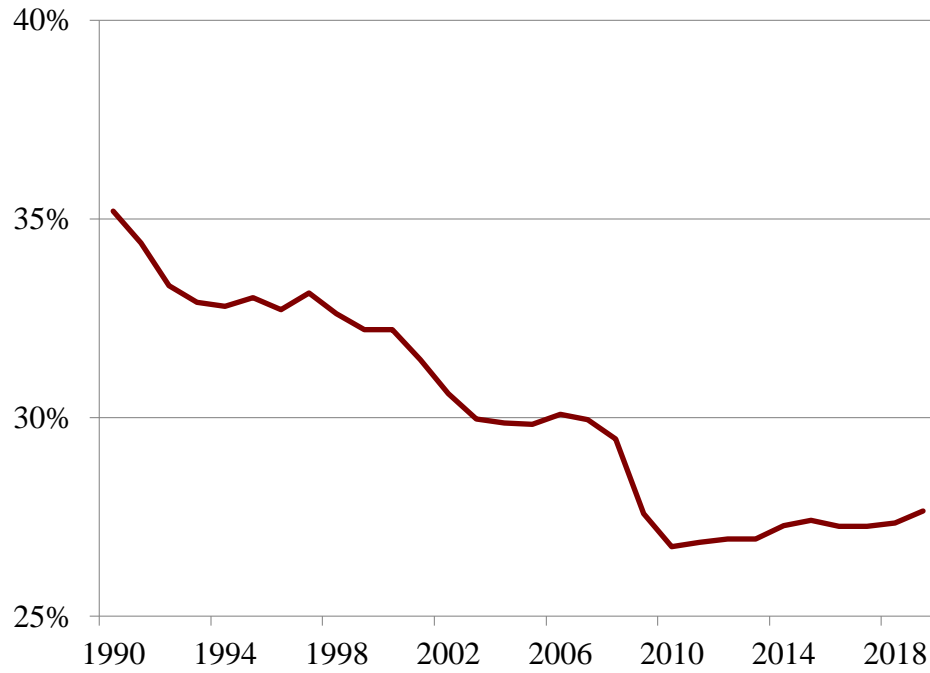
Figure 6. *Average Age of DI Applicants, 2001-2019*



Note: The data are not available prior to 2001.

Sources: Authors' calculations from administrative data provided by the SSA's Office of Disability Programs and the CPS (2001-2019).

Figure 7. *Share of Workers in Physically Intensive Industries, 1990-2019*

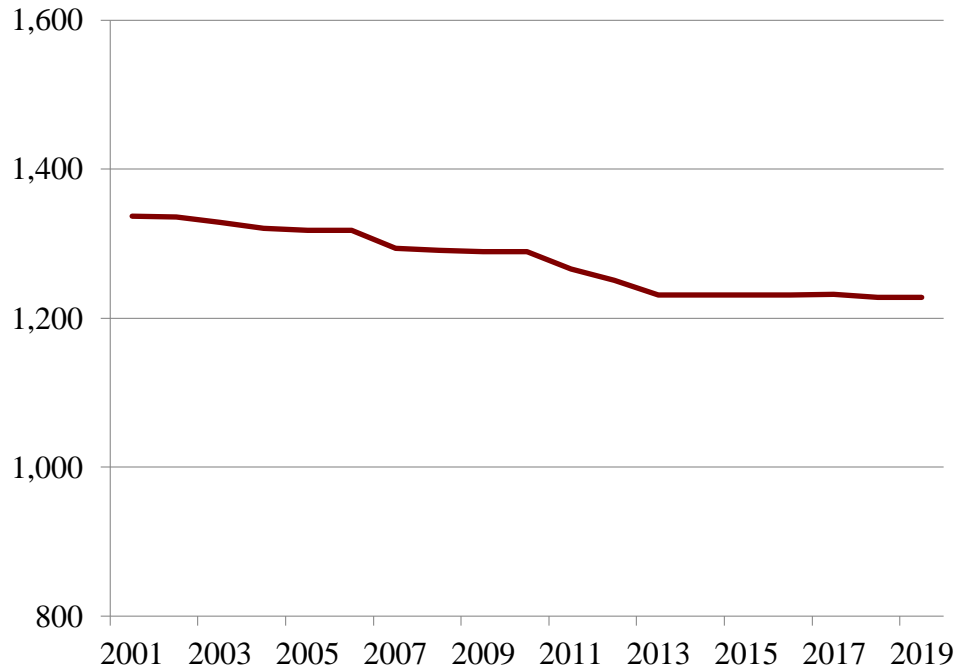


Notes: Physically intensive industries include agriculture, forestry, fisheries, mining, manufacturing, construction, transportation, communications, and other public utilities.

