**The consequences of parents’ unemployment on investments in children’s education in Brazil**

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Abstract

This paper investigates whether parents’ entry into unemployment affects investment in children’s education through their decision to provide public or private education for their children. The empirical approach makes use of longitudinal data from the Continuous National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios Contínua* – PNAD contínua) and propensity-score matching with difference-in-difference methods. According to estimates, parents’ unemployment reduces the probability of children’s enrollment in the private educational system, which usually has better quality but high costs, instead of in the public educational system, which is offered for free but typically has poor quality. Thus, evidence suggests that reductions in household income as a consequence of unemployment can have impacts on the quality of human capital accumulated by children.

JEL: I22; I25; J64.

Keywords: Unemployment; Children’s education.

**1 - Introduction**

A worker’s entry into unemployment usually has many negative consequences for himself or herself and for other individuals in the household. The economic literature has investigated different aspects related to the impacts of unemployment. In addition to the difficulty in finding a new job, especially a full-time job, empirical evidence also reports reductions in labor earnings for those who are re-employed (Farber, 2004, 2017). Another strand of the literature investigates whether spouses and children respond to reductions in household income as a consequence of the household head’s unemployment increasing their labor supply (Lundberg, 1985; Spletzer, 1997).[[1]](#footnote-1) Also, Gruber (1997) shows that unemployment has negative effects on individual consumption and that unemployment insurance helps to smooth these impacts.

Duryea et al. (2007) analyze the effects of economic shocks represented by the household head’s unemployment on children’s labor supply and their education performance in Brazil in the 1980s and 1990s. The results show that an unemployment shock increases the probability of children aged 10-16 years moving into employment and decreases the probability of children being promoted in school. Nowadays, school dropout of children, mainly in basic education, has reached very low levels in Brazil,[[2]](#footnote-2) but the household head’s unemployment can still affect economic resources allocated to children’s education, influencing the processes of human capital accumulation.

The aim of this paper is to investigate to what extent parents’ unemployment could affect investment in children’s education based on parents’ decision for public or private systems of education. Primary education is provided free of charge to children at public schools, which are available all over the country. Although access to public primary education does not seem to be a problem, the quality of education provided by the public system is usually very poor. Private education has much better indicators of quality, but the access is limited by tuition fee costs. Thus, reductions in household income can affect children’s education by changes from private to public schools or by discouraging transitions in the opposite direction.

The empirical analysis herein uses data from the Continuous National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios Contínua* – PNAD contínua), which provides longitudinal information on children and their parents. The empirical approach assesses the probability of enrollment in a private school for children with parents who go from employment to unemployment as compared to children whose parents remain employed. Comparisons are implemented using the propensity-score matching with difference-in-difference method.

Estimates indicate that unemployment shocks, mainly the most intense ones, negatively affect the probability of children’s enrollment in private schools. Shocks represented by two or more quarters of unemployment for the household head in a year or by the entry into unemployment for both the household head and the spouse increase children’s probability of enrollment in a public school, where education is provided for free. However, evidence does not indicate significant effects for less intense unemployment shocks. Therefore, although parents may be reluctant to move their children from one school to another, a reduction in household income seems to contribute to keeping their children away from the better quality private educational system.

This paper is organized as follows. Section 2 presents a brief discussion on public and private primary schools in Brazil, emphasizing the difference in students’ performance in each system, and on whether the quality of school influences parents’ decision about children’s enrollment. Section 3 describes the dataset and Section 4 reports some descriptive statistics. Section 5 briefly describes the propensity-score matching with difference-in-difference method, whereas Section 6 presents the estimation results relating parents’ entry into unemployment to children’s enrollment in either public or private schools. The main conclusions of the paper are discussed in Section 7.

**2 – Public and private education in Brazil**

Basic education in Brazil comprises early childhood education care, primary and secondary education. Primary education is compulsory for children aged 6 to 14 years and has a duration of 9 years. Children who do not repeat a grade usually begin secondary education at the age of 15 years, which has a 3 years’ duration. The analysis in this paper is restricted to children attending primary school.

Brazilian children have access to public primary education in all parts of the country. According to Soares (2004), enrollment of almost all Brazilian children aged 7-14 years was reached in the early 2000s. Despite the progress made in terms of access to school, Soares (2004) mentions high rates of grade repetition and of dropout as problems that still persisted in the Brazilian educational system in the early 2000s.

