

SPOTLIGHT ON:

**Liquid Assets,
Financial Shocks,
and Entrances into
Material Hardship**

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Introduction

While a substantial share of New Yorkers face persistent material hardship year over year, for many, experiences of hardship are periodic. Poverty Tracker data shows that over a two-year period, half of New Yorkers will experience hardship in at least one year. Of those New Yorkers who face hardship in at least one year, more than half will not face hardship in both years, instead either entering or exiting hardship from one year to the next.¹ **Given these fluid experiences, this report explores which events and circumstances push New York families into hardship and whether assets may prevent a slide into hardship.** Understanding the answers to these questions can help inform policymakers who aim to increase economic security and stability for individuals, families, and communities.

Previous research demonstrates the link between financial shocks (e.g., job losses, decreases in income, child births) and entrances into poverty and hardship.² The Consumer Financial Protection Bureau links shock-related expenses (like car or home repairs) and income disruptions (like job losses) to decreases in financial well-being.³ Poverty Tracker data similarly show that events like enduring major unanticipated expenses, having a child, ending a relationship, and losing a job are associated with a higher probability of entry into poverty and material hardship in New York City.⁴ Such events can be very costly, especially for those with limited savings or who are living paycheck to paycheck. Ensuring that families have access to ready sources of cash may be one way to guard against periods of hardship after a financial shock.

In this report, we define a financial shock as someone in the household experiencing a major unanticipated expense, major decrease in income, job loss, or loss in public benefits, or if the respondent or their partner had a child. While many may not think of having a child as a financial shock, given the expenses associated with having and raising a child, including both expected and unexpected expenses, we include it in our measure.

Policies that provide income supports help individuals and families get by during periods when they experience financial shocks and can play a large role in preventing entries into hardship. For example, in the early days of the COVID-19 pandemic, unemployment benefits and stimulus checks kept nearly 2 million New Yorkers out of

¹ Wimer et al., “Dynamics of disadvantage in New York City.”

² Ruggles and Williams, “Transitions in and out of poverty: New data from the Survey of Income and Program Participation”; Bane and Ellwood, “Slipping into and out of poverty: The dynamics of spells”; McKernan and Ratcliff, “Events that trigger poverty entries and exits.”

³ Bufo et al., “Financial shocks and financial well-being: What builds resiliency in lower-income households?”

⁴ Collyer et al., “The state of poverty and disadvantage in New York City.”

poverty.⁵ The since-expired expanded Child Tax Credit temporarily kept millions of children across the country out of poverty in 2021,⁶ helping families to make ends meet.⁷ **While income is one way to mitigate the impact of financial shocks on economic well-being,⁸ financial assets such as savings and investments also likely buffer the impacts of such shocks—but researchers have not fully investigated this relationship.⁹**

A great deal of research on assets cites the significant share of the population who cannot afford a \$400 or \$1,000 emergency expense.¹⁰ In New York City, results from a 2019 Poverty Tracker report showed that 45% of New Yorkers could not cover a \$400 expense with cash.¹¹ While research has examined the likelihood of entering hardship at different asset levels, little work has been done to investigate the relationship between entering hardship along a continuous asset measure. And regarding the often-cited data point of who has access to savings of \$400 or \$1,000, previous studies have not answered the question of if, and to what degree, such levels of assets are actually protective against entrances into material hardship in the event of an adverse financial shock.

Are those with \$400 or \$1,000 in assets less likely to enter hardship after experiencing a shock compared to those with lower asset levels? Are there other asset levels associated with decreases in the likelihood of entering hardship in the face of a shock? What types of hardship are people most likely to enter in the face of a shock, and how does that change as assets increase? These are the questions we aim to answer.

In this report, we focus on working-age adults (age 18 to 64) in New York City. We focus on this population because changes in income and work among the retired population are often the result of planned retirement supported by programs like Social Security and pension plans, as well as assets accumulated throughout an individual's working career. Alternatively, shocks to income and job loss among the working-age population are often unexpected and come at a time when individuals and families do not have access to adequate savings.

⁵ Poverty Tracker Research Group at Columbia University, "The state of poverty and disadvantage in New York City: Volume 4."

⁶ Parolin et al., "Monthly poverty rates among children after the expansion of the Child Tax Credit"; Parolin et al., "Sixth Child Tax Credit payment kept 3.7 million children out of poverty in December."

⁷ Lens et al., "Spotlight on: Direct cash benefits during the pandemic."

⁸ Bufe et al., "Financial shocks and financial well-being: What builds resiliency in lower-income households?"

⁹ Ibid.

¹⁰ Federal Reserve, "Economic well-being of U.S. households in 2020."

¹¹ Cargill, Maury, and Wimer, "Spotlight on emergency expenses on the precipice: An analysis of the vulnerability of New Yorkers to financial shocks."

Key findings



Working-age New Yorkers who experience a financial shock face an elevated risk of entering material hardship.

Among working-age New Yorkers initially not facing material hardship, those who experience a financial shock are more than **twice as likely** to enter hardship compared to those who do not experience such a shock. While **10%** of those who do not face a shock enter material hardship in a typical year, this rate rises to **24%** among those who face at least one shock.

Working-age New Yorkers who experience a cut or loss in benefits or job loss are more than **three times as likely** to be pushed into material hardship compared to those who don't experience any shocks (approximately **35% vs. 10%**).



The likelihood of falling into hardship after **experiencing a financial shock** is highest for working-age New Yorkers without any liquid assets.¹²



However, the risk of entering hardship falls as liquid assets rise: Working-age New Yorkers with **\$2,000 in assets** are significantly less likely to fall into hardship after experiencing a shock than those with **\$0** in liquid assets.



When assets rise above the **\$2,000** level, the risk of falling into hardship after a shock levels off and is roughly the same when comparing those with **\$2,000** and **\$3,000** in liquid assets.

The likelihood of entering hardship among working-age New Yorkers who do not experience a financial shock is relatively consistent as assets rise.

The likelihood of entering financial, billing, food, and housing hardships after a financial shock drops as assets rise, but the likelihood of entering medical hardship is more consistent across asset levels.



Compared to working-age New Yorkers with **\$0** in liquid assets, those with **\$2,000** are **40%** less likely to enter most forms of hardship after a financial shock. The risk of entering medical hardship, however, is only **8%** lower.

