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Appendix

The data used in this report comes from the 1995-1996, 2007-2008, and 2019-2020 waves of the National Postsecondary Student Aid Survey (NPSAS). The first wave represents the first survey conducted following substantive changes to the federal financial aid system made in 1992. The last wave is the most recent one available and the 2007-2008 is roughly halfway between those two. The economy was reasonably strong in each of these years (the Great Recession began later in 2008 and the COVID pandemic hit at the end of the 2019-2020 academic year).

All analysis conducted for these years was also conducted for the interim waves of those data (1999-2000, 2003-2004, 2011-2012, and 2015-2016), but are not reported here largely for simplicity. These data, though, also show strong evidence that the state of the economy affects how students and their families pay for college. For instance, the economy was still very weak in 2011-2012 in the aftermath of the Great Recession. Data for that year show higher levels of parental borrowing to make up for lower family incomes in that year. Student earnings were also lower that year.

In each wave, I have restricted the data to dependent students enrolled full-time at a single institution living away from their parents (on or off campus). There are 10,700, 22,200, and 15,400 students that satisfy these sample restrictions in the 1995-1996, 2007-2008, and 2019-2020 waves of this survey, respectively. They represent roughly 3 million students in each academic year. All NPSAS data used in this report is restricted and accessed under a licensing agreement with the Institute for Education Science/National Center for Education Statistics (IES/NCES).