Source: Authors' calculations from the CPS (1990-2019).



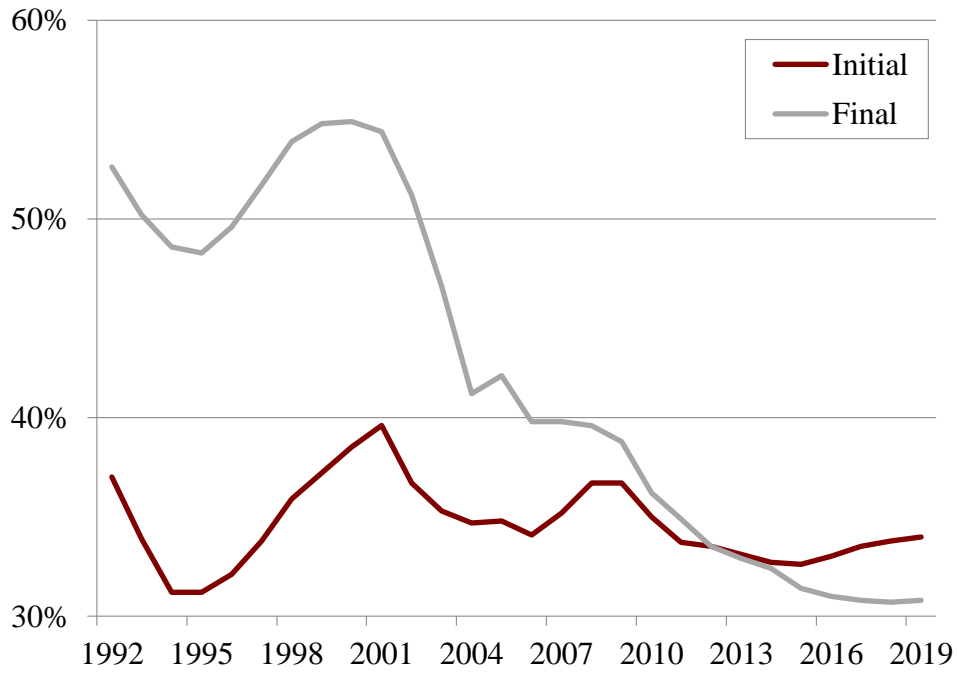
Figure 8. *Number of SSA Field Offices, 2001-2019*



Notes: Field offices include level 1 and 2 offices, as well as resident stations. The data are not available prior to 2001.

Source: Annual Statistical Report on the Social Security Disability Insurance Program (2002-2020).

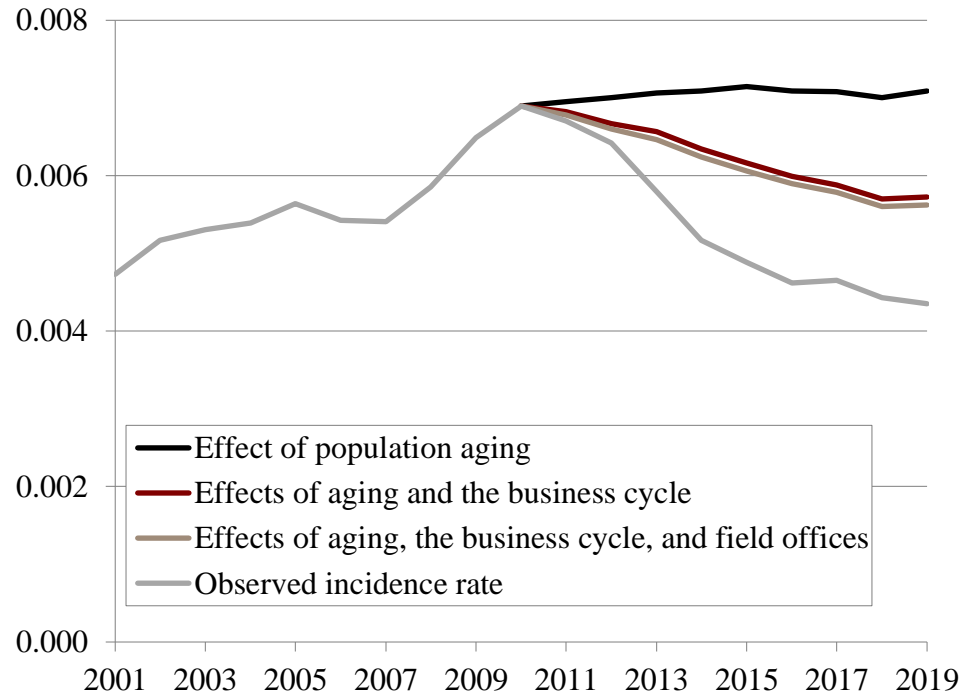
Figure 9. Initial and Final Allowance Rates, 1992-2019



