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**WAVE 3**

National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM)

# Age, employment history and the heterogeneity of COVID era employment outcomes

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# Age, employment history and the heterogeneity of COVID era employment outcomes

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## Abstract

Past research suggests that spells of unemployment can cause long-term labour market scarring, and that economic shocks can lead to severe, more persistent unemployment effects for youth in particular. We investigate heterogeneity in employment outcomes between February and October 2020 (as captured by NIDS-CRAM waves 1 to 3) for three age groups: youth (18-24), prime-age adults (25-40) and older adults (41-55). Thereafter, we group adults (within a balanced panel) on the basis of their employment history between 2012 and 2017 (NIDS waves 3 to 5) to study the correlation between 2020 employment outcomes and this employment history. We find evidence for a substantial recovery in employment rates between June and October, leading to October employment rates that were similar to February levels for youth and older adults. Employment recovery was positively correlated with educational attainment among prime-age adults and youth. On the other hand, April job loss was more likely to be persistent for youth relative to older groups. Employment history correlated strongly with 2020 employment outcomes: individuals with a more extensive history of employment were more likely to remain stably employed, or, among the non-employed, to find work. Importantly, the recovery of employment between April and October was driven to a substantial degree by job finding among people who were non-employed in February, and not just a 'bounce back' of April job losers. Together, these findings provide valuable insight into the adjustments, along dimensions of age and employment history, that have occurred in the South African labour market in response to the COVID-19 pandemic and lockdown.

**Keywords** – youth unemployment; employment history; labour market scarring; coronavirus; covid-19; employment transitions

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# Executive Summary

Past research suggests that spells of unemployment can cause long-term labour market scarring, and that economic shocks can lead to greater and more persistent unemployment effects among youth in particular. We investigate heterogeneity in employment outcomes between February and October 2020 (as captured by NIDS-CRAM waves 1 to 3) for three age groups: youth (18-24), prime-age adults (25-40) and older adults (41-55). Thereafter, we group adults (within a balanced panel) on the basis of their employment history between 2012 and 2017 (NIDS waves 3 to 5) to study the correlation between employment history and 2020 employment outcomes.

**There were signs of strong employment recovery by October across age groups.** After falling from 66% to 58% between February and April, employment of older adults had recovered to 67% in October. Among youth a large increase in employment between June and October led to a higher rate of employment in October (37%) than in February (34%). Partly due to poor employment growth between April and June, less prime-age adults were employed in October (60%) than in February (63%). However, none of these differences between February and October employment rates were statistically significant.

**Job recovery was positively correlated with educational attainment, especially among youth.** 42% of youth with a matric were employed in October, relative to just 29% in February, while over the same period the employment of youth with more than matric increased from 42% to 46%. On the other hand, for youth with less than matric the employment rate fell from 28% to 23%. This positive correlation between education and regaining or finding a job was also found for prime-age adults, but not for older adults.

**Recovery to pre-COVID employment levels was not exclusively driven by 'bounce back' among April job losers.** Across age and employment history groups, around half of April job losers were employed in October. On the other hand, a notable proportion of people who were without employment going into the lockdown subsequently found employment. Among the February non-employed, 27% of youth and prime-age adults and 32% of older adults were employed in October.

**The younger workers were, the more likely it was that they experienced persistent job loss with the imposition of the lockdown.** 17% of youth lost work between February and April and failed to re-enter employment, relative to 12% and 9% of prime-age and older adults, respectively.

**Employment history correlated strongly with 2020 employment outcomes.** In comparison to those with a mixed or non-existent employment records, those with a stable history of employment between 2012 and 2017 were more likely to remain employed throughout 2020, or to find work (if they were not employed going into the lockdown). The interaction between employment history and age revealed some heterogeneity. Among those who were either stably employed or persistently non-employed between 2012 and 2017, older adults experienced worse employment effects than prime-age adults, while among those with a mixed history of both employment and non-employment, prime-age adults fared worse under lockdown.

This research provides meaningful insight into the complex pattern of changes underlying the aggregate recovery of employment from the position in April to that observed in October. Youth were more vulnerable to persistent employment loss. However, substantial attainment of employment by October by other youth means that this group may have had higher rates of employment in October than they did before the lockdown. Among older groups, individuals' employment history was an important determinant of their employment outcomes.

The evidence in this paper suggests that the South African labour market under COVID-19 has exhibited some bounce-back but also substantial adjustment. To further understand the significance of these changes in the labour market, the complex pattern observed here for 2020 should be benchmarked against employment dynamics in pre-COVID years.

# SECTION A: INTRODUCTION

The COVID-19 pandemic and the economic lockdowns introduced in response have wrought havoc on economies, labour markets and livelihoods across the world. In South Africa, a severe lockdown induced unprecedented levels of job loss, with the youth found to be amongst those who faced the highest increases in unemployment (along with women, Africans and low wage workers) (Jain et al., 2020a; Ranchhod & Daniels, 2020; Casale & Posel, 2020). As the lockdown restrictions eased over the course of 2020, and the economy began to open up, important questions have arisen surrounding the persistence of initial employment loss, whether individuals and sectors have recovered to their pre-lockdown levels, and whether the dramatic shock has induced or made possible a restructuring of the South African labour market. Youth already faced very high unemployment rates and great difficulty in entering the labour market before COVID-19 (De Lannoy et al., 2020). It is thus especially important to understand the extent to which they have been affected by the crisis and the extent to which they have benefited from the subsequent recovery.

In this paper, we investigate how changes in employment since February 2020 have varied along the dimensions of age and employment history. Along with age, employment history can act as an important lens for understanding compositional changes in the workforce. For example, are older stably employed workers losing employment and potentially being replaced by younger workers? The panel nature of the data also means we can explore the extent to which any recovery of employment levels in the labour market has been driven by regaining of employment among job losers, or by new entrants to the labour market.

Following a review of literature relevant to this issue (Section B) and a description of the data that we use (Section C), the analysis in this paper is divided into two distinct but complementary sections. The first (Section D) examines differences in 2020 employment outcomes by age (and educational level), with a focus on how youth have fared relative to other age groups. The second (Section E) investigates the relationship between an individual's employment history and their contemporary employment outcomes. Finally, in Section F we consolidate and conclude.

# SECTION B: BACKGROUND & LITERATURE

Higher rates of unemployment for youth relative to older groups are common across the world (Cunningham & Salvagno, 2011) and in South Africa youth unemployment has remained persistently high despite significant labour market interventions targeting youth (De Lannoy et al., 2020). Further, there is evidence across the world of the particular impact that the young have felt under the COVID-19 pandemic, partly due to their disproportionate representation in sectors that were hard hit by the lockdown, such as services and hospitality (see Gould & Kassa, 2020, for the United States and Jackson, 2020, for Australia). This was echoed in South Africa, where youth were found to be particularly affected by the job loss induced by the introduction of a national lockdown (Jain et al., 2020a; Ranchhod & Daniels, 2020).