Figure 1 presents information on the school enrollment of children aged 6-14 years, which is the age range used in the empirical analysis here, according to information collected between the fourth quarter of 2015 and the fourth quarter of 2018. That information refers to all children in the first interview in the continuous PNAD. Eighteen percent of the children are enrolled in private primary schools, whereas almost 80% are in public primary schools.[[3]](#footnote-3) Two percent of the children are enrolled at secondary school, and only less than one percent are not enrolled in school. Although almost all children are in school, the quality of education is still very poor, especially in the public system of education, which has most of the students in the primary educational level. According to the INEP (Instituto Nacionais de Estudos e Pesquisas Educacionais Anísio Teixeira), standardized reading and math tests for students in the last year of primary school show that the average for those in private schools is 20% higher than that for students in public schools (INEP, 2011). Soares (2004), using data from students in the last year of primary school in the 2001 Brazilian System of Assessment for Basic Education (Sistema de Avaliação da Educação Básica – SAEB), finds that math proficiency for those in the first quartile of the distribution for individuals in private schools is better than that of those in the third quartile of public school distribution.

As documented in a number of studies, the characteristics of schools help explain part of the gap in students’ performance between private and public primary schools in Brazil. Private schools are more likely to have better teachers and structure, such as access to libraries and adequate classroom ventilation, for example, than public schools. Parents’ socioeconomic characteristics also play an important role, but evidence shows that differences in proficiency tests between students from private and public primary schools still remain even after a number of factors are controlled for (Albernaz et al., 2002).

A few empirical studies aim to identify the main determinants of children’s enrollment in private schools, and, in particular, whether the enrollment is quality-driven. Improvements in household income and parents’ education increase the probability of attending a private school. Curi and Menezes-Filho (2010) find that children’s enrollment in a private school is negatively influenced by the cost of private schools, in addition to mother’s education, family income, availability of public schools, and place of residence. Also according to these authors, expenditures with education sharply increase with family income.[[4]](#footnote-4) Estevan (2012) and Terra et al. (2012) present evidence that the low quality of public schools and the worst performance relative to private ones are important factors influencing parents’ preference for private schools.



Estevan (2012), based on data from the Brazilian School Census (Censo Escolar) in the 1990s, shows that improvements in the quality of public schools reduce the share of enrollment in private schools, indicating a crowding out effect. Terra et al. (2012) use information from different sources[[5]](#footnote-5) to compute the productivity differentials between private and public schools in terms of proficiency in mathematics and reading. According to their estimates, the greater educational productivity of the private sector as compared to the public one increases the probability of families choosing private schools for their children.

In sum, empirical evidence on primary education in Brazil shows that private schools are usually much better than public schools in a number of different aspects. Also, parents aiming to provide better education to their children seem to take into account the better quality of the private system when choosing a school for their children. However, given the cost of tuitions, this choice is restricted by household economic resources in most cases.

**3 - Data**

The empirical analysis in this paper uses nationally representative data from the continuous PNAD, a survey conducted by the Brazilian Census Bureau (Instituto Brasileiro de Geografia e Estatística - IBGE). The survey has a longitudinal design, in which each household is interviewed every quarter for five quarters. The continuous PNAD surveys around 200,000 households each quarter, offering labor market and educational information on all individuals living in those households. The dataset used here contains information from the fourth quarter of 2015, when a question to investigate whether students are enrolled in a public or in a private school was introduced, to the fourth quarter of 2018.

The sample is restricted to children aged 6 to 13 years at the time they enter the survey, enrolled in school at the time of their first and fifth continuous PNAD interviews.[[6]](#footnote-6) Only the household head’s and/or spouse’s sons or daughters are included in the sample, which is also limited to observations with information on the type of school (public or private).

The analysis is limited to children from households where both the head and the spouse are present, and where the household head is employed at the time of the first continuous PNAD interview. Children from households where the head or the spouse are aged less than 18 years or more than 70 years at the time of their first continuous PNAD interview are dropped from the sample. The empirical analysis requires information on the labor market status (employed, unemployed, or out of the labor force) of the household head in all five interviews in order to define treatment and control groups. Also, those from households where the head is out of the labor force at the time of interviews 2, 3, 4, and 5 are excluded. This sample comprises around 30,000 children. A more restrictive sample is also defined by the use of filters for spouses regarding labor market activities similar to those used for household heads.

