Discussion of the paper

Financial education and the debt behavior of the young
by Meta Brown, Wilbert van der Klaauw, Jaya Wen, and Basit Zafar
(Federal Reserve Bank of New York)

Silvia Magri - Bank of Italy

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Aim and results

Aim - In this paper the authors study the effects on debt outcomes in early adulthood of changes in high school financial literacy, economics, and mathematics course requirements from 1999 through 2012 at state-level.

Results – On the extensive margin, only financial literacy has a sizable impact on the propensity of youth having a credit report. Conditional on having a credit report, on the intensive margin, math and financial literacy education reduces the incidence of adverse outcomes (such as delinquent accounts) and reduces both the likelihood of youth carrying debt and their debt balances; there is also an increase in the creditworthiness. *However, math education increases the probability of bankruptcy in a non negligible way (1 pp on an average probability equal to 2.7 per cent)*.

On the other hand, economic education increases the likelihood of individuals carrying debt balances, leads to significant increases in debt balances to support consumption and, at the same time, raises the likelihood of adverse credit outcomes, leading to a decline in youths' average risk scores; *however, it reduces the probability of bankruptcy by roughly 10 per cent.*

Comments on the motivation/contributions of the paper

The motivation is clear. There are other papers analyzing the relationship between education and debt. Cole et al (2012) use the same credit dataset as the authors, but they analyze the impact of change in compulsory *general education* that happened *between 1914 and 1978*. Cole et al (2013) extend the analysis to *personal finance and math courses,* but again they focus on *old reforms* (financial education between 1957 and 1982 and mathematic between 1984 and 1994).

In this paper the authors analyze the **impact of more recent education reforms, i.e. state-level policy changes from 1999 through 2012.**

And because of this, they focus on the credit behavior of the **young, restricting the dataset to individuals born in or after 1984. So their focus is on the young whose attitude towards debt will be very important for future development of credit market.** These cohorts will enter high school **in or after 1998**, coinciding with the start of their economics and financial literacy education reform. **The first students leave high school around 2002**; as a result of this age constraint, the data are heavily concentrated in the years after 2004.

All in all their contributions to the literature are relevant.

Comments on the results (1)

Some results are puzzling and not always in line with previous evidence. I am referring to the large increase in bankruptcy after math course and the negative impact of courses in economics on debt outcomes.

Cole et al (2012) find that improvement in *general education* between 1914 and 1978 *had positive effects on debt behavior*: improve credit score, reduce delinquencies and bankruptcy (high effect on the latter). Cole et at (2013) find indeed that math leads in general to positive results, though personal finance courses have no effect. However, in their paper the effect of math courses is such that bankruptcy decreases, not increases. [no effect on credit score and balances]

First, why economic course should have negative effects on debt outcomes? The current explanations offered in the paper are not satisfying ("exposure to basic economic concepts may make students more comfortable with debt" - why?). Lusardi and Tufano (2008) show that debt illiteracy concerns the inability to grasp the concept of compound interest rates or the working of credit card interest and repayments, **concepts that should be clearer after math, financial literacy, but also economics class. Why in economic courses people should not grasp the concept of compounding interest rates and have better debt outcomes?**

Comments on the results (2)

Secondly, you find that math has important positive results on debt outcomes, but bankruptcy largely increases. You argue that the higher likelihood of exercising the bankruptcy option is an effect of debt savvy. It is true that students could have learnt about the possibility of bankruptcy in their math classes and this can explain the upward trend; however, they should also learn about the high costs of bankruptcy as it results in lower credit scores, and reduced access to credit.

Gerardi et al (2013) specifically show that the ability to perform basic mathematical calculations is negatively associated with the propensity to default on one's mortgage; this should also reduce the propensity of bankruptcy and not increase it.

