

Asset holdings, information aggregation in secondary markets and credit cycles

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Understanding fluctuations in credit that lead to persistent and sizable effects on economic activity has been at the forefront of the debate in policymaking and academia. Several features have been identified as important drivers behind these fluctuations. The most prominent involve problems of asymmetric information and adverse selection and the presence of non-linearities due to credit constraints. Here we focus on a novel mechanism generating amplified economic and credit cycles based on imperfect information aggregation in credit markets and mispricing. Asset holdings of financial intermediaries have grown considerably in the last decades. The share of assets allocated to the trading book, which is mark-to-market, has also increased substantially. Finally, bankers' compensation has been heavily skewed towards short-term payoff. In a framework that incorporates these features, in which banks have heterogeneous information and participate in an active secondary market of loan baskets, there are incentives for incomplete information aggregation in credit markets, ultimately leading to the mispricing of credit assets. These instances of market dysfunction and mispricing generate initially a boom, and subsequently a prolonged recession, increasing macroeconomic volatility and amplifying credit cycles. Mispricing may therefore contribute to shaping financial cycles.

FRAMEWORK

The framework used builds on the standard macroeconomic model of credit frictions with risk shocks (Christiano et al. (2014)). Entrepreneurs must borrow from banks to fund investment projects. Loan contracts are a function of the degree of riskiness of entrepreneurs' projects or the dispersion of the distribution of entrepreneurs returns, which is the only aggregate exogenous stochastic variable in the model. The key novelty of the framework is the introduction of a more realistic banking sector in which (1) bankers initiate every

period with a set of loans in the balance sheet and put a greater weight on current mark-to-market gains relative to future profits, (2) bankers differ regarding their information on the expected degree of riskiness of entrepreneur projects, as only a random subset of bankers get a signal on riskiness (bankers who receive a signal are informed and the ones who do not, are uninformed), and (3) bankers interact in a secondary market of credit through signalling games where by determining the new valuation of loans, an economy wide posterior view on the degree of riskiness emerges. Under this posterior view all existing and new loans are priced.

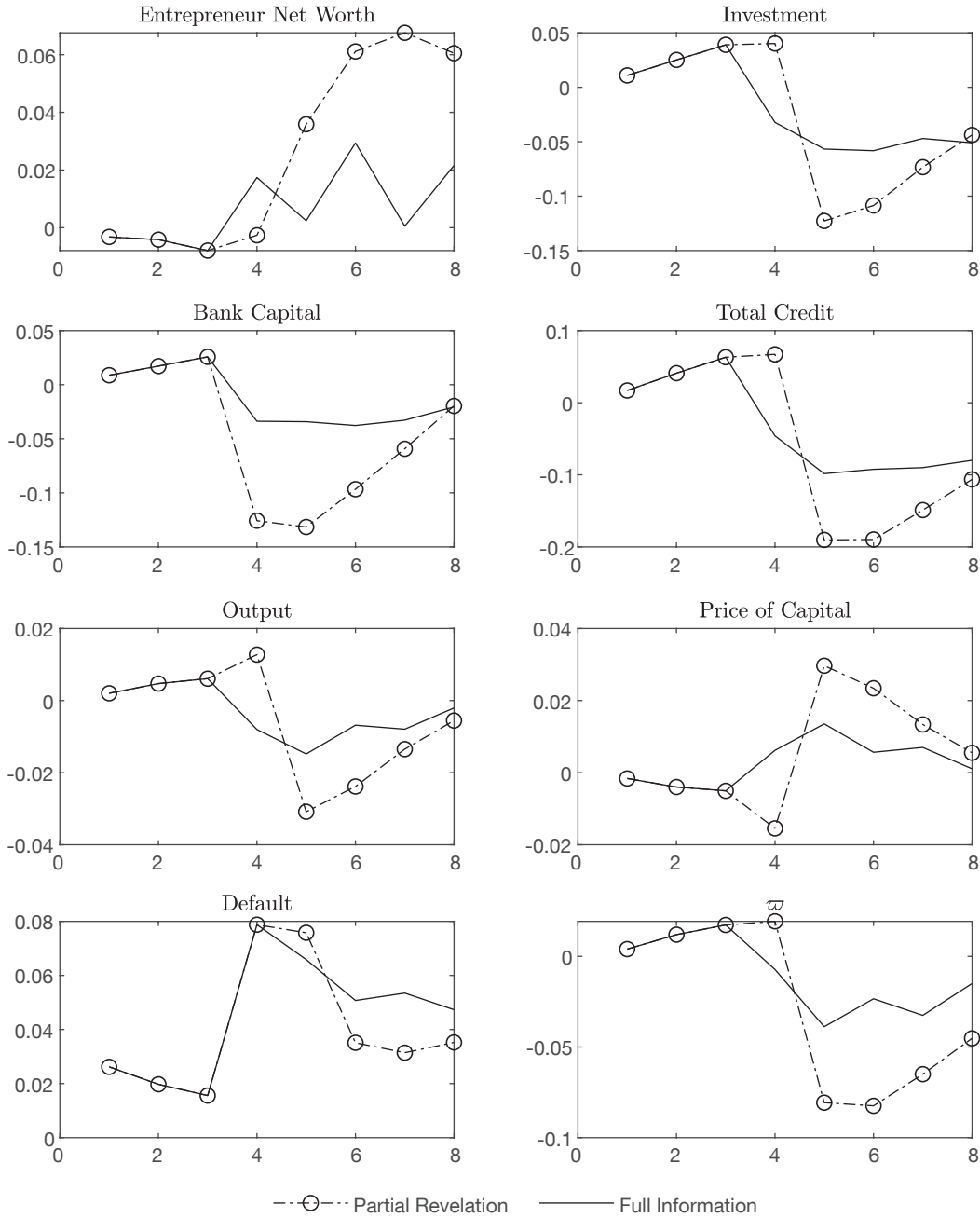
The key decision for an informed banker is whether to reveal its signal to uninformed bankers or avoid doing so. Informed bankers are all identical and set the same strategy in a series of signalling games between each informed banker and the collective of uninformed bankers, which then determines the equilibrium in secondary markets. On the one hand, if informed bankers fail to reveal adverse signals to uninformed ones by refraining from selling off credit assets, the equilibrium in credit markets is such that the mark-to-market value of assets in the balance sheet are preserved. However, by doing so informed bankers forgo gains from trading while exploiting informational advantages and as information does not become public, the valuation of new credit instruments does not appropriately reflect the risks undertaken - credit markets malfunction. As a result, the banking sector fails to set credit spreads that match the expected default rates, potentially increasing future losses. On the other hand, attempting to go short in the secondary market and revealing the signal leads to lower mark-to-market valuation of asset holdings. Nonetheless, informed bankers make trading profits and information is fully incorporated into loan rates. The banking sector sets credit spreads on new loans appropriately, avoiding future losses. Therefore, informed bankers effectively face a trade-off between the current mark-to-market valuation of asset holdings and their future profits from trading and newly issued loans.

