Financial Distress and Student Performance*

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Abstract

This paper studies the effect of household financial distress on students' cognitive skills. We link standardized test scores to spatial variation in exposure to household foreign currency loans during a currency crisis in Hungary. Our identification strategy exploits free school choice and compares the development of students attending the same class but living in different postal codes. A 10 percent unexpected local debt shock hindered math and reading skills by 0.058 and .045 standard deviations, respectively. A decline in extracurricular activities suggests that liquidity constraints are significant, but student aspiration also decreases.

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1 Introduction

The past decade has seen a renewed interest in the causes and consequences of financial crises. These have a profound negative impact on the real economy, and the recovery takes longer than after ordinary recessions (Jordà et al., 2013). However, traditional metrics focusing on the state of the economy, such as income or unemployment, might not capture all effects of a crisis. In particular, human capital formation takes a long time. Children affected by a crisis will enter the labor market one or even two decades later. Therefore, potentially adverse impacts might become evident only in the long run. Meanwhile, if an effect is persistent over decades, the cumulative impact can be significant. Financial crises are often debt crises, and borrower households might not internalize all risks associated with risky borrowing. This could lead to spillover effects on other households as well as hardly-foreseen effects on the children in debtor households. We take the first step and examine the short- and medium-run impact of debtor distress on children's cognitive skills.

This paper studies how household financial distress affects the cognitive development of students using the 2008 Hungarian household foreign currency debt crisis. Before the crisis many households borrowed in Swiss franc while others had subsidized local currency loans. The unexpected and large depreciation of the domestic currency increased the debt burdens of households borrowing in the foreign currency but not of households borrowing in the local currency. We match administrative student-level panel data on cognitive skills to credit registry data at the postal code level. We use spatial variation in foreign currency debt exposure and exploit that Hungary has a free school choice system. This allows us to compare the cognitive development of students attending the same class but living in different postal codes with different exposure. The crisis had a significant negative impact on students' cognitive skills. A 10 percentage point increase in household debt to income ratio triggered by the debt revaluation leads to a 5 percent of a standard deviation decrease in mathematics and reading comprehension skills. Examining the channels through which debtor distress could have affected student development, we find a drop in extracurricular activities and diminishing aspirations.

Variation in foreign currency debt exposure was mainly driven by the timing of borrowing in Hungary. A credit boom started with the introduction of a mortgage subsidy in the early 2000s, which was scaled back in 2004 due to its ballooning cost, at which point lenders switched to foreign currency loans. By 2008, more than 60 percent of household debt was denominated in the Swiss franc. Local bank branch density before the start of the credit boom predicts the type of lending prevalent in an area, with more early lending in local currency with higher initial branch density. Later, newcomer banks were ramping up their

foreign-currency lending faster than their established local counterparts. The catch-up period left previously underserved regions with considerably more foreign-currency debt.

An auxiliary individual-level survey suggests that foreign currency and local currency borrowers are broadly similar on observables. Foreign currency debtors have slightly higher educational attainment, income, and probability of being employed. However, foreign currency debtors are more likely to live in more deprived areas.

Our primary data link student achievement on nationwide standardized tests to household foreign currency debt exposure at the postal code level. We use administrative household credit registry data to define exposure in September 2008, the last month before the depreciation. We match this data to the National Assessment of Basic Competencies (NABC), which is a student-level panel data on standardized cognitive skills. The NABC measures the mathematics and reading comprehension skills of every student in grades 6, 8, and 10 in every year. A background questionnaire complements student achievement measures, with detailed information on the socio-economic characteristics of families.

We identify the effect of foreign currency debt exposure in a difference-in-differences framework, assuming parallel trends across areas if all households held debt in forints. Our research design compares the development of two classmates with the same socio-economic background who live in different areas and therefore had different exposure to the crisis. However, the development of students living in more exposed regions might be different for two reasons. First, school quality might be inferior in more exposed regions as these are more deprived areas. Second, households' investment in their children might be lower than in less exposed regions. Our study can control for differences in school quality by exploiting that Hungarian families have free school choice. This allows us to hold school inputs fixed by comparing the development of two students attending the same class but living in different postal codes. To address concerns related to lower human capital investment in more exposed regions, we control for family characteristics from the detailed background questionnaire of the NABC.

We find that higher foreign currency debt exposure had a significant negative impact on the development of high school students between 2008 and 2010. A 10 percent increase in local household debt decreased the development of math and reading skills by 5.8 and 4.3 percent of a standard deviation, respectively. Besides, student performance declined in later years for younger cohorts between the same grades, which suggests that the effect of the crisis was persistent.[1]

[1]To put these magnitudes into perspective, Chetty et al. (2014a,b) found a teacher one standard deviation better in the New York teacher value added distribution would raise standardized test scores by .124 standard deviations in English and 0.163 standard deviations in math, and earnings by 1.34 percent at age 28 and potentially over the lifecycle.

Next, we explore the mechanisms through which financial distress could have affected students' cognitive skills. As we use within school variation, our empirical approach keeps school inputs fixed. Parental investment into children decreased in more exposed areas, as evidenced by a fall in extracurricular activities. Negative demand externalities from a decline in local consumption of non-tradeable goods led to more jobs lost in exposed areas. Nevertheless, parental unemployment does not explain the negative impact on student achievement. This suggests that families' financial distress was a crucial channel in the decline of student performance.

Falling college aspirations and grade point averages, a direct input into college admission scores, suggest life-altering impacts even after our data ends. Students' grit, as graded in class, also dropped off in affected areas.

Our empirical strategy does not allow the estimation of the direct effects of a child's parents' financial distress separately from the spillovers and general equilibrium effects in their local community. However, the sum of these is relevant for any policy concerned with concentrated indebtedness beyond personal debt management or relief. Our source of variation is aggregate, similar in spirit to Mian and Sufi (2009); yet we *partial out* important individual-level drivers of student achievement and thus do more than ecological inference.

This paper speaks to the broad literature on how economic conditions affect children's educational outcomes. Studies often find recessions to boost educational attainment in developed countries but with adverse effects in developing countries (see, for example, the literature review in Ferreira and Schady (2009)). We complement these studies by using standardized test scores that measure the cognitive skills of students.

Many studies use an increase in unemployment as a shock to economic conditions, and document that parental job loss is an essential channel in the decline of student achievement. Most use mass layoffs as an exogenous shock to unemployment and measure its effect on GPA (Rege et al., 2011), grade retention (Stevens and Schaller, 2011), and standardized test scores (Ananat et al., 2011). Hilger (2016) counters that large effects of firm closures are tainted by selection; most paternal layoffs lead to no change in college-going, college quality, or earnings. We add to this literature by exploiting a large-scale household debt crisis to measure how economic hardship affects student performance.

In Hungary, Kertesi and Kézdi (2008) found a negative effect of parental unemployment on dropping out from high school using the transition from socialism to capitalism. Kertesi et al. (2017) also found that the effect of the 2008 financial crisis was similar but mitigated in families with higher socio-economic status.

One important channel of the effect of economic conditions on educational attainment involves parental income. Others found exogenous variation in that from random lottery

winnings (Cesarini et al., 2016) or labor demand shocks due to the oil boom in Norway (Løken, 2010; Løken et al., 2012), cocoa price shocks in Côte d'Ivoire (Cogneau and Jedwab, 2012), or coffee price shocks in Brazil (Kruger, 2007). Standardized test scores provide a finer measurement of cognitive skills, picking up subtler effects not evident in educational attainment. We also go beyond the precisely estimated small effects of positive shocks to affluent Swedes Cesarini et al. (2016) find.[2] Dahl and Lochner (2012) exploit nonlinear changes in the Earned Income Tax Credit schedule and uses rich survey data to measure the effect of income on student achievement. We complement this study with a more general study population, beyond the underprivileged.

A direct link between adult financial distress and student achievement has been established by Maturana and Nickerson (2019), though for a channel we specifically exclude in our research design. That paper finds that student achievement on standardized tests in Texas falls after teacher bankruptcy. Regardless of whether debt relief itself would help or harm the teacher (Dobbie and Song, 2015), it is a strong correlate of financial distress. Our study abstracts away from teacher spillovers by exploiting class fixed effects in our preferred specifications.

This paper also contributes to the literature on how financial crises affect real outcomes like growth, household consumption, or unemployment (Jordà et al., 2013; Mian et al., 2013; Mian and Sufi, 2014). These traditional measures focusing on the state of the economy might not be able to capture all the effects of a crisis. We add that financial crises could have negative impacts on the development of children's cognitive skills. Since human capital formation is a long process, children affected by a crisis will enter the labor market one or even two decades later. Therefore the potentially adverse effects might become evident only in the long run.

The rest of the paper continues as follows. Section 2 starts with the description of the Hungarian credit boom and bust. In Section 3, we describe the data we use and define measures of exposure to the exchange rate shock. The following section outlines our identification strategy and research designs. Our results follow in Section 4. We report robustness checks and our explorations of the mechanisms in Section 5. Section 6 concludes.

2 Context

In this section, we introduce the two relevant features of the recent Hungarian environment.

[2] Cesarini et al. (2016) also see non-cognitive skills in conscription records but GPAs and test scores only around age 15.

2.1 Household credit expansion

Hungarian households used to hold little debt in international comparison after the collapse of socialism. Nevertheless, after some stabilization and global optimism in the 1990s, both the government and the newly-private lenders became bullish about expanding credit.

Figure 1 shows the household debt stock relative to GDP by currency denomination. Indebtedness was low at the end of the 1990s. However, the introduction of a mortgage subsidy program in 2000 significantly increased household borrowing in the domestic currency. However, runaway demand inflated the costs of the program, and a new government tightened eligibility rules and decreased the size of the interest subsidy at the end of 2003.[3] This cutback coincided with the start of the foreign currency credit expansion. Foreign banks were the first to offer such loans. However, later in the boom, domestic banks also entered into foreign currency lending.

The continued credit expansion raised household debt to 25 percent of GDP by September 2008. Concurrent with the credit expansion, the share of foreign currency debt also rose from 5 percent in 2004 to 66 percent by September 2008. The most common foreign currency was the Swiss franc (CHF), which accounted for 97 percent of foreign currency debt at the start of the crisis, and the rest was mainly euro and Japanese yen. Since the interest rate subsidy program applied only to mortgage loans, the share of foreign currency debt was close to half for mortgages. In contrast, most home equity debt was denominated in francs or euros.

Both demand- and supply-side factors contributed to the spread of foreign currency lending. The primary driver was a wide gap between prevailing market rates on forint and foreign currency loans (Rosenberg and Tirpák, 2008; Csajbók et al., 2010). This was not balanced by expectations of uncovered interest parity. Instead, the perceived stability of the domestic currency (Brown et al., 2017) and the presumed adoption of the euro bolstered the carry trade (Fidrmuc et al., 2013). Moreover, banks trying to match the currency composition of their liabilities and a substantially looser foreign monetary policy (Ongena et al., 2018) also contributed to the supply of foreign currency credit.

