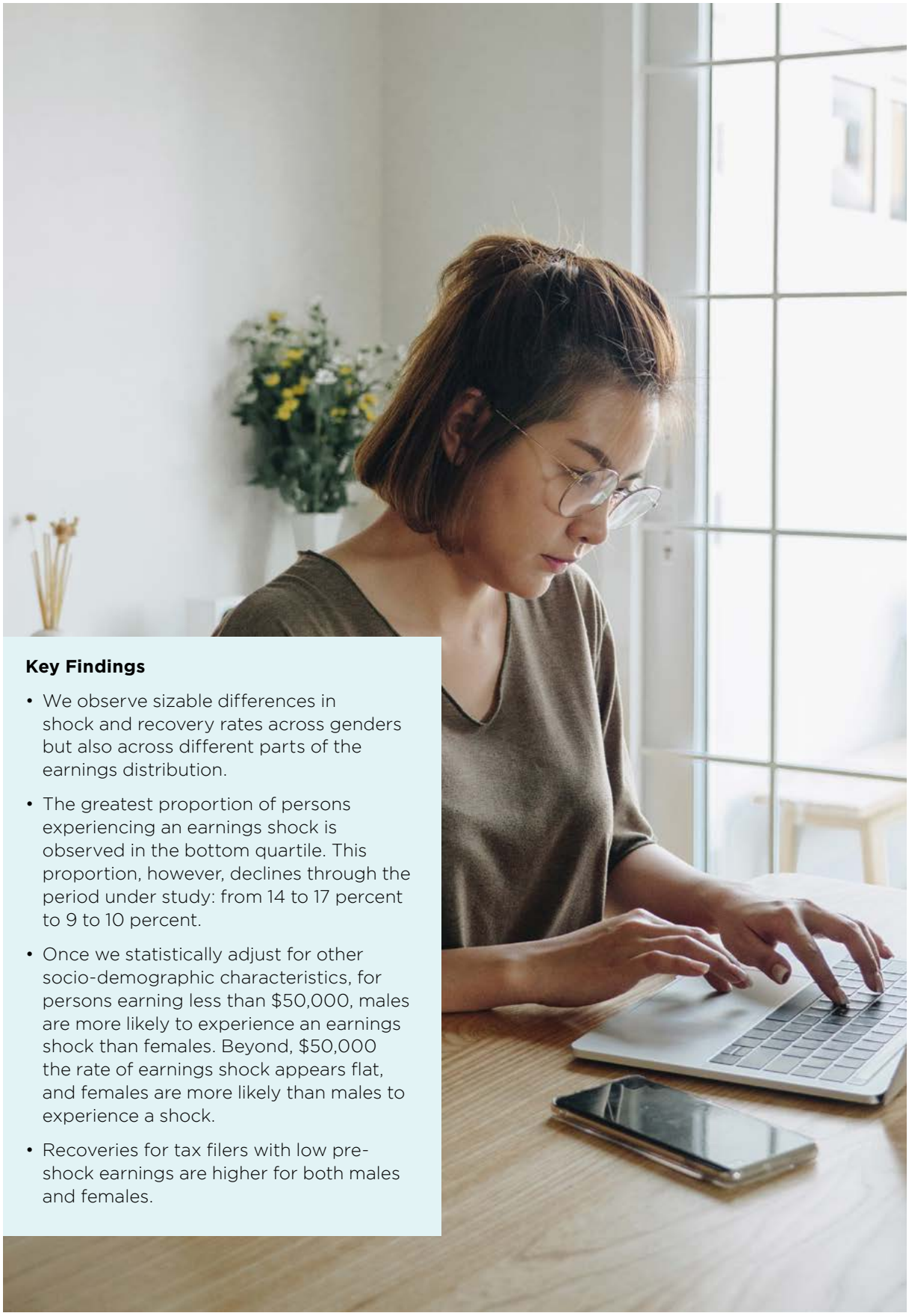
6. Earnings shocks across income groups



Key Findings

- We observe sizable differences in shock and recovery rates across genders but also across different parts of the earnings distribution.
- The greatest proportion of persons experiencing an earnings shock is observed in the bottom quartile. This proportion, however, declines through the period under study: from 14 to 17 percent to 9 to 10 percent.
- Once we statistically adjust for other socio-demographic characteristics, for persons earning less than $50,000, males are more likely to experience an earnings shock than females. Beyond, $50,000 the rate of earnings shock appears flat, and females are more likely than males to experience a shock.
- Recoveries for tax filers with low pre-shock earnings are higher for both males and females.

6.1

Introduction

In Chapters 4 and 5 we documented earnings shocks and recovery rates for males and females, respectively, regardless of age or pre-shock earnings. In this chapter, we explore shocks and recoveries after grouping the tax filers based on their pre-shock earnings.

Pre-shock socio-economic status may have a sizeable influence over the distribution of shocks and recoveries, as well as inform the policy implications for identifying ways to minimise experiencing a shock and/or addressing the repercussions from a shock. If shocks tend to be concentrated among low-income earners, the policies proposed to deal with these events may be different from those if most of the shocks happen among individuals earning higher incomes. To the extent that we view income shocks as undesirable events and aim to propose better ways to both reduce their incidence and facilitate recovery, understanding who is most affected and their length of recovery is crucial.

We find large differences in shocks and recoveries by earnings quartile for each gender. The group with the highest shock rates is males in the bottom 25 percent of the earnings distribution, followed by females in the bottom 25 percent of the earnings distribution. The correlation between earnings and susceptibility to shocks remains high after we control for age, macroeconomic period and other factors. Recovery from these shocks is more rapid for people of lower earnings as well. Because our definition of recovery relies on achieving pre-shock earnings, low-earners recover at lower levels of earnings than high-earners.

6.2

Shocks based on initial earnings quartile

To explore earnings shocks across the earnings distribution, for each year under study, tax filers are grouped into quartiles based on the minimum earnings received in the previous two years before a shock is measured. Given the earnings distribution, even after adjusting for inflation, the cut-offs for each quartile will vary over time. The approximate cut-off is as follows:

- bottom-earners: < $31,500;
- middle-low earners: $31,500 to $50,000;
- middle-high earners: $50,000 to $73,000;
- top earners: > $73,000.

In Table 6.1, we report the distribution by gender across the four quartiles. During the period under study, males are more likely to report earnings in the top quartiles and females are more likely to report earnings in the lower quartiles. The differences in the distribution of male and female earners are substantial. In the most recent period, 34 percent of males and only 15 percent of females were in the top quartile. The distribution is reversed at the lowest quartile: 34 percent of females and 18 percent of males were in the bottom quartile.

In Figures 6.1A to 6.1D we depict the share of tax filers who experience an earnings shock in the given year. For each figure, we separate the shock rates by gender. Across the four quartiles, the rates for any given year are the highest for the bottom earners, those with the lowest earnings (Figure 6.1A). The rates for males and females follow similar trends. The rates, however, are higher for males than for females. In the mid-1990s, the earnings shock rate for males ranged between 15 and 16 percent. The rate for this same period for females, was approximately 12 percent. For both genders, the rate of shock falls over time, ending at approximately 10 percent for males and 9 percent for females by 2017. During the period of the GFC, the shock rate jumped more for males than for females.