Research on unemployment scarring, also known as structural dependence, investigates whether and to what extent an individual's propensity for future unemployment increases with previous spells of unemployment (Gregg, 2001). Proposed explanations for this phenomenon include the fact that unemployment precludes the accumulation of work experience and skills (which may even deteriorate), and that unemployment may be interpreted as a signal of low productivity by potential employers (Arulampalam et al., 2001). Spending more time out of employment also means less contact with 'productive' social networks: people who have information about job opportunities (see De Lannoy et al., 2020). This highlights the importance of exploring the influence of 2020 labour market participants' employment histories (they they brought into the pandemic) on their employment outcomes during 2020[4]. It also flags the risks of longer-term career effects arising from the unemployment induced by COVID-19 (and the associated lockdown and recession).

4 See Espi et al. (2020) for an initial exploration of the relationship between prime-age adults' employment history and their employment outcomes under COVID-19.

The risk of labour market scarring exists for workers of all ages, but an important literature combines the themes of youth employment and unemployment scarring by investigating differential employment effects of recessions for younger people relative to older adults. This is particularly important in South Africa as many youth spend a number of years looking for work after leaving education (Mlatsheni & Ranchhod, 2017). Research from the United States has found that college graduates entering the labour market are particularly vulnerable to prevailing economic conditions (Altonji et al., 2014; von Wachter, 2020). They can suffer greater effects in the long-term relative to those graduating in non-recessionary periods, including higher unemployment and lower, more unstable earnings and hours worked. Importantly, these effects seem to persist even after the economy has recovered from the shock or recession and seem to be more acute for lower educated youth (Schwandt & von Wächter, 2018).

Our understanding of the mechanisms through which youth are particularly affected by recessions is limited (Kahn & Rothstein, 2020) but there are various hypotheses. The factors that make finding employment difficult for youth are likely to be exacerbated in poor labour markets, when there is less demand for workers and employers may become even more risk-averse[5]. Apart from the importance of initial states in determining subsequent outcomes, another possible explanation for the disproportionate persistence of wage and employment effects among younger people is that they are not able to switch jobs frequently during economic downturns, something that young people tend to do very often and that is a crucial part of their movement up the career ladder into higher-skilled, better-paying work (Kahn, 2019).

There exists some prior research which suggests that firms' restructuring and adoption of technology tends to occur around recessions, and that average skill requirements for jobs advertised increase around these times (Hershbein & Kahn, 2017). The effect of any economic recovery since the level 5 lockdown in South Africa is difficult to predict. In general, macroeconomic upswings are believed to be effective in generating employment for the long-term unemployed (Arulampalam et al., 2001). However, firms are typically slow to re-employ in upswings after shedding jobs rapidly in crises (Burger & von Fintel, 2009). South Africa is an emerging economy with chronically high unemployment, especially among youth, even in periods of growth. The effects of the crisis for youth and other age groups may not follow the same patterns reviewed here. Therefore, in seeking to understand the seismic changes that have occurred in the South African labour market, it is important to investigate differential effects along the dimensions of age and education (or skill). In addition, the structural dependence of contemporary employment outcomes on previous labour market experience suggests that this investigation should account for individuals' employment history.

## SECTION C: DATA

The data for this paper come from two different but related data sources: the first three waves of the NIDS-CRAM panel (May, July and November 2020) and waves 3 to 5 of the NIDS panel (2012, 2014/15 and 2017).

NIDS was a South African national panel survey that started in 2008 with a sample of just over 28,226 people who were re-interviewed (along with anyone that they lived with) every two or three years for five waves up to 2017 (Brophy et al., 2018)[6]. NIDS-CRAM is a follow-up individual-level survey implemented during the the COVID-19 pandemic and therefore using Computer Assisted Telephone Interviewing (CATI). The survey is focused on adult individuals' responses to the pandemic and national lockdown (Ingle et al., 2020). The NIDS-CRAM sampling frame came from the NIDS wave 5 sample, and so (after weighting) it estimates outcomes in 2020 for a broadly representative sample of South African adults from 2017. In NIDS-CRAM wave 3 a top-up sample was randomly selected from individuals from the original NIDS wave 5 sample (who had not been selected previously for NIDS-CRAM wave 1 sampling)[7].

5 See De Lannoy et al. (2020) for discussion of employers' risk aversion with regard to youth.

6 At that stage close to 40,000 individuals were interviewed.

7 This was done to counterbalance attrition between waves of NIDS-CRAM (Ingle et al., 2020).

NIDS-CRAM provides employment status information for four periods: February, April (both from wave 1), June (from wave 2), and October (from wave 3). In Section D, where we investigate employment outcomes in 2020 by age, the full cross-section from each wave of NIDS-CRAM (and the NIDS-CRAM weight for each wave) was used for the employment estimates from respective periods. On the basis of individuals' age at the time of their NIDS-CRAM wave 1 interview, we define three age groups that are used across the paper: youth (18 to 24), prime-age adults (25 to 40) and older adults (41 to 55)[8].

In Section E, where we analyse the relationships between employment history, age and changes in employment in 2020, the analysis is based on a balanced panel of individuals interviewed across waves 3, 4 and 5 of NIDS and waves 1, 2 and 3 of NIDS-CRAM. Given the length of the panel, and the likelihood that attrition is correlated with important characteristics, it is important to think about who stays in the balanced panel from NIDS wave 3 (2012) to NIDS-CRAM wave 3 (October 2020). Appendix 1 presents a comparison of unweighted statistics for the NIDS-CRAM wave 1 cross-section and our balanced panel in May 2020, providing some insight into whether the sample in the balanced panel is different from the NIDS-CRAM sample in a meaningful way[9]. The table shows that the balanced panel had slightly higher proportions of Africans, women and older adults relative to the NIDS-CRAM cross section. On the other hand, educational attainment, employment, earnings and urban residence rates were slightly lower in the balanced panel. The broad similarity in characteristics across the two samples meant that we were comfortable in proceeding with the analysis, but with careful consideration of the effect sample differences could have on our estimates.

We create balanced panel weights that are adjusted for respondents' probabilities of remaining in the sample between waves. (See Appendix 2 for a full explanation of the weight creation process). Due to the focus on employment history the majority of estimates in Section E are based on members of the balanced panel who also have employment status information across all periods considered.

