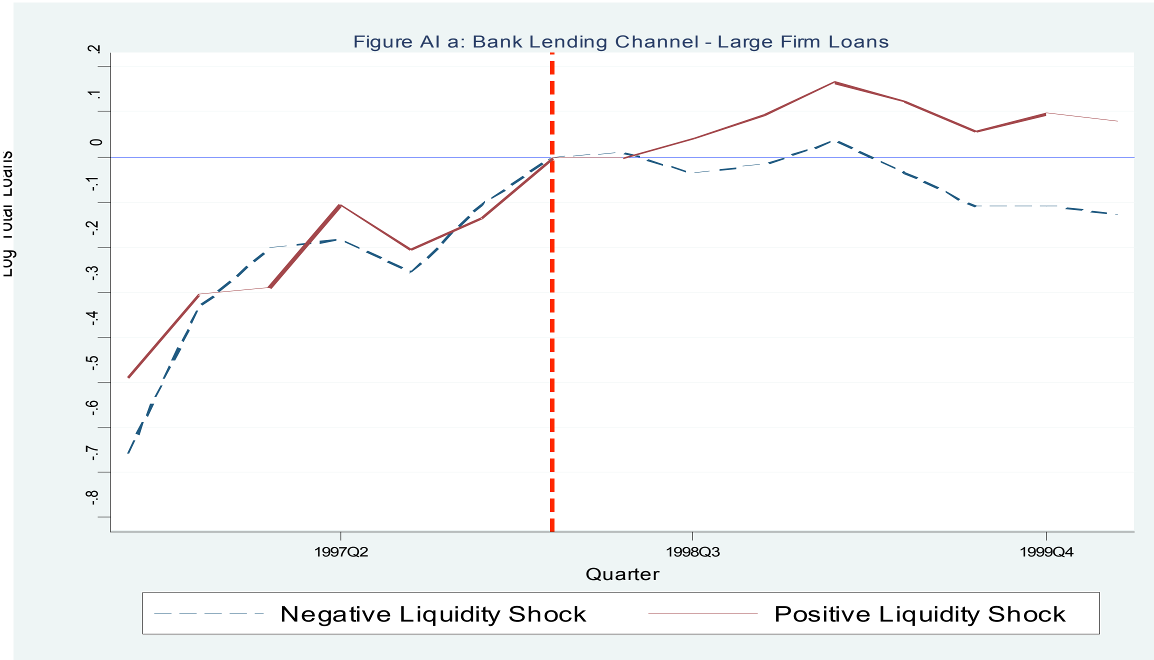
Online Appendix: Non-parametric patterns

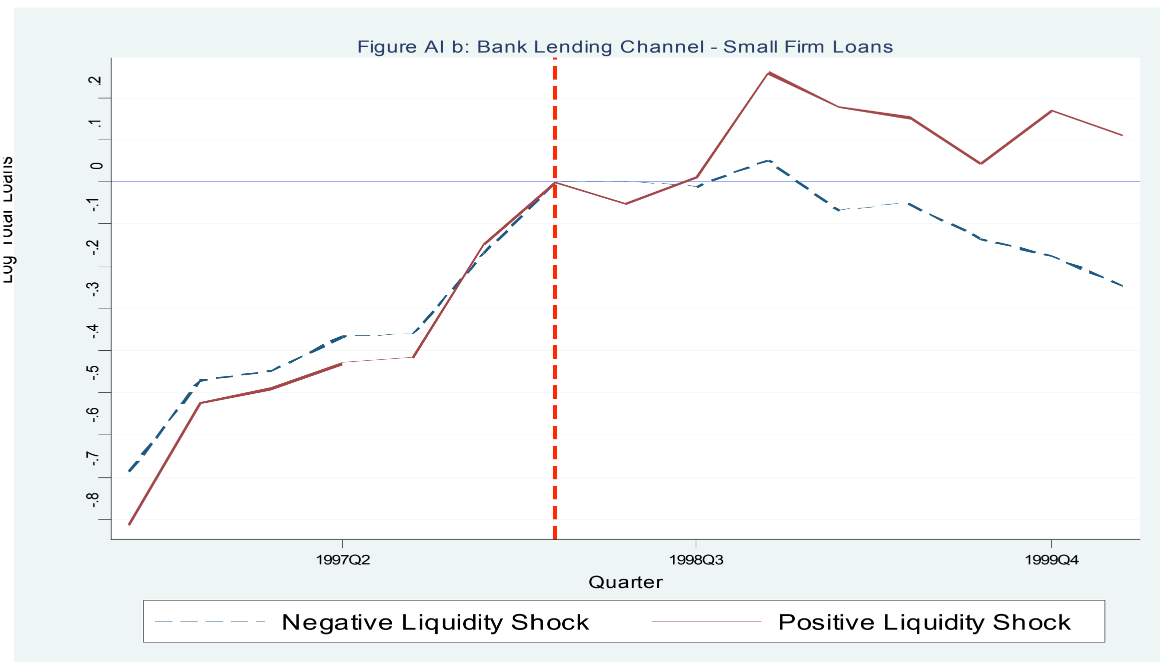
Figure III in the paper illustrated the bank lending channel non-parametrically. Here we present analogous graphs for the bank lending channel separately for large and small firms and for the firm borrowing channels.

Figures AI a-b repeat the analysis in Figure III separately for large and small firms and show that both face a bank lending channel. While the magnitude of the channel does seem larger for small firms, we will explore this more precisely in the regression analysis. The figures are not as appropriate for magnitude comparisons since they weigh larger firms more, and hence (unlike the regressions) do not compare the average small to the average large borrower.