Before 2008, the Hungarian forint was stable, but during the crisis, it depreciated significantly. Meanwhile, the Swiss franc was appreciating, as global demand rose for this safe-haven currency with a more limited supply. Panel (b) of Figure shows the percentage change in the monthly HUF/CHF and HUF/EUR exchange rates relative to January 2004. During the credit expansion phase, the forint was pegged to the euro with a ±15% band. However, the central bank de facto maintained a ±5% crawling band (Ilzetzki et al., 2019). The EUR/CHF exchange rate was also stable; Ilzetzki et al. (2019) classify it as a ±2% crawl-

[3] Farkas et al. (2004) review the housing market and the subsidy program between 1999 and 2003.

ing band. The central bank of Hungary abandoned the forint's peg to the euro by February 26, 2008, and adopted a floating exchange rate regime. With the outbreak of the full-blown crisis in late 2008, the Hungarian forint depreciated significantly vis-à-vis the Swiss franc. Between September 2008 and April 2010, the HUF/CHF exchange rate depreciated by 23 percent, and further during and after the eurozone crisis.

Market participants did not anticipate such a substantial depreciation of the forint.[4] Data from Consensus Economics, an economic survey organization, shows that experts projected that the forint-euro exchange rate to remain stable right before the outbreak of the crisis. Figure A.1 plots the expected percent change in the exchange rate on a 12- and 24-month horizon over time. Experts forecasted appreciation in September 2008 and a minor depreciation before that.

Not surprisingly, Hungarian households did not hedge against the depreciation of the domestic currency. Several studies show that few households held any foreign currency assets.[5] Moreover, a negligible fraction of households earned any income in foreign currency before the crisis.[6]

With little assets in foreign currencies either, the exchange rate shock significantly increased the debt burden of Hungarian households. This quickly translated into a rising share of non-performing loans. Figure 2 The delinquency rate for domestic currency loans increased only slightly during this period. On the other hand, by 2014, it was almost 20 percent for foreign currency mortgage loans, and as high as 30 percent for home equity loans. Strategic default cannot explain this as debt is recourse in Hungary. Delinquency is a sign of limited ability as opposed to limited willingness to pay. Besides, there was no provision for personal bankruptcy before 2015.

Although some commentators warned about the potential risks of foreign currency lending, no effective regulatory measures were taken to curb its growth before the crisis. The central bank's Report on Financial Stability (MNB, 2006) discussed the risks of foreign currency lending as early as 2006. In 2007, they got the banking sector to stop lending in Japanese yen, as it was considered too risky, but lending in Swiss franc and euro continued. With minimal political capital, the outgoing government introduced no major policy

[4]This is empirically true, even if somewhat surprising. Households or refinancing lenders could have expected the forint depreciating to justify the interest difference. The carry trade is profitable only if the Swiss franc rates were lower than justified by the uncovered interest rate parity.

[5]Using repeated cross-sectional survey data, Backé et al. (2007) documents that less than 10 percent of households had foreign currency holdings between 2002 and 2006, and the median positive holding was around €100. Moreover, the primary motive for holding foreign currency cash was to spend it abroad. Feige (2003) calculates that only 6 percent of total cash holdings were denominated in foreign currencies in 2001.

[6]Though Hungary joined the European Union in 2004, emigration to EU countries remained low. Hárs (2016) uses census data and shows that less than 2 percent of Hungarian households emigrated by 2011, and emigration accelerated only after 2010. Remittances rose above 2 percent of GDP only after 2011.

to tackle foreign currency loans before the 2010 elections. Meanwhile, a €25-billion rescue package from the IMF, the EU, and the World Bank left little fiscal legroom to intervene in domestic credit markets.[7]

After the election of a government with a supermajority in parliament, two significant initiatives were meant to help foreign currency debtors. First came the Early Repayment Program (ERP) in the fall of 2011, which allowed households to repay their mortgage and home equity debt converted at 30 percent below market rates at the banks' cost. No eligibility criteria were set for participation, but the program stipulated that the entire outstanding balance had to be paid back at once. Approximately 170,000 loans were repaid early, constituting approximately 20 percent of outstanding foreign currency loans.

Second, the government implemented two more programs in late 2014. A settlement program required banks to compensate borrowers for charges from earlier unilateral changes to their contractual terms (interest rate increases and exchange rate spreads). The compensation amounted to more than 3 percent of 2014 GDP. Another program forcibly converted foreign currency mortgage and home equity loans to domestic currency, and hence ended the exchange rate exposure of households. Many were still left with a larger loan outstanding than what they took out in the first place.

2.2 School system

Hungary offers free school choice of any school parents prefer for their children. Primary schools have to admit all students living in the school district if they prefer to attend the local school. If demand is above capacity, a lottery allocates seats among non-local students. Families are also free to choose any secondary school, yet those can set entry requirements for all applying students. These are school-specific, ranging from no bar to a family interview to entry exams.

The school system was mostly public and decentralized until 2011. Typically, municipalities maintained schools from central government funding based on the number and the composition of the students. However, this was rarely sufficient, and local governments contributed additional funding. As poorer locales were more constrained, school expenditures correlate positively with municipal wealth (Varga, 2000). Teacher salaries mostly follow central guidelines with occasional local bonuses. According to a recent OECD (2018) tabulation, real salaries for teachers with 15 years of experience fell by 32 percent in primary and lower secondary education and 35 percent in upper secondary education in Hungary between 2005

[7] After the outbreak of the crisis several regulatory measures were initiated, which are summarized by Banai et al. (2011). Initially, these measures were to prevent the further foreign currency lending, which culminated in a retail ban of foreign currency lending in 2010. Later policies targeted foreign currency debtors directly.

and 2013. We do not observe teacher salaries or municipal resources. However, our preferred specifications measure the effects by residence orthogonal to class averages. This implies that our estimates do not include any effects the financial crisis had on the municipality, the school, or the teacher that affected all classmates equally.

Hungary offered three types of secondary schools in this period. Grammar schools were meant to prepare students for higher education. Vocational schools provided both abstract and practical qualifications. Students of either track take a school-leaving exam at the end of twelfth grade and can apply for college. The third option was a vocational school, which focused only on the practical training of the students. By any indication, school type determines opportunities later in life (Hajdu et al., 2015).

Primary school typically takes eight years, and secondary school takes four. However, some grammar schools provide six- or even eight-year programs, and hence students attending these schools leave primary school after grades 6 or 4, respectively. These grammar schools have more prestige than traditional secondary schools. Besides, Hungary allows the interruption of the 12-year public education curricula for an extra year dedicated mostly to learning foreign languages. In the period we study, as many as 15 percent of students took advantage of this opportunity, and most in ninth grade, in essence adding a bonus year to the beginning of secondary school. Six-year grammar schools might offer such grades in year 7. These gap years imply that a student in grade 8 in 2008 might take the tenth-year test only three years later. For struggling students, the same could happen because of grade retention.

Because of free school choice, commuting is prevalent even in primary school. Kertesi and Kézdi (2005) document in the 2001 census that 23 percent of children from municipalities with only one school commute elsewhere for school. Furthermore, they also show that commuting is positively correlated with parental education. This feature is crucial for our identification strategy, even if some areas have only a handful of students in any cohort.

Schooling used to be compulsory until age 18, reduced to 16 only in 2011. This does not affect our main estimates as we focus on younger age groups in an earlier period.

3 Data, descriptive statistics, and empirical stategy

This section describes our data sources. For our primary analysis, we combine individual-level data on student achievement with credit registry data aggregated to the postal code level.

3.1 Data

Student achievement data. We use the Hungarian National Assessment of Basic Competencies (NABC) database to measure students' cognitive skills. This test started in 2006 as a standard-based assessment of mathematics and reading comprehension skills that follows the Programme for International Student Assessment (PISA) of the OECD in its goals and format. The NABC is a low-stake test, as neither students nor schools are evaluated by the outcomes. However, the school-level average results are publicly available.

Beyond students' cognitive skills, the NABC data contains extensive information on the socio-economic background of the families. All students receive a questionnaire and fill in together with their parents. The survey asks about family characteristics, family life, and the neighborhood. Response rates fluctuate around 70 percent.[8]

From 2008, all students take the tests in grades 6, 8, and 10 in every May, yielding a panel on the student level. For grades 6 and 10 in the first two years, though, only a random sample of schools took the tests. The Education Authority matched the student identifiers of grade 8 students in 2006 to their next assessment in grade 10 in 2008, with an overall match rate of 57 percent.

Since the NABC contains no information on family finances, we match aggregate household debt data to the NABC at the postal code level.[9] In 2006 and 2007, only the survey component asked children's addresses, but from 2008 onwards, schools report this information directly; hence it is available for all students.

Schools are identified in the data, while classmates share the same school and grade identifier, as some instruction is in groups different from official classes. Our data also contains some descriptive information on the schools and their establishments from the principals' questionnaire.

We standardize NABC test scores by grade-year pairs in the balanced panel, so they have zero mean and standard deviation of 1. We do not impute values for students who take the test in other years because of grade retention, a gap year, or otherwise.

Credit registry data. Information on household indebtedness comes from the Household Register of the Central Credit Information System (KHR). It provides detailed information on all loans extended to households by Hungarian credit institutions. Loan characteristics include the date of origination, type of loan, currency denomination, as well as other details.

[8] In Appendix Figure A.3, we compare the distribution of testscores for students in grade 8 in 2008 by the availability of all control variables. This shows that the average performace of students used in our analysis is slightly higher.

[9] The postal code is a fine geographic unit in Hungary, with an average population of approximately 3000. It corresponds to a municipality in most cases. Some larger cities have multiple postal codes.

Data collection in KHR started only in May 2012; thus, we only observe loans outstanding in May 2012 or originated later. Loans terminated before are missing from the database. We focus on mortgage and home equity loans as these have a longer maturity and are likely to be in the dataset in 2012. However, the Early Repayment Program initiated by the government in 2011 enabled some households to repay their foreign currency denominated mortgage and home equity loans early.[10] Since this happened before the start of KHR, ERP participants are missing from the data. Our baseline approach allocates this missing debt proportionally to those observed in 2011.[11]

Additional data sources. For additional control variables on the municipal level, we use the T-Star database of the Central Statistical Office. T-Star contains detailed information on local characteristics ranging from income to demographics to unemployment. Their data on municipal educational attainment comes from the 2011 census.

We also use the Euro Survey of the Austrian Central Bank to compare the average characteristics of foreign currency and local currency borrowers in Hungary. It asked about household debt as well as its denomination. For more precision, we pool the waves 2007-2011.

Summary statistics. We collate some summary statistics in Table **??**. Panel (a) presents the means of various foreign currency debt exposure measures. Panel (b) tabulates the average characteristics of students who were in grade 8 in 2008.

3.2 Cross-sectional variation in foreign currency debt exposure

We examine the drivers of household foreign currency debt exposure on the postal code level. We define exposure to the depreciation as the share of foreign currency-denominated loans in September 2008, before the start of the crisis:

$$FCS_z = \frac{N_{FC,z}}{N_{FC,z} + N_{LC,z}},$$

where $N_{FC,z}$ is the number of foreign currency-denominated loans in September 2008 in postal code z, while $N_{LC,z}$ denotes the local currency analogue. This measure captures what fraction of the loans was exposed to the depreciation.

[10] The program allowed households to repay their foreign currency-denomnated debt at a preferential exchange rate, which was approximately 25% lower than the market exchange rate at the time of announcement. At the same time, participation required that the whole amount should be repaid at once. Because of this feature of the program, wealthier households were more likely to participate in the program.

[11] We follow Verner and Gyöngyösi (2018) and Gyöngyösi and Verner (2019) in reconstructing this data.

Figure 3 shows a map of Hungary colored by deciles of foreign currency debt exposure at the postal code level. Foreign currency borrowing was widespread before the crisis; almost half of the loans have been denominated in a foreign currency even in the lowest decile.

