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Contingent Liquidity Swap: A Prearranged Source of Liquidity

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Contingent Liquidity Swap: A Prearranged Source of Liquidity

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EXECUTIVE SUMMARY

In many cases, insufficient liquidity is the preamble of insolvency. In the financial crisis starting in 2008, many companies encountered difficulties of raising money or liquidating their assets to meet their funding requirements. Some losses caused by market illiquidity were huge enough to trigger government bail-out plans. After the crisis, regulators have been setting more stringent rules on capital requirements and liquidity requirements for financial institutions. Those are necessary to reduce the systemic risk in the financial industry, but at the same time the cost of capital has increased significantly.

Many efforts have been made by practitioners, regulators and the academic community to seek a solution for the increasing cost of capital. Some automatic bail-in hybrid securities such as contingent convertible bonds (CoCo bonds) were suggested and used. They provide prearranged contingent capital if a specified bad event happens, such as the regulatory capital ratio dropping below a certain level. However, most of them do not deal with liquidity risk directly. This may be partly caused by the difficulty of distinguishing illiquidity and insolvency in an objective way. In addition, the conversion of debt to equity may reduce the liquidity requirement but does not provide additional funding. Therefore, other innovative ways are needed to provide liquidity at an affordable price.

This paper proposes a new type of financial derivative named contingent liquidity swap (CLS) to address the liquidity issue. CLS is a swap agreement that the buyer of the swap pays cash in exchange for less-liquid assets in the event of a liquidity event. Those less-liquid assets may include stocks or high-yield bonds. The seller of the CLS makes a series of payments for the contingent liquidity. The payment should be lower than the equity risk premium to reduce the cost of funding but high enough to attract investors. There are some unique features of the proposed CLS.

1. The term of the CLS is uncertain but limited to the maturity of the agreement.
2. If no liquidity event happens, there will be no exchange of cash to other less-liquid assets.
3. To reduce the counterparty risk, the buyer needs to back up the potential cash payment with very liquid assets such as government bonds.
4. The exchange can be triggered based on a credit downgrade, a large amount of fine due to a financial scandal, mass lapses of insurance policies, margin requirements for financial derivatives, run on the bank, or any combination of the above; or it can be at the full discretion of the seller, as long as the price is reasonable.

This paper discusses the features of the proposed CLS and its potential impact on the systemic risk and the liquidity risk profile of financial institutions. It talks about the challenges the CLS may face during the implementation. Pricing and risk analysis are also touched on.

1. INTRODUCTION

Liquidity risk is the direct reason for many bankruptcies or government bail-outs. When an unexpected large liquidity requirement occurs, there may not be enough liquid assets to meet the requirement. Illiquid assets need to be sold quickly, which could have a big market impact. The loss is especially large during a financial crisis when everyone is selling assets, which pushes the asset prices down further. At the same time, the cost of accessing additional funding from the market could be very high.

Managing liquidity risk is difficult due to its unpredictability. The easiest way is to invest more in liquid assets and acquire more funding to support the same level of risk. But the investment return could be too low for the company to stay competitive in the market and be attractive to investors. After the financial crisis in 2008, regulators asked for more stringent liquidity requirements and more prudent liquidity risk management. These measures are necessary for reducing the systemic risk but lead to a much higher cost of capital.

Liquidity risk is also difficult to transfer in the capital market efficiently. In a systemic credit event, it is not easy to get liquidity from the market. Any liquidity arrangement is subject to credit risk and may not work as planned.

Innovative financial instruments are needed that can enhance a company's liquidity position with limited increase in the cost of capital. To be effective, the financial instrument's exposure to credit risk should be small. It should also be attractive to investors so that it can easily access the capital market. A new type of financial derivative—contingent liquidity swap (CLS)—is proposed in the paper that can provide prearranged liquidity with a reasonable cost. It reduces the need of funding and the probability of selling assets for meeting unexpected liquidity requirements in the future.

The remainder of the paper proceeds as follows:

- Section 2 (Liquidity Risk Management) discusses the landscape of liquidity risk management, regulatory requirements, and approaches to improve the liquidity risk profile.
- Section 3 (Contingent Liquidity Swap) discusses the proposed financial tool: CLS. It touches on the features, the selection of trigger events, the impact on the systemic risk, its effectiveness, and challenges that may be faced during implementation.
- Section 4 (Risk and Pricing) discusses the pricing models and the risk for the buyers and sellers.
- Section 5 summarizes the key points of this paper.

