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Skardziukas, Domantas

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Asymmetric information: the multiplier effect of financial instability

Domantas Skardziukas,
Erasmus University Rotterdam

ABSTRACT

Financial markets and financial intermediation are essential to well-functioning economy. They perform the role of channeling funds to parties that have value creating investment opportunities. However, asymmetric information can seriously impair the process when parties to the financial contract are not fully aware of the risks involved and, as a result, can limit their exposure to financial agreements to prevent themselves from possible

losses. Increasing asymmetric information as we explain in the article has a tendency to bring a ripple effect in the financial system. This negative money multiplier then sets the stage until it severely hampers money supply, productive investment opportunities and finally aggregate economic activity. The article introduces the reader with the framework of asymmetric information developed by several authors in the last few decades and builds on the recent financial developments that pose new challenges.

The theory of asymmetric information is one of the most powerful framework theories that can explain data patterns in the different factors during the periods of economic crises.

The academics have analyzed the asymmetric information and its consequences that arise due to dissimilarities of information that is available to parties that enter financial agreements. Often the main problem is that borrowers are more alert of pitfalls of financial contract since they are better aware of the risks involved in a project for which financing is requested. These informational differences are the very underlying cause of adverse selection or what is already known as the lemons problem which was introduced by Akerlof in 1970. A lemons problem occurs in debt markets because lenders have trouble determining whether borrower's investment opportunities are attractive enough compared to the level of risk involved (i.e. he is a "good risk" or "bad risk"). When that happens, lenders provide loans at an average interest rate that balances off expected return for a loan portfolio that constitutes both high quality and low quality credits. Presumably, one can see this as a fact that risks and the associated required return for high quality borrowers is overstated, whereas that of low quality borrowers is understated. Lenders tend to average out these differences; as a result, high quality borrowers end up paying more, whereas low quality borrowers less than they should. If that happens, high quality borrowers will not seek financing and forego profitable investment opportunities.

Furthermore, as demonstrated by Stiglitz and Weiss (1981), borrowers with the riskiest investment projects will now be the ones most likely to take out the loans at high interest rates, since they will reap the benefits and leave the losses for lenders should they occur. These risky undertakings on behalf of borrowers will result in lenders cutting down on the number of loans that they make, this way causing the supply of loans decrease with higher interest rates more than it would at equilibrium. Mankiw (1986) has shown that a marginal increase in the risk-free rate can significantly decrease or even cause a collapse in lending through the ripple effect described above.

The mechanism suggests that a major sign of financial crisis would be a significant increase in interest rate of loans available for those borrowers whose risk characteristics are hard to identify. Higher and lower grade bond yields essentially reflect the perception about the risk related to the undertakings of higher and lower quality borrowers. This perception might arise either because the lenders are well aware of the risks related to both high and low quality borrowers, or more likely, because information about the low quality borrowers is not available. As a result, the large spread between high and low grade bonds should signal when the adverse selection problem in the debt markets is far stretching.

To reduce the adverse selection problem in debt markets lenders secure their loans with collaterals or with the borrowers' net worth. However, value of collateral or net worth can decrease because of lower future income streams (ex. market crash, see Greenwald and Stiglitz, 1988, Bernanke and Gertler, 1989) or increased interest rates at which one discounts these income streams. As a result, should a borrower default in any of these cases, the lender will bear higher losses not covered by the value of collateral. Just as before, we expect that the adverse selection problem stemming from the situation will again widen the spread of interest rates on loans between low-quality and high-quality borrowers due to differences in information available on the two groups of borrowers.

Asymmetric information also leads to moral hazard problem between the parties to the contract that again impairs financial efficiency. Moral hazard refers to borrower's behavior that occurs after the financing has been obtained. Because lenders are not fully able to ascertain the quality of investment or monitor the use of the funds, the borrower has incentive to engage in personally beneficial activities (ex. excessive risk taking, misallocation of funds) that increases the probability of default and deteriorates the quality of loan. The borrower will reap the benefits should it turn for the best, while lender will bear the losses if borrower defaults.

This agency problem between the contract parties will result in suboptimal levels of financing as lenders cut down on number of loans trying to limit themselves from the losses.