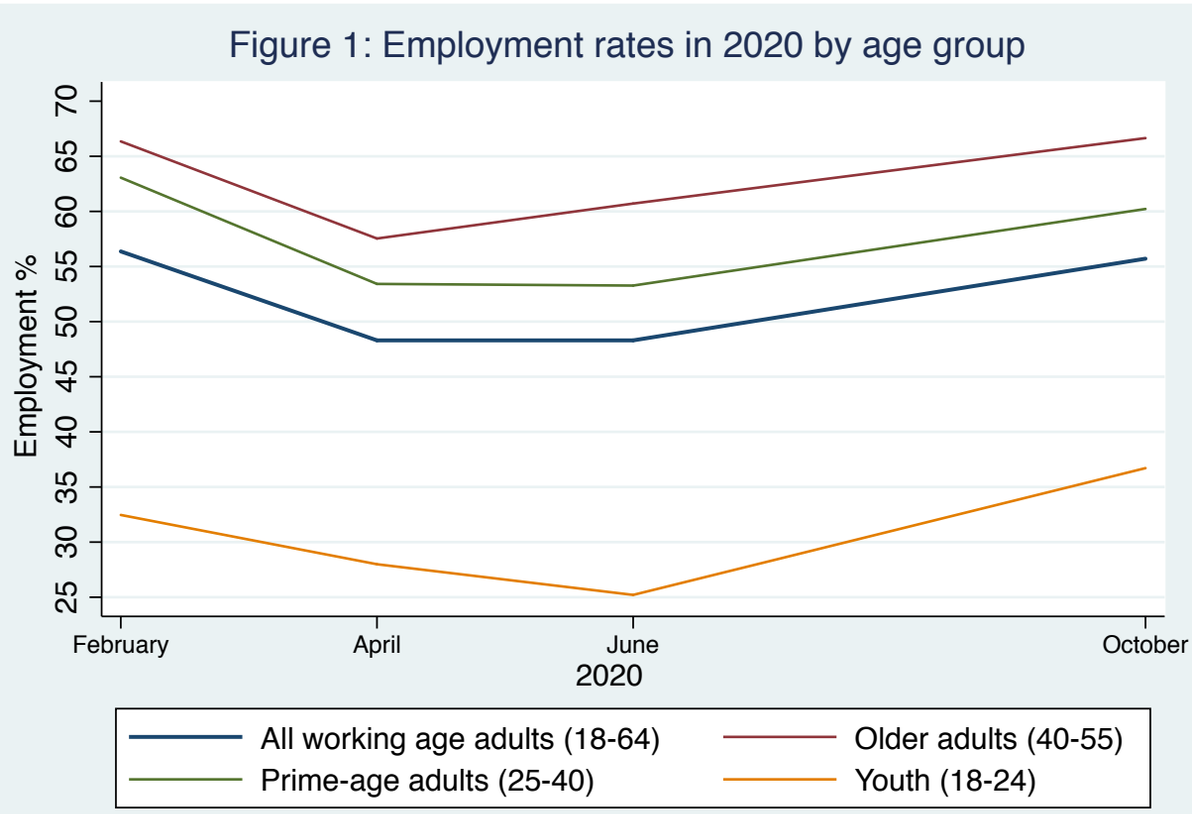
## SECTION D: 2020 YOUTH EMPLOYMENT OUTCOMES COMPARED TO PRIME-AGE AND OLDER ADULTS

In this section we document the employment outcomes for our three age groups, based on the NIDS-CRAM waves 1 to 3 cross-sections. We first seek to determine overall changes in employment rates by age group, before disaggregating by educational level. We then examine how other aspects of employment (earnings and hours worked) changed for each age group over the course of 2020. Throughout this analysis we use the term 'employment rate' to refer to the proportion of a given group that is employed in a given period (also known as the employment-to-population ratio). Note that this statistic is not restricted to labour market participants (those wanting to work) and does not distinguish between active employment and other forms of employment (like paid leave or furloughed status).

8 For respondents from the NIDS-CRAM wave 3 top-up sample who do not have a wave 1 interview date or age recorded, their age on 1 June 2020 (around the midpoint of the wave 1 interview process) was calculated using their date-of-birth information.

9 See Espi et al. (2020) for a thorough description of a similar balanced panel.

***Figure 1: Employment rates in 2020 by age group***




Notes. Estimates based on cross-sections with employment status information in each wave of NIDS-CRAM; weighted with cross-sectional weights.

*Figure 1* shows employment rates by period for all working-age adults, as well as 2020 youth, prime-age and older adults. All age groups experienced dramatic job loss between February and April. Between April and June youth experienced further job losses while there was no change in employment for prime-age adults and an increase for older adults. The gradients between June and October show that there was pronounced job growth across all age groups. Job growth was particularly large for youth in this period, with the employment rate rising from 25% to 37%. This led to a higher employment rate among youth in October (37%) compared to February (32%). Older adults regained their pre-lockdown employment rates (66-67%), while employment levels amongst prime-age adults did not fully recover, falling from 63% in February to 60% in October. Note that this and other differences discussed are not statistically significant, so caution must be exercised in interpreting these findings. Taken together, working-age adults experienced a decrease in employment between February and April (from 56% to 48%) with the employment rate remaining stable until June[10] before increasing between June and October (to 56%).

To investigate interactions between age and education with respect to these employment changes, *Table 1* further disaggregates by education level within each age group.

10 The constant employment rate between April and June masks an increase in active employment in the period as those who were on paid leave or furloughed in April returned to work (Jain et al., 2020b).

***Table 1: Employment in 2020 by education and age group***

| Age group | Education level | Proportion employed in February (%) | N | Proportion employed in April (%) | N | Proportion employed in June (%) | N | Proportion employed in October (%) | N |
|---|---|---|---|---|---|---|---|---|---|
| **Youth (18-24)** | Less than matric | 28.19 (3.76) | 384 | 20.47 (3.25) | 377 | 16.24 (3) | 303 | 22.63 (3.15) | 382 |
| | Matric | 28.89 (3.76) | 427 | 24.71 (3.67) | 418 | 24.06 (3.97) | 348 | 42.1 (3.79) | 483 |
| | More than matric | 42.01 (4.53) | 261 | 40.79 (4.95) | 256 | 36.2 (4.75) | 208 | 46.44 (5.53) | 187 |
| **Prime-age adults (25-40)** | Less than matric | 53.38 (2.55) | 1174 | 44.97 (2.48) | 1159 | 43.51 (2.47) | 934 | 48.51 (2.45) | 993 |
| | Matric | 66.07 (2.54) | 779 | 49.99 (2.91) | 768 | 56.03 (3.22) | 601 | 62.24 (2.54) | 739 |
| | More than matric | 70.32 (2.25) | 976 | 63.58 (2.48) | 962 | 61.59 (2.62) | 765 | 71.49 (2.64) | 694 |
| **Older adults (41-55)** | Less than matric | 53.26 (3) | 1012 | 44.23 (2.67) | 997 | 46.81 (3.28) | 823 | 54.25 (3) | 891 |
| | Matric | 70.03 (3.95) | 306 | 57.04 (4.88) | 303 | 63.26 (5.65) | 246 | 71.8 (4.55) | 266 |
| | More than matric | 85.53 (8.55) | 432 | 79.41 (2.63) | 427 | 82.4 (2.76) | 337 | 84.88 (2.78) | 290 |

**Notes.** Estimates based on the full cross-section with employment status information in each wave of NIDS-CRAM and weighted with cross-sectional weights. Standard errors in parentheses.

The table shows that job recovery was positively correlated with educational attainment among youth and prime-age adults, while there was no clear correlation among older adults. Across age groups, by October those with more than matric had largely recovered, or exceeded, the employment lost between February and April, while there was a more inconsistent pattern of results among youth and prime-age adults with matric or less than matric.

Among youth there was substantial heterogeneity in October employment outcomes by education level. While all youth experienced job loss between February and April (and April and June), youth with matric or more than matric then experienced large employment increases between June and October, leaving them with a higher employment rate in October than in February. This increase was especially large for youth with matric, whose employment rate increased from 29% in February to 42% in October. Youth with less than matric, on the other hand, experienced a notably lower increase in employment levels between June and October (16% to 23%), and this was insufficient to recover to their February employment levels (28%).