The analysis focuses on the following payment methods: (a) student loans, (b) parent loans, (c) student earnings, and (d) payments made from income and savings. Information regarding loans is administrative in nature, obtained from the institutions themselves. Student earnings are obtained from surveys of students. The final payment category represents the residual, calculated as the difference between the net price and the former three categories, as detailed in the report. Student earnings are counted in 1995-1996 and 2007-2008, but omitted in subsequent years because the more recent data are not comparable to earlier years. The residual category in 2019-2020 includes these student earnings.
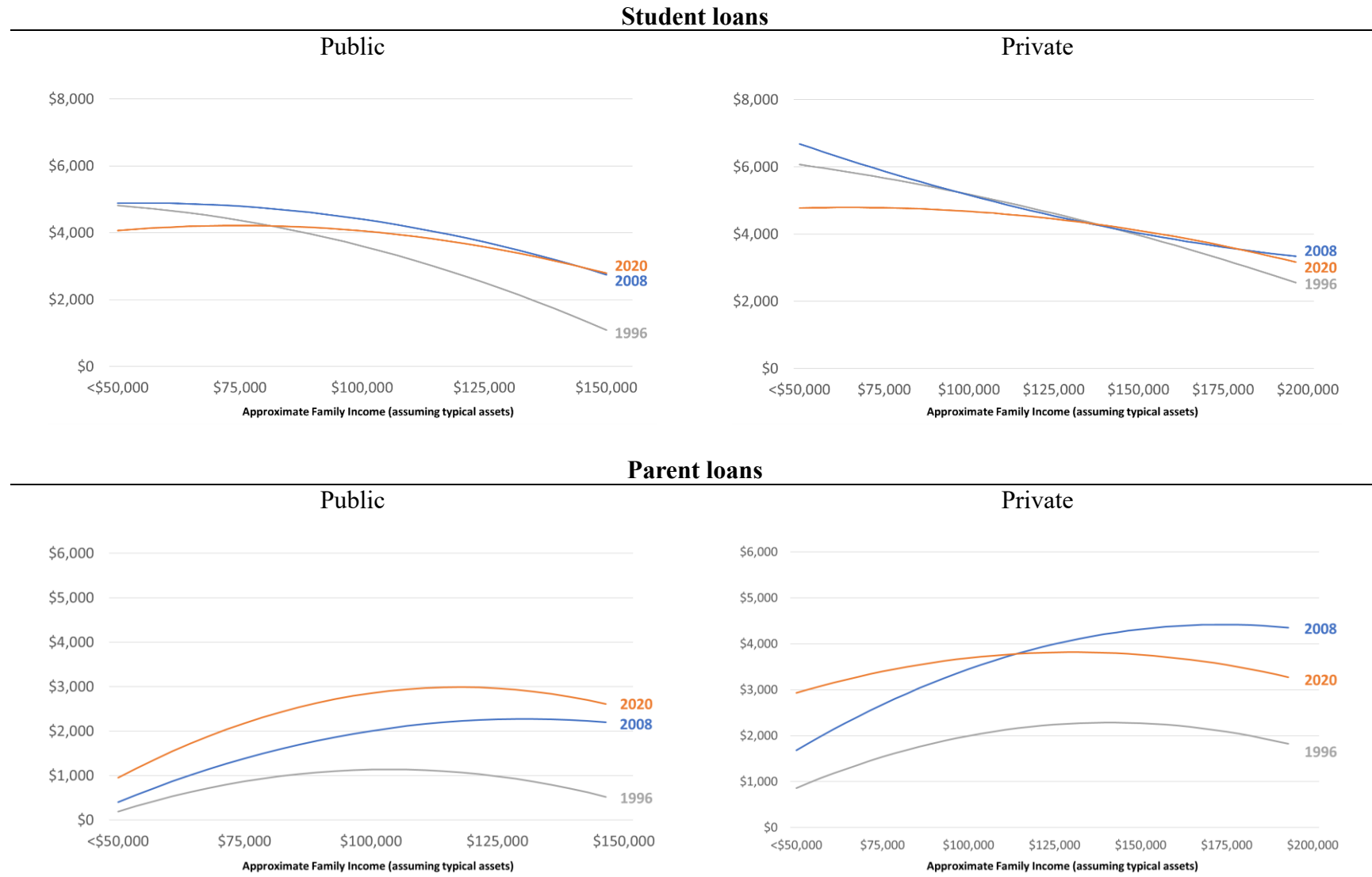
For each category, I estimate non-linear regression models relating the outcome to the expected family contribution (EFC) and its square. The coefficients enable me to estimate the average spending level from each category at any EFC level. I also estimate a separate regression model that relates EFC to family income and use the coefficients from that to translate EFC levels to analogous family income levels.[1] This approach assumes that families at different levels have typical asset levels for those families. For presentation purposes, I chose less than $50,000, $100,000, $150,000, and, for private institutions, $200,000 as income levels that represent relevant locations in the income distribution that are still well-represented in the sample. These income levels translate to EFC levels of $0, $14,000, $28,000, and $42,000.