Note: The data are not available prior to 1992.

Source: Annual Statistical Report on the Social Security Disability Insurance Program (2021).

Figure 10. Counterfactual DI Incidence Rates, 2010-2019



Note: The counterfactual rates hold all other factors constant at 2010 levels.

Sources: Authors' estimates from data provided by SSA's Office of Disability Programs; the CPS (1990-2019); and Deshpande and Li (2019).

## Appendix

Table A1. *Summary of Previous Studies on the Relationship Between the Unemployment Rate and DI Application Rate*

| Study                                     | Elasticity | Time period     | Time series frequency |
|---|------------|-----------------|-----------------------|
| Stapleton et al. (1988)                   |            |                 |                       |
| DI Only                                   | 0.28**     | 1980-1993       | Annual                |
| DI/SSI Concurrent                         | 0.26**     | 1980-1993       |                       |
| Cutler, Meara, and Richards-Shubik (2012) | 0.31***    | 2001-2011       | Quarterly             |
| Maestas, Mullen, and Strand (2015)        | 0.19***    | 1992-2012       | Monthly               |
| Maestas, Mullen, and Strand (2021)        | 0.20***    | 2006-2012       | Monthly               |
| This paper                                | 0.31***    | 1990-2019       | Fiscal Year           |
|   | 0.33***    | Expansion years |                       |

Note: Significance level is \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

Source: Maestas, Mullen, and Strand (2021)

Table A2. Age Differences in DI Application Rates, 2001-2019

| Year    | 25-44            | Difference from the 25-44 group |       |       |       |       |
|---------|------------------|---------------------------------|-------|-------|-------|-------|
|         | application rate | 45-49                           | 50-54 | 55-59 | 60-61 | 62-64 |
| 2001    | 0.54%            | 0.35%                           | 0.65% | 1.08% | 1.76% | 1.69% |
| 2002    | 0.61             | 0.39                            | 0.70  | 1.04  | 1.78  | 1.61  |
| 2003    | 0.67             | 0.41                            | 0.72  | 1.07  | 1.73  | 1.66  |
| 2004    | 0.69             | 0.43                            | 0.73  | 1.05  | 1.74  | 1.65  |
| 2005    | 0.69             | 0.43                            | 0.71  | 1.01  | 1.70  | 1.57  |
| 2006    | 0.65             | 0.42                            | 0.70  | 0.96  | 1.70  | 1.52  |
| 2007    | 0.63             | 0.44                            | 0.69  | 0.95  | 1.46  | 1.47  |
| 2008    | 0.65             | 0.43                            | 0.67  | 0.92  | 1.41  | 1.45  |
| 2009    | 0.69             | 0.44                            | 0.67  | 0.91  | 1.39  | 1.15  |
| 2010    | 0.79             | 0.46                            | 0.78  | 0.97  | 1.43  | 1.23  |
| 2011    | 0.82             | 0.52                            | 0.89  | 1.13  | 1.55  | 1.30  |
| 2012    | 0.77             | 0.51                            | 0.86  | 1.10  | 1.54  | 1.26  |
| 2013    | 0.71             | 0.47                            | 0.84  | 1.06  | 1.42  | 1.13  |
| 2014    | 0.66             | 0.45                            | 0.89  | 1.13  | 1.40  | 1.13  |
| 2015    | 0.62             | 0.41                            | 0.80  | 1.05  | 1.34  | 1.07  |
| 2016    | 0.57             | 0.36                            | 0.76  | 1.04  | 1.34  | 1.04  |
| 2017    | 0.52             | 0.33                            | 0.72  | 0.96  | 1.27  | 0.98  |
| 2018    | 0.47             | 0.29                            | 0.69  | 0.94  | 1.20  | 1.00  |
| 2019    | 0.48             | 0.28                            | 0.64  | 0.95  | 1.19  | 0.94  |
| Average |                  | 0.41%                           | 0.74% | 1.02% | 1.49% | 1.31% |

Note: The data are not available prior to 2001.