The spatial variation in exposure is primarily driven by the timeline of borrowing. In the first phase of the credit boom, all households borrowed in the domestic currency. After the cutback of the interest rate subsidy program, most new borrowers switched to foreign currencies. However, the early boom was more pronounced in regions with a higher density of domestic banks' branches. With the removal of the subsidy, foreign banks entered the retail market in previously underserved regions and expanded their branch network greatly.

Next, we examine how foreign currency debt exposure is related to student and postal code level characteristics. Panel (a) of Table A.1 reports on estimates from univariate regressions of foreign currency debt exposure on student characteristics in grade 8 in 2008. The average math score of children is significantly lower in areas with a higher foreign currency share, with a 1.3 standard deviation difference in math scores going from the no-FC extreme to the other. We find a similar pattern for reading comprehension as well. The negative correlation between foreign currency share and student performance is apparent even in non-standardized student achievement, such as the GPA at the end of the previous school year. Mothers of children living in more exposed areas are also less educated.

Panel (b) reports regression results for postal code level characteristics.

Debt revaluation shock. For a direct measure of surprise debt, we also calculate the revaluation shock as

$$\Delta \hat{d}_z = \frac{\sum_{j \in C} (E_t^j D_{z,08}^j - E_{08}^j D_{z,08}^j)}{\sum_{j \in C} E_{08}^j D_{z,08}^j},$$

where C is the set of currencies, E_t^j is the exchange rate at time t in currency j, and $D_{z,08}$ is the debt in postal code z in September 2008. For only two currencies, as the majority of household debt is denominated in forint or Swiss franc, $\Delta \hat{d}_z$ is just the foreign currency share of debt rescaled by the depreciation.[12]

We also use the debt revaluation relative to income, defined as:

$$\Delta \hat{d}_z^{inc} = \frac{\sum_{j \in C} (E_t^j D_{z,08}^j - E_{08}^j D_{z,08})}{\text{HH disposable income}},$$

which captures the increase in household debt burden relative to household disposable income.

[12] We can rewrite the debt revaluation as the following: $\Delta \hat{d}_z = \frac{(E_t^{CHF} D_{z,08}^{CHF} - E_{08}^{CHF} D_{z,08}^{CHF})}{E_{08}^{CHF} D_{z,08}^{CHF} + D_{z,08}^{HUF}} = \frac{E_{08}^{CHF} D_{z,08}^{CHF}}{E_{08}^{CHF} D_{z,08}^{CHF} + D_{z,08}^{HUF}} \times \frac{E_t^{CHF} - E_{08}^{CHF}}{E_{08}^{CHF}}$

3.3 Survey evidence on foreign currency borrowers

We can compare foreign currency (FC) borrowers to local currency (LC) borrowers in the Euro Survey data. We define an individual to borrow in a foreign currency if she has any foreign currency-denominated debt. Local currency debtors are defined to have only local currency-denominated debt. Table A.2 collects the average characteristics of individuals by the currency denomination of their debt. The first column presents foreign currency borrowers, the second column their local currency counterparts, while non-borrowers feature in column 3. Column 4 calculates the difference between foreign currency and local currency borrowers, while the last column contrasts borrowers to non-borrowers.

The average characteristics of FC and LC borrowers are broadly similar. However, FC borrowers tend to look better on observable characteristics. For example, they are less likely to have only primary school education and more likely to have a college degree than LC borrowers. Moreover, they have higher incomes and a higher probability of being employed. Foreign currency borrowers are more likely to have children and live in larger households.

Though FC and LC borrowers are broadly similar, borrowers are significantly different from those who do no borrow at all (column 5). Borrowers are better educated, and they are more likely to be employed. These suggest that the credit boom affected more affluent households.

Though there are fewer borrowers than non-borrowers, a substantial fraction of children live in families with foreign currency debt. The survey has no information about the number of children, but if it is not related to the currency denomination nor borrowing status, we can calculate the fraction of children living in households with FC debt. One-third of children live in an exposed household, while 20 percent live in borrower households with no exposure. The larger households of FC borrowers suggest that this simple calculation underestimates the foreign currency debt exposure of children somewhat.

3.4 Empirical strategy

To measure the effect of household debt revaluation on students' cognitive skill development, we use a value-added model.[13] We compare the development of two students who live in different postal codes and hence have different foreign currency debt exposures. Our baseline specifications estimate linear regressions of the following form:

$$\Delta y_i = \alpha + \gamma \boldsymbol{y}_{i,t-1} + \beta FCS_{z(i)} + \Gamma X_i + \delta W_{z(i)} + \mu_{c(i)} + \varepsilon_i, \tag{1}$$

[13] Todd and Wolpin (2003) reviews the underlying assumptions for identifying the effect of various inputs on student' cognitive skills. For a recent literature review, see Koedel et al. (2015).

where Δy_i is the change of the test score of student i between time $t-2$ and t, and $\boldsymbol{y}_{i,t-2}$ is the vector of test score of student i at time $t-2$ in mathematics and reading. $FCS_{z(i)}$ is the share of foreign currency loans in area z, and X_i is a set of student-level control variables in $t-2$, while $W_{z(i)}$ are area-level control variables from 2008. The variable $\mu_{c(i)}$ captures a class fixed effect defined for classmates in year t. The parameter of interest is β, which measures how foreign currency debt exposure affected cognitive skill development.

The first difference specification soaks out student-level unobservable characteristics that are constant over time, like some notion of ability. It also allows students with different family backgrounds to have different paths of development, captured by the X_i covariates. For example, the cognitive skills of children of more educated parents might develop faster than other students'. The inclusion of lagged test scores allows us to compare students with the same cognitive skills at the beginning of the crisis in 2008. Since there is a great degree of mean reversion in test scores these controls documented by Figure A.2, these controls ensures that our results are not driven by mean reversion of the test scores.

The covariates W_z include postal code level loan penetration and household debt-to-income. The total number of affected children depends on the number of borrowers and the fraction of borrowers that have foreign currency-denominated loans. Controlling for these variables implies that we compare students living in areas with the same number of borrowers-to-population and the same debt-to-income ratio. The only difference we are identified off of is the currency composition of loans.

To control for differences in parental investment, we use the rich information on the socio-economic background of families from the survey. We include covariates that are important for childhood development. The main covariates among the control variables are parental education as it has the highest predictive power for later outcomes in Hungary compared to other OECD countries. The rest of the control variables are gender, age measured in months, and a disadvantageous family background officially recognized by the school.

The class fixed effects capture any differences in school quality, which may be lower in more exposed regions for several reasons. First, municipalities' school expenditure is positively related to the income of the municipality (Varga, 2000). More exposed regions are poorer; hence, schools might also need to get by with less in these regions.[14] Second, there could be assortative matching between teachers and students as a result of free school choice (Kertesi and Kézdi, 2005). As wealthier families tend to live in cities, average teacher quality is higher in urban areas, where the share of foreign currency loans is lower. Both of these mechanisms imply that children living in more exposed regions may attend lower-quality

[14] Educational spending has a large effect on completed years of education, wages and adult poverty (Jackson et al., 2016).

schools. In Hungary, most secondary school teachers follow a class for the entire curriculum in the subject. Hence, school or class fixed effects can potentially capture teacher quality and other school inputs.

To mitigate this concern of correlation between school quality and foreign currency debt exposure, we include school and class fixed effects to control for unobservable differences in school quality. This implies that we compare the development of children within the same school or class. Since commuting is widespread, the effect of financial distress can be estimated using within-class variation.

Our central identifying assumption is that in the absence of the exchange rate shock, the development of children living in more versus less exposed areas would have been the same.

It is important to note that our inclusion of school fixed effects can result in the underestimation of the real effect of the crisis. School fixed effects are potentially bad controls as the foreign currency debt crisis could have had an impact on school type, track, and quality as well. Not only could school expenditures decrease in affected areas, or teachers end up in distress themselves[15], but affected families might choose different schools as early as the fall of 2009. Declining school quality might be a crucial causal channel for the effects of a debt shock, which within-class variation is unable to identify.

4 Results

4.1 Main results

We begin by presenting the main difference-in-differences results for children between grades 8 and 10 in Table 1. Panel (a) shows the results for mathematics and Panel (b) for reading comprehension. The standard errors are robust and clustered two-way at the postal code and the grade 10 school level.

Column 1 in Panel A presents the bivariate regression between foreign currency exposure and the change in mathematics test scores without controls. There is a negative but weak correlation between FCS and the change in cognitive skills. In Column 2 we add the lagged mathematics and reading test scores. This allows us the comparison of students who had the same abilities in 2008. Including these controls makes the association between FCS and the change in math score significantly negative.

We begin by presenting the main difference-in-differences results for children between grades 8 and 10 in Table 1. Panel (a) shows the results for mathematics and Panel (b) for reading comprehension. The standard errors are robust and clustered two-way at the postal

[15] Maturana and Nickerson (2019) documented a correlation between teachers' bankruptcy and a 0.42 standard deviation subsequent decline in their students' passing rate on the Texas mathematics exam.

code and the grade 10 school level. Column 1 collects the bivariate regressions between foreign currency exposure and the change in math test scores without controls. There is a negative correlation between FCS and both the math and reading test scores. Column 2 presents the point estimates when control variables are included. We control for postal code level indebtedness, which allows us to use variation in the currency composition of loans while keeping household indebtedness fixed. We also include several student-level control variables from grade 8. These are parents' educational attainment and age. The coefficient of FCS decreases in absolute terms but remains significant. In column 3, we add student-level control variables, which allows students with different characteristics having different development of math and reading skills. In column 4, we add school fixed effects, and in column 5, we include class fixed effects. These fixed effects allow us to compare the development of students within the same secondary school, and within the same tenth-grade class, respectively. The point estimates are similar to those to the left. One in column 5 can be interpreted as going from zero dollarization of household loans to full would have decreased the development of math skills by 14.7% of a standard deviation. The results for reading comprehension show a similar pattern, with a smaller magnitude (10.8% of the standard deviation). Table A.7 summarizes the results for other cohorts and grades as well.

Economic effect To have a better sense of the magnitude of the estimated effects, Table **??** presents estimates when the debt revaluation is used as an independent variable. It shows that a 10 percent increase in the zip code level debt to income ratio decreased students' math skills by X percent.

How does lower cognitive test scores translate into adulthood outcomes? Hermann et al. (2019) link the first cohorts of the NABC to income in early adulthood. For tenth-graders of 2008, they find standardized math scores to be associated with higher earnings in 2017, at age 25-26, fairly linearly by 8-9 percent for each standard deviation. They also find a negative correlation between test scores and unemployment status.

4.2 Dynamic effect of foreign currency debt exposure

Our key identifying assumption is one of parallel trends, namely that with no depreciation, test scores of students from more and less exposed areas would have evolved similarly. We examine this assumption using two different approaches. The first one uses the same value-added approach and estimates equation 1 for the same grades, but for an older cohort between 2006 and 2008. The second approach uses all students in grade 8 across year, We can check this for the pre-treatment period.

Dynamic effect in value-added in grade 8-10 To rule out the possibility of differential pre-trends, we first analyze the cognitive skill development of children using pre-crisis data between 2006 and 2008. Though the NABC data has a longitudinal structure only from 2008 onwards, the Educational Authority matched some students' test scores across years for the pre-crisis period for one cohort. These students were in grade 8 in 2006 and grade 10 in 2008; hence, both tests were taken before the crisis. Moreover, these are the same grades as in our primary sample; thus, this is directly comparable to the main results.