*Table 2* shows various percentiles of the earnings distribution (the 25th percentile, median and 75th percentile) for the three age groups across February, April, June and October. This gives us some insight into how monthly earnings changed at different parts of the distribution over the course of the year.

***Table 2: Monthly earnings and duration of work in 2020 by age group***

| | Earnings 25th percentile | | | | Earnings median | | | | Earnings 75th percentile | | | | Mean days worked per week | | | Mean hours worked per day | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feb | Apr | June | Oct | Feb | Apr | June | Oct | Feb | Apr | June | Oct | Apr | June | Oct | Apr | June | Oct |
| **Youth (18-24)** | 965.67 | 1104.81 | 1323.87 | 1000 | 1931.34 | 3306.80 | 2853.61 | 2500 | 4065.97 | 5091.30 | 5295.49 | 3906 | 3.52 (0.22) | 4.98 (0.19) | 4.46 (0.17) | 6.31 (0.55) | 8.16 (0.44) | 7.62 (0.26) |
| **Prime-age adults (25-40)** | 1524.74 | 3054.78 | 2547.87 | 2200 | 3862.67 | 5290.88 | 4789.99 | 4300 | 8131.94 | 12830.09 | 10191.47 | 9000 | 3.63 (0.11) | 4.79 (0.07) | 4.64 (0.07) | 6.53 (0.2) | 8.14 (0.15) | 8.09 (0.14) |
| **Older adults (41-55)** | 1524.74 | 2851.13 | 2647.74 | 2000 | 4370.92 | 6822.35 | 5197.65 | 5400 | 11181.92 | 16292.17 | 15287.21 | 15000 | 3.71 (0.13) | 4.64 (0.1) | 4.83 (0.08) | 6.59 (0.24) | 8.02 (0.18) | 8.21 (0.14) |

**Notes.** Estimates based on the full cross-section with employment status information in each wave of NIDS-CRAM and weighted with cross-sectional weights. Earnings percentiles reflect the sample of positive earners at each period. Point values were imputed for bracket earnings responses by taking the median earnings of individuals who gave point values falling within the range of each bracket. All monthly earnings in real November 2020 South African rands (ZAR). Standard errors in parentheses for mean days and hours worked columns.

For all age groups, there was a dramatic increase in real earnings across the earnings distribution between February and April[11] for those who retained their jobs and had positive earnings. This is believed to be driven by composition effects as lower-wage workers were more likely to lose work in the period (Ranchhod & Daniels, 2020). The pattern between April and June diverges for youth and for prime-age and older adults. For youth, earnings continue to increase at the 25th and 75th percentiles (but not the median). For prime-age and older adults, earnings begin to decline. Between June and October all groups see reductions in earnings across the distribution, but earnings in October remain higher than February earnings for all age groups.

Comparing across age groups, prime-age and older adults had similar earnings at the lower part of the earnings distribution, with older adults earning substantially more at the higher end of the earnings distribution (across periods). Earnings for youth were consistently lower than for the two older age-groups.

*Table 2* also contains mean days worked per week and mean hours worked per day for April, June and October, providing insight into whether there were changes in working patterns among the employed. While April to June saw substantial increases in mean days and hours worked, likely reflecting the easing of the national lockdown, these figures remained stable around a mean of 5 days worked per week and 8 hours worked per day between June and October. There were no clear differences between age groups in the duration of work.

## SECTION E: 2020 EMPLOYMENT OUTCOMES BY EMPLOYMENT HISTORY

The previous section pointed to some marked differences in employment trajectories by age and education level. In this section we add a further layer to the analysis by accounting for individuals' employment histories, which the labour market scarring literature suggests would be an important determinant of current employment outcomes. Considering employment history also allows us to examine whether the return to pre-lockdown employment levels has been due to the historically employed re-entering employment or, alternately, driven by new labour market entrants and first-time job finders.

To enable a consideration of employment history, all analysis in this section is based on a balanced panel of individuals interviewed in every wave from NIDS wave 3 (2012) through to NIDS-CRAM wave 3 (November 2020). For prime-age and older adults with employment status information across all periods, we distinguish between three employment history groups on the basis of employment in 2012, 2014/15 and 2017 (NIDS waves 3, 4, and 5):

- The stable employed: those employed in all three periods.
- The transient employed: those with a combination of employment and non-employment in the three periods.
- The persistent non-employed: those non-employed in all three periods.

This gives us a simple measure capturing an individuals' employment at three moments in time over a historical 6-year period and allows us to identify those with consecutive periods of recorded employment or non-employment. The age windows of 2020 prime-age (25-40) and older adults (41-55) means that they would have had age ranges of approximately 17-22 and 33-47 at the first period considered in the balanced panel (2012)[12].

11 One exception was the lower part of the youth earnings distribution where there was a more minor earnings increase.

12 The youth are not included in employment history analyses because they would generally have been too young to work between 2012 and 2017.