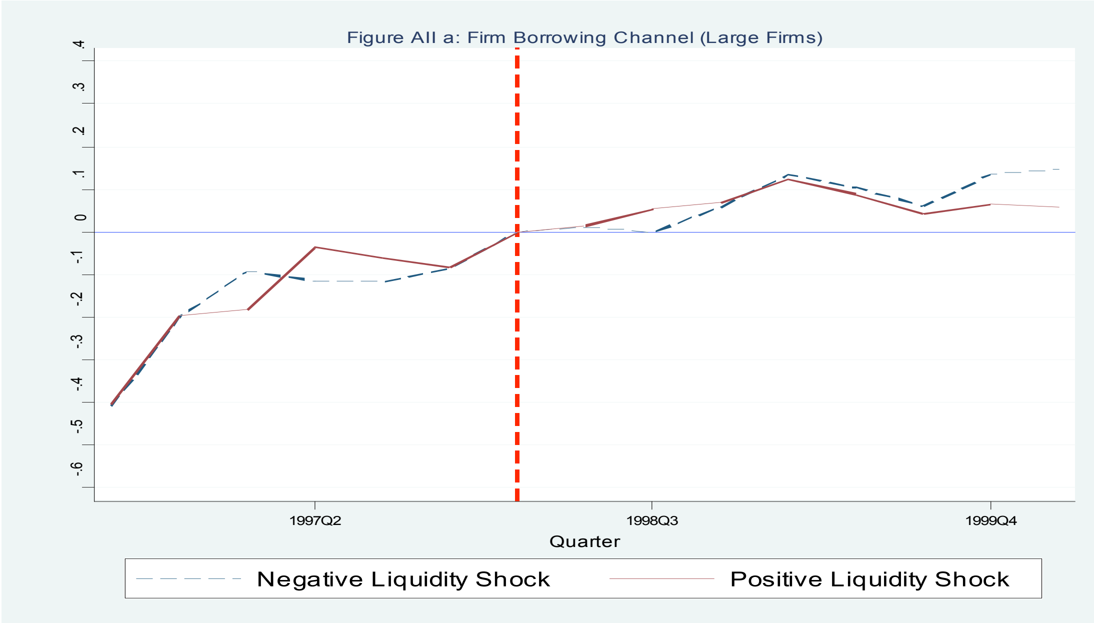
Figures AII a-b next examine the firm borrowing channel by asking what happens to a firm's overall borrowing after the shock. We repeat the analysis of the previous figures but now aggregate all loans for a given firm across lenders at each point in time. A firm is then grouped into the positive liquidity shock category if its bank(s) at the time of nuclear tests received above median liquidity shock on average (and the opposite for negative liquidity shock category). The figures show that large firms are completely able to compensate the adverse effects of the bank lending channel by borrowing more from new and existing liquid banks, but small firms are entirely unable to do so. We will examine such differences further in the regressions below.