THESE FINDINGS SUGGEST THAT HAVING **\$2,000 IN LIQUID ASSETS** PROVIDES A STRONG BUFFER AGAINST ADDED HARDSHIPS AFTER A FINANCIAL SHOCK. BUT ACCESS TO SUCH ASSETS ARE LIMITED AMONG NEW YORKERS – ONLY 55% OF ADULTS CAN COVER A **\$400** EXPENSE WITH CASH ON HAND – UNDERSCORING THE IMPORTANCE OF POLICIES THAT BUILD LIQUID ASSETS.



¹² The predicted likelihood of entering material hardship includes controls for income and other measures (see Figure A2 for other variables included). Thus, these estimates account for differences in income at different asset levels.

The Poverty Tracker

Launched in 2012, the Poverty Tracker surveys a representative sample of New Yorkers every three months, providing critical information on the dynamics of poverty and other forms of disadvantage in the city. Unlike other surveys, the Poverty Tracker explores how New Yorkers experience poverty and material hardship over time, rather than in a single day, month, or year. The Poverty Tracker follows the same households by contacting an adult in each household via online, phone, and paper surveys every three months, allowing us to build a better understanding of New Yorkers' actual lives. In addition, the Poverty Tracker focuses on more than just income poverty; we also collect data on other core measures of disadvantage, such as material hardships and health problems. We use these alternative measures to understand how certain disadvantages, or multiple, overlapping disadvantages, make it harder for New Yorkers to survive. The Poverty Tracker also collects data on other aspects related to New Yorkers' well-being, from asset and debt accumulation, to social service program utilization, to spending and consumption patterns, in order to form a better understanding of how New Yorkers make decisions about their own lives.

About our approach:

This report examines the relationship between liquid financial assets, adverse financial events (shocks), and entrances into material hardship. We shed light on whether assets are protective against the consequences of financial shocks, specifically entrances into material hardship.

Below, we explain the key measures of material hardship, financial shocks, and liquid assets focused on in this report.¹³

Measures of Material Hardship: Food, Housing, Bills, Financial, and Medical Hardship

The Poverty Tracker measures material hardship in five domains: **food, housing, bills, general financial hardship, and medical care** (see definitions below). New Yorkers who face one or more of these forms of material hardship in a year are identified as having faced material hardship.



SEVERE FOOD HARDSHIP

Running out of food or often worrying that food would run out without enough money to buy more.



SEVERE HOUSING HARDSHIP

Having to stay in a shelter or other place not meant for regular housing, or having to move in with others due to cost.



SEVERE BILLS HARDSHIP

Having utilities cut off due to lack of money.



SEVERE FINANCIAL HARDSHIP

Often running out of money between paychecks or pay cycles.



MEDICAL HARDSHIP

Not being able to see a medical professional due to cost.

¹³ Respondents are asked whether they faced any of these hardships in the past 12 months.

Measuring financial shocks:

The Poverty Tracker surveys ask respondents quarterly if they experienced any of a handful of financial shocks. The question reads, “Please tell me which of the following, if any, have happened in the past 3 months.” We limit our analysis to the following shocks that indicate either a decrease in income or an expense:

- SOMEONE IN THE HOUSEHOLD EXPERIENCED AN UNANTICIPATED MAJOR EXPENSE
- SOMEONE IN THE HOUSEHOLD EXPERIENCED A MAJOR DECREASE IN INCOME
- SOMEONE IN THE HOUSEHOLD EXPERIENCED A JOB LOSS
- SOMEONE IN THE HOUSEHOLD EXPERIENCED HAVING PUBLIC BENEFITS CUT OFF
- THE RESPONDENT (OR THEIR SPOUSE OR PARTNER) HAD A CHILD

In the following analysis, respondents are considered to have faced a financial shock if they experienced one of these events at least once over a 12-month period.¹⁴ We include having a child as a shock given the costs associated with childbirth and the decision parents face to either stay home with their newborn or to work and pay for childcare. We have also seen in previous Poverty Tracker reports and other research studies that the birth of a child is associated with entrances into poverty.¹⁵ Throughout this report we refer to such events as “shocks.”

Measuring liquid assets:

Because we are interested in how financial assets protect against the consequences of events that increase expenses or decrease income, we focus on liquid assets (checking accounts, stocks, etc.), which are more easily accessible than non-liquid assets (homes, cars, etc.). We define liquid assets using the following sources asked about in the Poverty Tracker:

The total dollar value of:

- CHECKING OR SAVINGS ACCOUNTS
- TREASURY BILLS
- CORPORATE MUNICIPAL GOVERNMENT OR FOREIGN BONDS, OR BOND FUNDS
- CDS OR MONEY MARKET FUNDS
- CASHABLE LIFE INSURANCE POLICIES
- STOCK OR MUTUAL FUNDS
- OTHER ASSETS

¹⁴ If a respondent reported a shock in any survey wave, they are recorded as having experienced that shock. If they are missing from any wave and have not reported a shock, they are recorded as missing for that shock.

¹⁵ Collyer et al., “The state of poverty and disadvantage in New York City.” Hamilton et al., “Experiences of poverty around the time of a birth: A research note. Hamilton et al., “Experiences of poverty around the time of a birth: A research note.”

The Poverty Tracker module on assets and debts is asked in the third and ninth follow-up surveys. If a respondent provided information on assets at multiple time points, those reported closest to the outcome were used. Throughout this report, we refer to liquid assets as “assets.”

Data and methods

The following analysis uses Poverty Tracker samples from 2012, 2015, and 2017.¹⁶ We start by examining the likelihood of entering material hardship in the year when a respondent experienced a shock. We next look at the likelihood of entering hardship at various asset levels, overall and broken out by experience of a shock. We also look at entrances into individual domains of hardship, including financial, medical, billing, food, and housing hardship. We use a set of advanced statistical models to estimate the likelihood of entering hardship (among those who begin without experiencing hardship) across a continuous distribution of liquid assets.¹⁷ These models include controls for some of the strongest predictors of entrances into material hardship, including an income-to-needs ratio (using income and thresholds as defined under the Supplemental Poverty Measure (SPM)), foreign-born status, and race/ethnicity. Thus, estimates of entrances into material hardship by experiences of financial shocks and asset levels are independent of income, for example.

¹⁶ We start with a total sample of $n = 9,892$; 2012 ($n = 2,076$), 2015 ($n = 6,788$), and 2017 ($n = 1,028$). This sample is larger than the total combined Poverty Tracker datasets (total, $n = 7,047$; 2012, $n = 2,286$; 2015, $n = 3,908$; 2017, $n = 853$) because we stack multiple years of data to increase the size and analytic power of the sample. This means some individuals are included in the dataset multiple times using information from different time points.