2. LIQUIDITY RISK MANAGEMENT

Nikolaou (2009) discussed the liquidity of the financial system in detail. The liquidity is categorized into three types: central bank liquidity, funding liquidity and market liquidity. Central bank liquidity is related to the ability of the central bank to provide necessary liquidity in a crisis. Although it is important to consider monetary policies in liquidity risk management, it is out of the control of business managers. Liquidity risk management from the perspective of a company focuses more on the funding liquidity and market liquidity. The manager needs to understand the cost of funding and selling in a liquidity event.

Liquidity risk management usually considers the available liquidity and the required liquidity. The goal is to make sure that in almost all cases, the available liquidity is greater than the required liquidity. With a well-established liquidity risk appetite, the company can project the change in available liquidity and required liquidity under extreme scenarios. Shang and Chen (2012) proposed a liquidity management framework for insurance companies that is linked to their risk appetite. The Basel Committee on Banking Supervision developed the liquidity coverage ratio (LCR) in 2013 to ensure that banks have adequate high-quality liquid assets to survive a 30-calendar-day liquidity stress scenario. The committee is also developing the net stable funding ratio (NSFR), which is used to measure the liquidity position with a longer time horizon. Whether it is an internal or regulatory requirement, liquidity risk management is more sophisticated, and the need for liquid assets is higher than before.

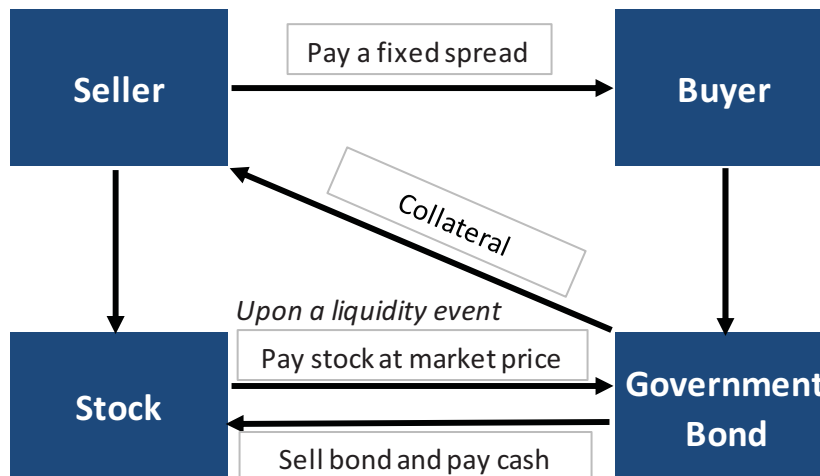
More stringent liquidity requirements lead to lower expected investment income, and more financial resources are needed to back the same level of risk. Coupled with more stringent capital requirements, it causes additional cost of capital and results in a lower return on capital. There have been many efforts to reduce the increase in the cost of capital when arranging more capital and liquidity. Contingent capital such as contingent convertible bonds is one of the examples. The bond will be converted to equity given a pre-specified event occurs. The trigger event is usually set as a low capital adequacy. Although insufficient liquidity is highly correlated with insufficient capital in an extreme event, contingent capital may not be effective in providing additional liquidity. Shang (2013) analyzed the limitation of contingent capital in solving the financial distress in a timely manner. Nicoletti-Altimari and Salleo (2010) proposed the Roll-Over Option Facility (ROOF) that allows the issuer to keep the funds if the observed liquidity risk at maturity is big. It can defer the liquidity requirement. However, some liquidity events happen quickly and the company could go bankrupt before the maturity of the ROOF. In these cases, no additional liquidity is provided by the ROOF. Therefore, the ROOF may effectively reduce the exposure to liquidity risk but may not be useful for beating a liquidity crisis. A new type of financial instrument that can effectively transfer liquidity risk

is needed.

3. CONTINGENT LIQUIDITY SWAP

The CLS is designed to provide additional liquidity quickly in a liquidity crisis at a predetermined fixed cost. Figure 1 illustrates a possible arrangement of the CLS.

Figure 1. Contingent Liquidity Swap



The seller who wants to transfer its liquidity risk pays a fixed spread to the buyer periodically. The seller can still invest in risky assets such as stocks to earn a high expected return. Upon a liquidity event when the seller needs cash to pay for an unexpected liquidity requirement, the buyer will trade cash with stocks at the market price. If there is no liquidity event, the exchange will not happen. In order to reduce the counterparty risk in this deal, the buyer is required to invest in government bonds as the collateral to ensure that it is able to pay cash when needed.