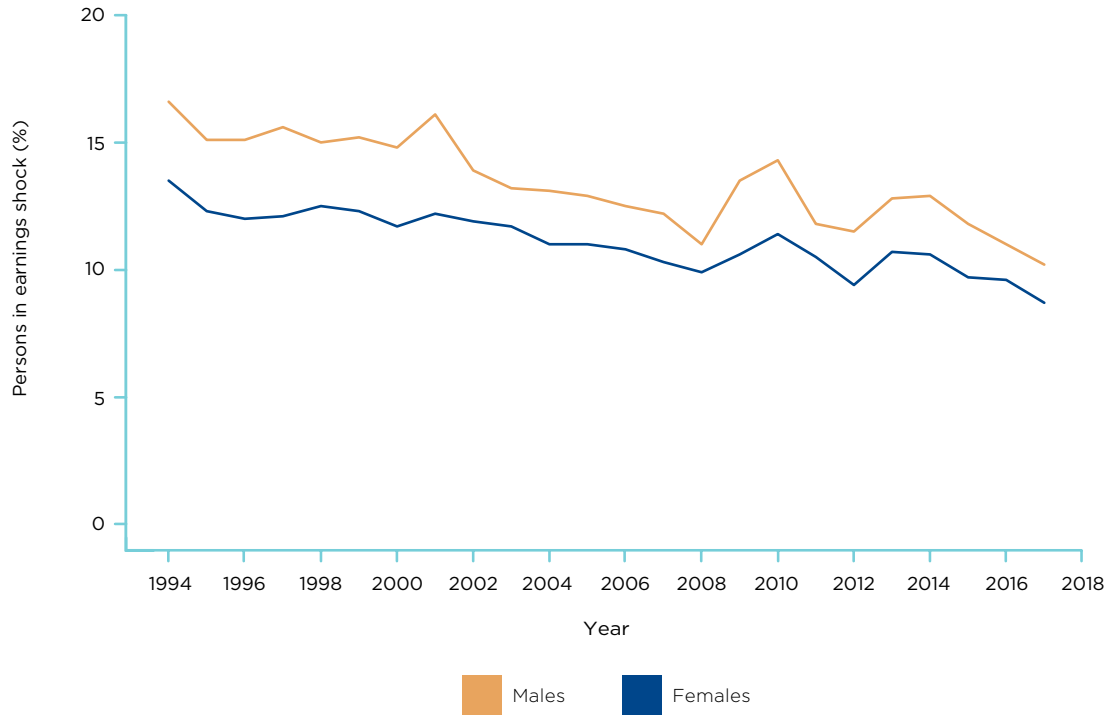
The second highest shock rates are for those tax filers whose earnings fall into the second quartile. Over the period of study, the rates for males and females are very similar. In the mid-1990s the rates are approximately 10 percent and by 2017, the rates fell by approximately three percentage points. Like those who fall into the first quartile of earnings, males experienced higher rates of shock than females around the period of the GFC.

Table 6.1. Earnings distribution, by gender and period (%)

	Bottom earners	Low-Middle earners	Middle-High earners	Top earners
Males				
Productivity boom	16.8	21.1	27.7	34.5
Resources boom	17.7	21.5	27.2	33.6
GFC and recovery	17.6	21.5	27.2	33.8
Dog Days	17.7	21.4	27.0	33.9
Females				
Productivity boom	35.9	30.2	21.5	12.5
Resources boom	34.0	29.4	22.3	14.3
GFC and recovery	34.0	29.3	22.4	14.3
Dog Days	33.6	29.3	22.6	14.5

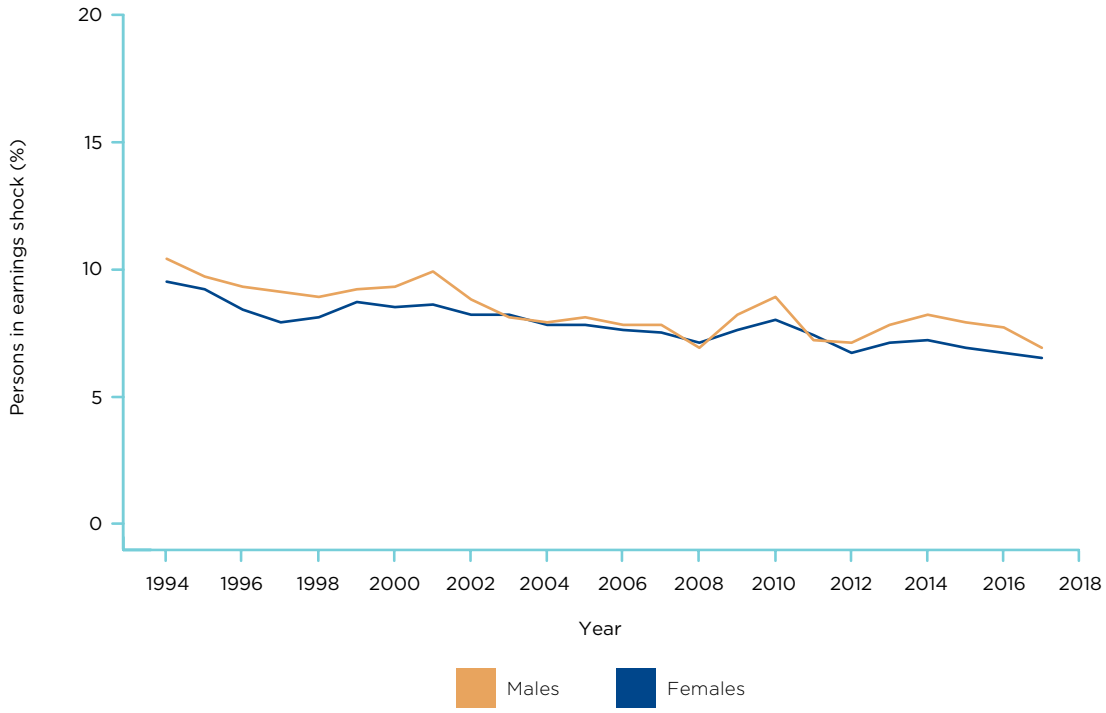
Notes: The table shows the share of males and females by earnings quartile and period. Quartlies are calculated seperately for every year for males and females combined. 'Productivity boom' refers to years 1993-2001. 'Resources boom' refers to years 2002—2007. 'GFC and recovery' refers to years 2008—2011, and 'Dog Days' refers to years 2012—2014.

Figure 6.1A. Persons experiencing an earnings shock, by gender—Bottom earners



Notes: Numerator is number of persons entering an earnings shock, denominator is number of persons who are at risk of experiencing shock.