¹⁷ To predict entries into hardship, we use random forest models, which involve running iterative models, called decision trees, to allocate the contributions of the predictors without making assumptions about the data or its distribution. These models produce an average predicted value of entering hardship for each respondent in the data. Random forest models have been identified as particularly useful in getting more accurate and stable prediction. Once we have predicted values for each respondent, we use localized regression models, which allow us to predict entrances into hardship along a continuous asset measure by including cases around the point of interest, weighting data nearest to the point of interest higher. This method allows us to observe specific points (across asset levels) where the likelihood of entering hardship changes. See more discussion on these models in the Appendix.

Results

The risk of entering material hardship is elevated for New Yorkers after they face a financial shock.

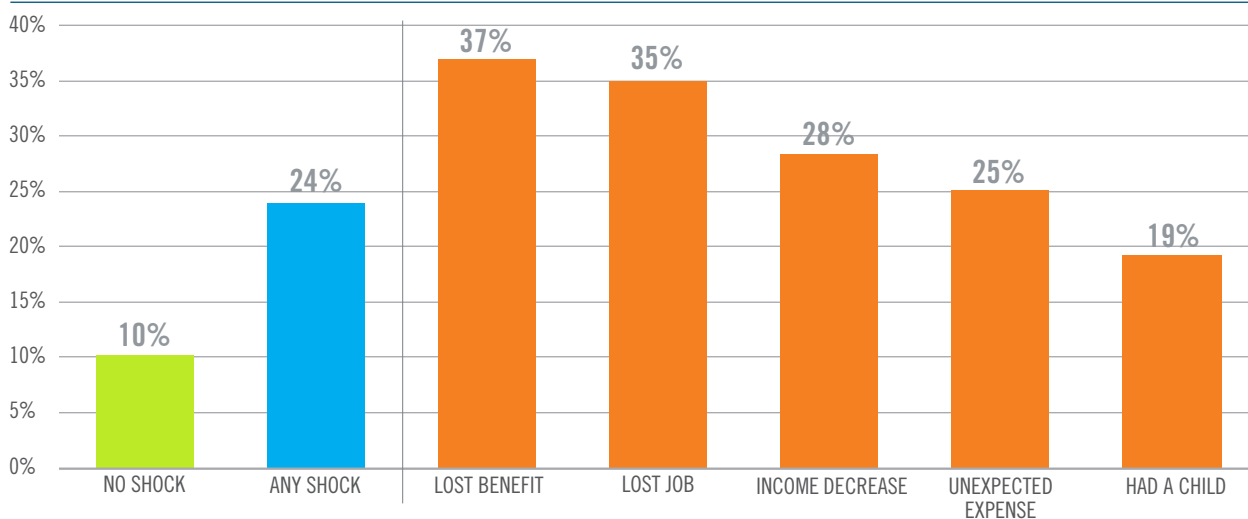
Among those initially not facing material hardship, working-age New Yorkers who experience a financial shock are more than twice as likely to enter hardship compared to those who do not experience such a shock. While 10% of those who do not face a shock enter material hardship in a typical year, this rate rises to 24% among those who face at least one shock.

Those who experience a cut or loss in benefits (37%) or job loss (35%) are more than three times as likely to be pushed into material hardship as those who don't experience any shocks (10%).

The first question we answer is: Are New Yorkers who experience a financial shock more likely to fall into hardship compared to those who do not experience such a shock? The answer, unsurprisingly, is yes. Figure 1 shows that, among those not already in material hardship, New Yorkers who experience a financial shock are more than twice as likely to enter hardship in the year they experience that shock than those who do not experience such a shock (24% vs. 10%).¹⁸ We find similarly higher rates of entering hardship among those who experience a major unanticipated expense (25%), a major income decrease (28%), a loss of public benefits (37%), or a job loss (35%).¹⁹ These findings confirm what we have seen in other research where shocks to income and expenses are correlated with decreases in economic well-being.

Figure 1

Share of New Yorkers who enter material hardship by financial shock type (among those 18–64 years old)



Source: Poverty Tracker respondents who were not in material hardship in year one using the first (2012), second (2015), and third (2017) Poverty Tracker cohorts. For any shock $n = 2,851$, major unexpected expense $n = 1,853$, major income decrease $n = 1,248$, lost benefit $n = 533$, job loss $n = 570$, and birth of a child $n = 270$.

¹⁸ We note that we do not know if the shock or entrance into hardship occurred first. While our framework implies that shocks are driving entrances into hardship, it is also possible that entrances into hardship pre-date shocks.

¹⁹ The likelihood of entering hardship after any shock is not the average of each individual shock because the various shocks occur at different rates. For example, an unexpected expense is much more common than a lost benefit or job, thus bringing down the combined any shock rate.

The likelihood of falling into hardship **after experiencing a financial shock** is highest for working-age New Yorkers without any liquid assets.²⁰

However, the risk of entering hardship falls as liquid assets rise: Working-age New Yorkers with \$2,000 in assets are significantly less likely to fall into hardship after experiencing a shock than those with \$0 in liquid assets.