The results relating unemployment to children’s enrollment in school are organized into two groups. The first set of estimates uses the employment status of the household head as reference, whereas the head and the spouse are defined according to information provided in the first interview of the household. In this case, the control group comprises children from households where the head remained employed at least up to the fifth interview. Treatment groups are defined in different ways by taking into account the number of periods of unemployment or the timing of the unemployment spell of the household head between the second and fourth interviews. For example, the treatment group can be represented by heads who became unemployed in at least one out of the three following interviews.

The second set of results is based on subsamples that include only children in households where both the head and the spouse are employed at the time of the first interview. The control group comprises children from households where both the head and the spouse remain employed at the time of interviews 2 to 5. The treatment groups are defined depending on the periods of unemployment of the household head or of the spouse, or of both. The treatment group can be represented, for example, by children from households where the head and the spouse became unemployed in at least one out of the following three continuous PNAD interviews.

**4 – Data description**

Table 1 shows the summary statistics for children in the broad sample described in Section 3, the one which uses the household head as reference, sorting them by public and private schools. Information refers to the individual’s first interview in the continuous PNAD. About three-quarters of the children in this sample are enrolled in public schools.[[7]](#footnote-7) Average age and the proportion of girls are similar for children in both types of schools. Ninety-four percent of the children in private schools live with their father and mother. Among those children enrolled in public schools, 89% have their father and mother living in the household.



Regarding information on household heads, Table 1 shows that average age and the proportion of women are slightly greater for children in private schools, but differences in the educational level between household heads in these two groups are remarkable. Among those children enrolled in public schools, more than 40% of the household heads did not complete primary education, and only 6% have a graduate degree. The situation is quite different for children in private schools, among whom only 7% of the household heads did not complete primary school and 47% completed a graduate program. Similar educational differences can be noticed when spouses in columns (1) and (2) are compared.



Monthly labor earnings of household heads whose children are enrolled in private schools are, on average, more than three times greater than those whose children attend public schools. Also, three-quarters of the spouses in households with children enrolled in private schools are employed, which is 16 percentage points higher when compared to children enrolled in public schools. Comparisons using only employed spouses show that their average labor earnings are almost three times higher for when children are enrolled in private schools than when they are enrolled in public schools. Thus, evidence demonstrates much better socioeconomic characteristics for children enrolled in private schools than for those attending public schools.

As also shown in Table 1, children enrolled in public schools are more likely to be in a household where the head moved from employment to unemployment during the period between the second and fourth continuous PNAD interviews, which is one of the criteria for defining the treatment group. Among children enrolled in public schools, 13% are in the treatment group defined in this way, which is twice the percentage of those in private schools who are in the same situation.

Figure 2 illustrates the transitions of children from public to private schools between the first and fifth continuous PNAD interviews. Among children previously enrolled in a public school, 3% moved to a private school one year later, whereas 13% of the children previously enrolled in a private school moved to a public school during the same interval. Although these numbers indicate a more intense movement across types of school in the second case, it is important to notice that there are four children in the public educational system for each child in the private one. So, despite the reluctance of parents to move their children to another school, there are non-negligible transitions across statuses. The results in Section 6 investigate whether these changes across types of schools are at least in part a response to the children’s parent’s entry into unemployment.

According to the argument of this paper, the greater the drop in household income as a consequence of parents’ entry into unemployment, more pronounced the unemployment effect on educational investment, holding all other relevant factors constant. Although the continuous PNAD offers quarterly data on labor earnings, the survey only provides information on the total household income, which includes other sources of income besides labor earnings, in the first and fifth interviews. For the analysis reported in Table 2, a sample of households that entered the survey in 2016 and that are also investigated in 2017 is selected. The broad sample used in the analysis reported in Table 2 has households where the head is employed in the first interview but the spouse can be employed or not. In this case, when the head becomes unemployed one year later, the average household income *per capita* drops to half of its value in the first interview. The average income *per capita* increases 3% in households where the head remains employed.