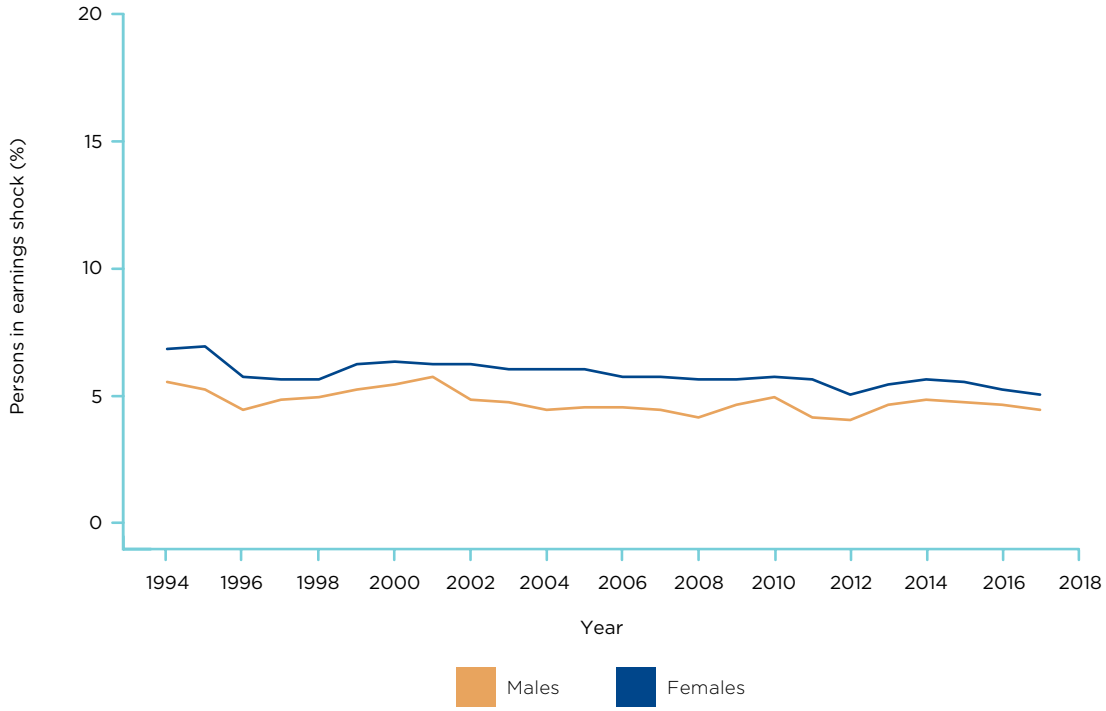
Figure 6.1B. Persons experiencing an earnings shock, by gender—Low-Middle earners



Notes: Numerator is the number of persons entering an earnings shock, denominator is number of persons who are at risk of experiencing shock.

For tax filers who fall into the third quartile of earnings, the rates also fall between the beginning and the end of the sample period by approximately two percentage points for females and one percentage point for males. Unlike the bottom two quartiles, however, females are observed experiencing higher shock rates than males. Unlike males, however, there are no discernible peaks around the period of the GFC for females.

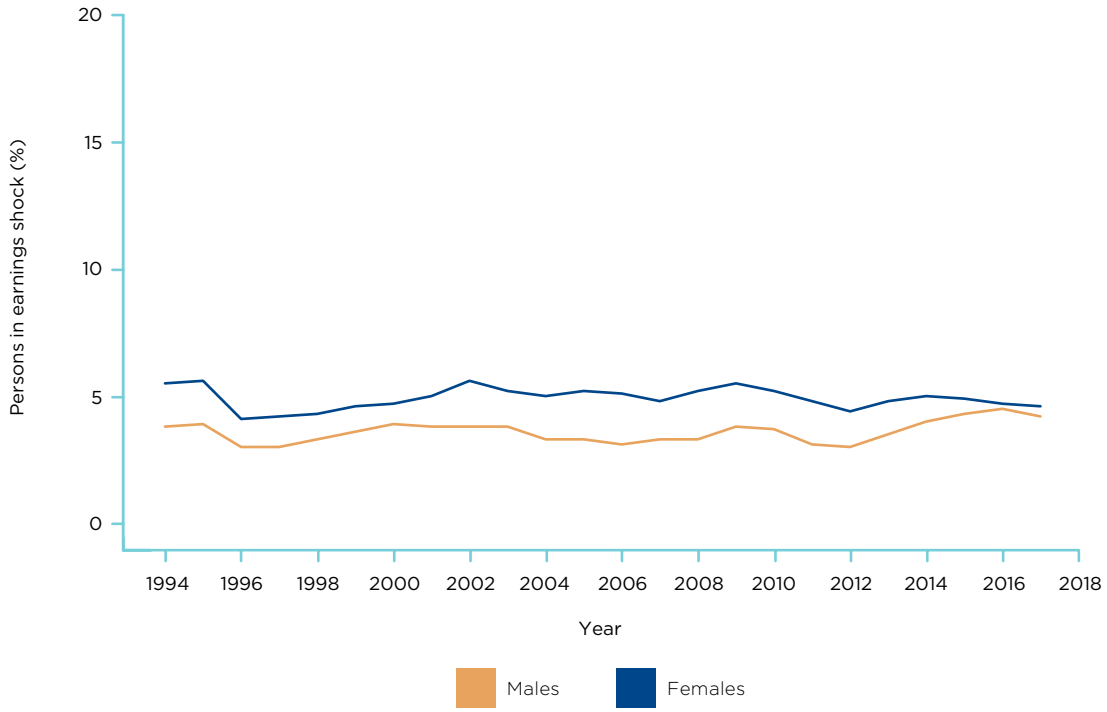
Figure 6.1C. Persons experiencing an earnings shock, by gender—Middle-High earners



Notes: Numerator is the number of persons entering an earnings shock, denominator is number of persons who are at risk of experiencing shock.

Finally, for the fourth quartile of earnings, the female shock rate is higher than the male shock rate, but the overall shock rates are lower for both genders relative to the other three quartiles. For this quartile, both males and females have higher shock rates around the period of the GFC. Unlike the first two quartiles, however, the overall trend for the shock rates is relatively flat for females and the rates rise for males in the last part of the sample period.