Sources: Authors' calculations from administrative data provided by the SSA's Office of Disability Programs and the CPS (2001-2019).

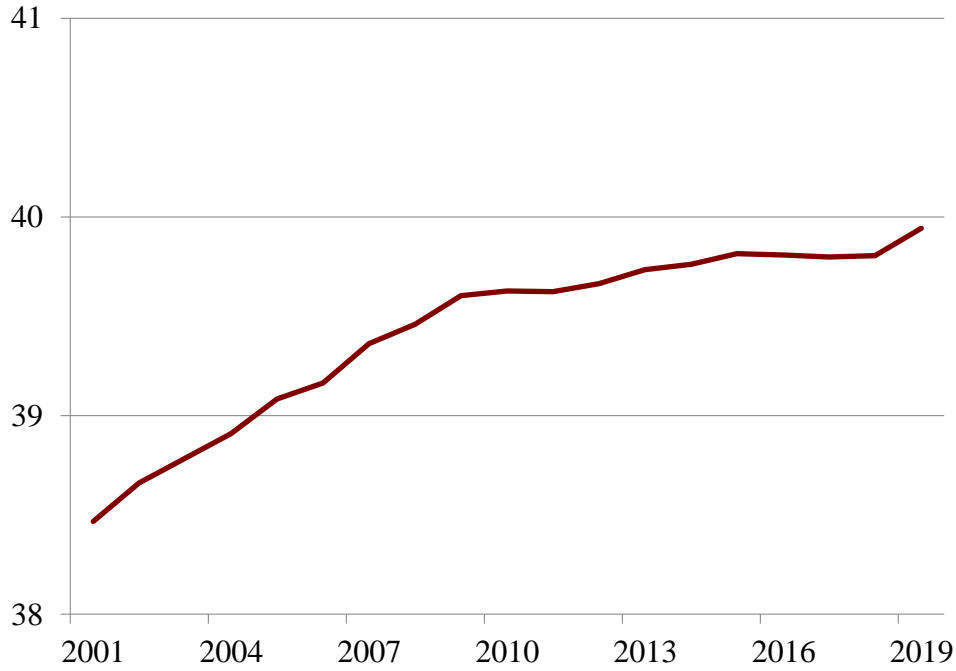
Table A3. *Regression Results for the Relationship Between the Log Unemployment Rate and Log DI Application Rate, 1990-2019*

|                                      | (1)               | (2)               | (3)               | (4)                | (5)                                     |
|--------------------------------------|-------------------|-------------------|-------------------|--------------------|---|
|                                      |                   | Expansion periods |                   |                    |   |
| Log application rate                 | 1990-2019         | 1992-2000         | 2002-2007         | 2010-2019          | All expansion years<br>(including 1990) |
| Log unemployment rate                | 0.31***<br>(0.02) | 0.27***<br>(0.06) | 0.22***<br>(0.04) | 0.29***<br>(0.006) | 0.33***<br>(0.03)                       |
| Percent with a BA degree             | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| Percent Black                        | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| Female LFP                           | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| Age composition (five-year brackets) | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| Industry mix                         | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| State FE                             | Yes               | Yes               | Yes               | Yes                | Yes                                     |
| Observations                         | 1,530             | 459               | 306               | 510                | 1,326                                   |
| R-squared                            | 0.49              | 0.67              | 0.27              | 0.71               | 0.50                                    |
| Number of states                     | 51                | 51                | 51                | 51                 | 51                                      |

Notes: Robust standard errors in parentheses. \*\*\* p<0.01. Regressions include the District of Columbia and are weighted by the state population in 2000. The denominator is defined as those between the ages of 18 and 64 not receiving Social Security benefits.