On the contrary economic reform reduces bankruptcy and in the more flexible specification the increase in delinquent accounts is not even significant

Comments on the empirical strategy: evaluate the treatments separately

One thing that captured my attention is that if you look at economic reforms (10 reforms respectively after 1998), in 4 cases the year of introduction of the economic reform was the same as that of the financial literacy (2002 in Kentucky, 2007 in Missouri, 2009 in New Jersey, 2009 in Virginia). And in 2 other cases the year of the economic reform is the same (or almost) as the math reform (Arizona 2008-2009; Indiana 2006-2007). **So this overlapping happens in 6 out of 10 economic state reforms.**

In theses cases, therefore, the dummies highlight simultaneously for the individuals when the two treatments start. **How could you identify the effects separately?**

This could create high correlation among the dummies capturing the different treatments and could partly explain quite similar results in absolute values for economic and financial literacy reforms, *but with opposite signs*, such as for a) delinquent balances b) collections c) auto loans balances (Table 5)

I would suggest trying to evaluate the different treatments separately like other papers do.

Comments on the empirical strategy: the specification

Why analyzing credit report and not having debt? The important outcome is having or not a debt and then, conditional on having debt, the debt balance, the delinquencies and the credit score. It is confusing that you call the probability of having a credit report as the probability to participate in the credit market (table 4): this should be measured by the probability of having any debt, which you also consider in Table 5, but conditional on having a credit report..

Why the specification for the extensive margin does not refer to the individual like that of the intensive margin, but it is run at a state level? In other words, why you do not estimate the probability that an individual i, in state s at time t, has a debt?

There are too many specifications in the paper. I would suggest focusing on the event study 2, which is very flexible because you do not have to assume that the effect of the reforms is immediate, constant or even linear. You should present graphic and tabular evidence from this specification and use the others as robustness (By the way: is it possible to treat math in the same way as the other treatments in this specification?)

You do not exploit the **panel dimension** of the dataset. Are individual fixed effects impossible to use? They would control for a lot of individual heterogeneity you do not observe (you just have the age of the individual and the state of birth).

Comments on the empirical strategy: time-varying controls at state level (1)

In this version of the paper there are two different specifications, one for the extensive margin, with only state-fixed effects and time effects, and one for intensive margin, with state-year fixed effects that account for state-specific and aggregate time trends in the outcomes. The authors argue that the staggered implementation of the reforms across states and over time allows them to identify both state-time and cohort-time fixed effects, *though there are a lot of dummies.*

You then add some controls at zip code-level for unemployment and income and at state level for compulsory schools, subject course requirement and state educational spending **to control for changes in the macroeconomic conditions of the zip-codes (states) that may correlate with the enactment of the policy changes.**

However, **there is the possibility that other policy changes or other more general changes may have occurred at the state level, more or less at the same time as the reforms analyzed.** And these unobserved factors happening at the state level can partly explain the observed changes in debt outcomes

Two things occurred to my mind: changes in house prices and bankruptcy exemptions, which you can easily control for.

Comments on the empirical strategy: time-varying controls at state level (2)

The financial crisis has been an important catalyst for financial education. Almost half of the states that introduced a financial literacy class after 2007 (10 out of 16) experienced strong reduction in house prices (4 states, Maryland, New Jersey, Virginia, West Virginia, out of 10 states),

It could be that the results about financial literacy capture, at least partially, the effect that the young living in those states that experienced strong drop in house prices after 2007 reduced debt and this decreased delinquencies and improved credit score, compared with the young that enter the credit market in previous years (2002-2007). It would therefore be useful to introduce a control for change in house prices, at zip-code or state level, as the enactment of the literacy reform could be correlated with these non observed trends.

Given the relevant results for bankruptcy found in the paper, it would also be useful **to control for asset exemptions in bankruptcy procedures that varied over time and over states.** Jappelli, Pagano and Di Maggio (2013) underline the importance of **institutional factors** such as information sharing, judicial efficiency and individual bankruptcy regulations in determining the size and fragility of household credit markets.

Conclusions

Very interesting topic specifically for the focus on the young, whose attitude towards debt will be very important for future developments of credit market.

Evaluate treatments separately.

Some remarks about the specification.

Include more time-varying controls at state level, at least house price dynamics and changes in asset exemptions in bankruptcy procedures.