The results of this check are presented in Table 2; Panel (a) contains the estimates for mathematics and Panel (b) for reading. Column 1 shows the results when no covariates are included. The point estimates are close to zero and insignificant both for math and reading scores. This indicates that the development of children living in high FCS and low FCS areas were similar between grades 8 and 10. In the other columns, we include control variables, which does not change the results. The coefficient for foreign currency loan share remains insignificant for both mathematics and reading comprehension. This indicates that the development of children before the crisis was unrelated to the prevalence of foreign currency loans.

Next, we examine younger cohorts using the same value added design. Figure **??** summarizes these estimates for all cohorts.

Dynamic effect in value-added in grade 6-8 Dynamic effect in value-added in grade 6-8

The value-added modelling measures the change in cognitive skills between two periods. However, the crisis can affect students not only between the periods when student assessment takes place but from the outbreak of the crisis. Morevoer, not only students in grade 6-8-10 but all all students. Therefore to measure the cumulative impact of the crisis, we examine the impact on grade 8 students over time in the next subsection.

Dynamic effect in grade 8 Next, we check for pre-trends using cross-cohort variation by focusing only on grade 8 students over time. We look at how the association between foreign currency debt exposure and student performance changed over time. They are strongly negatively correlated in the cross-section, but now we focus on the dynamics of this relation. We test whether the association is stable before the exchange rate shock.

We pool together all the data for grade 8 students across years. We measure the performance gap between students living in more exposed and less exposed areas and examine whether this gap widened after the onset of the crisis. We estimate the following regression using data from 2006 to 2012:

$$y_i = \delta_{t(i)} + \sum_{s \neq 2008} \beta_s FCS_{z(i)} \times I(t(i) = s) + \gamma X_i + \delta W_{z(i)} + \varepsilon_i,$$

where y_i is the normalized test score of student i who lived in postal code z in year t (when she was in grade 10), FCS_z denotes the share of foreign currency loans in area z, and X_i are a set of student-level, $W_{z(i)}$ area-level control variables. The parameter δ_t is a year fixed effect. The coefficients β_s, are the parameters of interest. They show the achievement gap between students living in areas with lower or higher shares of foreign currency-denominated loans. This gap is normalized to be zero for year 2008, hence β_s shows the achievement gap in year s relative to 2008, the last year before the crisis. We calculate robust standard errors clustered two-way at the class-by-year and the postal code level.

Figure 6 presents the $\hat{\beta}_s$ estimates for students in grade 8 both for mathematics and reading comprehension (results for other grades are available in the Appendix). The coefficients for 2006 and 2007 are close to zero and insignificant, indicating that the gap between more and less exposed areas was similar to that of 2008 in the preceding years. A declining trend in later parameters implies a widening gap in performance between children living in more exposed and less exposed areas. However, the estimates are not statistically significant for all years. The result for mathematics shows a less clear pattern; the point estimates are not significantly different from zero in the first three years after the start of the crisis. By 2012, children from areas where all loans were in foreign currencies would have had an additional 0.4 standard deviations worse test scores than children with no exposure. The pattern for grade 6 students is similar, while in grade 10, there is no apparent decline in performance relative to 2008 (see Figures A.4 and A.5 in the Appendix).

Although these results suggest that the crisis could have affected children, students living in more exposed areas are different, and this difference might bias the previous estimates. Unobserved student and school characteristics might be correlated with exposure. For example, students living in more exposed areas have lower-educated parents on average, and parental education is an essential determinant of the development of children. Similarly, school quality might be lower in more exposed regions, which we take into account in our identification strategy.

4.3 Robustness checks

This subsection demonstrates that our results are robust to alternative explanations which would threaten our identification.

Alternative measures of foreign currency debt exposure. We corroborate our findings by showing in Table 3 that our results are robust to an alternative definition of foreign currency debt exposure.

For the proportional rise in household debt attributable to the currency movements, our $\Delta\hat{d}$, we need no new estimates. As we noted in footnote 12, this measure is just the foreign currency share rescaled by the depreciation of the forint against the debt-share-weighted basket of those currencies. As Swiss franc appreciates 29% against the Hungarian currency between September 2008 and mid-2010, we can simply divide the coefficients in Table 1 by 0.3 to get the corresponding coefficients on $\Delta\hat{d}_z$. Thus a 10% rise in debt would have hinder progress in math by 5% of the cross-sectional standard deviation, and 3.6% for reading comprehension.

We also learn from Table 3 that an additional 10% of annual disposable income in debt (our Δd_z^{inc}) would detriment the math scores by 5.8% of the cross-sectional standard deviation, and 4.3% in reading. This is in line with the scaling of $\Delta\hat{d}$ as this would be roughly equivalent to doubling the baseline debt of households in 2008.

Selective commuting Student commuting is associated with a higher share of foreign currency loans in the residential area. However, unobserved characteristics of such students might be wrongly attributed to distress. Therefore we focus on the development of children between grades 8 and 10 when students enter secondary school. There are fewer of them, which makes it necessary for many students to commute. Moreover, classes are more homogenous in secondary schools because admission is conditional on an entrance exam.

Using within-school variation to estimate the effect implies that we compare students attending the local school to commuting students living in other areas. Commuting students might have different unobservable characteristics. For example, they might have more caring parents, because they choose not to send their kids to the local school. In line with this conjecture, Kertesi and Kézdi (2005) document that primary school-aged children who commute have better-educated parents on average. The typical commuting pattern is that children living in small villages commute to a nearby town. As foreign currency share is higher in villages than in towns, this implies a positive correlation between unobservable family characteristics and foreign currency share. If any of this were present in the data even conditional on our controls, the effect of exposure would be overestimated (closer to zero for detrimental effects).

Because of the potentially unobservable characteristics of commuting children in primary school, we focus on the development of students between grade 8 and grade 10 as it mitigates the commuters selection problem. Using this sample of students instead of focusing on the

development of children between grades 6 and 8 mitigates the selection problem stemming from commuting for two reasons. First, there is an entry requirement to secondary schools, which implies that at the beginning of the secondary school, the within-class variation is much smaller than the same variation in grade 6. Second, the number of secondary schools is much smaller than the number of primary schools. This makes a necessity for many students to commute, as there is no local secondary school.

The placebo tests in Table 2 also address the concern about selective commuting. They test a compound hypothesis that commuting does not produce mechanical patterns before and nor is the 2008 foreign loan share correlated with performance changes conditional on controls. Maintaining the combination of these two hypotheses is not equivalent to maintaining both on their own. However, we consider it unlikely that changing patterns in commuting and local development just happened to cancel out confounding patterns in the pre-period.

Controlling for other local characteristics Our identification strategy exploits postal code level variation in household foreign currency debt exposure. Because of this feature of our empirical approach, we cannot include postal code fixed effects as a control variable. Hence any postal code characteristic that is correlated with foreign currency debt exposure and affects students' cognitive skill development poses a threat to our identification. To rule this out, we directly control for these postal code characteristics as a next step.

Table 4 summarizes these results. It shows that controlling for postal code characteristics does no affect the main results. We control for characteristics that are correlated with household foreign currency debt exposure documented in Table 4. These include settlement level education, as well as income and the unemployment rate before the crisis.

Other cohorts We also examine the impact of the crisis on other cohorts. The child development literature finds that the early years are critical (see Heckman (2008) for an overview); therefore, we look at how younger children are affected. Then we analyze the effect for the same age group for younger cohorts that were already affected by the crisis when they took the first test.

Despite the commuter's selection problem, we begin by measuring the effect of the crisis between grades 6 and 8. Results are presented in Table 5 for students who were in grade 6 in 2008. It is indicative of the selection stemming from commuting that the point estimates of FCS are positive without individual control variables. Once we include student characteristics as covariates, we find no effect of the crisis. This result remains if we add school or class fixed effects. In the last column, we drop students that attend the local school. Using only the commuting students' foreign currency share still not have a significant effect; moreover,

the point estimates are positive.

Next, we measure the effect of foreign currency debt exposure between grades 8 and 10 for younger cohorts. Appendix Table A.3 presents the results for the cohort that was in grade 8 in 2009 and grade 10 in 2011, while Appendix Table A.4 shows the estimates for the cohort that was in grade 8 in 2010 and grade 10 in 2012. Between 2009 and 2011, we find negative point estimates, but the results are insignificant. Between 2010 and 2012 the point estimates are significantly negative, the coefficient for mathematics is similar to the one using the sample between 2008-2010, but the point estimate on reading is 50 percent larger than between 2008 and 2010.

These younger cohorts had already been affected by the depreciation when they took the tests in grade 8. If the crisis harmed younger students as well, despite our null results, then the crisis could have had an ongoing negative impact on child development. Interestingly, though we can find no effect between grades 6 and 8 for the cohort that was in grade 6 in 2008, for the same cohort, we find a significant negative effect of the crisis between grades 8 and 10.

These results suggest that during the crisis, student achievement declined persistently in more exposed areas. Compared to the baseline results, these students were already affected by the crisis at the time of the first test they took. This suggests that the negative impact of the crisis was not just a one-time shock to children's development but continued to hinder student performance.

Other outcomes. We also examine the self-reported GPA and the grades of students. Table 6 reports the results. As schools also grade student discipline and diligence, we also have a glimpse of non-cognitive skills, though not from standardized measurements. Children coming from distressed areas seem to fall behind on "diligence," which closely resembles perseverance and grit (Alan et al., 2019).

The changes in math and reading grades, which run on a 1-5 scale in Hungary, are just as prominent as the effects on standardized test scores.

5 Mechanisms

The previous section documented the negative effect of the household balance sheet shock on student achievement. This section explores the channels through which the household debt shock could have influenced the cognitive skills of students.

Unemployment. Increased unemployment might explain the decline in the cognitive skills of students. A household balance sheet shock increases unemployment as affected households cut back consumption, and local firms facing decreasing demand lay off some of their employees (Mian and Sufi, 2014). Therefore unemployment increased more in areas more exposed to the exchange rate shock. Verner and Gyöngyösi (2018) show that foreign currency debt exposure of households significantly worsened the depth of the local downturn. One-fourth of the increase in unemployment can be attributed to foreign currency debt exposure of households.

As parental job loss harms student achievement (Rege et al., 2011; Stevens and Schaller, 2011), this channel might mediate the negative impact of the household debt revaluation. Parents living in more exposed regions are more likely to lose their jobs. Therefore the observed decline of student performance might be explained by the increasing unemployment of the parents, rather than the financial distress of households.

As a first step, we use the self-reported employment status of parents from the survey to control for parental job loss.[16] We focus on the cohort that was in grade 8 in 2008. In Table 7, we document that controlling for the 2010 paternal and maternal employment status, either separately or jointly, does not change the point estimate of FCS.

Parent-teacher conferences.

Table 8 documents that parents report a 7 percentage point difference in parent-teacher conference attendance across areas with only foreign currency loans or none. This can be a sign of stress, disillusionment, time constraints, or "scarcity" of mental bandwidth (Mullainathan and Shafir, 2013), but a proximate cause of the children falling behind during the transition from middle school years to high school regardless.

Extracurricular activities.

We also see some signs that exposed families report somewhat fewer extracurricular activities, including math or foreign language tutoring, music lessons, or sports. These results in Table 9 are slight and not statistically significant, but in contrast with the pretrends we report in Appendix Table A.5 that the exposed areas would have sent their children of this age to more activities if anything, not less. This again can be a sign of lack of resources in these areas, a proximate cause of the children progressing slower.