Figure 6.1D. Persons experiencing an earnings shock, by gender—Top earners

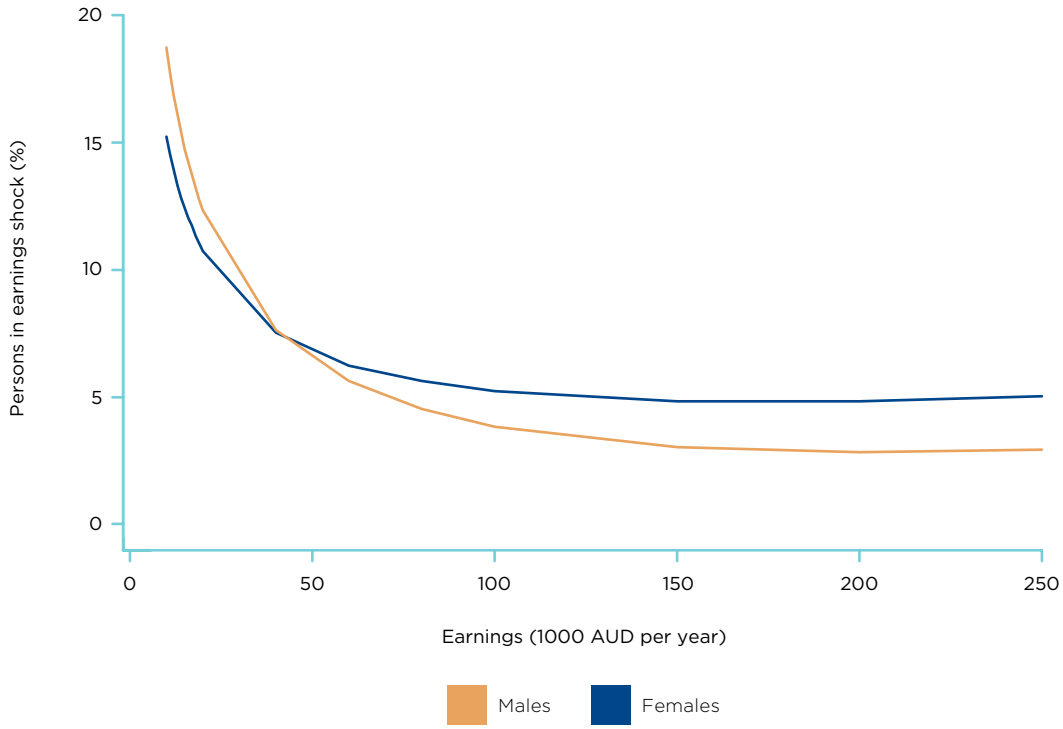


Notes: Numerator is the number of persons entering an earnings shock, denominator is number of persons who are at risk of experiencing shock.

While Figure 6.1 focuses on depicting raw statistics, in Figure 6.2 we show the predicted probability of experiencing an earnings shock. To create this prediction, we run a regression that controls for the following characteristics of the tax filer—pre-shock earnings, age, geographic location of residence, state level unemployment rates and indicator variables—to capture the four macroeconomics periods during the period under study.

From this analysis, we can then predict the likelihood of experiencing an earnings shock. Focusing on those who earn between $10,000 and $250,000, Figure 6.2 provides further evidence that there is a higher probability of experiencing an earnings shock if one's pre-shock earnings is at the bottom end of the earnings distribution. Moreover, males have a higher probability of experiencing an earnings shock for those with earnings less than $50,000. Females are more likely to experience an earnings shock for higher incomes.

Figure 6.2. Predicted probability of experiencing an earnings shock, by gender



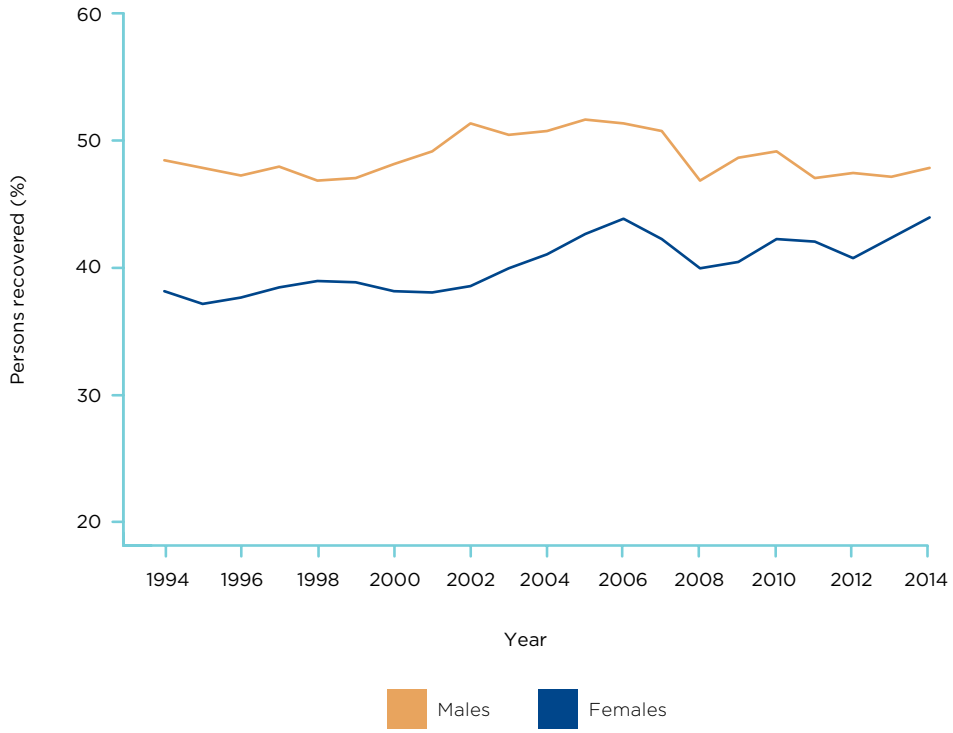
Notes: The predicted probabilities are calculated using a regression with earnings, earnings squared, age, age squared, sa4-level unemployment rate, positive and negative changes in unemployment rate and indicator variables for macroeconomic periods.

6.3

Recovery from earnings shocks

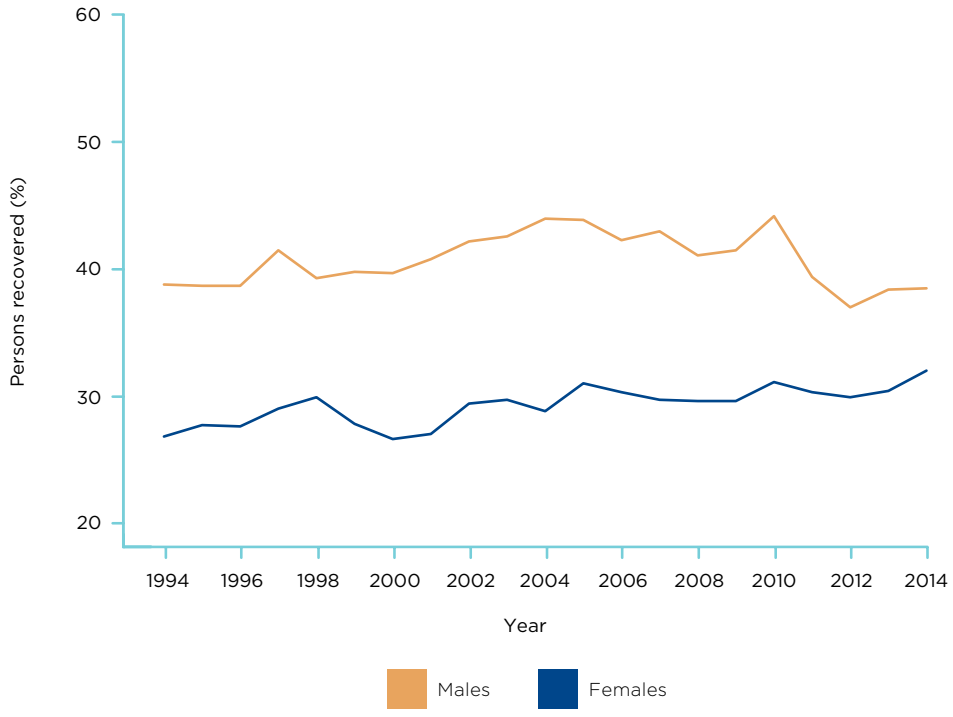
In the last section, we demonstrated that rates of earnings shocks vary across the four income quartiles and that within each quartile the shock rates are the highest for those in the bottom two quartiles. These rates, for the most part, also vary by gender. Do we observe the same patterns of recovery? To explore this question, Figures 6.3A to Figures 6.3D depict the three-year recovery rates over time for each of the four quartiles. Focusing initially on the first two quartiles, Figures 6.3A and 6.3B, across all years, show that males recover at higher rates than females. Over time, the recovery rates are relatively flat for males, with approximately 50 percent recovering within three years for those with pre-shock earnings in the lowest quartile and approximately 40 percent recovering within three years for those with pre-shock earnings that fall into the second quartile. For females, there is a slight upward trend from 40 percent to 44 percent in the bottom quartile and a recovery rate of closer to 30 percent for those with earnings falling into the second quartile.