There could be other variants of the CLS described above. The seller may pay a floating spread that changes with its financial credit rating or credit default swap rate. The seller may not pay a spread periodically to the buyer but pay stocks with a premium for cash. For example, stocks with a total value of \$102 million are exchanged for \$100 million cash when a liquidity event happens.

When the CLS market is big enough, financial institutions may act as an intermediary to provide services and collaterals for a fee.

3.1 Features

The CLS can provide the seller the cash it needs to deal with a liquidity crisis. It has the following unique features.

1. The seller can get cash in exchange for stocks without having a market impact that may

significantly reduce the value of the stocks. However, to increase the marketability of the CLS, there might be some minimum requirements for the stocks. The stocks may be required to be publicly listed and the stock companies need to have an investment grade credit rating.

2. The seller needs to pay a premium to the seller, either periodically or as a lump sum premium at the exchange of stocks to cash. Using CLS, the seller can still invest in the stock market. It gains access to additional liquidity and the cost is lower than raising additional capital. At the same time, the premium needs to be high enough to attract enough investors. The premium is expected to be lower than the equity risk premium, which is the expected stock return in excess of the risk-free rate. Otherwise, it is better for the company to sell its stock holdings and purchase liquid assets with risk-free returns to provide additional liquidity.
3. The exposure to credit risk is low. The buyer invests in safe assets such as government bonds and puts them as collateral for the cash payment. In a systemic crisis, even if the buyer is in financial distress, the collateral can still guarantee the cash payment.
4. The buyer earns the government bond yield and the spread paid by the buyer. However, the risk for the buyer is limited. Even if the exchange happens, the buyer can still get the stocks with the same total value of the cash. The risk-adjusted return is relatively high compared to other asset classes.
5. It is the seller's responsibility to make sure that it has enough assets that are qualified for the exchange with cash. The seller needs to consider it in asset management and monitor its asset portfolio.

3.2 Trigger Events

Choosing the appropriate trigger events for the CLS is difficult. Many issues about the trigger events for contingent capital discussed by Shang (2013) apply to the CLS as well. For the CLS, it is even more difficult to have an objective trigger that is easy to measure and implement. A liquidity crisis may be caused by many different reasons, such as a credit downgrade, a large amount of fines due to a financial scandal, mass lapses of insurance policies, margin requirements for financial derivatives, run on the bank, and any combination of the above. Although there can be multiple trigger events, it is difficult to include all the possibilities. The company shall foresee the liquidity crisis in advance and has enough liquidity to solve the issue. The speed of going bankrupt due to a liquidity crisis can be very high. If we need to wait for some trigger event to happen before we can get the liquidity, we may lose the chance of saving the company.

On the other hand, if there is no trigger event specified and the exchange of stocks for cash is solely at the full discretion of the seller, the CLS can provide liquidity timely. It is easier for regulators

to admit it as a source of liquidity when assessing the liquidity sufficiency. At the same time, the required spread will be higher as the option that the seller owns is more valuable. But if the seller has full control, the exchange may be triggered for other purposes rather than addressing liquidity issues.

3.3 Impact on the Systemic Risk

The CLS can mitigate the market impact of selling a large amount of assets in a crisis. Instead of selling risky assets in the market, the exchange is prearranged and will not create price pressure in the stock market when everyone is trying to sell.

In addition, the source of liquidity provided by the CLS is only available to business managers when the company encounters insufficient liquidity and the triggering of the exchange is based on some liquidity event. Unlike newly raised capital, it cannot be used to take additional risk.

While the CLS can reduce the chance of bankruptcy and the level of systemic risk, its impact depends on the size of the CLS market.

3.4 Effectiveness

The effectiveness of the CLS depends on a few key things. Without them, the CLS may not be marketable and the market can be very small.

1. The trigger event must be objective, measurable, and a leading indicator of a liquidity crisis. Or the seller can trigger the exchange at any time. Otherwise, the exchange may not occur before the company goes bankrupt due to liquidity issues.
2. The credit risk of the CLS must be low enough. Liquidity risk is highly correlated with credit risk. In a financial crisis, credit risk and liquidity risk are both very high. Using very safe assets such as government bonds as the collateral makes the exposure to credit risk small. It is critical to make sure that the collateral is solely used to back the CLS. The collateral can be held by the seller of the CLS or a financial intermediary.
3. The stocks to be exchanged must be easily tradable although selling a large volume may have a big market impact. Only stocks of companies with a large market capital are eligible for the exchange. This will increase the attractiveness of CLS to the buyers. In addition, the premium that is paid to the buyers should be high enough to attract investors.