The results of these spending regression models are characterized in Appendix Figure 1. Spending at public versus private institutions is distinguished. The values in these figures at the four discrete income levels highlighted are reported in Table 1 and used to construct the values in Table 2 in the text.

I also decomposed the impact of EFC/family income on spending levels into the probability of using each category of spending along with the amount for those who spend something in that category. I estimate analogous models to that described earlier for this purpose (linear probabilities models are used to examine patterns in the likelihood of each type of spending). To provide additional insight into the earnings results, I also estimate the same models for hours worked per week. The results of these models are characterized in Appendix Figures 2 through 5.

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[1] That translation also imposes the assumption that a family only has one child in college. More details on this approach are provided in my earlier study linking changes in net prices to differing levels of "family income." The EFC label has also recently been changed to the Student Aid Index (SAI).

Appendix Figure 1: Average changes in payment methods by family income
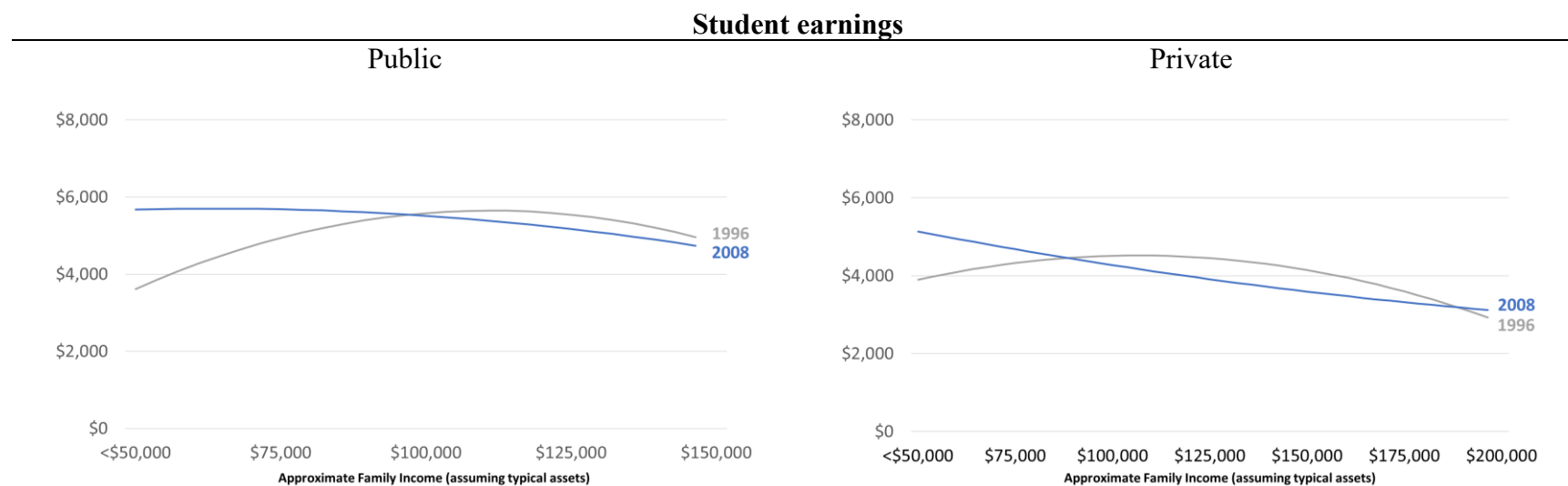
Student loans

Public

Approximate Family Income (assuming typical assets)

Private

Approximate Family Income (assuming typical assets)

Parent loans

Public

Approximate Family Income (assuming typical assets)

Private

Approximate Family Income (assuming typical assets)

Student earnings

Public

Private

Source: Previously unpublished tabulations based on the U.S. Department of Education, National Center for Education Statistics, 1995-1996, 2007-2008, and 2019-2020 National Postsecondary Student Aid Study.

Notes: All calculations are based on dependent, undergraduate students enrolled at a single institution, full-time, and living away from their parents. Private institutions are non-profit. The years indicated represent the end of the academic year. All dollar values are inflation-adjusted and reflect the price level in 2023.

