Financial constraints can amplify the severity and duration of negative shocks on firms’ employment and investment decisions. Moreover, as firms interact along the production chain, the soundness of suppliers may affect their customers’ real and financial outcomes, mainly via liquidity provision in the form of trade credit. Our results are consistent with the conjecture that financial constraints propagate downstream via a constrained firm’s lower capacity to assist clients, increasing clients’ exposure to downturns and facilitating the downstream contagion of shocks. Despite recent advances in the literature, we still know little about the network implications of financing constraints that can facilitate the vertical transmission of economic distress. These considerations have become critical after the 2020 COVID-19 crisis drew renewed attention to perceived one of the potential sources of financial stress.

In this paper, we estimate the extent to which firms with financially constrained suppliers experience an amplification of the effects of industry downturns. In addition, we test whether these firms are also more exposed to downturns, and the transmission of supply chain shocks to clients. To link firms’ economic distress to upstream financial distress and exploit cross-supplier variation in financing constraints, we leverage recent advances in production network data by Feserad, Hoberg, and Phillips (2020). Our empirical approach builds upon and expands Carvalho’s (2015) which quantifies the net effect of the externalities that financially constrained firms impose on their peers during industry downturns. We augment the empirical model to capture net effects of externalities stemming from upstream financing constraints. This allows us to disentangle and quantify the contribution of both horizontal and vertical production chain relations on firms’ exposure to aggregate shocks. Following Almeida et al. (2012) and others, we use corporate long-term debt structure to gauge potentially exogenous variation in financing constraints. Our results show that firms experience additional valuation losses during industry downturns when their suppliers have greater shares of their long-term debt due. Our results are stronger when suppliers are more constrained, and when customer’s costs of switching suppliers are higher. Further tests suggest that trade credit is the underlying mechanism generating the downstream amplification effects.

We construct several variables and include them in our main specification interacting with the measures of financial constraints and the measures of exposure to industry and supply-chain shocks. To do this, we build an indicator of suppliers’ downturns, , similar to our industry downturn variable. We include this variable in our baseline specification where the coefficient of its interaction with captures differential downstream effects of shocks to suppliers when these are constrained.

To control for overlaps between industry and supplier downturn events, we also interact with . The results are summarized in Table 2, where we compare the downstream contamination of supply-chain shocks to the amplification of downstream industries downturns. Two results are worthy of note. First, industry downturns impose overall larger devaluation than supply-chain shocks. Second, upstream financial constraints amplify supply-chain shocks by much more than industry downturns (29.8% versus 10.9%, respectively).

Next, we show that upstream financial constraints are also associated with a stronger downstream contamination of supply-chain shocks. To do this, we build an indicator of suppliers’ downturns, similar to our industry downturn variable. We include this variable in our baseline specification where the coefficient of its interaction with captures differential downstream effects of shocks to suppliers when these are constrained.

To control for overlaps between industry and supplier downturn events, we also interact with . The results are summarized in Table 2, where we compare the downstream contamination of supply-chain shocks to the amplification of downstream industries downturns. Two results are worthy of note. First, industry downturns impose overall larger devaluation than supply-chain shocks. Second, upstream financial constraints amplify supply-chain shocks by much more than industry downturns (29.8% versus 10.9%, respectively).

We investigate firms’ observable characteristics driving our baseline amplification results. To do this, we construct several variables and include them in our main specification interacting with and . Hence, the coefficient of the triple interaction estimates the sensitivity of our baseline result to the variable of interest. We summarize the variables used and the results obtained below.

We estimate that an increase of one s.d in leads to 0.936% lower abnormal returns via downstream amplification.

Hence, we identify a novel channel through which financial constraints propagate in the production chain.

We identify a novel channel through which financial constraints propagate in the production chain.

Our results lend support to policies that facilitate trade credit in upstream segments during crises.

### Data, Variable Construction & Baseline Specification

#### Data sources:

- Firm balance sheets: Compustat Fundamentals Annual and Quarterly
- Controls:
  - Firm and Downturn-quarter fixed effects.

#### Financial constraint: Large proportion of long-term debt maturing in a given year, as predicted one year before.

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#### Controls:

- Winsorized Median.
- Lagged Revenue Growth.
- Industry-quarter fixed effects.
- Industry balance sheets.

#### Heterogeneity Analysis & Mechanism Inspection

- : Intra-Industry (horizontal) amplification effect (Carvalho, 2015).