Comparisons are also implemented by restricting the sample to households where both the head and the spouse are employed in their first continuous PNAD interview. As shown in Table 2, when the spouse remains employed in the fifth interview but the head is unemployed, the average household income *per capita* amounts to only 60% of the value observed one year before. When the head is employed and the spouse is unemployed in the fifth interview, there is an income loss corresponding to one-third of its value in the first interview. Also, the average household income *per capita* when both the head and the spouse are unemployed corresponds to only 18% of that verified when both of them are employed. Among households where heads and spouses are employed in the fifth interview, the average income *per capita* improved about 3% compared to that of one year before. It is also worth noticing that, even in the first interview, households where parents are employed in both periods reported in Table 2 have a much greater income than those where parents become unemployed.



In sum, evidence in Table 2 shows that the unemployment of the head or of the spouse represents a sharp reduction in household income, which is in line with the important role of labor earnings relative to other sources of income.[[8]](#footnote-8) Therefore, it seems that few periods of unemployment should be enough to severely affect the household budget, making it quite difficult for a family to maintain the same pattern of consumption.

**5 – Estimation method**

Children whose parents remained employed usually have different characteristics from those whose parents became unemployed, as illustrated in Table 2, on account of the remarkable disparity, in the first interview, in the household income of those who are unemployed and those who are employed one year later. These characteristics may be related to children’s enrollment in public or private schools. The idea of standard matching estimators is to compare children in the treatment group with those in the control group with similar observable attributes. In order to justify matching estimators, a few assumptions are needed. If the parameter of interest is the average treatment effect, standard matching estimators require that, conditional on variables Z, the mean of the control group outcome ( be independent of the participation in treatment or control groups.

(1)

Where represents the outcome variable (enrollment in a private school) and D is a dummy indicating participation in the treatment group. Thus, it is assumed that the type of school is independent of the assignment to treatment or control group, controlling for a set of observable attributes. In addition, it is required that, given the characteristics in Z, there should be a child in the control group analogue to each child in the treatment group:

(2)

Following Rosenbaum and Rubin (1983), Z can be represented by the propensity score, the predicted probability of being in the treatment group conditioned on the set of observable characteristics, . Thus, the average treatment effect is given by:

(3)

Making use of longitudinal data, matching can be combined with the difference-in-differences estimator to weaken the assumption in equation (1). Differences between children in the treatment and control groups due to unobservable variables may cause bias in the standard matching estimator stated in equation (3). The difference-in-differences matching estimator as proposed in Heckman et al. (1997) controls for unobservable characteristics of children in these two groups that are time-invariant. Thus, the assumption in equation (1) can be replaced by:

(4) ,

where t1 and t0 are the periods of time corresponding to the fifth and first interviews in the continuous PNAD. The condition in equation (2) is also needed at both t1 and t0.

The difference-in-differences matching estimator is given by:

(5),

where *I1* is the set of children in the treatment group, *I0* represents the set of children in the control group, *Sp* is the region of common support, and *n1* is the number of children in set . Equation (5) states that the match for each child in set is given by a weighted average over the values of children in the control group.

The weights depend on the distance between and , the predicted probability of selection in the treatment group for children in each group as a function of the characteristics in Z, through a Gaussian kernel function.

**6 – Results**

This section presents the estimates of difference-in-differences matching models for the parents’ unemployment effect on children’s probability of enrollment in private schools. The results are organized into two subsections. First, subsection 6.1 reports the results using the household head as reference. Then, subsection 6.2 has estimates using a sample restricted to children from households where both the head and spouse are employed in the first continuous PNAD interview, and treatment and control groups definitions take into account the labor market statuses of both members.

6.1 – The consequences of unemployment shocks to the household head on children’s type of school

Column (1) of Table 3 shows that the household head’s entry into unemployment for only one out of three periods does not have a significant effect on children’s type of school.[[9]](#footnote-9) According to column (2), however, children from households where the head reported being unemployed in two interviews have 3.3 percentage points lower probability of being in private schools than children from households where the head remained employed.[[10]](#footnote-10) The household head’s entry into unemployment for at least one period reduces the probability of children being in a private school by 1.0 percentage point in column (3). Considering at least two periods of unemployment to define the treatment group, the estimated probability of enrollment in a private school decreases by 3.4 percentage points relative to those in the control group, as shown in column (4).[[11]](#footnote-11)