Figure 6.3A. Recoveries from an earnings shock, by gender—Bottom earners



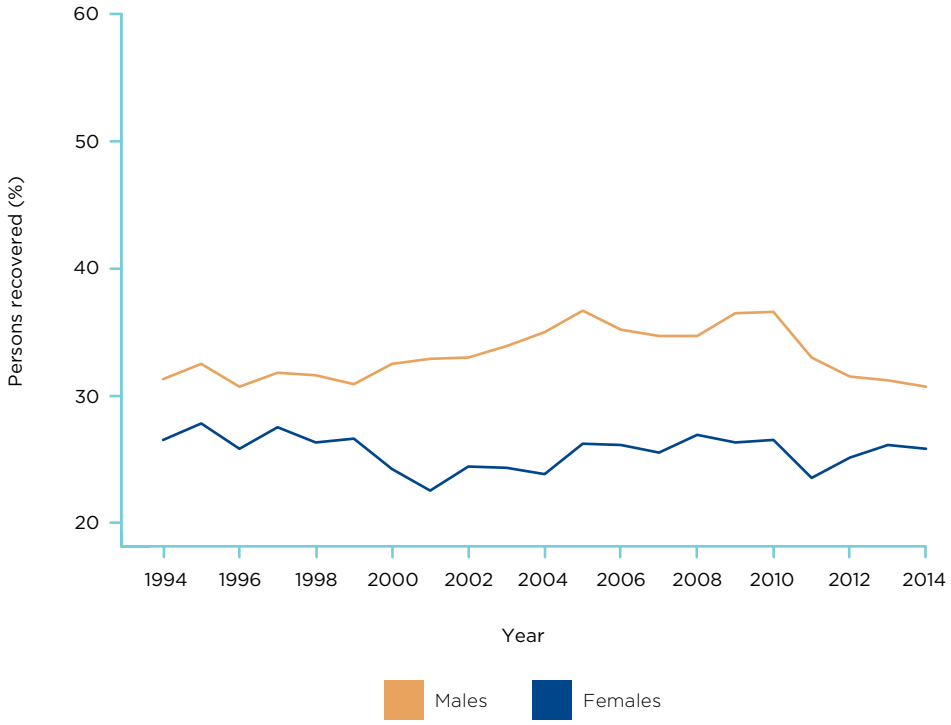
Notes: Numerator is number of recoveries within 3 years for persons who experienced an earnings shock in a given year. Denominator is number of persons experiencing shock.

Figure 6.3B. Recoveries from an earnings shock, by gender—Low-Middle earners



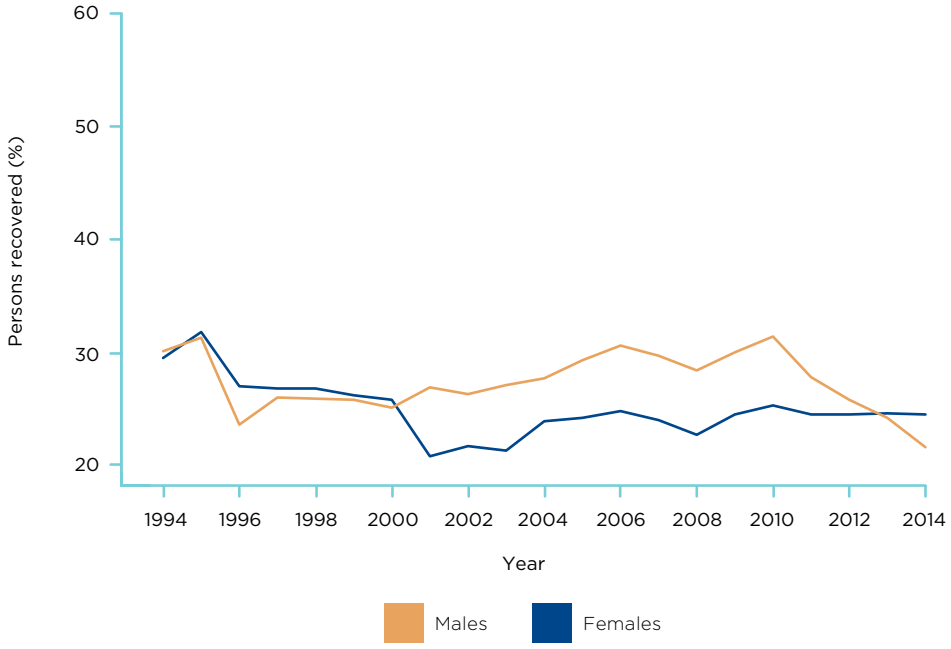
Notes: Numerator is number of recoveries within 3 years for persons who experienced an earnings shock in a given year. Denominator is number of persons experiencing shock.

Figure 6.3C. Recoveries from an earnings shock, by gender—Middle-High earners



Notes: Numerator is number of recoveries within 3 years for persons who experienced an earnings shock in a given year. Denominator is number of persons experiencing shock.

Figure 6.3D. Recoveries from an earnings shock, by gender—Top earners



Notes: Numerator is number of recoveries within 3 years for persons who experienced an earnings shock in a given year. Denominator is number of persons experiencing shock.

For tax filers whose pre-shock earnings fall into the third and fourth quartiles, the three-year recovery rates are much lower with males having higher rates than females for most years. For males, however, the recovery rate in the years near the end of the sample period have been falling, not improving.