Appendix Figure 2: Student loans—probability and amount, if any
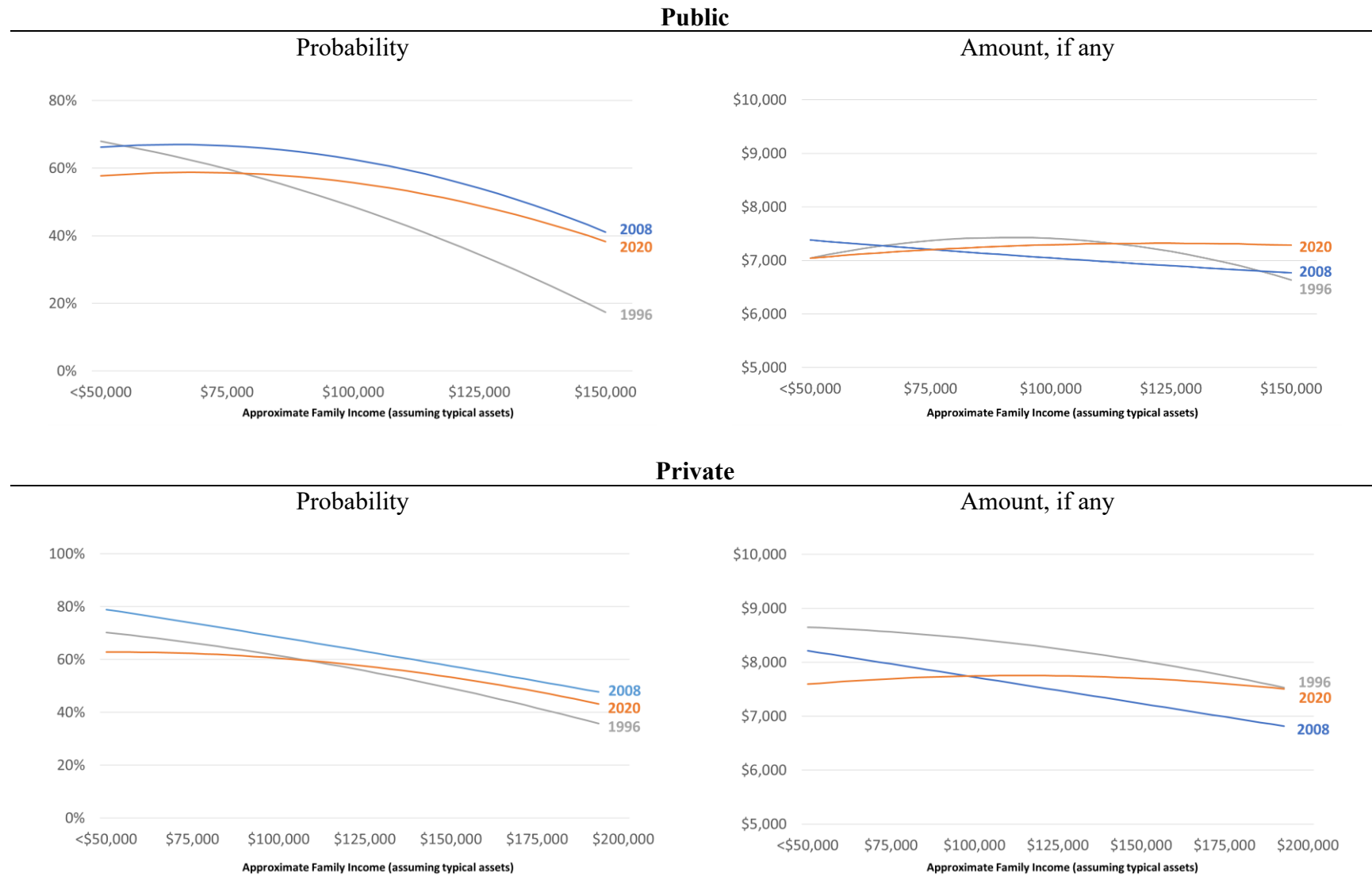
Public

Probability

80%

60%

40%   2008
       2020

20%   1996

0%
<$50,000 $75,000 $100,000 $125,000 $150,000
Approximate Family Income (assuming typical assets)

Amount, if any

$10,000

$9,000

$8,000

$7,000   2020
                                                 2008
                                                 1996
$6,000

$5,000
<$50,000 $75,000 $100,000 $125,000 $150,000
Approximate Family Income (assuming typical assets)

Private

Probability

100%

80%

60%

40%   2008
                                           2020
                                           1996
20%

0%
<$50,000 $75,000 $100,000 $125,000 $150,000 $175,000 $200,000
Approximate Family Income (assuming typical assets)

Amount, if any

$10,000

$9,000

$8,000   1996
                                                    2020
$7,000
                                                    2008

$6,000

$5,000
<$50,000 $75,000 $100,000 $125,000 $150,000 $175,000 $200,000
Approximate Family Income (assuming typical assets)