***Figure 2: Employment rates in 2020 prime-age amd older adults, by employment history***

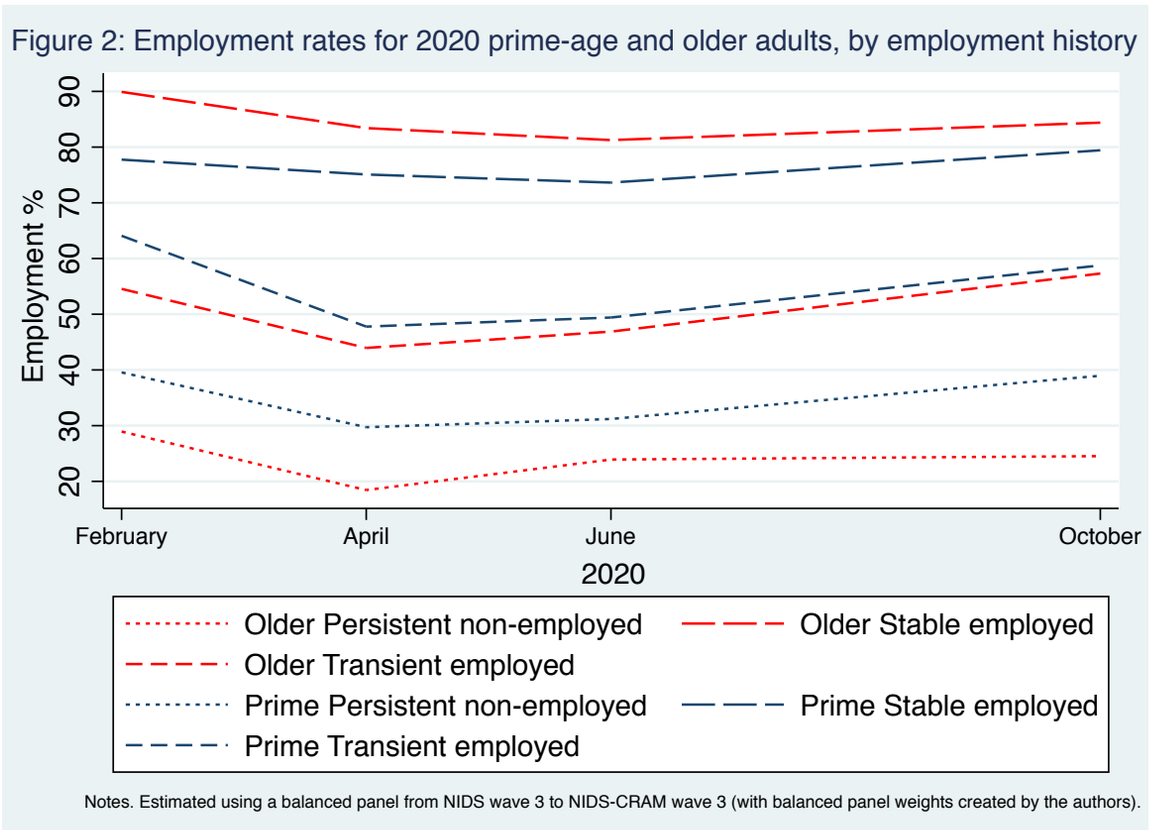



*Figure 2* shows employment rates for 2020 by age group and employment history. The blue lines show the proportion employed at various points in time in 2020 for prime-age adults (25-40), and the red lines show the corresponding values for older adults (41-55). It is clear that greater employment history led to higher employment rates in 2020 across age groups. Older adults who were stably employed going into the lockdown faced slightly steeper job loss between February and April relative to prime-age stable employed adults. Minimal employment recovery after April meant that these older adults had a lower employment rate in October (84%) relative to February (90%), whereas prime-age stable employed recovered to 79% (relative to 78% in February)[13].

Changes in employment were also worse for older adults without an employment record (the persistent non-employed) relative to prime-age adults without an employment record. On the other hand, among those with a mixed history of employment and non-employment, prime-age adults faced significantly more job losses between February and April than older adults did. Prime-age adults with a transient employment history had an employment rate of 59% in October, compared to 64% in February (whereas employment among older adults with the same employment history increased from 55% to 57% in the period). Given the positive performance of the other prime-age groups it is likely to be these individuals with a mixed employment history who are driving the decrease in overall prime-age employment observed in the previous section.

*Table 3* looks at 2020 employment rates among those who were without employment going into the lockdown (the February non-employed). This allows us to examine how attainment of new jobs varied by age and employment history.

13 Note that these and other changes in this section are not statistically significant and so must be interpreted with caution.

***Table 3: Employment attainment under COVID-19 for the February non-employed with different employment histories***

| Age group | Sub-group | N | Proportion finding employment in either April, June or October (%) | Proportion employed in April (%) | Proportion employed in June (%) | Proportion employed in October (%) |
|---|---|---|---|---|---|---|
| **Prime-age (25-40)** | All Prime-age | 520 | 35.39 (3.37) | 13.56 (2.06) | 19.99 (2.97) | 28.05 (3.26) |
| | Persistent non-employed | 242 | 28.36 (4.92) | 7.04 (2.28) | 15.89 (4.04) | 22.68 (4.76) |
| | Transient employed | 217 | 38.12 (4.97) | 16.47 (3.6) | 17.16 (3.81) | 28.31 (4.36) |
| | Stable employed | 61 | 61.96 (11.87) | 37.04 (10.93) | 49.44 (11.34) | 54.08 (11.52) |
| **Older adults (41-55)** | All Older adults | 303 | 42.56 (4.51) | 16.08 (3.26) | 23.58 (3.8) | 32.09 (4.12) |
| | Persistent non-employed | 102 | 20.6 (5.65) | 4.61 (2.59) | 12.06 (4.71) | 10.97 (3.86) |
| | Transient employed | 158 | 50.76 (6.43) | 17.88 (4.84) | 28.64 (5.87) | 39.57 (6.2) |
| | Stable employed | 43 | 58.97 (10.82) | 35.36 (9.61) | 28.96 (9.13) | 49.69 (10.97) |

**Notes.** Based on a balanced panel of respondents with employment status information from NIDS wave 3 (2012) to NIDS-CRAM wave 3, weighted using balanced panel weights created by the authors. Standard errors in parentheses.

Among the February non-employed, both prime-age and older adults saw monotonic increases in employment between April, June and October. Among prime-age adults without February employment, 14% were employed in April, 20% employed in June and 28% employed in October. The figures for the corresponding group of older adults were 16%, 24% and 32% respectively. For both age groups these increases were highest for those with a history of stable employment, and then for those with a history of transient employment. They were lowest for those who were persistently non-employed coming into 2020.

There were also some interactions between employment history and age group; historically transient employed prime-age adults saw much less pronounced employment growth over the period (16% to 17% to 28% in April, June and October) relative to older adults with a history of transient employment (18% to 29% to 40%). In contrast, among the persistent non-employed attainment of work over the period was more pronounced among prime-age relative to older adults[14]. These patterns are consistent with those of the previous figure, suggesting that some of the superior employment outcomes among older transient employed adults (relative to prime-age adults), and among prime-age persistent non-employed adults (relative to older adults), are due to more job seekers finding employment in these groups (in contrast with job losers regaining employment).

These tables provide a clear picture of what the aggregate employment recovery was like for these different groups. The panel nature of the data can be used to understand the dynamics underlying these changes and the employment paths that different people have taken. Transition trees provide a description of the employment paths followed by different groups over a series of points in time (in this case February, April, June and October 2020), at each point showing the proportion of people who have followed each possible path (for example, employed in February, not employed in April and then employed in June). Appendix *Figure 1* contains transition trees for the three age groups and Appendix *Figures 2 and 3* contain transition trees disaggregated by employment history group for prime-age and older adults respectively. This information is dense and the analysis that follows contains tables based on these transition trees, each reflecting an important insight or prominent employment path that they revealed.

14 Stable employed rows are not discussed due to small sample sizes for February non-employed groups with a history of stable employment.

*Table 4* shows the proportion of people who were either employed in all periods or non-employed in all periods (February, April, June and October), by age group (including youth for comparison with older age groups) and employment history (for prime-age and older adults).

***Table 4: Stable employment and non-employment in 2020, by age group and employment history***

| Age group | Sub-group | N | Proportion employed in all of February, April, June and October (%) | Proportion non-employed in all of February, April, June and October (%) |
|---|---|---|---|---|
| **Youth (18-24)** | All youth | 480 | 11.51 | 44.92 |
| **Prime-age (25-40)** | All Prime-age | 1222 | 31.1 | 27.64 |
| | Persistent non-employed | 417 | 14.19 | 43.4 |
| | Transient employed | 550 | 33.09 | 22.23 |
| | Stable employed | 249 | 58.44 | 8.46 |
| **Older adults (41-55)** | All Older adults | 777 | 40.53 | 19.38 |
| | Persistent non-employed | 143 | 8.46 | 56.42 |
| | Transient employed | 255 | 21.93 | 22.38 |
| | Stable employed | 296 | 69.16 | 4.14 |

**Notes.** Figures derived from transition trees contained in appendices. Estimates based on a balanced panel of individuals interviewed from NIDS wave 3 (2012) to NIDS-CRAM wave 3. All estimates weighted using balanced panel weights created by the authors. Sample sizes for rows accounting for employment history are based on individuals with complete employment status information from NIDS wave 3 to NIDS-CRAM wave 3; sample sizes for the Youth, Prime-age and Older rows based on individuals with complete employment status information across all periods of NIDS-CRAM (only).