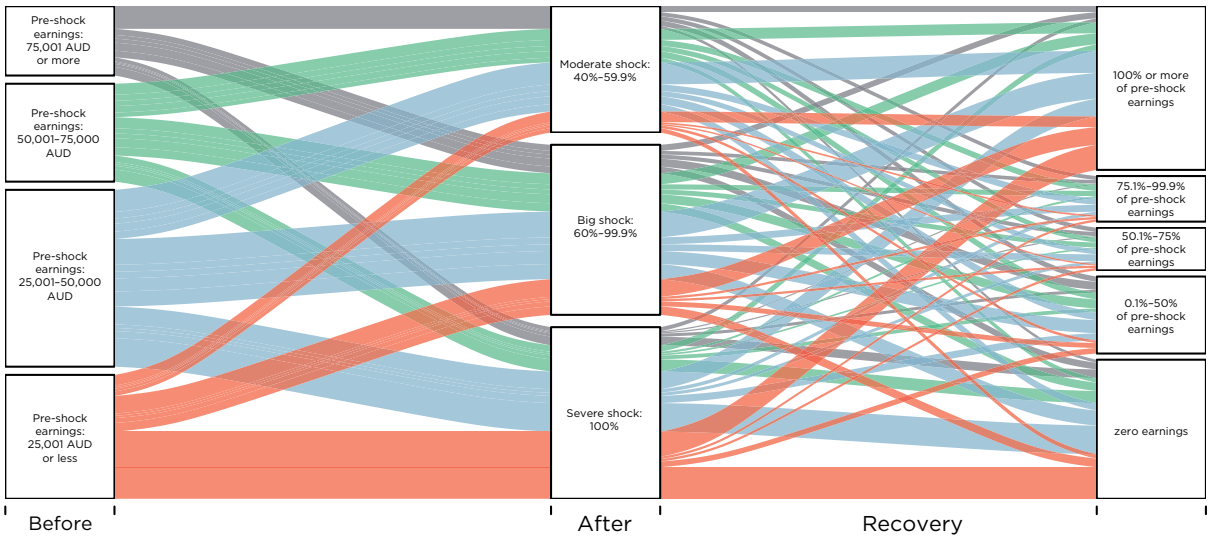
A challenge when studying recovery rates by income quartile is that at higher incomes it may be much more challenging to recover fully given the absolute drop in earnings is greater the higher the earnings. To investigate in more depth the proximity to recovery for those who experience an earnings shock, Figures 6.4A and 6.4B depict the flow from shock to recovery for 2003 and 2012, respectively, for males. For each figure there are three panels. The left panel captures the pre-shock earnings for those who experience a shock. We grouped the pre-shock earnings into four categories. The vertical distance for each category equates to the approximate distribution of the tax filers under study (those that are classified as experiencing an earnings shock).

The bottom two categories reflect those at the bottom part of the earnings distribution, those who likely fall near or below what might be considered living in poverty. These tax filers represent most tax filers who experience an earnings shock. In 2003, tax filers with pre-shock earnings above $75,000 represent the lowest part of the distribution of those with an earnings shock. In contrast, in 2012, those with pre-shock earnings greater than $50,000 represent a greater share of those observed with a shock. As we control for inflation, this change between 2003 and 2012 suggests that we should be considering the roles of such shocks across the earnings distribution.

The middle panel captures the extent of the earnings shock into three categories: a moderate shock (40 to 59.9 percent); a big shock (60 to 99.9 percent); and a complete or severe shock (100 percent). Across all income groups, tax filers are observed experiencing different levels of shocks. The patterns of the distribution of tax filers across the three shock categories is approximately the same for 2003 and 2012. Those with lower pre-shock earnings are observed with bigger shocks. Those with higher earnings are more likely to experience a moderate or big shock.

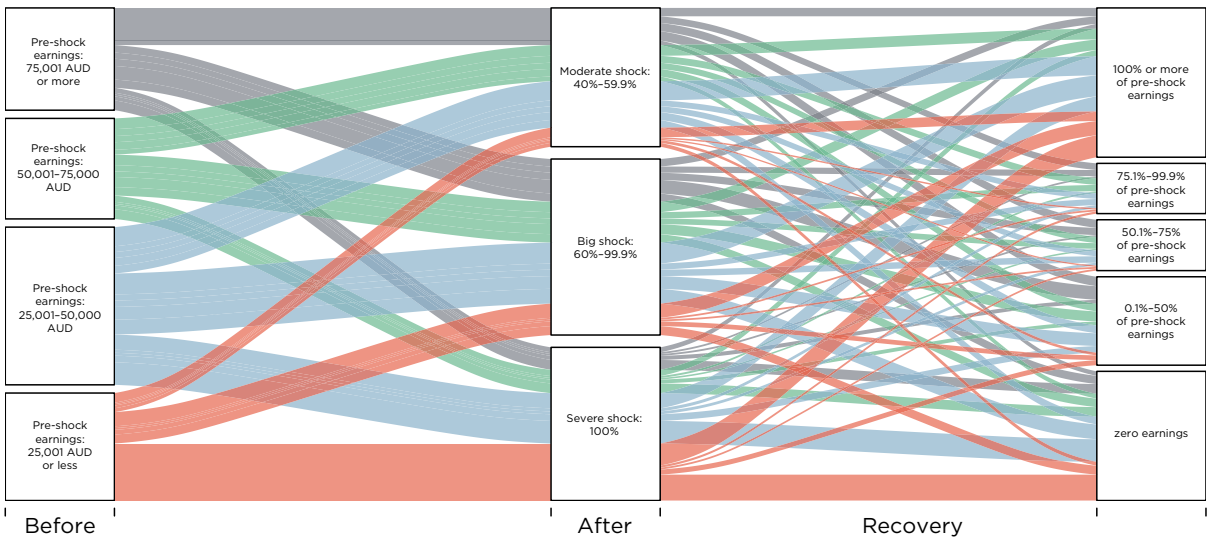
The right panel captures the earnings observed four years after the earnings shock. We grouped the earnings into five categories: those with no labour earnings; those with earnings that are up to 50 percent (less than half) of pre-shock earnings; those with earnings that range between 50 and 75 percent of pre-shock earnings; those with earnings that range between 75 and 99 percent of pre-shock earnings; and those who have returned or exceeded pre-shock earnings. No strong story emerges for each of the four groups of tax filers based on pre-shock earnings. Similarly, there is no strong story based on the depth of the shock (middle panel) in terms of level of recoveries. Across 2003 and 2012, however, it appears that a higher proportion of those who experience an earnings shock are observed with earnings greater than 75 percent of pre-shock earnings.

Figure 6.4A. Experiencing an earnings shock, 2003–2005—Males



Notes: The flows represent persons who move between categories. Columns represent the following states: "Before" shows an earnings category before the income shock, "After" shows an earning category right after the shock based on the depth of the shock, "Recovery" shows the earning category three years after the shock based on the pre-shock earnings. Only individuals who experienced an income shock are depicted.