Source: Previously unpublished tabulations based on the U.S. Department of Education, National Center for Education Statistics, 1995-1996, 2007-2008, and 2019-2020 National Postsecondary Student Aid Study. *Notes:* See notes to Appendix Figure 1.
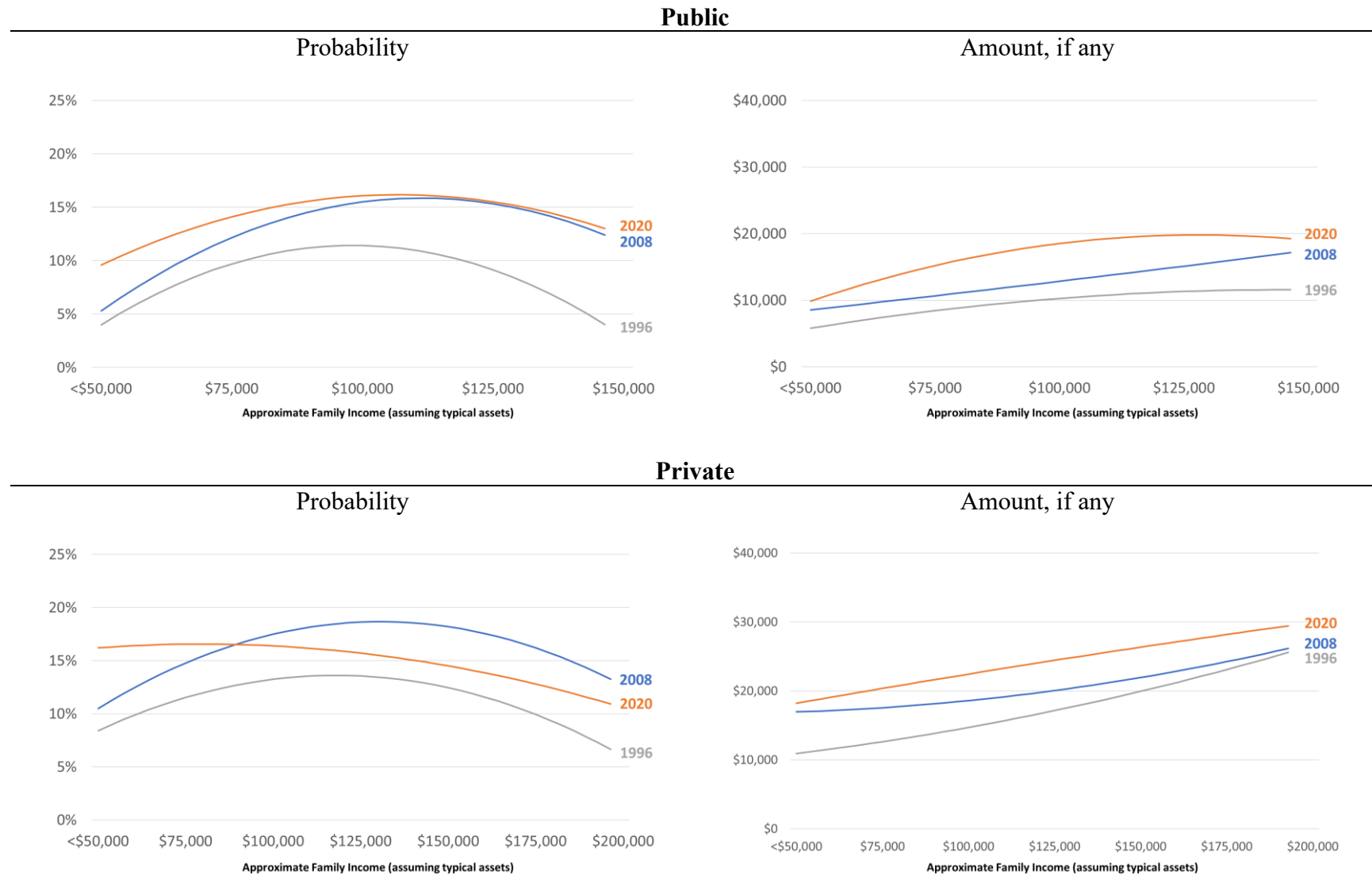
Appendix Figure 3: Parent loans—probability and amount, if any

Public

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

Approximate Family Income (assuming typical assets)