The agency problem will further amplify the ripple effect on the aggregate economy should there occur an unanticipated deflation. Under deflation, real value of debt grows while the real value of assets does not and wealth is redistributed to lenders at the expense of borrowers. Shrinking net worth of borrowers would prevent them from new undertakings which would eventually lead to decline in investment and economic activity.

The presence of information asymmetries in debt markets explains the vital role that banks play in reducing adverse selection and moral hazard in credit markets through financial intermediation.

The expertise that they have in screening and distinguishing bad borrowers from good ones allows them to reduce information asymmetries at low cost (Stiglitz and Weiss, 1983).

1.1 2008 Financial Turmoil and the "Lemon Brothers"

The failure of financial intermediation and the resulting increase in asymmetric information is a probably the simplest best way to explain the recent financial turmoil that has led to global downturn.

Slowing economy coupled with insolvency of mortgage borrowers and the housing market crash caused the value of collaterals to drop sharply. Huge losses related to mortgage related debt instruments pushed a major financial institution – Lehman Brothers - into bankruptcy and caused increased risk-aversion in the markets. Because many financial and non-financial institutions had exposure to these collateralized debt obligations, banks stopped the lending since they could not distinguish between those who had loss bearing positions in CDOs and could default and those who were not. This has led to an immediate spike in interest rates and dry-up of liquidity in debt markets. As a result, even largest and most prominent US bluechips could not access debt markets to fund their operations and investment activities. This caused a severe drop in production output and a contraction in aggregate economic activity.

They are more efficient than individuals in monitoring the contracts and enforcing restrictive covenants that reduce moral hazard problem that is likely to arise (Diamond, 1984).

The existence of asymmetric information in debt markets gives us an important underlying rationale about the significance of banks in channeling funds from savers to borrowers who have the most attractive investment opportunities. Bernanke (1983) also argued that turmoil in financial markets often harms intermediation performed by banks and brings down financing of valuable investment opportunities which in the end leads to economic downturn.

Bank panics are one major example of the failure of banks to fully perform their intermediation role. In a panic, depositors, fearing the safety of their deposits, withdraw them from the banking system and cause a major wipe out of funds and significant reduction in lending activities of banks. Undoubtedly the asymmetric information is one of the main ingredients of financial panic. As depositors are not able to distinguish between solvent and insolvent banks they rush to withdraw funds from all of the banks that could possibly fail to meet their obligations or return the deposits in time. The resulting capital deposit outflow bank capital to level where they either cannot meet their obligations, provide new loans or both. Cost of financial intermediation rises, new profitable investment opportunities are not financed and as there is no value created in the economy, it slips into recession.

Given the absence of intervention of policy makers, bank panic decreases liquidity which leads to higher interest rates. The ripple effect continues since higher interest rates as mentioned previously (adverse selection) decreases firm value. Therefore, bank run is another channel through which asymmetric information both enters the financial markets as well as is further reinforced. Again, as a result, there should be a pattern of widening spreads between lower and higher grade investments in the dawn of bank panics.

All in all, asymmetric information is a very powerful framework that presents the dynamics and resulting downturn that happen once there is a decrease in money supply. However, decline in money supply is not the only area of financial discrepancies that asymmetric information can explain. Instead, one should take a much broader picture to see informational asymmetries that exist in financial markets (see box 1.2) that can induce a financial meltdown.