[16]The NABC questionnaire differentiates between several kinds of employment status: having a permanent job, being self-employed, working regularly, having odd jobs, being unemployed, on disability benefits, receiving child support.

Alternative mechanisms. The financial distress of families can affect child outcomes through several channels. A conventional interpretation of the financial distress of households might emphasize the drop in disposable income. However, other channels might be similarly influential.

Economic hardship could increase the stress level of parents. Involuntary unemployment is documented to increase mental stress (McKee-Ryan et al., 2005; Kuhn et al., 2009). The debt shock-induced financial stress of households could have similar effects on mental stress. Increased mental stress could, therefore, influence the way parents interact with their children; they might become less patient, less caring. Which, in turn, could affect the cognitive development of children in schools.

Parents might increase their labor supply as a result of the debt shock. To counter the drop in household disposable income, parents might take a second job. This could change both the amount and quality of time they spend with their children. Less time with children might have a detrimental effect on children's outcomes.

Economic hardship might also increase the chance of marital dissolution (Charles and Stephens, 2004). Divorce is documented to have adverse effects on children; hence, it could be an essential channel for declining student performance.

One outcome we see about families' plans and ambition is the child's stated aspiration to go to college. In Table 10, we document a 6 percentage point drop in such plans among the children from exposed areas entering secondary school during the crisis. This contrasts with the same age group from the same areas two years earlier, more of whom said in tenth grade to pursue higher education than in less exposed areas (Table A.6).

School fixed effects Though our main specification controls for school-level inputs such as teacher quality and school expenditures, the foreign currency debt crisis could have had an impact on school inputs as well.[17] This implies that we may underestimate the true effect of the crisis on student achievement by exploiting within-school variation. We now examine how schools' contributions to the cognitive development of students are related to foreign currency debt exposure.

We estimate the school fixed effects using equation 1 using mathematics test scores as the outcome for the 2008-10 period. Then we relate the estimated school fixed effects to school-level average student foreign currency debt exposures. Figure 7 summarizes the results using the binned scatterplots. Panel a) shows that foreign currency debt exposure is positively related to foreign currency debt exposure in the post-2008 period. This suggests that schools

[17] For example Maturana and Nickerson (2019) show that teacher financial distress has a negative impact on student performance.

in more exposed regions were able to improve the test scores of their students more than schools in less exposed regions. Controlling for postal code characteristics and weighting by the size of the school does not change this pattern (Table A.8).

When we re-estimate our main regression for the pre-crisis period, we find a weaker correlation between foreign currency exposure and school fixed effects (panel b).

6 Conclusion

We presented causal evidence that schoolchildren living amidst more debt fell behind on subsequent practice-oriented tests. This suggests that the costs of the credit cycle and financial crises are even higher than gauged from more immediate outcomes. These costs might be particularly high in present value if the effects persist over the next generation's lifecycle. By the same logic that drives why more social programs targeting children have a large marginal value of public funds (Hendren and Sprung-Keyser, 2020), it would be more likely that interventions to mitigate the aftermath of debt crises are worth their costs.

Our findings are especially disconcerting because the effects on children's human capital accumulation are even less likely to be internalized ex ante by the contracting parties. This externality comes on top of other significant effects recently documented to result from financial distress ex post.

Future work might use the same research design to estimate the causal impact on adult earnings, as the affected children enter the labor force.

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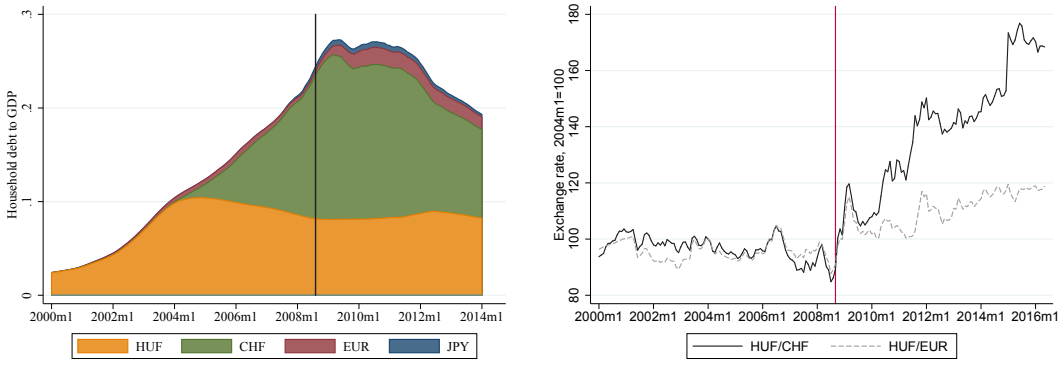
Figure 1: Household debt and exchange rate

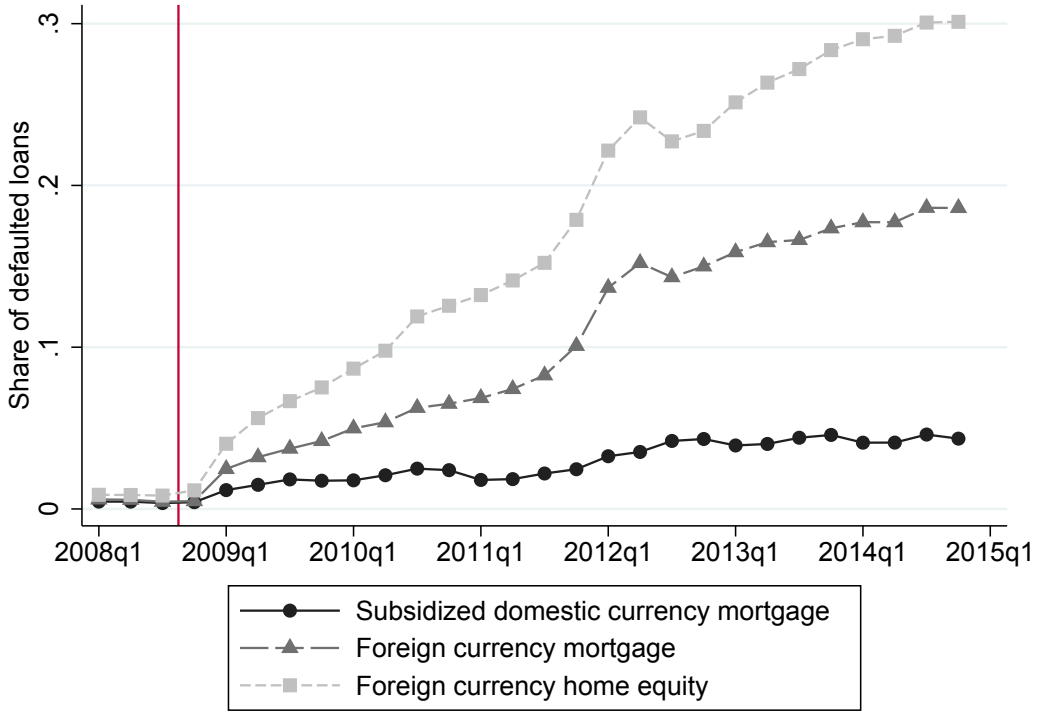


(a) Household debt to GDP

(b) Exchange rate

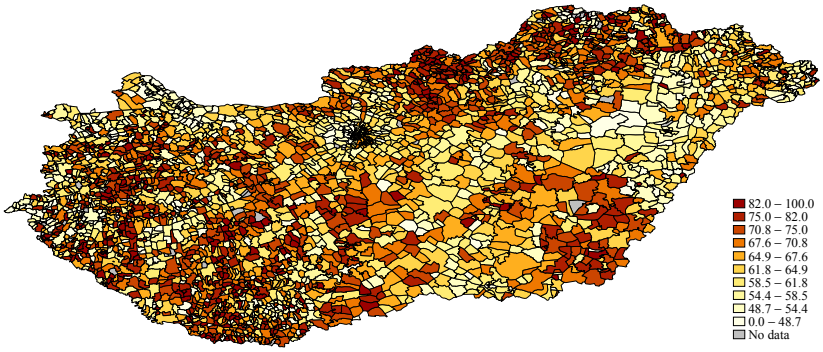
Notes: Panel a) This figure shows total household debt relative to GDP by currency denomination. Panel b) This figure plots the HUF/CHF (solid line) and HUF/EUR (dashed line) exchange rates relative to January 2004. A positive number indicates a depreciation of the domestic currency relative to January 2004. The vertical lines represent September 2008 in both panels.

Figure 2: Non-performing loans over time



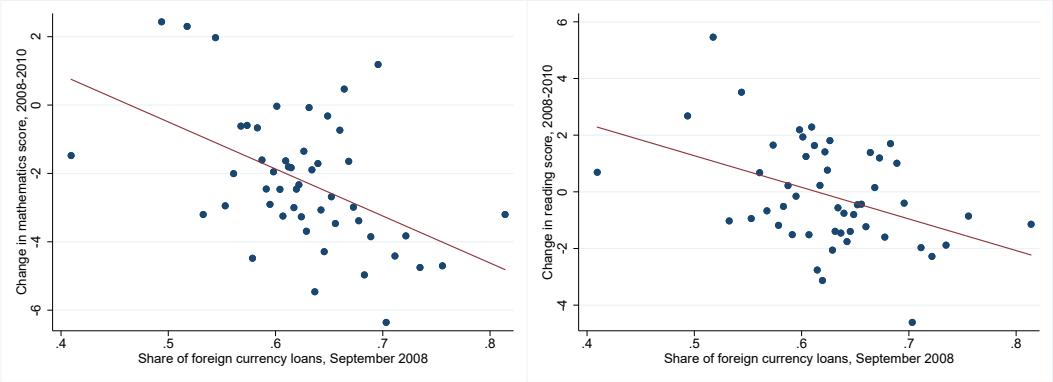
Note: The vertical line represents September 2008.

Figure 3: Share of foreign currency loans in September 2008



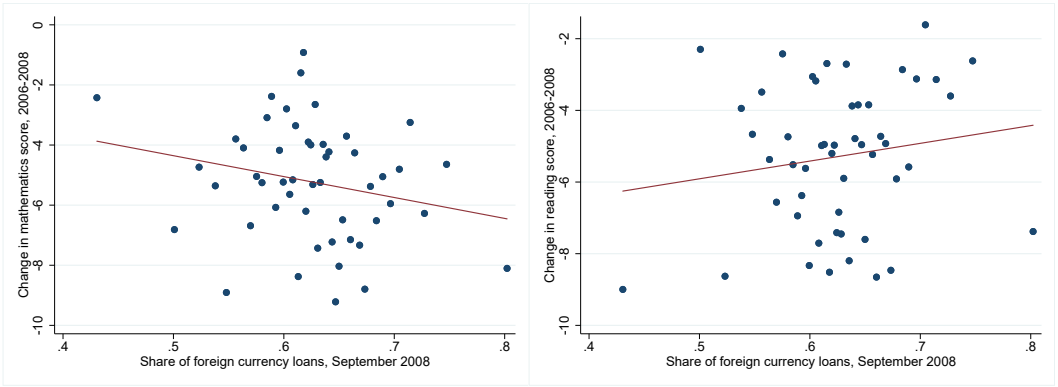
NOTE: The chloropleth map depicts the share of outstanding household debt calculated in foreign currency as of September 2008 per postal code, as reported by the central bank. The shading shows the deciles of the share of foreign currency denominated loans.