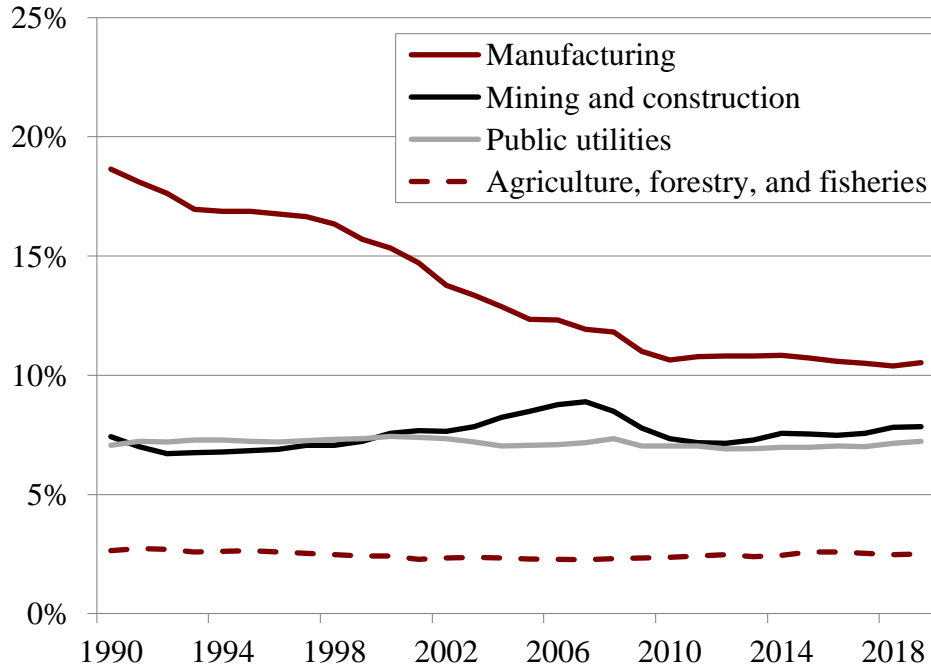
Sources: Authors' estimates from data provided by the SSA's Office of Disability Programs and the CPS (1990-2019)

Figure A1. Average Age of the Population Eligible for DI, 2001-2019



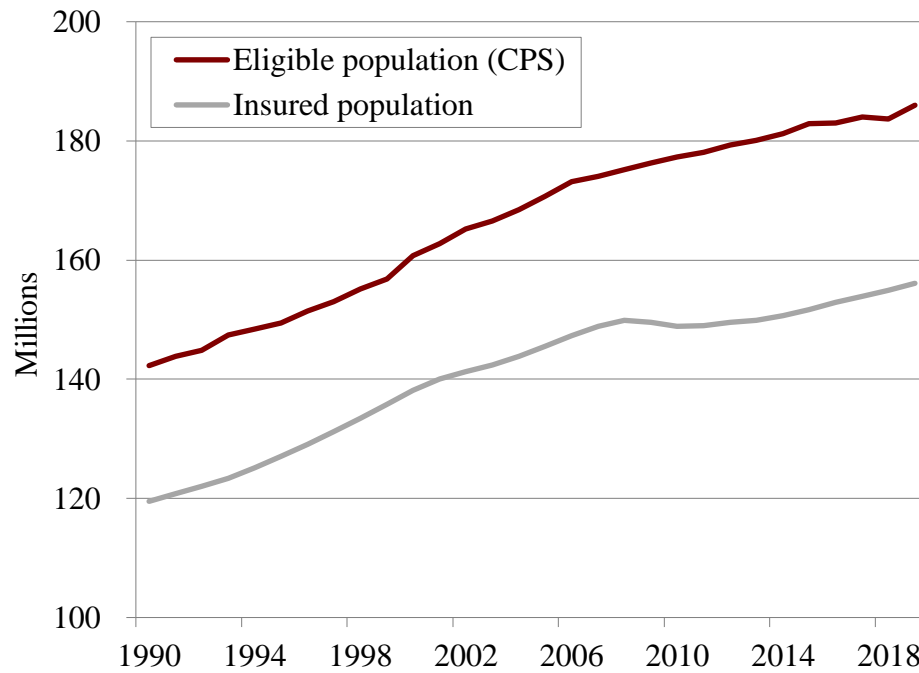
Note: We define the eligible population as 18 to 64 year-olds who are not yet receiving Social Security benefits.  
 Source: Authors' calculations from CPS (2001-2019).

Figure A2. Percentage of Workers in Physically Intensive Industries by Industry Type, 1990-2019



Source: CPS (1990-2019).

Figure A3. *DI Eligible Population and Insured Population, 1990-2019*



Notes: The eligible population from the *Current Population Survey* (CPS) is defined as those ages 18 to 64 who are not currently receiving OASDI benefits.

Sources: Authors' calculations from the CPS (1990-2019) and Annual Statistical Report on the Social Security Disability Insurance Program (2021).



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