1.2 Asymmetric Information and Financial Derivatives

It appears that with the evolution of financial system and financial products, there not only has been a significant improvement in the reduction of information asymmetries in the financial markets through major advances in technology and regulation, but also hand in hand increase in information asymmetries through off-balance sheet trading activities in highly complex structured derivative products and OTC (over-the-counter) market development. Not to mention that, even simple derivative products such as forwards that exhibit steeper pay-off schemes than that of the underlying asset already amplify the consequences of asymmetric information through implicit leverage if a party to the contract fails to follow agreement. This can make even simple and sound linear derivative contracts very risky. Meanwhile, OTC markets allow for less transparency on such agreements. To continue with the example, OTC forward agreements unlike their peer contracts traded on an exchange, i.e. futures, allow parties to engage into contract and settle it only on the maturity; this way party losing money in the contract avoids daily margin calls to cover marginal losses should the market turn out unfavorable. Again asymmetric information and specifically moral hazard is at its height since party to the contract is not aware if the counterparty will be able to meet the obligations on maturity. The losses by the end of the contract might be so huge that the party losing money might not be able to follow the agreement. Finally, even more complex derivative contracts such as CDOs enable debt to be repackaged and resold to multiple buyers while staying off the bank's balance sheets; the debt loses its origins – risk characteristics are modified and information related to the original debtor is lost. Instead, risk characteristics are assigned by parties that are intermediating the contract (i.e. investment banks) as well as those that are trusted to monitor them (i.e. rating agencies). Such structure of funneling funds through essentially multiple stages increases significantly asymmetric information between the initial borrower and the final lender, whereas the responsibility of reducing these asymmetries is then concentrated in the hands of several institutions which - as recent events show – happen to fail in their roles.

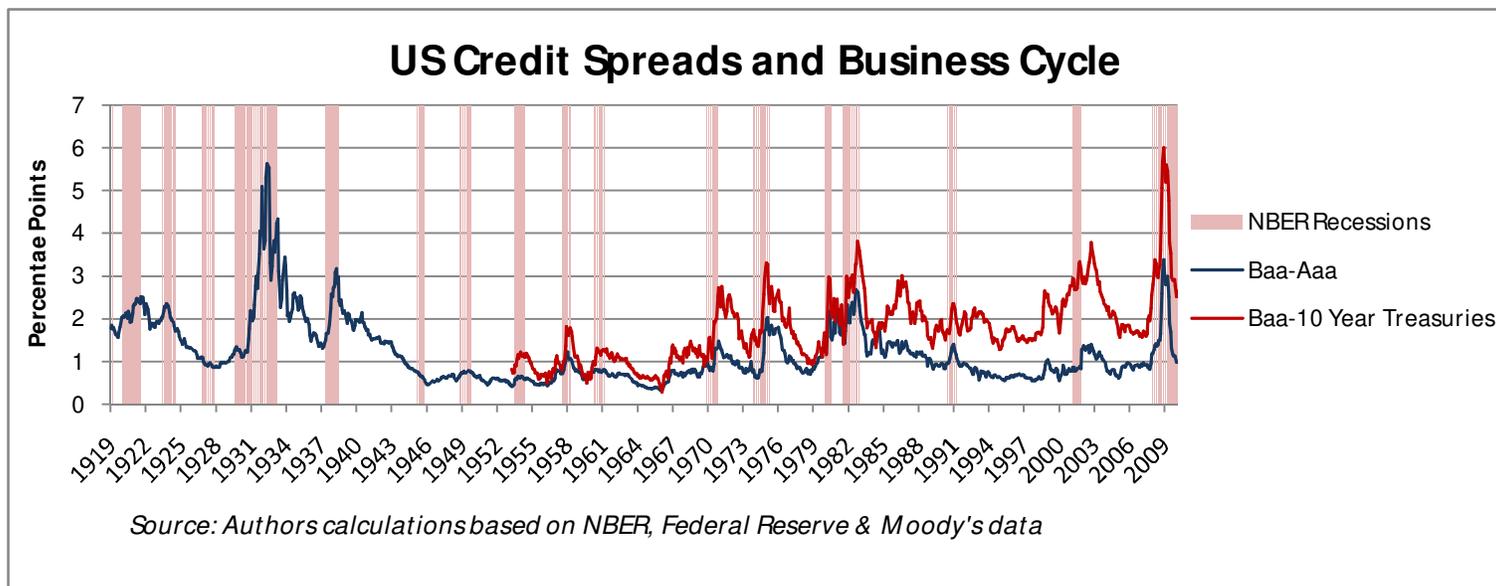
Having said that, it seems that with the development of financial world, asymmetric information, at least in certain markets, has been only increasing. No wonder that one of the world's most renowned investors Warren Buffett has called derivatives the financial weapons of mass destruction.