It is clear that rates of stable employment in 2020 increase with age, and that rates of persistent non-employment in 2020 decrease with age. More stability of employment history also correlates with a greater likelihood of stable employment in 2020. Among older adults with a stable employment history 69% remained employed in all periods of 2020 (relative to 58% of prime-age adults with the same history), suggesting the presence of a highly stable group who were protected from the COVID-19 employment shock[15]. However, among those with a less consistent or non-existent employment history, prime-age adults showed higher rates of stable employment than older adults. Finally, 45% of youth were not employed in any period in 2020.

*Table 5* presents two statistics: the proportion of the February employed who were then non-employed in all of April, June and October; and the proportion of April job losers (those employed in February and then non-employed in April) who were employed in October. The first gives a measure of how persistent April job loss was for different groups, while the second gives an indication of the extent of employment recovery among job losers from different groups.

15 Note that higher rates of stable employment across 2020 periods observed here are not inconsistent with the greater job loss gradient observed in Figure 1, as here we are comparing absolute levels rather than changes between periods.

***Table 5: Enduring job loss and job recovery for different age and employment history groups***

| Age group | Sub-group | Proportion of February employed who were non-employed in April, June and October (%) | N | Proportion of April Job losers employed in October (%) | N |
|---|---|---|---|---|---|
| **Youth (18-24)** | All youth | 17.27 | 131 | 49.65 | 52 |
| **Prime-age (25-40)** | All Prime-age | 11.67 | 697 | 53.53 | 210 |
| | Persistent non-employed | 14.31 | 153 | 52.24 | 66 |
| | Transient employed | 13.19 | 340 | 55 | 109 |
| | Stable employed | 6.74 | 199 | 51.1 | 33 |
| **Older adults (41-55)** | All Older adults | 9.33 | 471 | 51.4 | 130 |
| | Persistent non-employed | 25.54 | 39 | 40.38 | 19 |
| | Transient employed | 13.79 | 189 | 53.44 | 69 |
| | Stable employed | 5.05 | 242 | 51.24 | 41 |

**Notes.** Figures derived from transition trees contained in appendices. Estimates based on a balanced panel of individuals interviewed from NIDS wave 3 (2012) to NIDS-CRAM wave 3. All estimates weighted using balanced panel weights created by the authors. Sample sizes for rows accounting for employment history are based on individuals with complete employment status information from NIDS wave 3 to NIDS-CRAM wave 3; sample sizes for the Youth, Prime-age and Older rows based on individuals with complete employment status information across all periods of NIDS-CRAM (only).

The table shows that the younger people were, the more likely it was that they experienced enduring job loss with the imposition of the lockdown. For youth, 17% lost work between February and April and failed to re-enter employment. This is relative to 12% and 9% of prime-age and older adults, respectively. For prime-age and older adults we are able to examine the correlation of their employment histories with this difference in enduring job loss. Greater employment history correlates with lower rates of persistent job loss for both age groups, but this correlation appears to be substantially higher among older adults relative to prime-age adults.

The second column is restricted to April job losers. This results in relatively small sample sizes and imprecise estimates. There are no dramatic differences in regaining of employment across age or employment history groups, suggesting that recovery of employment lost under lockdown was not correlated with age or employment history. In addition, the fact that across all groups only 40-54% of April job losers were back in employment by October suggests that a substantial part of the return to pre-lockdown employment levels (observed above) must be driven by job finding among previously non-employed individuals, rather than the same individuals regaining employment.

Other notable information that emerges from the youth employment transition tree (Appendix *Figure 1*) are that rates of October employment among the February non-employed were similar for youth and prime-age adults (27%), and only slightly lower for these groups than for older adults (32%). Given the lower base of employment rates for youth, this substantial rate of job finding will explain part of the employment increase observed among youth as a whole. Finally, there were dramatic movements into employment between June and October among both youth who had been non-employed from February to June and youth who had lost their jobs in April, but not among youth who lost their jobs between April and June, who generally remained without employment.

Taken together, these findings give us much greater insight into the dynamics underlying employment changes, and the relative increases and decreases in employment among groups with different ages and employment histories.

# SECTION F: DISCUSSION AND CONCLUSION

Together these findings present a picture of the complex changes that have taken place in the South African labour market during the COVID-19 pandemic. There was substantial heterogeneity in the loss and attainment of employment by age, employment history and education (along with interactions among these factors). However, the findings from this paper indicate that the changes brought about by the COVID-19 pandemic and lockdown have not been altogether random nor totally disconnected from the past. The dramatic changes have followed some clear patterns, in terms of both age and employment history.

One clear finding that emerges is that the substantial employment recovery observed has not been driven exclusively by April job losers regaining employment. What occurred between April and October is not well characterised as a 'bounce back', with a return to normal as job losers regained employment. Rather it was an employment recovery with underlying adjustments in the composition of the workforce. Across age groups a substantial proportion of people who were without employment going into the lockdown subsequently found employment. Amidst these adjustments, those with stable employment histories who were employed in February were far more likely to retain their employment in April, and had notably higher rates of job retention in June and October.

A young age range is generally used to capture the situation of job seekers, but our analysis enabled an extension of this examination to older (prime-age) individuals who we know were non-employed at multiple historical points in time. In the context of a potential restructuring of the labour market this broader understanding of labour market entry and employment dynamics is valuable.

Evidence from developed countries finds more persistent unemployment effects for youth relative to other workers (Gould & Kassa, 2020). In harmony with this, we found higher rates of persistent job loss among youth relative to older groups, and a decrease in employment rates over the period for less educated youths. However, there were signs of substantial employment growth among youth in the aggregate, to the extent that a higher percentage of youth were observed to be employed in October than in February. This employment growth was restricted to better educated youth, however, with employment for youth with less than matric falling over the period.

Our consideration of employment paths pointed to a complex relationship between age and employment history. Among those who were either stably employed or persistently non-employed between 2012 and 2017, older adults experienced worse employment effects than prime-age adults, while among those with a mixed history of both employment and non-employment, prime-age adults fared worse under lockdown.

In general, the complexity and heterogeneity of these findings means that we have to wait for more data on the South African labour market's unfolding recovery before making strong conclusions. Some intriguing patterns emerged for different age groups, and at the intersection of age and employment history. With future waves of data, we will be able to tell whether these patterns represent some enduring aspect of the post-COVID labour market. In addition, the lack of statistical significance for differences in employment rates between February and October (and other periods) emphasises the importance of investigating the external validity of the results observed in NIDS-CRAM[16].

The fact that we do not distinguish between active employment and non-active employment (i.e. paid leave and furloughed workers) means that we miss some of the initial employment loss between February and April (along with some recovery between April and June) (Jain et al., 2020b). Our investigation of transitions between states, and the extent to which the composition of the workforce was restructured, is thereby limited to consider one kind of employment change (in and out of classically defined employment).