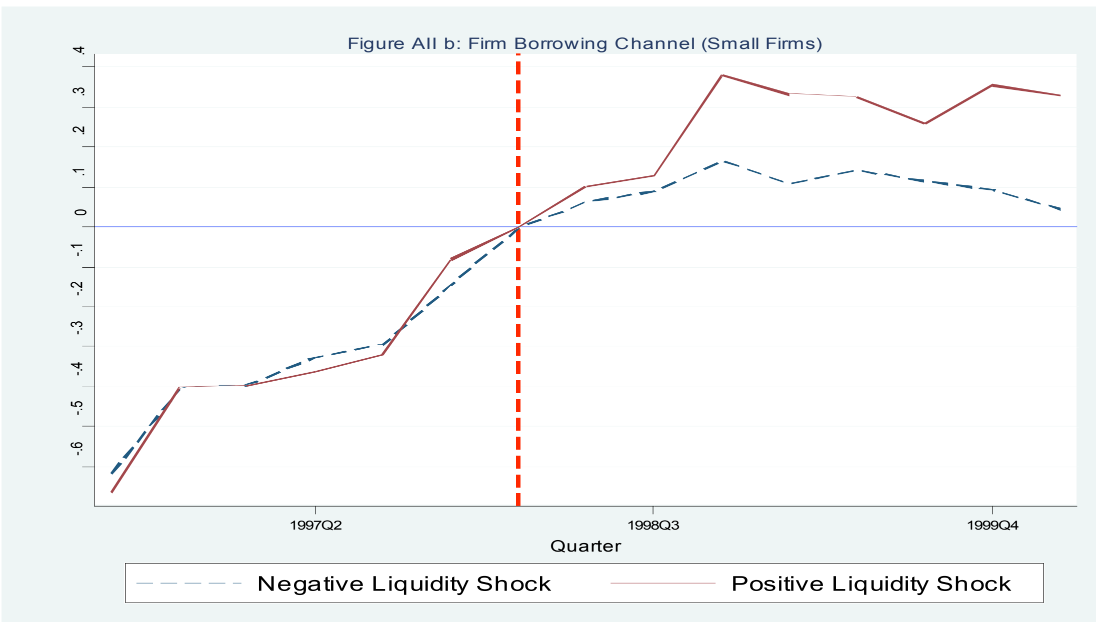
Figures AIII a-b examine whether the firm borrowing channel (for smaller firms) also affects a firm's overall financial strength. We repeat the analysis of figures AII a-b, but replace the y-axis by the average default rate of firms. Default rate is zero by construction before the nuclear tests, since we exclude firms in default at the time of the tests. Consistent with Figures AII a-b, we find that for large borrowers there is no impact of bank liquidity shocks. If anything, firms borrowing from negative liquidity banks have a lower default rate. This supports our earlier claim that such (affected) banks had better quality firms. On the other hand, within smaller firms, those borrowing from negative liquidity banks are significantly more likely to default; the lending channel identified earlier has real consequences for small (but not large) firms. The effect on default shows up a few quarters after the shock suggesting that firms use internal/informal sources of credit to survive in the short run but cannot keep this up for long.