Historically, financial crises have begun with stock market crash, rise in interest rates and resulting credit spread rather than with a failure of a financial institution, with the latter more likely being a consequence than a cause. The failure of a major financial intermediary however significantly increases the uncertainty in the market (see the box 1.1). *Ceteris paribus*, asymmetric information introduces a multiplier effect through which rise in interest rates raises lemons problem in the credit markets, agency problem and value destruction in stock markets. Failing banking institutions make the interest rates rocket, cause the final stock market crash both of which are reflected in the widening credit spreads between high grade and lower grade bonds. The events amplify asymmetric information to the degree where economic growth is halted.

There would be sorting of solvent from insolvent banks through public authorities and clearing-house associations (Mishkin, 1990). Furthermore, government as we have seen recently might induce money supply by providing liquidity. Uncertainty would slowly fade out, markets might recover, interest rates fall back and if deflationary processes would not pertain, one might see credit spreads shrinking and economy recovering as seen through 2009.

This course of events might be hampered if a substantial deflation sets in, leading to a debt-deflation process that transfers wealth from debtors to creditors as described by Fisher Irving (1933) and deteriorates the value of the companies. Should that happen, given already lower demand for products balance sheets of companies would worsen leaving them with excessive liabilities, liquidity problems and potential bankruptcy as seen in major corporations in Japan in 1990's. Investment spending and aggregate economy would then remain depressed for a longer period of time.

Figure 1.1



As you can see from the figure 1.1, theory is rather consistent with the empirical data. Credit spreads seem to balloon in the dawn of a crisis and during recessions. In addition, an interesting finding is that of the recent crisis. Apparently seeing signs of slowing economy on August 2007 Federal Reserve of the United States cut interest rates to induce monetary supply. Despite that, later next month the yield

spread between Baa graded bonds and 10-Year treasuries had already been at 20 year historical heights well above 2 percentage points. FED continued cutting interest rates in the following months, however, that did not stimulate economy sufficiently and on December 2007 the United States had slipped into recession which turned out to be comparable in scale to the Great Depression.

More than that, it is surprising to see how Mishkin (2000) has presented the vicious cycle to the Central Bank of Iceland in his later work just to see the meltdown of the county's financial system ten years after.

To test the predictive power of credit spreads and stock market we ran multiple least squares regressions between credits spreads, stock market and US industrial output using different time lags. Sample period dating back to 1920's has been used. We have found that over the period from 1920's until 2010 stock market has had the most explanatory power in predicting negative industrial output 4 months before it has occurred, whereas wide credit spreads 1 month before the crisis. A sample regression in figure 1.2 below shows that despite the fact that the credit spreads between high and low quality borrowers have marginal explanatory power for fully predicting economic activity, i.e. low R², it shows that it is significant to the variation of US industrial output, i.e. high t-value. This is however consistent with the fact that timely and well measured monetary easing and liquidity injections from central bank not accounted for in the regression often induce lending activities by banks, reduce high risk-aversion and information asymmetries in the market that are then reflected in the back drop of credit spreads, the result of all which is a prevention financial and economic paralysis.

All in all, although there has been empirical evidence that the degree of asymmetric information has diminished over the course of financial development¹, new century and financial derivatives for which asymmetric information seems to be second nature pose new challenges that we should take very seriously.

Figure 1.2

Dependent Variable: IND (US Industrial output)

Method: Least Squares

Sample (adjusted): 2 637

Included observations: 636 after adjustments

Newey-West HAC Standard Errors & Covariance (lag truncation=6)

$$IND=C(1)+C(2)* SPREAD(-1)$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.236733	0.050135	4.721907	0.0000
C(2)	-1.708171	0.418094	-4.085619	0.0000
R-squared	0.046140	Mean dependent var		0.224848
Adjusted R-squared	0.044636	S.D. dependent var		0.874328
S.E. of regression	0.854592	Akaike info criterion		2.526754
Sum squared resid	463.0272	Schwarz criterion		2.540764
Log likelihood	-801.5076	Durbin-Watson stat		1.304958

¹ See Antzoulatos, Tsoumas, Kyriazis (2008), Financial Development and Asymmetric Information

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