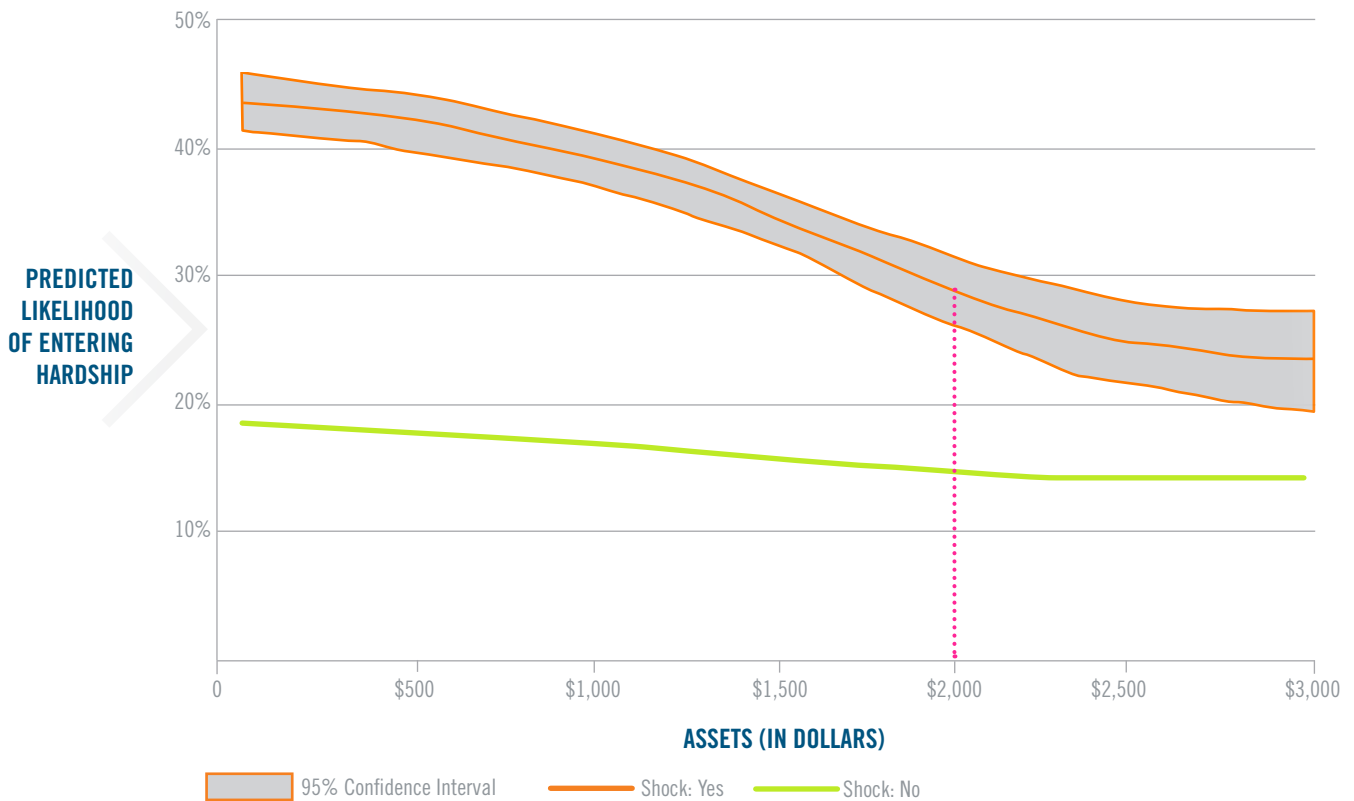
When assets rise above the \$2,000 level, the risk of falling into hardship after a shock levels off and is roughly the same when comparing those with \$2,000 and \$3,000 in liquid assets.

Figure 2 shows the likelihood of entering hardship by asset level among those who experience a financial shock versus those who did not experience such a shock. We include those who do not face a shock as a comparison group, providing a sense of how much the increased likelihood of entering hardship, among those with lower asset levels, is driven by experiences of financial shocks (compared to those who do not experience financial shocks).²¹

Figure 2



Predicted likelihood of entering material hardship by experience of a financial shock and continuous liquid asset measure (among New Yorkers 18–64 years old)



Source: Poverty Tracker respondents who were not in material hardship in year one ($n = 1,988$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Predictions are calculated from random forest models that are smoothed using kernel-weighted local polynomial regressions.

²⁰ The predicted likelihood of entering material hardship includes controls for income and other measures (see Figure A2 for other variables included). Thus, these estimates account for differences in income at different asset levels.

²¹ See Figure A3 in the Appendix, which shows the likelihood of entering hardship overall (among those who do and do not experience a shock) for those with assets up to \$3,000.

One question that readers may have is why those not experiencing a financial shock are entering hardship at all. It is important to note that inclusion in the “no shock” group does not indicate a lack of adverse financial events but rather that those New Yorkers did not experience one of the major financial shocks that we identified as closely related to entrances into hardship. It is likely that these New Yorkers are facing other events not included in our measure that are driving them into hardship. We expect these shocks to be less severe than the financial shocks we examine, as evidenced by lower rates of entering hardship among the “no shock” group. These events might include increases in expenses as a result of inflation, a death in the family, or individuals with low earnings moving into the household. If we believe that shocks are a driver of entrances into hardship, and that assets mitigate the impact of shocks, ***we expect that the probability of entering hardship will be higher among those who experience a shock and will drop (relative to those who do not experience a shock) as assets increase.*** We find just this.


In Figure 2 we see that among those who experience a shock, the likelihood of entering hardship drops as assets increase to about \$2,000. Alternatively, among those who do not experience a shock, the likelihood of entering hardship does not drop dramatically as assets rise to \$2,000. This provides evidence that the drop in the likelihood of entering hardship as assets rise is driven by those experiencing a shock. The fact that the likelihood of entering hardship drops sharply as assets rise to \$2,000, moving closer to the group who did not experience a shock, provides evidence that each dollar up to \$2,000 may decrease the impact of such events on an individual’s likelihood of entering material hardship.

The likelihood of entering financial, billing, food, and housing hardships after a financial shock drops as assets rise, but the likelihood of entering medical hardship is more consistent across asset levels.

This leads us to another question: Do assets appear to protect people from falling into all forms of material hardship after a shock or just some forms of hardship? In Figures 3.1–3.5, we examine the likelihood of entering each hardship type by experience of a shock and asset level. Comparing Figures 3.1, 3.2, 3.3, and 3.4, we see that the largest decrease (as assets rise to \$2,000) is in entrances into financial hardship but that similar drops exist in entrances into billing, food, and housing hardships. These results are similar to Figure 2 in that they show decreases in entrances into material hardship as assets rise to about \$2,000.

Compared to working-age New Yorkers with \$0 in liquid assets, those with \$2,000 are 40% less likely to enter most forms of hardship after a financial shock. The risk of entering medical hardship, however, is only 8% lower.

Figure 3.1

 Predicted likelihood of entering **financial** hardship by experience of a financial shock and liquid assets (New Yorkers 18–64 years old)