Evidence reported in this subsection indicates that the loss of household income due to the household head’s transition from employment to unemployment reduces the children’s probability of enrollment in the private system of education in most specifications. Even though small shocks represented by only one period of unemployment between the second and fourth interviews do not display a significant effect, more intense shocks, which are associated with a greater drop in income, significantly reduce the likelihood of enrollment in a private school. Differences between columns (1) and (2) and between columns (3) and (4) illustrate how estimated effects change according to the intensity of unemployment shocks. As shown in Table 2 of Section 4, monthly household income per capita becomes 40% lower when the head is unemployed. Thus, two quarters of unemployment should represent a long period during which changes in the pattern of household expenditures, with possible effects on educational investments, should be avoided.



6.2 – Evidence considering unemployment shocks to the household head and/or spouse

Table 4 presents the estimates of the consequences of unemployment shocks to only one of the parents, while the other one remains employed, on children’s type of school. According to column (1), the spouse’s entry into unemployment is not enough to influence children’s probability of enrollment in a private school when the household head remains employed. A similar result can be verified in column (3) considering one or more periods of unemployment for the household head when the spouse remains employed.



Children from households where the spouse experienced two or more periods of unemployment have 2.1 percentage points lower probability of attending a private school than those from households where both parents remained employed, as shown in column (3). Children from households where the head had at least two periods of unemployment have 4.0 percentage points lower probability of attending private schools than those from households where both the head and the spouse remained employed (column (4)). Although the greater (in absolute value) estimated coefficient in column (4) compared to the one in column (2) may be attributed to the fact that unemployment shocks to the household heads are usually associated with greater income losses than shocks to the spouses, Table 2 shows that the spouse’s transition from employment to unemployment implies a substantial drop in household income. Thus, it does not seem surprising that, even when the head remains employed, a more intense unemployment shock to the spouse, as that represented in column (2) of Table 4, also reduces the children’s probability of enrollment in a private school.

In column (1) of Table 5, children from households where only the head or the spouse experienced one period of unemployment between interviews 2 and 4 are classified into the treatment group, whereas the control group is comprised of children from households where both parents remained employed. The estimated impact of an unemployment shock of this type is nonsignificant. The coefficient is also nonsignificant for a shock that considers one or more quarters of unemployment for the household head or the spouse (column (2)). So, restricting a relatively mild unemployment shock of this kind to only one member when the other household member remains employed, does not seem to affect the type of school children will attend, as also shown in columns (1) and (2) of Table 4. When both the head and spouse become unemployed, which should represent a more severe reduction in household income, investments in children’s education are likely to be significantly affected. In column (3), the probability of attending a private school diminishes by 3.1 percentage points in the situation where both parents have one quarter of unemployment, not necessarily the same quarter as considered in Table 2. When parents have one or more quarters of unemployment, the estimated reduction in the probability of children’s enrollment in private schools amounts to 4.2 percentage points (column (4)).



It is important to mention that the analysis here only considers transitions across public and private schools. Thus, a negative impact of unemployment can occur through parents who give up moving their children from public to private schools, and through those who change their children from private schools to public ones. However, parents’ unemployment can also contribute to movements within private schools, from the most expensive to the most inexpensive ones, which may also have implications for the quality of education.

**7 – Conclusion**

Changes in household income can influence the economic behavior of household members in different ways. This paper investigates whether parents’ entry into unemployment, which should be associated with reductions in income, affects investments in children’s education in Brazil. Making use of data from the continuous PNAD for the period between 2015 and 2018, estimates show that parents’ transition from employment to unemployment can be associated with a lower probability of children’s enrollment in private rather than in public schools.

According to the results, although short periods of unemployment have nonsignificant effects, more intense shocks, represented by longer periods of unemployment or unemployment spells of both the household head and the spouse, seem to have greater effects on children’s probability of enrollment in a private school than less intense ones. Thus, the empirical evidence presented here indicates that parents’ unemployment can have negative impacts on children’s education. Private schools usually have much better quality than public ones, but parents are likely to move their children to free-of-charge public schools as a result of reductions in household income due to household members’ unemployment, or else, unemployment can spoil the plans of those who intend to change their children from a public to a private school.