Figure 4: Cognitive skills improvements and foreign currency denominated loan share after the crisis



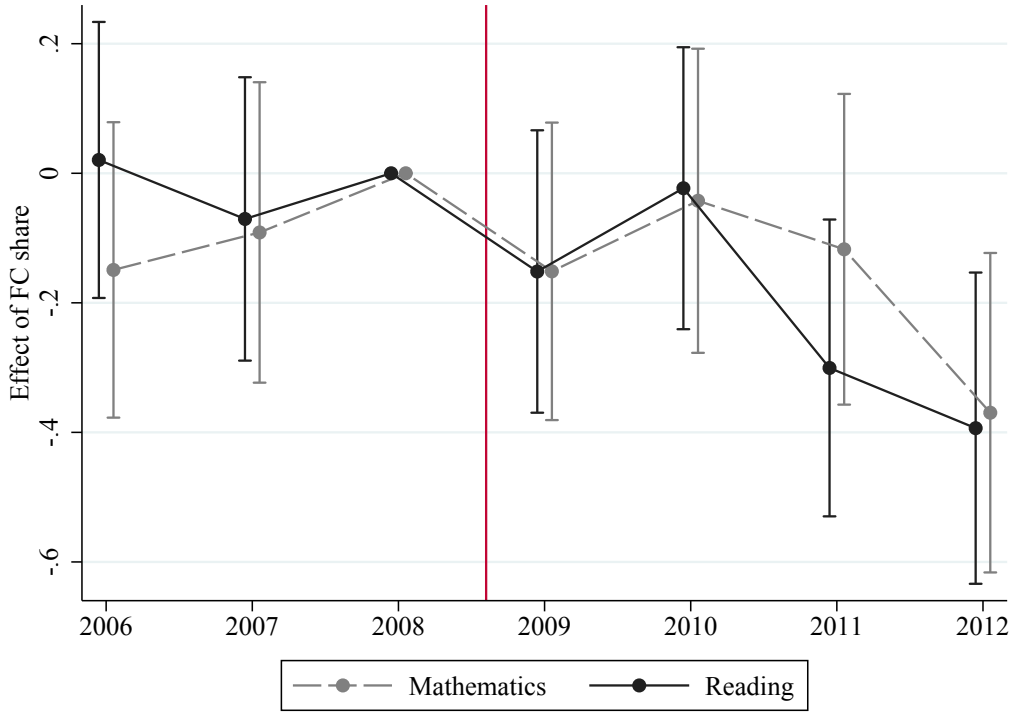
NOTE: The figure illustrates the partial correlation of foreign currency-denominated debt shares of residence at the time of the crisis (September 2008) and changes in standardized math and reading scores from grades 8 to 10 from May 2008 to May 2010. The regression line is overlaid average standardized test score changes in 50 equal-sized bins of foreign currency share in the postal code of residence. Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted.

Figure 5: Cognitive skills improvements and foreign currency denominated loan share before the crisis



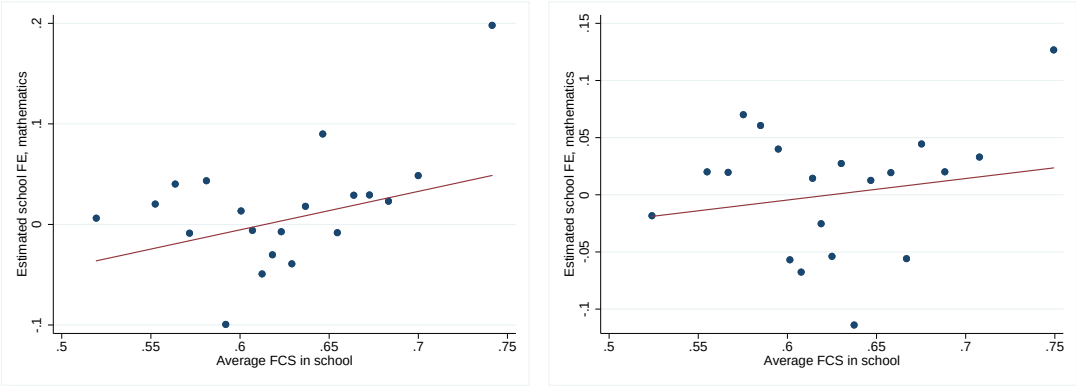
NOTE: The figure illustrates a placebo test of correlating foreign currency-denominated debt shares of residence at the time of the crisis (September 2008) and changes in standardized math and reading scores from grades 8 to 10 from May 2006 to May 2008. The regression line is overlaid average standardized test score changes in 20 equal-sized bins of foreign currency share in the postal code of residence. Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted.

Figure 6: The relation between foreign currency debt exposure and student performance over time in grade 8



Note: The figure collects coefficients from two linear regression of standardized test scores on the foreign currency-denominated debt share of residence at the time of the crisis (September 2008) interacted with the cohort for eighth-graders pooled over the years. The solid black line correspond to math scores, the gray dashed line to reading. Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects. Standard errors are clustered by (later) class and postal code.

Figure 7: Estimated school fixed effects and foreign currency debt exposure



(a) School FE for the period 2008-10

(b) School FE for the period 2006-8

Notes: Panel a) This figure shows the binned scatterplot of estimated school fixed effects in mathematics for the period 2008-10 on the average foreign currency debt exposure. Panel b) reports the same but the school fixed effect is estimated between 2006-8.

Table 1: Main results on the effect of foreign currency share between 2008-2010

	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	-.07171	-.07446	-.06697	-.1372*	-.1376*
	(.06130)	(.06391)	(.06432)	(.05885)	(.05636)
R^2	0.0000845	0.0000893	0.0271	0.100	0.187
Observations	73915	73764	61811	61801	61777
Panel B: Reading					
FC share	-.00713	-0.02583	-.01786	-.1050*	-.1116*
	(.04658)	(.04819)	(.05027)	(.04582)	(.04516)
Loan penetration		✓	✓	✓	✓
Student characteristics			✓	✓	✓
School FE				✓	
Class FE					✓
R^2	0.000000922	0.000267	0.00535	0.0694	0.150
Observations	73922	73771	61809	61799	61775

NOTES: The table reports on linear regressions of changes in standardized math and reading test scores from grades 8 to 10 from May 2008 to May 2010 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 2: Parallel trend test for the pre-crisis period between 2006 and 2008

	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	-.03157	-.01296	-.00123	-.08533	-.06958
	(.05104)	(.05202)	(.05213)	(.05384)	(.05411)
R^2	0.0000218	0.000214	0.00922	0.0846	0.183
Observations	41282	41158	38651	38619	38504
Panel B: Reading					
FC share	-.07863	-.05890	.02141	.02925	.04947
	(.05287)	(.05365)	(.05429)	(.05274)	(.05431)
Loan penetration		✓	✓	✓	✓
Student characteristics			✓	✓	✓
School FE				✓	
Class FE					✓
R^2	0.000120	0.000294	0.0200	0.0862	0.185
Observations	41296	41172	38661	38629	38515

NOTE: The table reports on linear regressions of changes in standardized math and reading test scores from grades 8 to 10 from May 2006 to May 2008 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 3: Alternative measures

	All students				
	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
Debt revalution to inc.	-0.0311	-0.376	-0.318	-0.565^{+}	-0.580^{+}
	(0.121)	(0.359)	(0.361)	(0.318)	(0.319)
R^2	0.00000440	0.0000984	0.0311	0.105	0.114
Observations	73766	73766	62258	62247	62244
Panel B: Reading					
Debt revalution to inc.	-0.145	-0.258	-0.207	-0.407^{+}	-0.434^{+}
	(0.0980)	(0.271)	(0.275)	(0.233)	(0.239)
R^2	0.000107	0.000242	0.00889	0.0735	0.0817
Observations	73773	73773	62257	62246	62243
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes in standardized math and reading test scores from grades 8 to 10 from May 2008 to May 2010 on changes in debt-to-income ratios at residence. Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 4: Robustness of main effects to adding covariates

	All students		
	(1)	(2)	(3)
Panel A: Mathematics			
FC share	-0.0924	-0.123^{+}	-0.126*
	(0.0623)	(0.0660)	(0.0632)
Unemployment rate, 2007	-0.819**		
	(0.285)		
College share		0.000383	
		(0.000641)	
Disp. income, 2007			0.00000840
			(0.0000301)
R^2	0.111	0.110	0.110
Observations	62372	62338	62372
Panel B: Reading			
FC share	-0.0933^{+}	-0.148**	-0.134**
	(0.0479)	(0.0513)	(0.0492)
Unemployment rate, 2007	0.00259		
	(0.191)		
College share		-0.00159**	
		(0.000524)	
Disp. income, 2007			-0.0000794**
			(0.0000243)
R^2	0.0780	0.0781	0.0783
Observations	62370	62336	62370
Loan penetration	✓	✓	✓
Student characteristics	✓	✓	✓
Class FE	✓	✓	✓

NOTE: The table reports on linear regressions of changes in math and reading test scores from grades 8 to 10 from May 2008 to May 2010 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 5: Sixth-grade results on the effect of foreign currency share between 2008-2010

	All students				
	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	0.144*	0.119+	0.0558	0.0296	0.0285
	(0.0649)	(0.0669)	(0.0677)	(0.0544)	(0.0480)
R^2	0.000356	0.000585	0.00723	0.231	0.274
Observations	84743	84587	72907	72897	72891
Panel B: Reading					
FC share	0.0441	0.0308	0.0269	0.0174	-0.0260
	(0.0505)	(0.0518)	(0.0520)	(0.0499)	(0.0499)
R^2	0.0000357	0.000166	0.00815	0.128	0.152
Observations	84746	84590	72915	72905	72899
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes in math and reading test scores from grades 6 to 8 from May 2008 to May 2010 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 6: Effects on GPA of foreign currency denominated loan share before the crisis

	All students				
	(1)	(2)	(3)	(4)	(5)
Panel A: GPA					
FC share	-0.101^{+}	-0.0985^{+}	-0.112*	-0.167**	-0.168**
	(0.0544)	(0.0547)	(0.0541)	(0.0483)	(0.0470)
R^2	0.000266	0.000292	0.0102	0.137	0.167
Observations	43571	43490	41209	41189	41184
Panel B: Mathematics grade					
FC share	0.00448	-0.0119	-0.0866	-0.361**	-0.367**
	(0.104)	(0.104)	(0.102)	(0.0809)	(0.0801)
R^2	0.000000138	0.000118	0.0135	0.142	0.169
Observations	54534	54428	50977	50961	50958
Panel C: Reading grade					
FC share	-0.228*	-0.250**	-0.319**	-0.318**	-0.318**
	(0.0912)	(0.0898)	(0.0887)	(0.0766)	(0.0763)
R^2	0.000419	0.000508	0.00943	0.123	0.151
Observations	54083	53975	50578	50563	50559
Panel D: Grade for discipline					
FC share	-0.0770	-0.0940	-0.0881	-0.0220	-0.0289
	(0.0575)	(0.0600)	(0.0596)	(0.0561)	(0.0553)
R^2	0.0000785	0.000251	0.00478	0.0657	0.0756
Observations	54066	53963	50583	50567	50562
	(1)	(2)	(3)	(4)	(5)
Panel E: Grade for diligence					
FC share	0.0299	-0.0196	-0.0730	-0.137*	-0.137*
	(0.0729)	(0.0733)	(0.0721)	(0.0661)	(0.0648)
R^2	0.00000944	0.000430	0.00405	0.0863	0.106
Observations	53669	53565	50212	50194	50190
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes of GPAs (as recorded by parents in the survey) from grades 8 to 10 from May 2006 to May 2008 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 7: Sensitivity of effects to parental employment controls