The phenomenon of decreases in work among some of our older adult group (41-55) suggests that

16 See Bassier et al. (2021) for an evaluation of the external validity of NIDS-CRAM wave 3 results.

future research should investigate the employment outcomes for older adults who are approaching retirement age. This group could have faced even greater job loss, even among the stable employed, and potential 'replacement' by younger educated people.

The NIDS-CRAM panel provides unique insight into changes in the labour market during the historic year that was 2020. One of the most important tasks for future research will be to benchmark the changes of this extraordinary year against labour market activity for the preceding pre-COVID years. Only then will we be able to tell the extent to which the movement out of and into employment that we observe, along with the resultant changes in the composition of the workforce, are exceptional and unusual. This will also enable a better understanding of the extent to which changes in employment reflect typical cyclical trends or effects that are specific to the COVID-19 pandemic and lockdown. This knowledge will put us in a much better situation to understand the implications for the labour market going forward.

# SECTION G: APPENDICES

## Appendix 1: Comparison of unweighted statistics for the NIDS-CRAM wave 1 cross-section and our balanced panel in May 2020

***Table 1: Comparison of unweighted statistics for the NIDS-CRAM wave 1 cross section and our balanced panel in May 2020***

| | May 2020 (NIDS-CRAM wave 1) | |
|---|---|---|
| | **NIDS-CRAM cross-section** | **Balanced panel** |
| African (%) | 85.49 | 90.17 |
| Female (%) | 61.02 | 62.55 |
| Urban (%) | 77.27 | 74.5 |
| Youth (18-24) (%) | 20.99 | 19.8 |
| Prime-age (25-40) (%) | 49.89 | 48.97 |
| Older adult (41-55) (%) | 29.12 | 31.23 |
| Less than matric (%) | 50.95 | 52.18 |
| Matric (%) | 22.87 | 23.93 |
| More than matric (%) | 26.18 | 23.9 |
| Employed (April, %) | 39.81 | 37.09 |
| Mean monthly earnings | 6860.65 | 5583.58 |
| N | 6617 | 2581 |

**Notes:** Unweighted descriptive statistics are presented for the NIDS-CRAM wave 1 cross section and a balanced panel between NIDS wave 3 (2012) and NIDS-CRAM wave 3 (November 2020). Monthly earnings are in real November 2020 South African rand (ZAR).

## Appendix 2: Creating balanced panel weights

Section E is based on a balanced panel from NIDS wave 3 to NIDS-CRAM wave 3. The fact that there were so many iterations of non-random attrition between periods means that those who remain in the sample in the final period (wave 3 of NIDS-CRAM) and make it into the balanced panel may be a highly selected sub-sample, and that some individuals belonging to groups who are more likely to attrite will be severely under-represented.

To account for this non-random attrition, we follow Finn and Leibbrandt (2017) in running probits estimating the probability of remaining in the sample in each wave conditional on being successfully interviewed in the previous wave and based on a range of characteristics from the previous wave (similar adjustments for attrition were made for the official NIDS panel weights, see Branson & Wittenberg, 2019). The inverse of this conditional probability of re-interview is then taken as a weight adjustment applied to the 2012 NIDS post-stratified design weight (from NIDS wave 3, taken as the baseline weight) for those who remain in the sample in the next wave. The application of high sequential weight adjustments to already high wave 3 weights resulted in some extremely high weights and so balanced panel weights were trimmed at the 1st and 99th percentiles following the precedent of Branson and Wittenberg (2019).

In choosing the explanatory variables predicting re-interview we largely followed the precedent of Branson and Wittenberg (2019[17]) and sought to account for the variables that have been found to correlate with attrition. Explanatory variables covered race, gender, province, urban location, age categories (younger than 30, 30-39, 40-50 and above 50), an indicator for employment and household per capita income quartile (with a separate category for missing household income)[18]. These weight adjustments will not correct for any selection on unobservable characteristics that occurs between waves, however.

Because we are analysing such a specific and selected sample, i.e. the cohort who were present in all waves of data collection in the period considered, we do not calibrate to later population totals. This means that our balanced panel is only broadly representative of the South African population in 2012 and does not factor in migration into and out of the country or the birth of new inhabitants over the period. If the employment shock has been particularly bad for migrants, as has been found elsewhere (Borjas & Cassidy, 2020) and observed anecdotally in South Africa (LRS, 2020), then these dynamics will present an overly optimistic picture of overall employment effects.

17 Similar explanatory variables were used by Kerr et al. (2020) for the estimation of NIDS-CRAM attrition and by Finn and Leibbrandt (2017) in creating balanced panel weights.

18 In a small number of cases missing information was imputed using information from the previous wave (for province, urban/rural) to avoid individuals having missing values for weights.

## Appendix 3: Employment transition trees

***Appendix Figure 1: Employment transition trees by age group***

| NIDS-CRAM (2020) period | | | | |
|---|---|---|---|---|
| **Age group (2020)** | **February** | **April** | **June** | **October** |
| **Youth (18-24) N = 480** | E 33% | E 20.25% | E 12.21% | E 11.51% |
| | | | | NE 0.07% |
| | | | NE 8.04% | E 0.33% |
| | | | | NE 7.71% |
| | | NE 12.75% | E 1.35% | E 0.63% |
| | | | | NE 0.71% |
| | | | NE 11.4% | E 5.7% |
| | | | | NE 5.7% |
| | NE 67% | E 6.02% | E 4.28% | E 3.78% |
| | | | | NE 0.5% |
| | | | NE 1.74% | E 1.34% |
| | | | | NE 0.41% |
| | | NE 60.97% | E 5.15% | E 2.6% |
| | | | | NE 2.55% |
| | | | NE 55.82% | E 10.91% |
| | | | | NE 44.92% |
| **Prime-age adults (25-40) N = 1,222** | E 57.41% | E 40.71% | E 33.28% | E 31.1% |
| | | | | NE 2.17% |
| | | | NE 7.44% | E 3.45% |
| | | | | NE 3.99% |
| | | NE 16.7% | E 5.67% | E 4.61% |
| | | | | NE 1.06% |
| | | | NE 11.03% | E 4.33% |
| | | | | NE 6.7% |
| | NE 42.59% | E 5.73% | E 3.53% | E 2.89% |
| | | | | NE 0.64% |
| | | | NE 2.2% | E 0.66% |
| | | | | NE 1.53% |
| | | NE 36.86% | E 4.91% | E 3.98% |
| | | | | NE 0.93% |
| | | | NE 31.95% | E 4.31% |
| | | | | NE 27.64% |

| | | | | |
|---|---|---|---|---|
| **Older adults (41-55) N = 777** | E 66.24% | E 51.92% | E 44.63% | E 40.53% |
| | | | | NE 4.1% |
| | | | NE 7.29% | E 5.64% |
| | | | | NE 1.64% |
| | | NE 14.32% | E 5.98% | E 5.2% |
| | | | | NE 0.78% |
| | | | NE 8.35% | E 2.16% |
| | | | | NE 6.18% |
| | NE 33.76% | E 5.41% | E 3.56% | E 2.47% |
| | | | | NE 1.09% |
| | | | NE 1.85% | E 0.9% |
| | | | | NE 0.95% |
| | | NE 28.35% | E 4.39% | E 2.91% |
| | | | | NE 1.49% |
| | | | NE 23.95% | E 4.57% |
| | | | | NE 19.38% |

**Notes.** E = employed; NE = not employed. Transition trees based on the balanced panel of individuals interviewed from NIDS wave 3 (2012) to NIDS-CRAM wave 3, who have employment status information across all periods of NIDS-CRAM. All estimates weighted using balanced panel weights created by the authors.