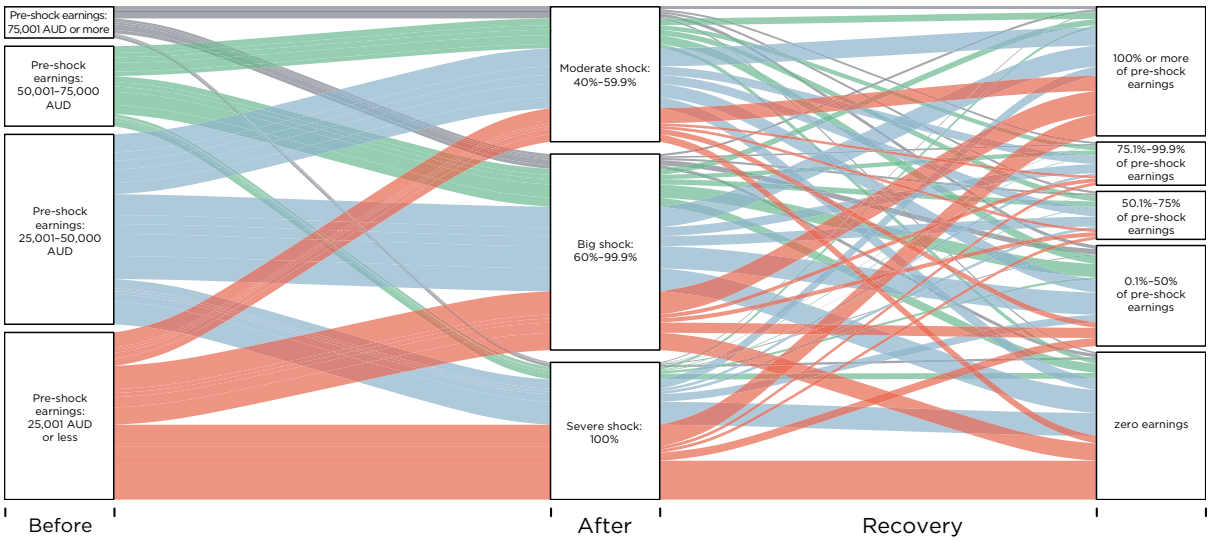
Figure 6.4B. Experiencing an earnings shock, 2012–2014—Males



Notes: The flows represent persons who move between categories. Columns represent the following states: "Before" shows an earnings category before the income shock, "After" shows an earning category right after the shock based on the depth of the shock, "Recovery" shows the earning category three years after the shock based on the pre-shock earnings. Only individuals who experienced an income shock are depicted.

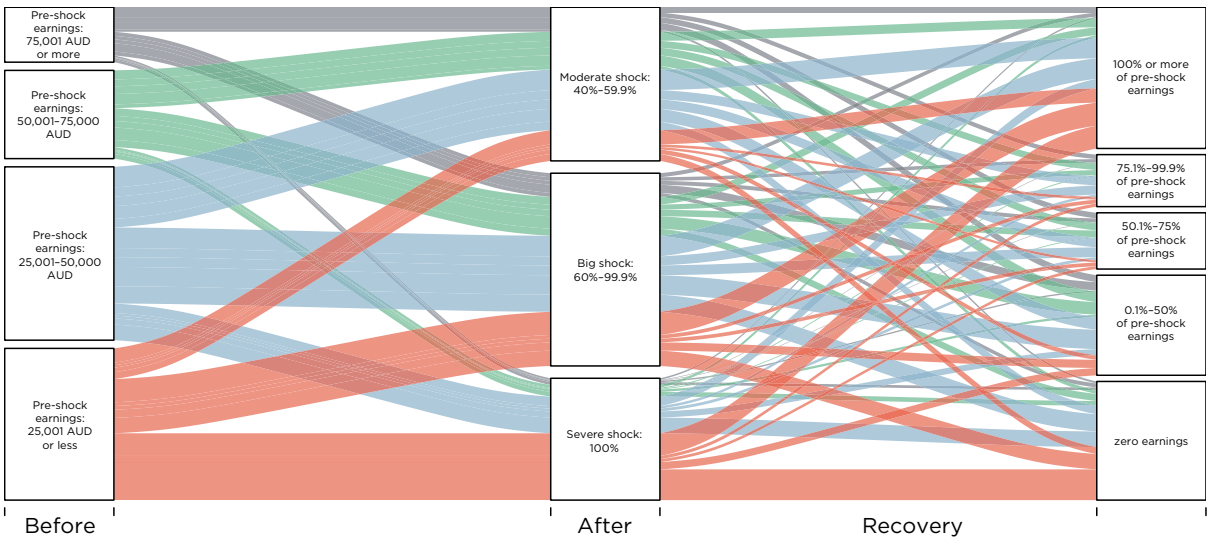
Do we observe the same patterns for females? In Figure 6.5 we depict the flow diagrams for females observed with an earnings shock in 2003 (6.5A) and 2012 (6.5B), respectively. Compared to males, the striking differences are the higher proportions of those who experience shock with lower pre-shock earnings and high proportions experiencing bigger shocks. In addition, there are fewer tax filers who have fully or even close to fully recovered within four years of our identifying an earnings shock.

Figure 6.5A. Experiencing an earnings shock, 2003–2005—Females



Notes: The flows represent persons who move between categories. Columns represent the following states: "Before" shows an earnings category before the income shock, "After" shows an earning category right after the shock based on the depth of the shock, "Recovery" shows the earning category three years after the shock based on the pre-shock earnings. Only individuals who experienced an income shock are depicted.

Figure 6.5B. Experiencing an earnings shock, 2012–2014—Females

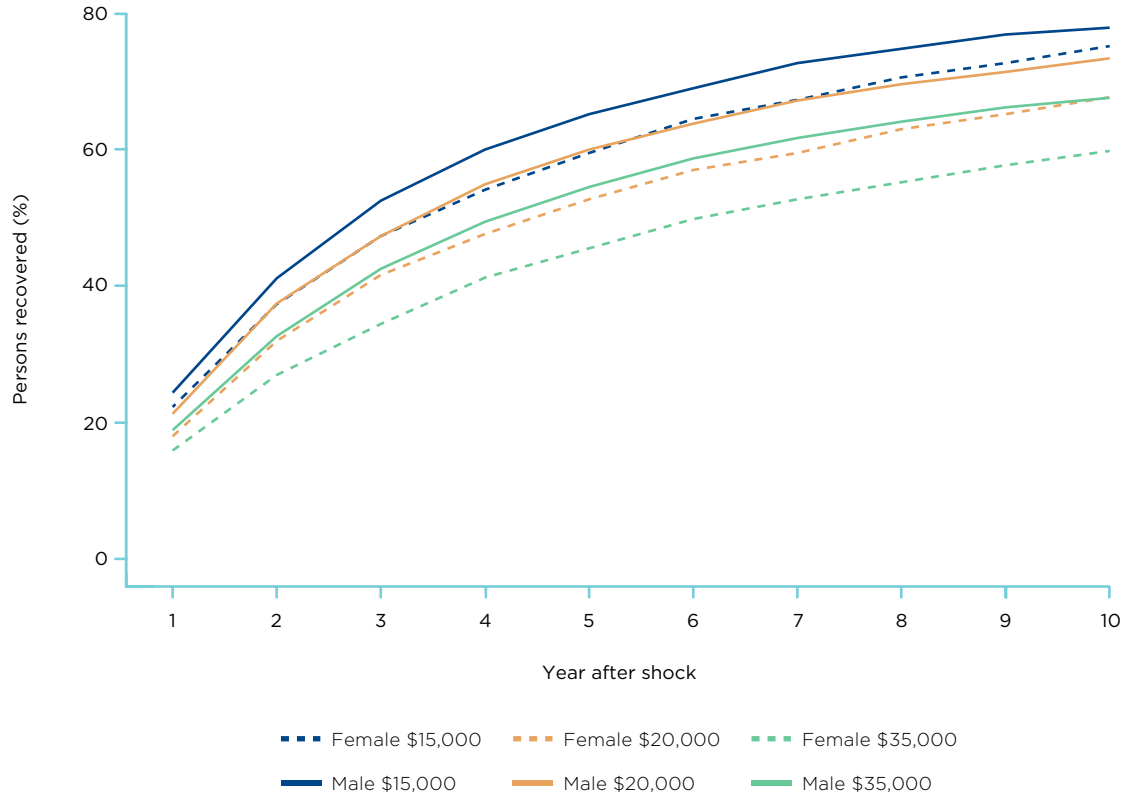


Notes: The flows represent persons who move between categories. Columns represent the following states: "Before" shows an earnings category before the income shock, "After" shows an earning category right after the shock based on the depth of the shock, "Recovery" shows the earning category three years after the shock based on the pre-shock earnings. Only individuals who experienced an income shock are depicted.