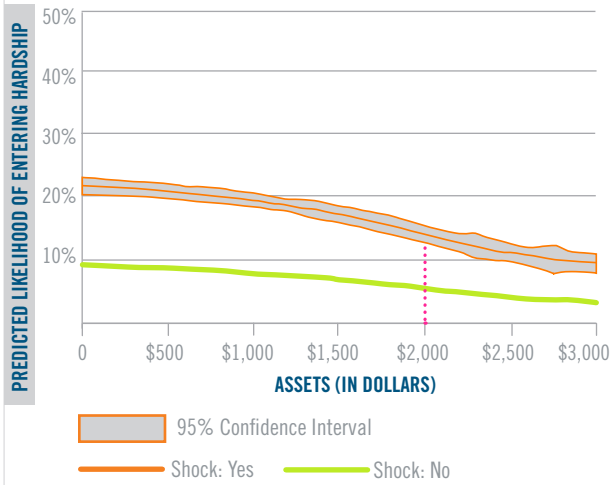

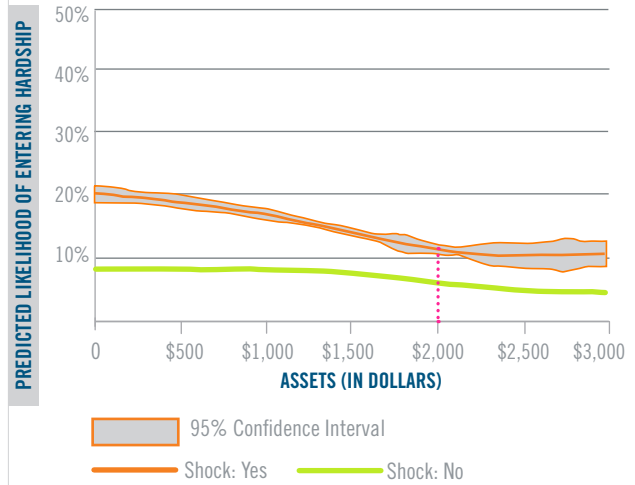



Figure 3.2

 Predicted likelihood of entering **billing** hardship by experience of a financial shock and liquid assets (New Yorkers 18–64 years old)



Source: Poverty Tracker respondents who were not in material hardship in year one ($n = 1,988$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Predictions are calculated from random forest models that are smoothed using kernel-weighted local polynomial regressions.

Figure 3.3

 Predicted likelihood of entering **food** hardship by experience of a financial shock and liquid assets (New Yorkers 18–64 years old)

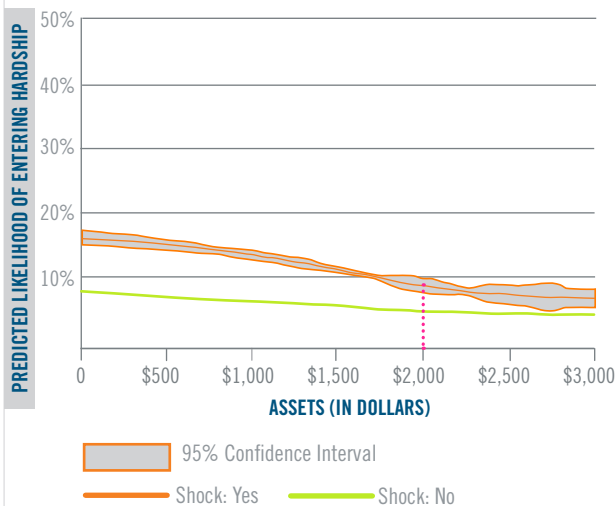

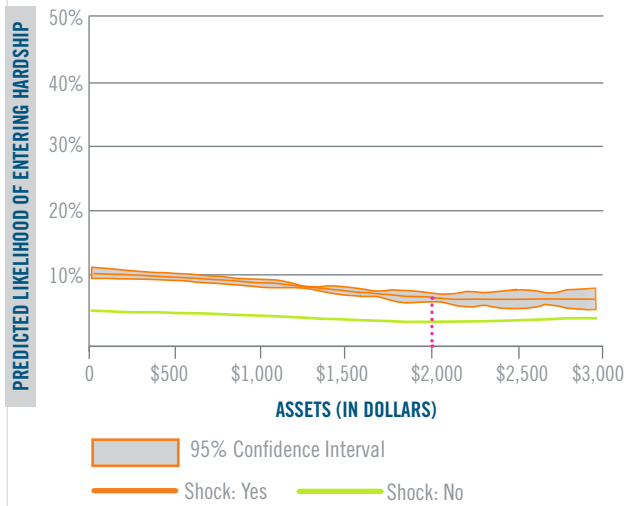


Figure 3.4

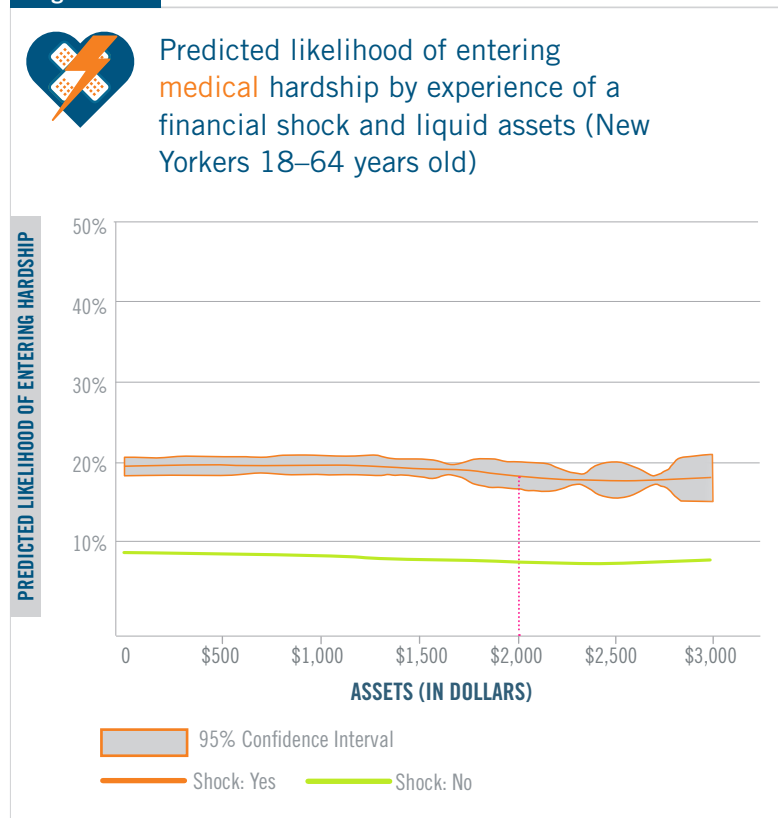
 Predicted likelihood of entering **housing** hardship by experience of a financial shock and liquid assets (New Yorkers 18–64 years old)



Source: Poverty Tracker respondents who were not in food hardship (Figure 3.3; $n = 3,557$) or billing hardship (Figure 3.4; $n = 3,960$) in year one. First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Predictions are calculated from random forest models that are smoothed using kernel-weighted local polynomial regressions.

Alternatively, in Figure 3.5, we see that the likelihood of entering medical hardship in the wake of a shock does not drop much as assets rise to \$2,000. While the likelihood of entering hardship between those with \$0 and \$2,000 in assets drops by about 40% or more for other the hardship types, it only drops by 8% for medical hardship. Thus, it seems likely that while having \$2,000 in savings protects against entrances into other forms of hardship, it does little to protect against entrances into medical hardship. This could be the result of high-cost medical procedures that even \$2,000 in assets cannot cover. In addition to being costlier than other expenses, high medical expenses may be a sign of health issues that impact an individual’s ability to work, threatening their earnings, savings, and insurance coverage.