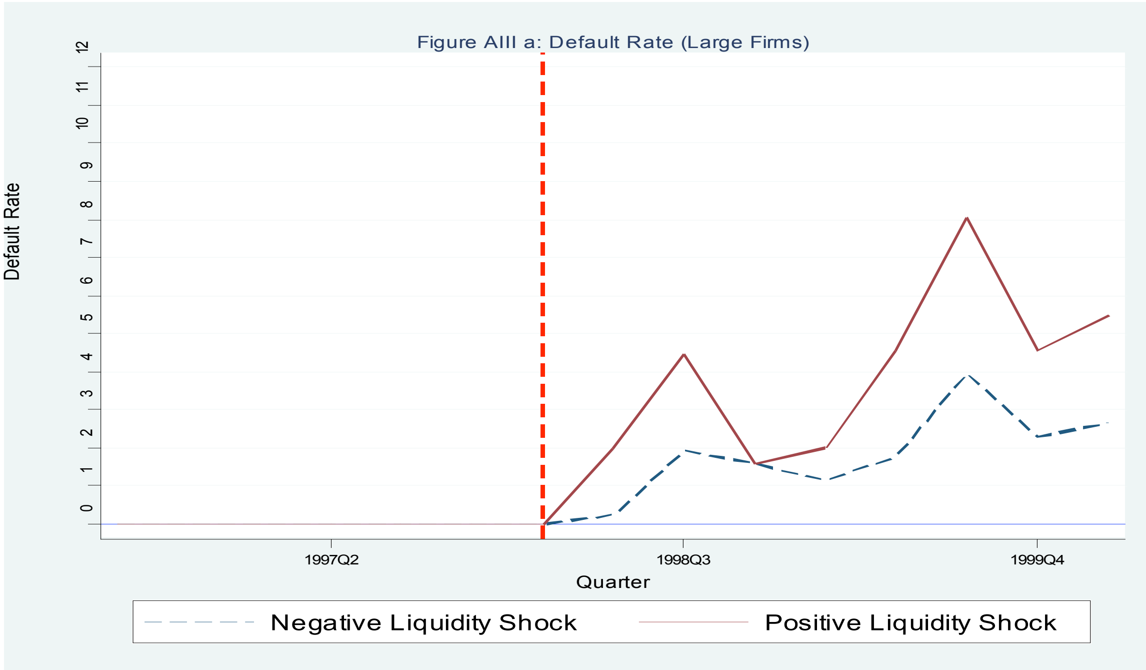


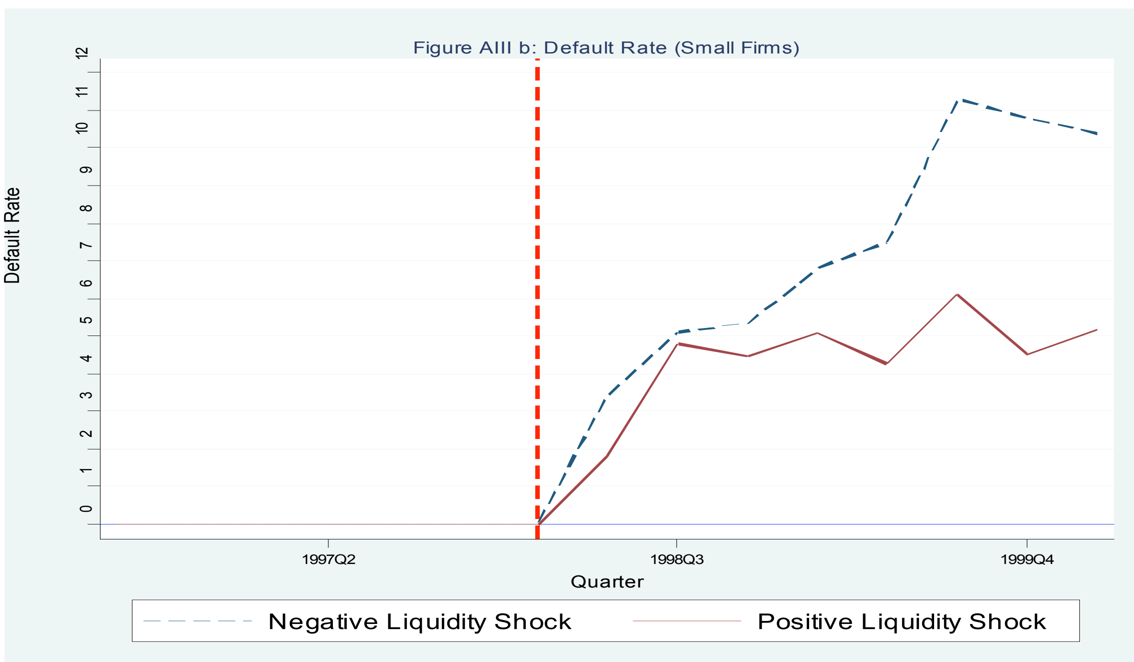
Figures AI a-b illustrates the bank lending channel separately for large (top 30% by total borrowing) and small (bottom 70%) borrowers. We compare lending to large/small firms borrowing from negative and positive liquidity (shock) banks. The former are defined as banks whose deposit growth was below the median deposit growth in the economy and the latter, banks whose deposit growth was above the median. The figure only includes firms that were borrowing and not in default at the time of the nuclear shock. For each quarter we aggregate all the loans to these firms for the positive and negative liquidity banks and plot the time series for this aggregate lending. To ease comparability we normalize the y-axis so that the logarithm of lending for both positive and negative liquidity banks is forced to be 0 at the time of the shock, i.e. the time series illustrates the log-ratio of total loans in a given quarter relative to the quarter of the liquidity shock. The y-axis values can then be readily interpreted as growth rates in lending relative to the nuclear shock quarter.





Figures AII a-b illustrate the impact of bank liquidity shocks on the overall amount a firm is able to borrow. The two figures separately consider large (top 30% by total borrowing) and small (bottom 70%) borrowers. For each quarter, we compare aggregate borrowing of large/small firms by grouping firms into two types: those that were borrowing from negative or positive liquidity (shock) banks at the time of the nuclear shock. The former are defined as banks whose deposit growth was below the median deposit growth in the economy and the latter, banks whose deposit growth was above the