***Appendix Figure 2: Employment transition trees for prime-age adults (25-40) with different employment histories***

| NIDS | NIDS-CRAM (2020) period | | | |
|---|---|---|---|---|
| 2012-2017 | February | April | June | October |
| Persistent non-employed (N = 417) | E 39.56% | E 25.47% | E 15.83% | E 14.19% |
| | | | | NE 1.64% |
| | | | NE 9.64% | E 3.7% |
| | | | | NE 5.95% |
| | | NE 14.09% | E 5.77% | E 4.7% |
| | | | | NE 1.07% |
| | | | NE 8.32% | E 2.66% |
| | | | | NE 5.66% |
| | NE 60.44% | E 4.26% | E 1.67% | E 0.91% |
| | | | | NE 0.76% |
| | | | NE 2.59% | E 0.51% |
| | | | | NE 2.08% |
| | | NE 56.18% | E 7.94% | E 7.34% |
| | | | | NE 0.6% |
| | | | NE 48.25% | E 4.95% |
| | | | | NE 43.4% |
| Transient employed (N = 550) | E 64.08% | E 41.86% | E 36.59% | E 33.09% |
| | | | | NE 3.5% |
| | | | NE 5.28% | E 3.29% |
| | | | | NE 1.98% |
| | | NE 22.22% | E 6.66% | E 5.11% |
| | | | | NE 1.55% |
| | | | NE 15.56% | E 7.11% |
| | | | | NE 8.45% |
| | NE 35.92% | E 5.92% | E 3.28% | E 2.5% |
| | | | | NE 0.78% |
| | | | NE 2.64% | E 1.07% |
| | | | | NE 1.57% |
| | | NE 30% | E 2.89% | E 1.71% |
| | | | | NE 1.17% |
| | | | NE 27.12% | E 4.89% |
| | | | | NE 22.23% |

| | | | | |
|---|---|---|---|---|
| **Stable employed (N = 249)** | E 77.75% | E 66.85% | E 59.04% | E 58.44% |
| | | | | NE 0.61% |
| | | | NE 7.81% | E 3.4% |
| | | | | NE 4.41% |
| | | NE 10.9% | E 3.59% | E 3.5% |
| | | | | NE 0.09% |
| | | | NE 7.32% | E 2.07% |
| | | | | NE 5.24% |
| | NE 22.25% | E 8.24% | E 7.57% | E 7.4% |
| | | | | NE 0.17% |
| | | | NE 0.67% | E 0.16% |
| | | | | NE 0.5% |
| | | NE 14.01% | E 3.43% | E 2.35% |
| | | | | NE 1.07% |
| | | | NE 10.58% | E 2.12% |
| | | | | NE 8.46% |

**Notes.** E = employed; NE = not employed. Transition trees based on the balanced panel of individuals interviewed from NIDS wave 3 (2012) to NIDS-CRAM wave 3, who have employment status information across all periods. All estimates weighted using balanced panel weights created by the authors.

***Appendix Figure 3: Employment transition trees for older adults (41-55) with different employment histories***

| NIDS | NIDS-CRAM (2020) period | | | |
|---|---|---|---|---|
| 2012-2017 | February | April | June | October |
| Persistent non-employed (N = 143) | E 28.94% | E 15.17% | E 9.95% | E 8.64% |
| | | | | NE 1.31% |
| | | | NE 5.22% | E 2.53% |
| | | | | NE 2.69% |
| | | NE 13.77% | E 5.39% | E 4.57% |
| | | | | NE 0.82% |
| | | | NE 8.38% | E 0.99% |
| | | | | NE 7.39% |
| | NE 71.06% | E 3.27% | E 2.33% | E 0.72% |
| | | | | NE 1.62% |
| | | | NE 0.94% | E 0.27% |
| | | | | NE 0.67% |
| | | NE 67.79% | E 6.24% | E 1.68% |
| | | | | NE 4.56% |
| | | | NE 61.55% | E 5.13% |
| | | | | NE 56.42% |
| Transient employed (N = 355) | E 54.55% | E 35.82% | E 26.17% | E 21.93% |
| | | | | NE 4.24% |
| | | | NE 9.65% | E 7.38% |
| | | | | NE 2.27% |
| | | NE 18.73% | E 7.69% | E 6.48% |
| | | | | NE 1.21% |
| | | | NE 11.04% | E 3.53% |
| | | | | NE 7.52% |
| | NE 45.45% | E 8.13% | E 5.8% | E 4.04% |
| | | | | NE 1.76% |
| | | | NE 2.33% | E 0.98% |
| | | | | NE 1.35% |
| | | NE 37.32% | E 7.22% | E 5.24% |
| | | | | NE 1.98% |
| | | | NE 30.1% | E 7.72% |
| | | | | NE 22.38% |

<table>
<tr><td rowspan="16">Stable employed<br>(N = 296)</td><td rowspan="8">E 89.91%</td><td rowspan="4">E 79.85%</td><td rowspan="2">E 74.08%</td><td>E 69.16%</td></tr>
<tr><td>NE 4.93%</td></tr>
<tr><td rowspan="2">NE 5.77%</td><td>E 5.06%</td></tr>
<tr><td>NE 0.7%</td></tr>
<tr><td rowspan="4">NE 10.07%</td><td rowspan="2">E 4.26%</td><td>E 3.89%</td></tr>
<tr><td>NE 0.36%</td></tr>
<tr><td rowspan="2">NE 5.81%</td><td>E 1.27%</td></tr>
<tr><td>NE 4.54%</td></tr>
<tr><td rowspan="8">NE 10.09%</td><td rowspan="4">E 3.57%</td><td rowspan="2">E 1.86%</td><td>E 1.58%</td></tr>
<tr><td>NE 0.28%</td></tr>
<tr><td rowspan="2">NE 1.71%</td><td>E 1.05%</td></tr>
<tr><td>NE 0.66%</td></tr>
<tr><td rowspan="4">NE 6.52%</td><td rowspan="2">E 1.06%</td><td>E 1.06%</td></tr>
<tr><td>NE 0%</td></tr>
<tr><td rowspan="2">NE 5.46%</td><td>E 1.32%</td></tr>
<tr><td>NE 4.14%</td></tr>
</table>

**Notes.** E = employed; NE = not employed. Transition trees based on the balanced panel of individuals interviewed from NIDS wave 3 (2012) to NIDS-CRAM wave 3, who have employment status information across all periods. All estimates weighted using balanced panel weights created by the authors.

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