Figure 3.5



Source: Poverty Tracker respondents who were not in medical hardship in year one ($n = 3,385$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Predictions are calculated from random forest models that are smoothed using kernel-weighted local polynomial regressions.

Conclusion

Since the beginning of the COVID-19 pandemic, we have seen the immense role income support programs like expanded unemployment benefits, tax credits, and stimulus payments have played in reducing financial hardship for New Yorkers amid high unemployment and rising costs of housing, food, and childcare. While income certainly helps protect against financial hardship and shocks, this report explores how liquid financial assets protect against entrances into material hardship.

We examined the increased likelihood of entering material hardship after facing financial shocks, such as major unanticipated expenses, decreases in income, or lost benefits. Such shocks may include events like costly medical procedures, deaths, or damages to property. We see that in the wake of a shock, the likelihood of entering material hardship is lower for those with higher levels of liquid assets. Earlier in the report we mentioned a commonly cited number from the Federal Reserve regarding the share of people who would be able to access \$400 or \$1,000 for an emergency expense. We found that among those with less than \$3,000 in assets, the likelihood of entering material hardship drops sharply until about \$2,000 before plateauing. Our results indicate that those with \$400 are less likely to enter hardship than those with \$0, and those with \$1,000 are less likely to enter hardship than those with \$400. Still, it is not until about \$2,000 that the likelihood of entering hardship levels off.

When looking at entrances into different forms of hardship, we found a similar pattern with respect to financial, billing, food, and housing hardships: the likelihood of entering hardship among those experiencing a shock drops as assets increase. Alternatively, we found little evidence that assets protect against entrances into medical hardship in the face of a shock. This may be because unexpected expenses and income losses as a result of medical issues are more costly than other shocks, making those with more than \$2,000 in assets vulnerable to related expenses and work disruptions.

While this research sheds light on the relationship between liquid assets, financial shocks, and economic well-being, it also highlights areas for future research. More work should be done to identify the specific types of shocks faced, the associated costs, and their relationship to financial hardship. What are the most common types of unexpected expenses and how much do they cost families and individuals? Do different communities experience different expenses? While we might expect older New Yorkers to have more expenses related to health, we might expect younger New Yorkers to have more expenses related to rising rents. Similarly, in which industries and among which communities are decreases in income most common? What types of income and how much income is being lost? What role does debt have in keeping families afloat and, alternatively, in raising their monthly expenses? These are all questions future research should address to expand our understanding of how such events impact economic well-being.

Given the role of income, assets, and financial support in mitigating the impact of financial shocks on economic well-being, policymakers should consider policies that lower the vulnerability of New Yorkers to financial shocks. Such policies include those that increase wages so families can save more; allowing those using public benefits to build up savings; expanding access to emergency funds through government programs, grants, and no-interest loans; and providing support to those who want to obtain education or training that increase earnings.

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Appendix

Random forest

To create a smoothed curve that shows the likelihood of entering hardship along a continuous line, we first use a machine learning technique called a random forest²² to assign predicted probabilities of entering hardship for each respondent. Random forest combines results from numerous decision trees (in our case 500 decision trees) to estimate a single average result. This method allows the model to select and assign importance to controls. While such methods are not useful for determining causality, they have been shown to perform well for prediction purposes.

In the figures below, we highlight descriptive statistics of the variables used to train the random forest model (Table A1) and supplementary figures produced as part of the random forest model (Figures A1 and A2). In Figure A1, we present the out of bag error and validation error broken out by the number of iterations.²³ These measures indicate the error embedded in the model (as we increase the number of iterations) compared to the root-mean-square error (RMSE). As we see the error terms level off as the number of iterations increase above 100, we can feel confident that our specification of 500 iterations is sufficient in reducing error. In Figure A2, we present the relative importance of the controls included. While these do not indicate causality, due to issues of collinearity, they do show which measures were deemed the most important in calculating predictions. We see that the experience of a shock was the most important indicator included in the model.²⁴

Kernel-weighted localized polynomial regression model

We then use kernel-weighted localized polynomial regression models²⁵ to create smoothed curves where the likelihood of entering hardship at each point is calculated using information from those with similar asset levels.²⁶ We create these figures overall, broken out by the experience of a shock, and among each individual hardship type.

²² Yiu, "Understanding random forest."

²³ These figures were produced using Stata 17. See Schonlau and Zou, "The random forest algorithm for statistical learning" for a description of the *rforest* package used to run random forest models in Stata.

²⁴ *Ibid.* Variable importance is calculated by adding up the improvement in the objective function given in the splitting criterion over all internal nodes of a tree and across all trees in the forest, separately for each predictor variable. In the Stata implementation of random forest, the variable importance score is normalized by dividing all scores over the maximum score: The importance of the most importance variable is always 100%.

²⁵ Local polynomial regression models are used to create smoothed curves along a scatter plot.

²⁶ We use bandwidths of \$750 where cases closest to the point of interest are weighted most heavily using a Gaussian distribution.