When we combine the depictions of Figures 6.3, 6.4 and 6.5, we continue to observe big differences in recoveries from earnings shocks between males and females. We also find that many do not recover within a few years and that many do not come close to recovering their pre-shock earnings.

How long does it take to recover? In Figures 6.6A and 6.6B, for several earnings thresholds we depict the probability of reporting earnings at least as much as the pre-shock earnings. The probabilities are based on regressions that control for year and geography of those who experience a shock.[20] In Figure 6.6A we depict the probabilities for those with pre-shock earnings between $15,000 and $35,000. In Figure 6.6B we depict the probabilities for those with pre-shock earnings between $60,000 and $160,000.

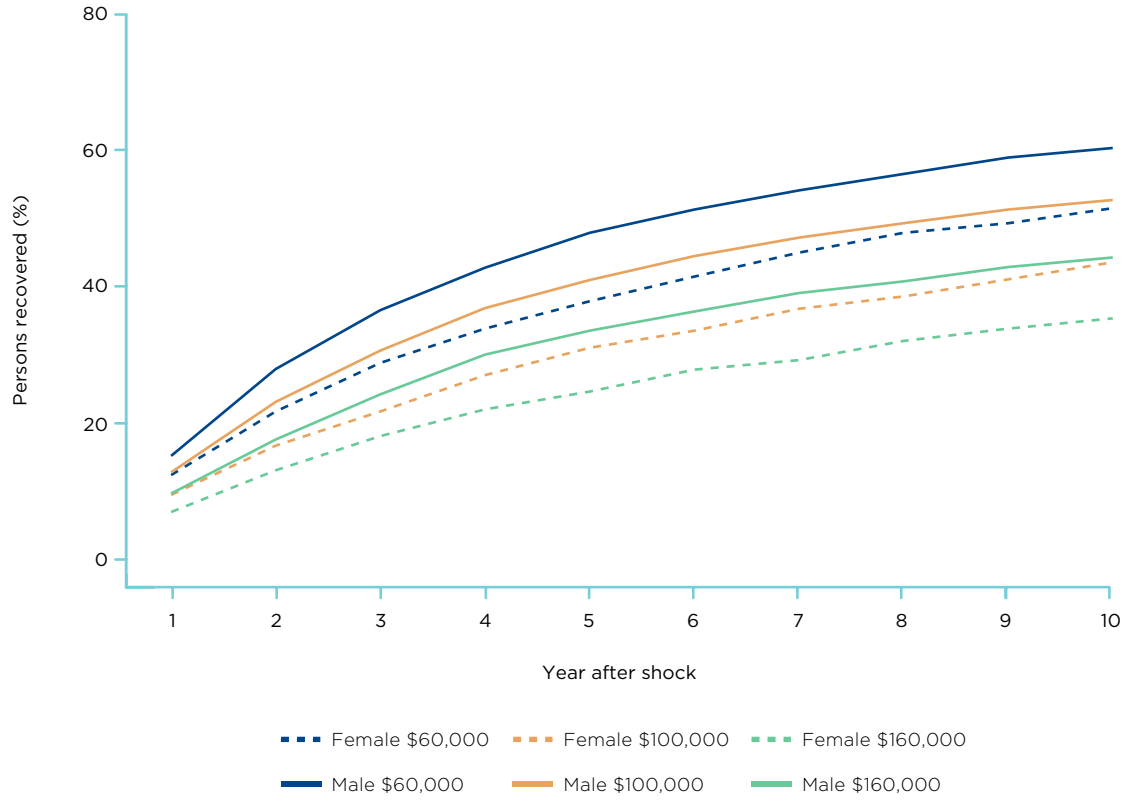
Figure 6.6A. Predicted recoveries from an earnings shock, by pre-shock earnings level and gender



Notes: Horizontal axis shows after-shock years, vertical axis shows proportions of people projected to recover by a given year. Numbers are calculated using Cox proportional hazard model.

20 The probabilities were estimated using a Cox proportional hazard model. See Appendix F for more details.

Figure 6.6B. Predicted recoveries from an earnings shock, by pre-shock earnings level and gender



Notes: Horizontal axis shows after-shock years, vertical axis shows proportions of people projected to recover by a given year. Numbers are calculated using Cox proportional hazard model.

Figure 6.6 confirms that recovery from an earnings shock takes many years. Moreover, the recovery rates are fastest for those with lower pre-shock earnings. For example, 70 percent of males with pre-shock earnings of $15,000 are likely to be earning $15,000 or more within six to seven years. In contrast, for males with pre-shock earnings of $60,000, the probability of recovery within six years is closer to 50 percent. Across the board, recovery rates for a given pre-shock amount are lower for females than for males. For those with pre-shock earnings of $35,000, the probability of recovering within 10 years of the shock is 68 percent for males and 60 percent for females.

6.4

Summary

We continue to observe sizable differences in shock and recovery rates across genders but also across different parts of the earnings distribution. A greater proportion of those at the bottom quartile of the earnings distribution are likely to experience an earnings shock. The share of those experiencing a shock, however, has fallen over time. Between 1994 and 2017, the rate of shock has fallen by approximately 40 percent, from 14 to 17 percent to 9 to 10 percent. Moreover, once we control for socio-demographic characteristics of the tax filer and the community in which the tax filer resides, for those tax filers earning less than $50,000, males are more likely to experience an earnings shock than females. Beyond $50,000, however, the likelihood of experiencing a shock becomes relatively flat and females are more likely than males to experience a shock.

In terms of recoveries, across most income profiles and most years, the recovery rate for females is lower and longer than for males. Recoveries for tax filers with low pre-shock earnings, however, are higher for both males and females.

From a policy perspective, this analysis illustrates the importance of understanding the reasons behind an earnings shock. This is particularly true for those whose pre-shock earnings fall below the median earnings observed, given we are observing relatively high rates of shocks for these tax filers. We have also observed, however, that those with earnings shocks at the higher end of the earnings distribution are likely to take longer to recover. Thus, it is equally important to better understand the factors that might influence a slow recovery from a shock.