MISPRICING AND BOOM-AND-BUST

The bigger the size of banks' balance sheets and the greater the short-term bias in the banker's payoff, the more likely it is that, after an adverse signal, informed bankers favour mark-

Chart 1

BOOM-AND-BUST IN THE PRESENCE OF IMPERFECT INFORMATION REVELATION



NOTE: Impulse Responses of a boom (three consecutive periods of positive shocks with default rates decreasing to 1.5%), followed by a strong adverse shock at period 4 (default rate increases to 8%). Two cases are compared, straight line - Full Information and dotted line with circles Partial Revelation (imperfect information case).

to-market gains on current asset holdings to the detriment of future profits. Thus, in a series of signalling games informed bankers avoid revealing the signal and the equilibrium in secondary markets only partially reflects new

information. As the adverse shock is effectively overlooked, markets remain bullish on entrepreneurs' projects, failing to adjust funding conditions. Credit spreads (which is related to $1/\sigma$, see Chart 1) are set relatively low, and total

loans/investment relatively high based on the underlying risk, benefiting entrepreneurs. As a result of this overinvestment, the price of capital falls, decreasing the funds needed for households to save in physical capital. In turn, this boosts consumption without depressing labour supply, and ultimately, production increases in the current period. Subsequently, banks face bigger losses resulting in a significant decrease in banking capital, compromising their ability to fund new investment going forward. Output thereafter decreases sharply due to credit supply shortages. This boom-and-bust characterisation matches closely to what it is observed during banking crises. Although defaults occur after an unanticipated adverse shock, without mispricing they are unable to generate volatile macroeconomic outcomes. Banks are more protected and credit market stability is guaranteed. Hence, the added mechanism creating credit market dysfunctions incorporated here, relative to standard models of credit frictions, is crucial in amplifying credit cycles.

The main element that drives economic fluctuations after imperfect or partial information revelation is the mispricing of risk. Contrary to Akerlof and Shiller (2009), who focus on “animal spirits” (or behaviour biases), mispricing in our setting results from instances where information is not fully reflected into prices as bankers react to their payoff incentives. Do we observe instances in which market prices do not fully reflect all available information? A cross market comparison of prices shows that agents may fail to require the correct compensation for the risk undertaken. Coval et al. (2009) show that the returns on credit default swaps on indexes and put options on these indexes, both of which reflect similar risk profiles, were significantly different. Comparatively, the differences of the lead bank’s internal valuation of syndicated loans and the price paid by investors reported by Ivashina and Sun (2011) suggest that not all information on the quality of borrowers reaches the auction for these loans. The results presented in these contributions indicate that prices of instruments used in the funding of investment (through securitization or syndication) may not internalize all available information.

The payoff structure that generates the incentive to avoid selling off in the secondary markets upon receiving signals

is directly related to the biases towards short-term market-to-market gains relative to realized payoffs in the banking industry. The CEO compensation numbers reported by Fahlenbrach and Stulz (2011) indicate a banking payoff structure heavily tilted towards short-term payments, as assumed in the framework here, seem to be the current norm in the industry. Analyzing the drivers that generate such payoff structure, potentially exploring both bankers’ tenure relative to the maturity of banks’ portfolios and the agency problems of writing contracts on imperfectly observed performance measures could further increase our understanding of how imperfect information revelation and mispricing of risk occurs.

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