	All students		
	(1)	(2)	(3)
Panel A: Mathematics			
FCS	-.2140**	-.2353**	-.2396**
	(.07484)	(.08146)	(.08334)
R^2	0.201	0.211	0.214
Observations	62386	53293	50839
Panel B: Reading			
FCS	-.2291**	-.2177**	-.2094**
	(.07271)	(.07777)	(.08035)
R^2	0.174	0.178	0.180
Observations	62384	53301	50843
Area indebtedness	✓	✓	✓
Student characteristics	✓	✓	✓
Class FE	✓	✓	✓
Mother's employment		✓	✓
Father's employment			✓

NOTE: The table reports on linear regressions of changes in raw math and reading test scores from grades 8 to 10 from May 2008 to May 2010 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education and employment status, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 8: Effects on parent-teacher conference attendance of foreign currency denominated loan share

	(1)	(2)	(3)	(4)	(5)
FC share	-0.162**	-0.143**	-0.0736**	-0.0693*	-0.0666*
	(0.0243)	(0.0249)	(0.0248)	(0.0272)	(0.0273)
R^2	0.00119	0.00146	0.0130	0.0423	0.0476
Observations	58111	57997	54348	54348	54348
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes of parent-teacher conference attendance (as recorded by parents in the survey) from grades 8 to 10 from May 2008 to May 2010 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table 9: Effects on extracurriculars of foreign currency denominated loan share

	All students				
	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	-0.00121	-0.00896	-0.00503	0.0295	0.0304
	(0.0258)	(0.0263)	(0.0272)	(0.0279)	(0.0281)
R^2	5.86e-08	0.0000607	0.00190	0.0348	0.0406
Observations	54736	54627	51208	51208	51208
Panel B: Foreign language					
FC share	-0.00192	0.00441	0.0214	-0.00619	-0.00468
	(0.0229)	(0.0234)	(0.0241)	(0.0266)	(0.0269)
R^2	0.000000152	0.0000417	0.00140	0.0344	0.0370
Observations	53979	53874	50554	50554	50554
Panel C: Music					
FC share	0.00289	0.00421	-0.0229	-0.0300	-0.0303
	(0.0155)	(0.0161)	(0.0162)	(0.0194)	(0.0195)
R^2	0.000000778	0.000116	0.00460	0.0319	0.0340
Observations	52915	52812	49532	49532	49532
Panel D: Sport					
FC share	-0.0426$^+$	-0.0284	-0.0285	-0.0375	-0.0365
	(0.0241)	(0.0244)	(0.0249)	(0.0297)	(0.0300)
R^2	0.0000601	0.000199	0.000641	0.0246	0.0278
Observations	53854	53750	50399	50399	50399
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes of extracurriculars (as recorded by parents in the survey) from grades 8 to 10 from May 2008 to May 2010 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

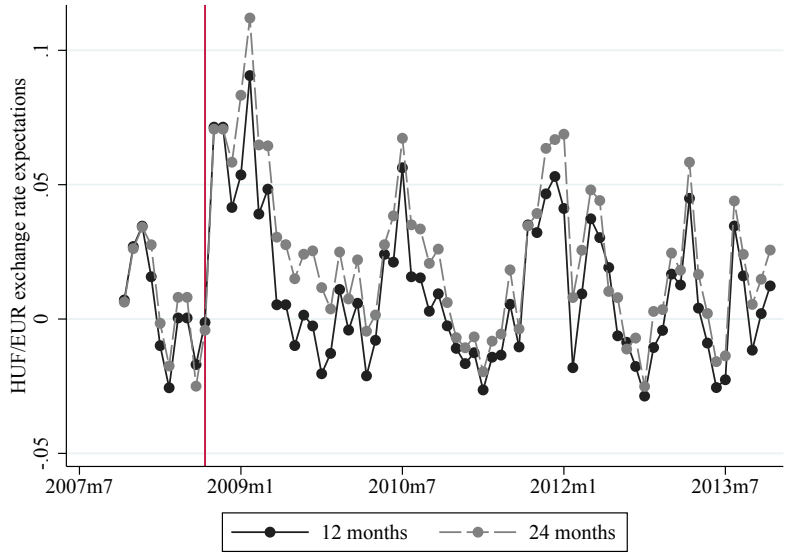
Table 10: Effects on college-going aspirations of foreign currency denominated loan share before the crisis

	All students				
	(1)	(2)	(3)	(4)	(5)
FC share	-0.0507*	-0.0559*	-0.0190	-0.0589*	-0.0601*
	(0.0250)	(0.0254)	(0.0262)	(0.0267)	(0.0264)
R^2	0.0000854	0.000150	0.0165	0.0576	0.0682
Observations	81927	81768	66955	66955	66955
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes of college-going aspirations (as recorded by parents in the survey) from grades 8 to 10 from May 2008 to May 2010 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

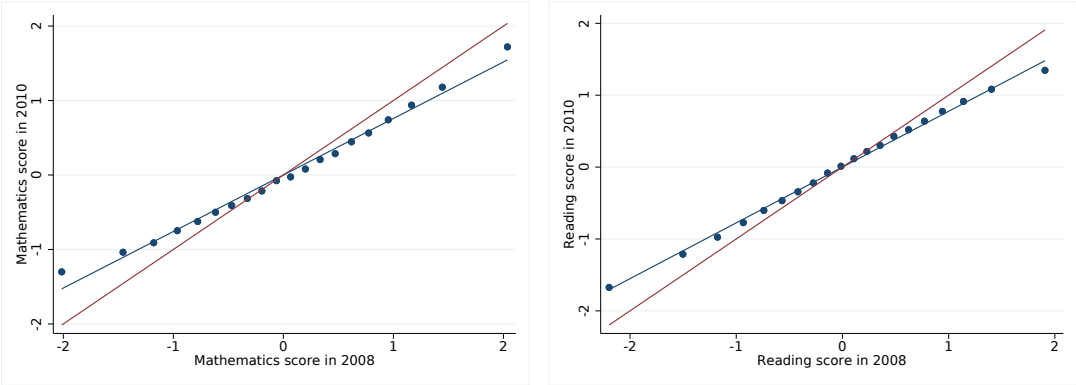
A Appendix Tables and Figures

Figure A.1: Exchange rate expectations



NOTE: The figure plots the HUF/EUR exchange rate expectations of experts from the Consensus Economics survey over time. The solid line represents the expectations on 1-year, the dashed line on 2-years horizon in the given month. Positive values represent depreciation of HUF. The vertical line represents September 2008.

Figure A.2: Mean reversion in test scores

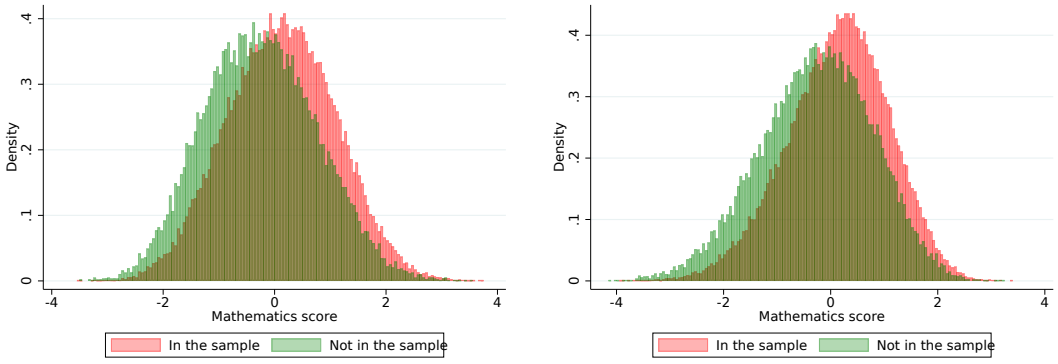


(a) Mathematics score

(b) Reading score

Notes:

Figure A.3: Comparison of grade 8 students in 2008 by sample status

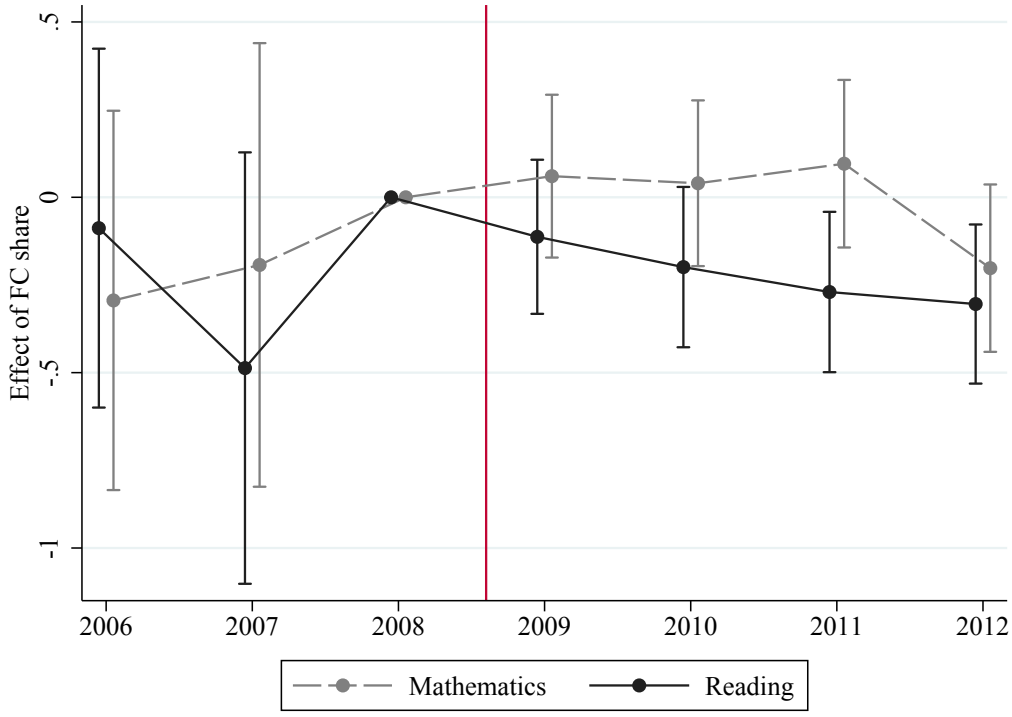


(a) Mathematics score

(b) Reading score

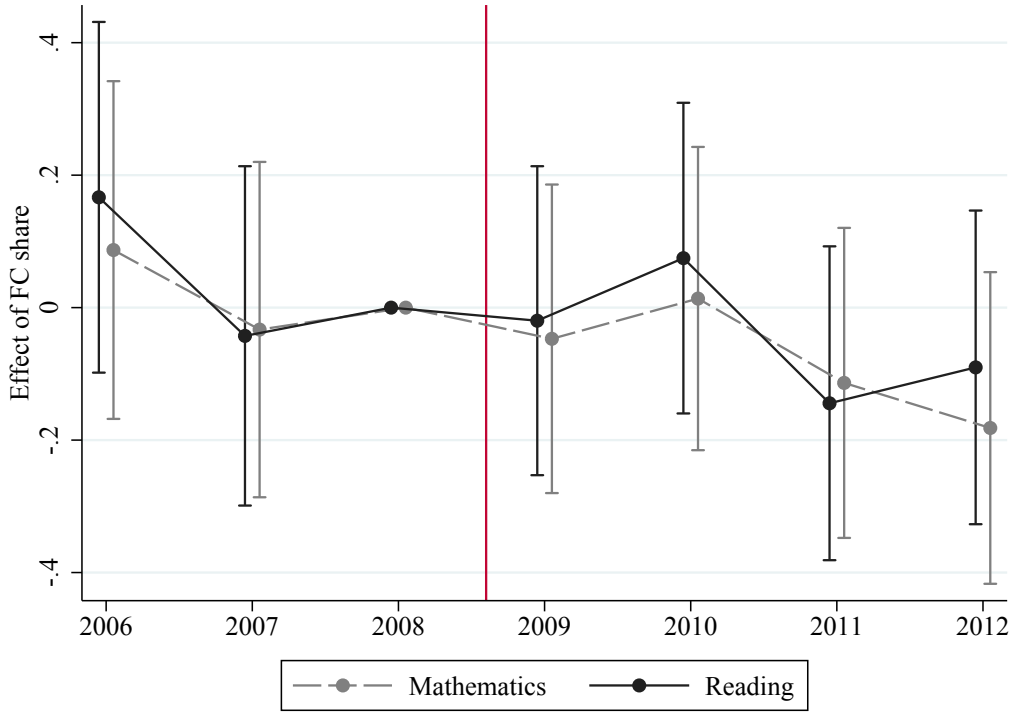
Notes:

Figure A.4: The relation between foreign currency debt exposure and student performance over time in grade 6



NOTE: The figure collects coefficients from a linear regression of standardized test scores on the foreign currency-denominated debt share of residence at the time of the crisis (September 2008) interacted with the cohort for sixth-graders pooled over the years. Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects. Standard errors are clustered by (later) class and postal code.

Figure A.5: The relation between foreign currency debt exposure and student performance over time in grade 10



Note: The figure collects coefficients from a linear regression of standardized test scores on the foreign currency-denominated debt share of residence at the time of the crisis (September 2008) interacted with the cohort for tenth-graders pooled over the years. Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects. Standard errors are clustered by (later) class and postal code.

Table A.1: Correlations between foreign currency share and student characteristics

	Coefficient	Standard error	N	R^2
Mathematics score	-1.277**	.083	91004	.013
Reading score	-1.351**	.077	90992	.015
Previous GPA	-.849**	.054	65814	.01
Grade retention in grade 1-4	.075**	.010	79922	.0011
Mother has tertiary education	-.603**	.030	79189	.017
Receive free textbooks	.455**	.033	79606	.0067
Attend local school	.619**	.041	80508	.014
Age	.128**	.030	95780	.00042

NOTE: The table collects estimates from univariate regressions of eighth-graders' characteristics on the foreign currency share of their postal code in 2008, in the linked NABC-KHR data.

Table A.2: Average characteristics of foreign and local currency borrowers

	(1) FC	(2) LC	(3) Rest	(4) FC-LC difference
Low education	0.13	0.20	0.28	-0.07***
	(0.33)	(0.40)	(0.45)	(-4.76)
Medium education	0.67	0.63	0.57	0.04*
	(0.47)	(0.48)	(0.50)	(2.01)
High education	0.20	0.17	0.16	0.03*
	(0.40)	(0.38)	(0.36)	(2.09)
DK / NA Income	0.18	0.14	0.19	0.04**
	(0.38)	(0.34)	(0.39)	(2.79)
Low Income	0.24	0.31	0.37	-0.07***
	(0.43)	(0.46)	(0.48)	(-4.05)
Medium Income	0.26	0.30	0.25	-0.03
	(0.44)	(0.46)	(0.43)	(-1.88)
High Income	0.32	0.26	0.19	0.07***
	(0.47)	(0.44)	(0.40)	(3.68)
Age	41.77	43.21	50.11	-1.44**
	(11.44)	(12.95)	(18.10)	(-2.93)
Have children	0.49	0.41	0.21	0.08***
	(0.50)	(0.49)	(0.40)	(3.81)
Size of household	3.10	2.86	2.39	0.24***
	(1.22)	(1.24)	(1.23)	(4.95)
Employed	0.69	0.61	0.42	0.08***
	(0.46)	(0.49)	(0.49)	(4.46)
Retired	0.13	0.20	0.39	-0.06***
	(0.34)	(0.40)	(0.49)	(-4.16)
Self-employed	0.05	0.04	0.03	0.01
	(0.22)	(0.19)	(0.17)	(1.72)
Able to save money	0.12	0.12	0.14	-0.00
	(0.32)	(0.33)	(0.35)	(-0.21)
Municipality $<$ 5,000	0.32	0.33	0.29	-0.00
	(0.47)	(0.47)	(0.46)	(-0.14)
Municipality 5,000-100,000	0.46	0.42	0.40	0.04*
	(0.50)	(0.49)	(0.49)	(2.15)
Municipality $>$ 100,000	0.22	0.26	0.31	-0.04*
	(0.41)	(0.44)	(0.46)	(-2.34)
Observations	1569	1061	5389	2630

NOTE: The table tabulates averages for three groups of Hungarian borrowers from the Euro Survey of the National Bank of Austria, 2007-2011. An individual is classified as borrowing in a foreign currency (FC) if she has any foreign currency-denominated debt. Local currency (LC) debtors are defined to have only local currency-denominated debt.

Table A.3: Effect of foreign currency share on eighth-graders after 2009

	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	-.1280*	-.08870	-.02769	-.05845	-.08216
	(.06325)	(.06487)	(.06587)	(.05857)	(.05676)
R^2	0.000269	0.000647	0.0147	0.0942	0.182
Observations	75737	75558	59617	59604	59577
Panel B: Reading					
FC share	-.09653*	-.08270$^+$	-.02181	-.08524$^+$	-.08596$^+$
	(.04711)	(.04814)	(.04961)	(.04754)	(.04636)
Loan penetration		✓	✓	✓	✓
Student characteristics			✓	✓	✓
School FE				✓	
Class FE					✓
R^2	0.000163	0.000217	0.00467	0.0662	0.148
Observations	75757	75579	59626	59613	59586

NOTE: The table reports on linear regressions of changes in math and reading test scores from grades 8 to 10 from May 2009 to May 2011 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table A.4: Effect of foreign currency share on eighth-graders after 2010

	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	-.2817**	-.2409**	-.1412+	-.1740**	-.1522*
	(.06816)	(.07150)	(.07269)	(.06544)	(.06346)
R^2	0.00124	0.00164	0.0119	0.0902	0.184
Observations	74863	74676	61440	61431	61401
Panel B: Reading					
FC share	-.2203**	-.2114**	-.1459**	-.1921**	-.1851**
	(.04767)	(.05008)	(.05038)	(.04819)	(.04703)
Loan penetration		✓	✓	✓	✓
Student characteristics			✓	✓	✓
School FE				✓	
Class FE					✓
R^2	0.000853	0.000866	0.0252	0.0716	0.146
Observations	74896	74709	61462	61453	61423

NOTE: The table reports on linear regressions of changes in math and reading test scores from grades 8 to 10 from May 2010 to May 2012 on foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, age, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table A.5: Effects on extracurriculars of foreign currency denominated loan share before the crisis

	All students				
	(1)	(2)	(3)	(4)	(5)
Panel A: Mathematics					
FC share	0.00335	0.0116	0.0384	0.0641^{+}	0.0634^{+}
	(0.0335)	(0.0339)	(0.0344)	(0.0367)	(0.0370)
R^2	0.000000425	0.0000638	0.00302	0.0563	0.0606
Observations	31951	31857	30281	30281	30281
Panel B: Foreign language					
FC share	-0.0208	-0.00961	0.0231	0.00981	0.00577
	(0.0356)	(0.0368)	(0.0377)	(0.0420)	(0.0424)
R^2	0.0000158	0.0000918	0.00331	0.0505	0.0536
Observations	31472	31380	29849	29849	29849
Panel C: Music					
FC share	0.0158	0.0227	0.000101	-0.00865	-0.00797
	(0.0223)	(0.0228)	(0.0228)	(0.0289)	(0.0291)
R^2	0.0000203	0.0000841	0.00447	0.0511	0.0534
Observations	30802	30713	29203	29203	29203
Panel D: Sport					
FC share	-0.0130	0.00379	0.00897	-0.0299	-0.0310
	(0.0333)	(0.0343)	(0.0350)	(0.0450)	(0.0453)
R^2	0.00000527	0.0000893	0.00115	0.0360	0.0398
Observations	31415	31323	29774	29774	29774
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓

NOTE: The table reports on linear regressions of changes of extracurriculars (as recorded by parents in the survey) from grades 8 to 10 from May 2006 to May 2008 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table A.6: Effects on college-going aspirations of foreign currency denominated loan share before the crisis

	All students				
	(1)	(2)	(3)	(4)	(5)
FC share	0.116**	0.125**	0.0672*	0.0208	0.0203
	(0.0320)	(0.0325)	(0.0316)	(0.0319)	(0.0317)
Loan penetration		✓	✓	✓	✓
Student characteristics				✓	✓
School FE				✓	
Class FE					✓
R^2	0.000502	0.000549	0.0138	0.0657	0.0735
Observations	44181	44045	41604	41604	41604

NOTE: The table reports on linear regressions of changes of college-going aspirations (as recorded by parents in the survey) from grades 8 to 10 from May 2006 to May 2008 and foreign currency-denominated debt shares of residence at the time of the crisis (September 2008). Controls include parental education, gender, and an indicator of deprived status as well as school and (later) class fixed effects as noted. Standard errors are clustered by (later) class and postal code.

Table A.7: Summary of value added results

	Grade 6-8		Grade 8-10	
	(1) math	(2) reading	(3) math	(4) reading
2008-2010				
FC share	.05428	-.02596	-.1376*	-.1116*
	(.04514)	(.04800)	(.05636)	(.04516)
R^2	0.349	0.207	0.187	0.150
Observations	72359	72366	61777	61775
2009-2011				
FC share	-.06397	.01425	-.08216	-.08596$^+$
	(.04801)	(.04502)	(.05676)	(.04636)
R^2	0.320	0.231	0.182	0.148
Observations	67262	67264	59577	59586
2010-2012				
FC share	-.02690	-.08175$^+$	-.1522*	-.1851**
	(.05000)	(.04373)	(.06346)	(.04703)
Loan penetration	✓	✓	✓	✓
Student characteristics	✓	✓	✓	✓
Class FE	✓	✓	✓	✓
R^2	0.355	0.233	0.184	0.146
Observations	66961	66987	61401	61423

NOTE: The table summarizes results for all cohorts and subjects for the class FE specification.

Table A.8: Correlattion between estimated school fixed effects and foreign currency debt exposure

	Non-weighted		Weighted	
	(1)	(2)	(3)	(4)
Average FCS in school	0.575*	0.573*	0.382**	0.356*
	(0.230)	(0.237)	(0.137)	(0.142)
R^2	0.0124	0.0231	0.0117	0.0345
Observations	673	673	673	673

NOTE: The table reports the correlation between estimated school fixed effect in mathematics for the period 2008-10 and average foreign currency debt exposure. Robust standard errors reported.