median. The figure only includes firms that were borrowing and not in default at the time of the nuclear shock. For each quarter we aggregate the total amount borrowed by these firms (from all 145 lending institutions). To ease comparability we normalize the y-axis so that the logarithm of total borrowing for both firms initially borrowing from positive and negative liquidity banks is forced to be 0 at the time of the shock, i.e. the time series illustrates the log-institutions). To ease comparability we normalize the y-axis so that the logarithm of total borrowing for both firms initially borrowing from positive and negative liquidity banks is forced to be 0 at the time of the shock, i.e. the time series illustrates the log-ratio of total borrowing of a firm in a given quarter relative to the quarter of the liquidity shock. The y-axis values can then be readily interpreted as growth rates in total firm borrowing relative to the nuclear shock quarter.





Figures AIII a-b illustrate the impact of bank liquidity shocks on firm default rates. The two figures separately consider large (top 30% by total borrowing) and small (bottom 70%) borrowers. For each quarter, we compare average default rates of large/small firms across all their loans (weighted by its loan size) by grouping firms into two types: those that were borrowing from negative or positive liquidity (shock) banks at the time of the nuclear shock. The former are defined as banks whose deposit growth was below the median deposit growth in the economy and the latter, banks whose deposit growth was above the median. The figure only includes firms that were borrowing and not in default at the time of the nuclear shock. Hence pre-default the default rate time-series is 0 by construction.