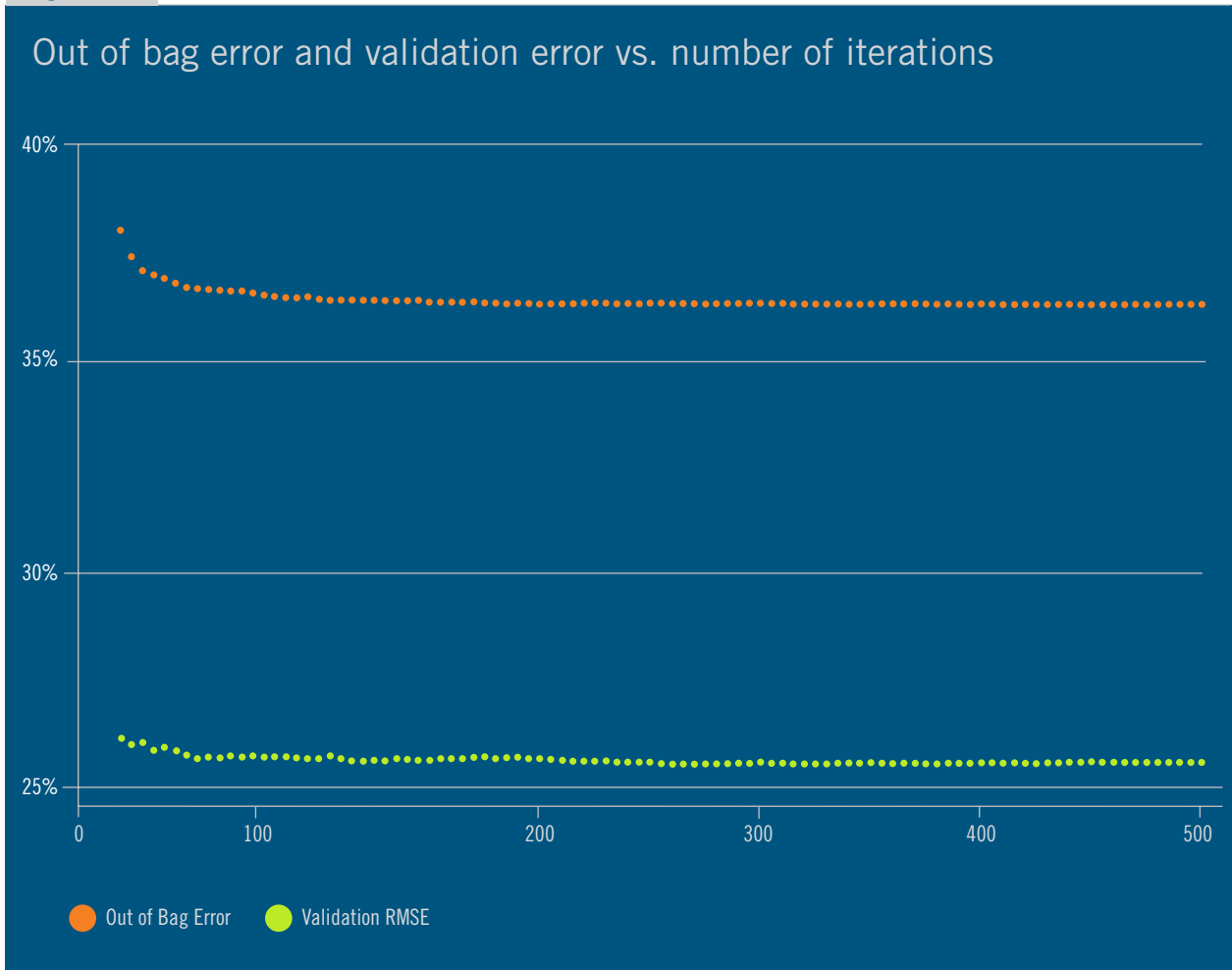
Table A1

Descriptive statistics of variables used to train the random forest

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
Severe material hardship	5,912	0.17	0.38	0.00	1.00
Liquid assets	5,912	3.75e+06	2.60e+08	0.00	2.00e+10
Sex/gender: Female	5,912	0.58	0.49	0.00	1.00
Age	5,912	43.06	13.51	18.00	64.00
Number of children in household	5,912	0.67	1.07	0.00	8.00
Number of adults in household	5,912	2.13	1.03	1.00	8.00
Presence of a spouse/partner	5,912	0.44	0.50	0.00	1.00
Race/ethnicity: White non-Latino	5,912	0.40	0.49	0.00	1.00
Race/ethnicity: Black non-Latino	5,912	0.24	0.42	0.00	1.00
Race/ethnicity: Other or multi-racial non-Latino	5,912	0.11	0.31	0.00	1.00
Race/ethnicity: Latino	5,912	0.25	0.44	0.00	1.00
Education: Less than a high school degree	5,912	0.08	0.27	0.00	1.00
Education: High school degree or GED	5,912	0.17	0.37	0.00	1.00
Education: Some college or associate's degree	5,912	0.21	0.41	0.00	1.00
Education: Bachelor's degree or more	5,912	0.54	0.50	0.00	1.00
Foreign-born status	5,912	0.31	0.46	0.00	1.00
Debts	5,912	96151.99	633286.58	0.00	4.51e+07
SPM income-to-needs ratio	5,912	16.07	561.47	0.00	24931.96

Source: Poverty Tracker respondents who were 18–64 years old and not in material hardship in year one ($n = 5,912$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Sex/gender is a binary variable where 0 indicates male and 1 indicates female. Presence of a spouse/partner is a binary variable where 0 indicates no spouse/partner in the household and 1 indicates the presence of a spouse/partner. Foreign-born status is a binary variable where 0 indicates the respondent is U.S.-born and 1 indicates the respondent is foreign-born. SPM income-to-needs ratio is a continuous measure ranging from indicating the ratio of income to needs using SPM specifications. Debts is a continuous measure that indicates the dollar value of debts held.