Private

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

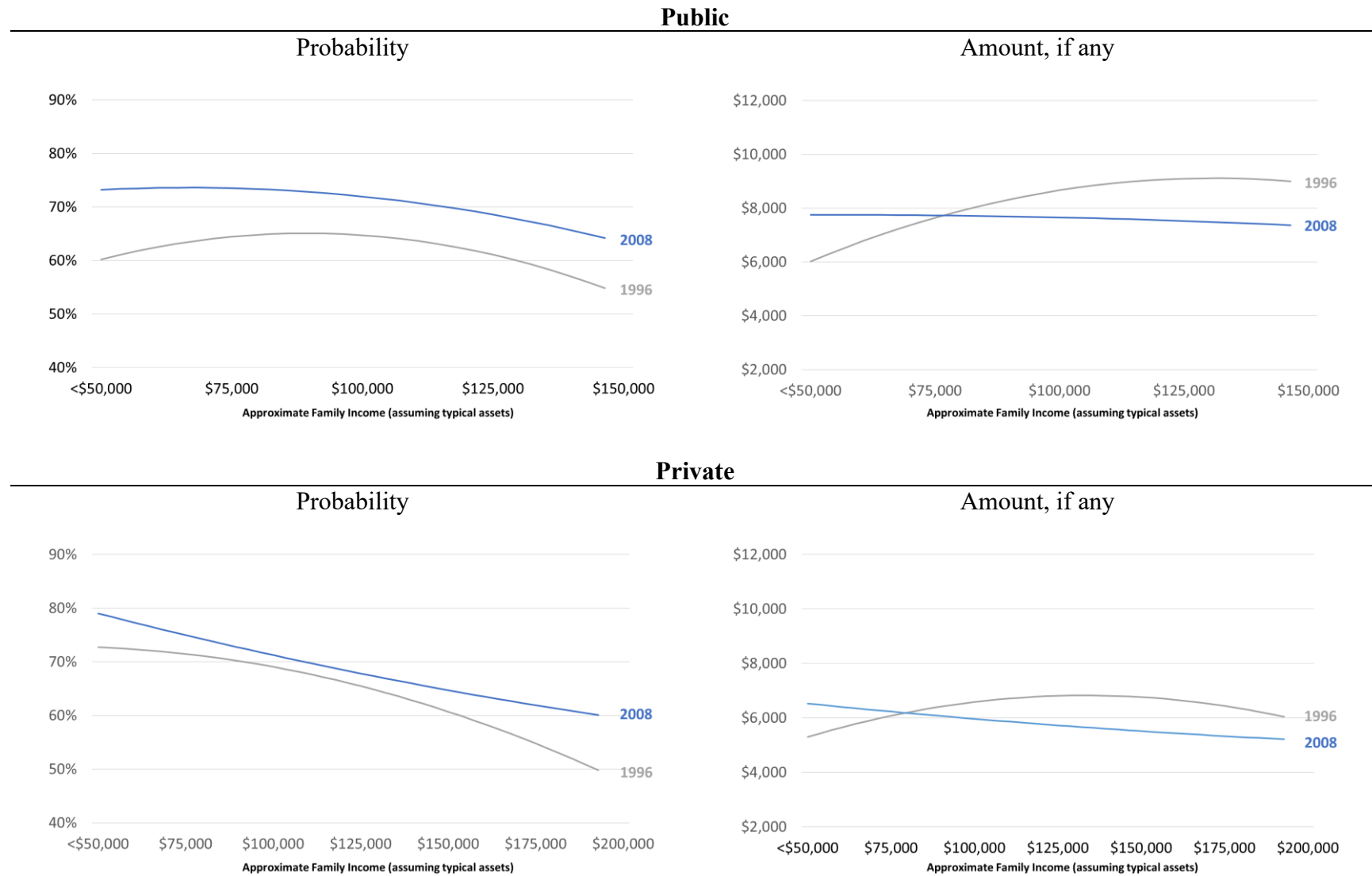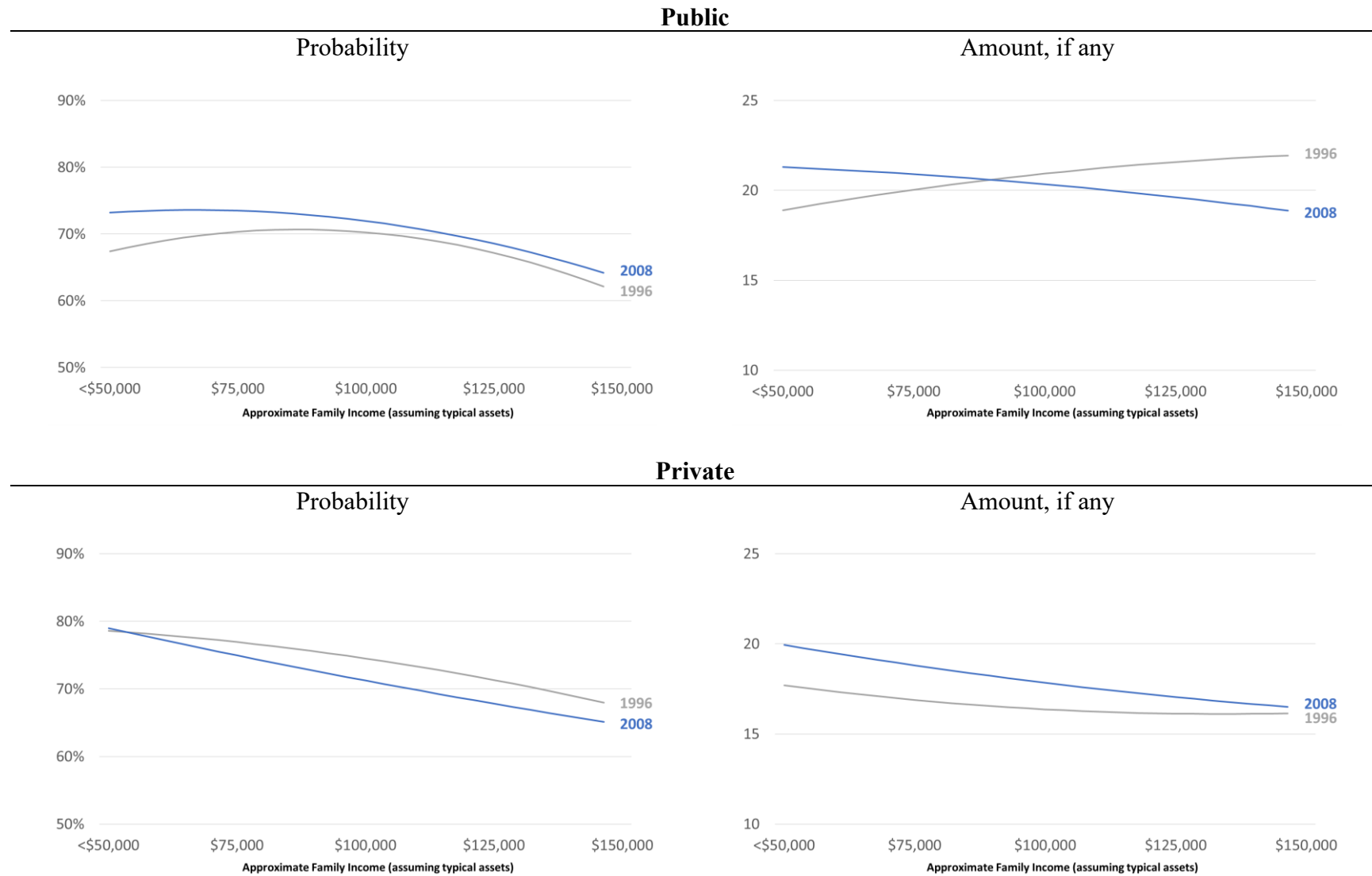Approximate Family Income (assuming typical assets)

Source: Previously unpublished tabulations based on the U.S. Department of Education, National Center for Education Statistics, 1995-1996, 2007-2008, and 2019-2020 National Postsecondary Student Aid Study. *Notes:* See notes to Appendix Figure 1.

Appendix Figure 4: Student earnings—probability and amount, if any

Public

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

Approximate Family Income (assuming typical assets)

Private

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

Approximate Family Income (assuming typical assets)

Source: Previously unpublished tabulations based on the U.S. Department of Education, National Center for Education Statistics, 1995-1996, 2007-2008, and 2019-2020 National Postsecondary Student Aid Study. *Notes:* See notes to Appendix Figure 1.

Appendix Figure 5: Student employment (weekly hours worked)—probability and amount, if any

Public

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

Approximate Family Income (assuming typical assets)

Private

Probability

Approximate Family Income (assuming typical assets)

Amount, if any

Approximate Family Income (assuming typical assets)

Source: Previously unpublished tabulations based on the U.S. Department of Education, National Center for Education Statistics, 1995-1996, 2007-2008, and 2019-2020 National Postsecondary Student Aid Study. *Notes:* See notes to Appendix Figure 1.