There are a few mechanisms that can be adopted by parents to prevent negative consequences of unemployment on children’s education. Saving could be an alternative to smooth household consumption and keep the same level of expenditures with education.[[12]](#footnote-12) The economic literature also emphasizes that the credit market could be a way to smooth consumption in response to transient changes in income, and also that unemployment insurance could mitigate consumption decrease as a consequence of unemployment. About unemployment insurance, however, its extent is limited in Brazil by the high level of informality in the labor market.

Although these factors may theoretically cancel out the effects of unemployment shocks, estimates indicate that decisions about the type of school are very sensitive to changes in parents’ employment status. This could be due to the fact that an important share of the households does not have enough economic resources, from savings or unemployment insurance, nor access to the credit market to mitigate the negative consequences of unemployment on children’s education. It should be taken into account that the results also depend on the value parents attribute to the education of their children. More studies are necessary to identify the relative importance of these elements. The empirical evidence presented here shows that mechanisms that could avoid the negative effects of unemployment on investments in education are not sufficient and, as a consequence, household income fluctuations can have long-lasting effects on children’s lives through the quality of human capital accumulated.

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1. Fernandes and Felicio (2002) find evidence that spouses increase their labor supply as a response to the household head’s unemployment in Brazil. [↑](#footnote-ref-1)
2. According to the continuous PNAD, only 0.8% of the children aged 7 to 14 years were not enrolled in school in 2018. Among those in the age range analyzed by Duryea et al. (2007), 2.5% were out of school, most of them aged 15 to 16 years. [↑](#footnote-ref-2)
3. According to the 2017 Educational Census, the private system also has 18% of the students enrolled in primary school (INEP, 2018). [↑](#footnote-ref-3)
4. Curi and Menezes-Filho (2010), using data from the 2002/2003 Brazilian Consumer Expenditure Survey (Pesquisa de Orçamentos Familiares – POF), show that average education expenditures for the 5% richer families is 15 times higher than that of the 28% poorer families. Curi and Menezes-Filho (2010) include only families with positive expenditures on education in this calculation. [↑](#footnote-ref-4)
5. The 2003 SAEB, the 2003 and 2005 Brazilian School Census, and the 2003 Census of Teaching Professionals (Censo dos Profissionais do Magistério). [↑](#footnote-ref-5)
6. Six-year-old children not enrolled in primary school are dropped to avoid transitions from pre-school. Older children in secondary school are also excluded from the sample. [↑](#footnote-ref-6)
7. This value is quite similar to the one that considers all children aged 6-13 years in the continuous PNAD. [↑](#footnote-ref-7)
8. Hoffmann (2009) shows that labor earnings represent three-quarters of the household income *per capita* in Brazil. [↑](#footnote-ref-8)
9. Table A in Appendix B displays the estimates of the propensity scores for the specifications in columns (1)-(4) of Table 3. [↑](#footnote-ref-9)
10. Estimates also indicate that children from households where the head became unemployed between interviews 2 and 4 are less likely to attend a private school than those in the control group, although these results should be viewed with caution because the treatment group has only 210 observations. [↑](#footnote-ref-10)
11. Estimates (available upon request) usually do not indicate that the main conclusions depend on the timing of the unemployment spells. Shocks represented by unemployment only in interviews 2, 3, or 4 are nonsignificant, and although two periods of unemployment in the interviews 3 and 4 seem to have a greater negative effect on the estimated probability of enrollment in a private school compared to a shock represented by unemployment only in interviews 2 and 3, the coefficients are significant at the 1% level in both cases. The results in Table 3 are not so different comparing households interviewed in the 2nd and 3rd quarters of the calendar year, in the middle of the school year in Brazil, with those interviewed in the 1st and 4th quarters. Also, estimates that drop children in rural areas, where private primary schools are much more scarce, show more pronounced impacts of unemployment than those reported in Table 3, although the main conclusions are similar. [↑](#footnote-ref-11)
12. Nonetheless, Gruber (1997) shows that less than 20% of individuals who lose their jobs have savings of more than two months of income before job loss in the U.S. The capacity of workers’ savings to finance unemployment spells seems much more limited in Brazil. According to Moreira and Silveira (2019), even among families in the top household *per capita* income decile, savings are positive for only 15% of them. [↑](#footnote-ref-12)