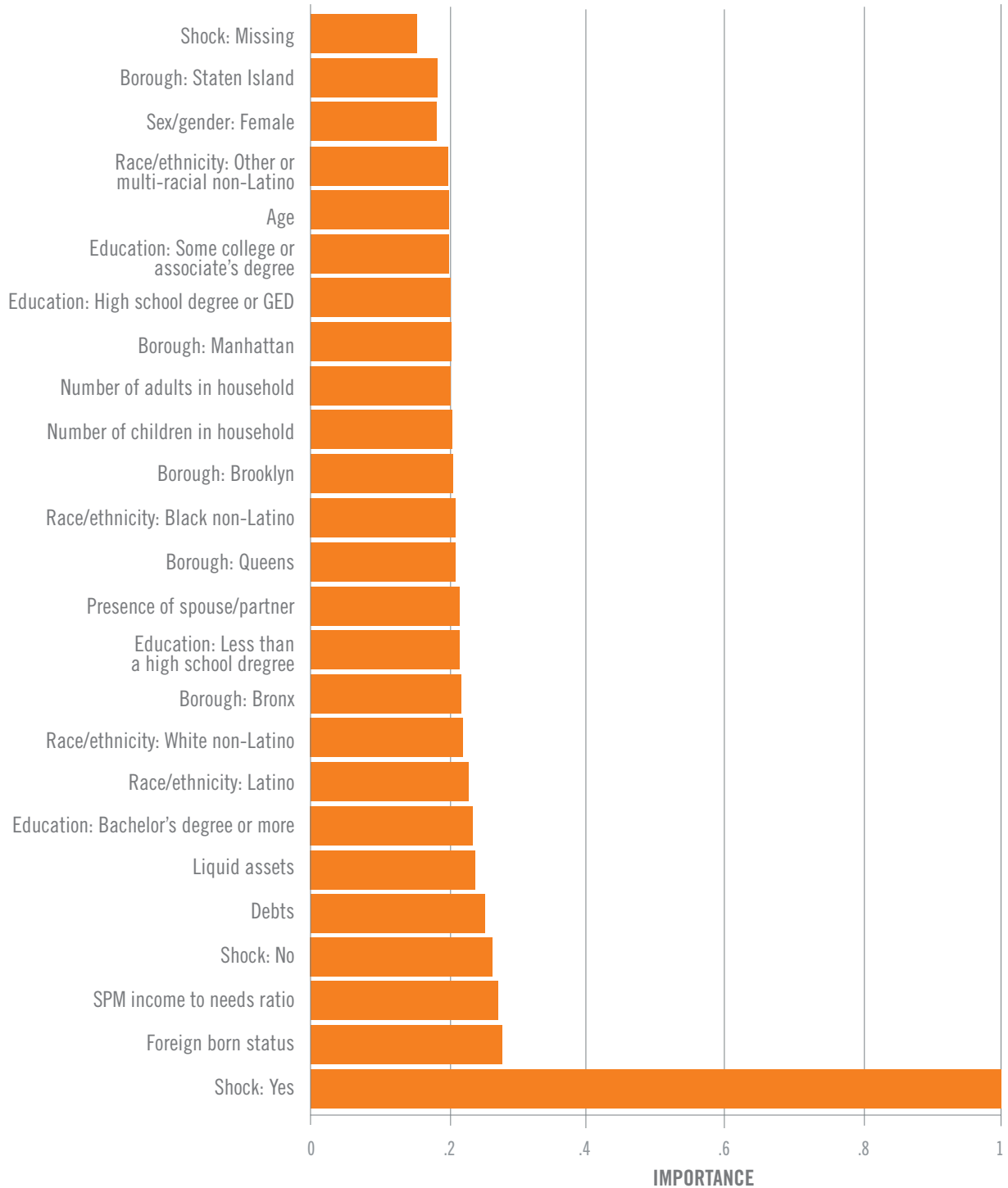
Figure A1



Source: Poverty Tracker respondents who were 18–64 years old and not in material hardship in year one ($n = 5,912$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts.

Figure A2

Variable importance plot from random forest model

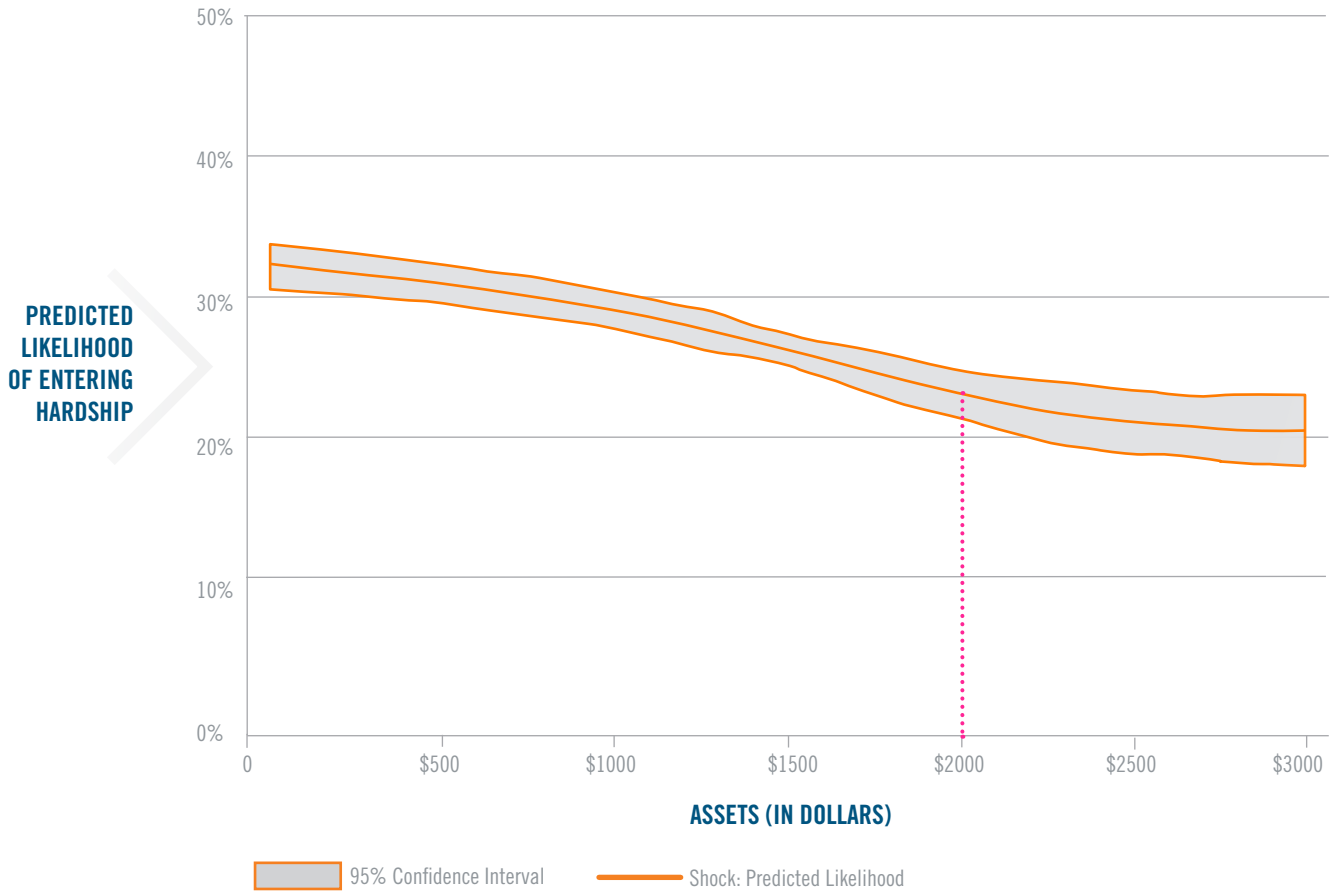


Source: Poverty Tracker respondents who were 18–64 years old and not in material hardship in year one ($n = 5,912$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. From Stata rforest documentation: Variable importance is calculated by adding up the improvement in the objective function given in the splitting criterion over all internal nodes of a tree and across all trees in the forest, separately for each predictor variable. In the Stata implementation of random forest, the variable importance score is normalized by dividing all scores over the maximum score: The importance of the most important variable is always 100%.

Figure A3



Predicted likelihood of entering material hardship by continuous liquid asset measure (among New Yorkers 18–64 years old)



Source: Poverty Tracker respondents who were not in material hardship in year one ($n = 2,655$). First (2012), second (2015), and third (2017) Poverty Tracker cohorts. Predictions are calculated from random forest models that are smoothed using kernel-weighted local polynomial regressions.