3.5 Implementation Challenges

As an innovation, there are many obstacles when implementing the CLS in the market. Investors need time to understand it, and there are still some uncertainties that may jeopardize the success of CLS.

1. It is difficult to say which trigger event is the best. Making the exchange solely depend on the

seller may cause unintended use of the cash for other purposes. Making the trigger event too specific may leave some causes of liquidity issues uncovered. It may also affect the timely delivery of the cash. Pilot tests in the capital market are needed to understand investors' preference.

2. The complication of the liquidity risk and the uncertainty of the exchange make it difficult to set a price for the CLS. The characteristics of the liquidity risk in normal situations are different from those in extreme events. There are many possible causes of a liquidity crisis. The current market does not have the capability to transfer the liquidity risk effectively. Therefore, there is no meaningful benchmark to make reference from. All these factors make the pricing of the CLS harder.
3. One possible motivation of using CLS is to meet the higher standard of liquidity risk management. It is less costly than getting additional funding. However, it may take time for regulators to admit the CLS as a source of liquidity with full credit.

4. RISK AND PRICING

The pricing of CLS is difficult as there is no direct market data available. Before choosing appropriate pricing models, the risk and return of the buyer and seller need to be analyzed.

4.1 Risk Analysis

Although the arrangement of collateral leads to a low level of credit risk, it is not risk-free for the buyer. Table 1 and Table 2 list the return and risk profile of the seller and buyer for two types of CLSs, one with periodical spread payments and one with a one-time premium payment when the exchange occurs.

Table 1. Return/Risk Profile of Contingent Liquidity Swap with Spread Payment

CLS with Spread Payment	Seller	Buyer
Return	Stock return	Government bond yield + fixed/floating spread
<u>Risk—Before the Exchange</u>		
Market Risk	Stock market volatility	Interest rate volatility
Credit Risk	Sovereign risk: the default of the collateral. However, it is lower than that for the buyer as the buyer provides	a) The spread payment is exposed to the seller's financial conditions.

CLS with Spread Payment	Seller	Buyer
	additional protection based on other financial resources.	b) Sovereign risk: the default of the collateral
Liquidity Risk	High potential market impact caused by selling assets	Low potential market impact caused by selling assets
<u>Risk—After the Exchange</u>		
Market Risk	Negligible	Stock market volatility
Liquidity Risk	Low potential market impact caused by selling assets	High potential market impact caused by selling assets

Table 2. Return/Risk Profile of Contingent Liquidity Swap with Premium Payment at Swap

CLS without Spread Payment	Seller	Buyer
Return	Stock return	Government bond yield + potential premium gained at the swap
<u>Risk—Before the Exchange</u>		
Market Risk	Stock market volatility	Interest rate volatility
Credit Risk	Sovereign risk: the default of the collateral. However, it is lower than that for the buyer as the buyer provides additional protection based on other financial resources.	a) The premium at the swap is exposed to the seller's financial conditions. b) Sovereign risk: the default of the collateral
Liquidity Risk	High potential market impact caused by selling assets	Low potential market impact caused by selling assets
<u>Risk—After the Exchange</u>		
Market Risk	Negligible	Stock market volatility
Liquidity Risk	Low potential market impact caused by selling assets	High potential market impact caused by selling assets

4.2 Pricing Considerations

There are many factors to be considered when setting the price of a CLS. The spread or the premium needs to be determined so that the value of the CLS is zero at the initialization of the deal. The spread needs to be positive and less than the equity risk premium. The list of major factors that are special for CLS pricing is given in Table 3. The quality of the collateral is positively related to the spread/premium at swap. The seller of the CLS is willing to pay higher spread/premium at swap for reduced credit risk with the higher credit quality of the collateral. The same applies to the credit quality of the buyer. On the other hand, the quality of the stocks is negatively correlated with the spread/premium. The buyer is willing to accept a lower spread if the stocks he will receive are of high quality. The higher the control of the swap by the seller is, the higher the spread/premium will be as the buyer faces a higher level of uncertainty. The size of the CLS also has an impact on the spread/premium at swap. A larger size means that the buyer takes a higher level of liquidity risk. The seller is willing to pay more for a larger amount of liquidity as it is more difficult to get it from the capital market.

Table 3. CLS Pricing Factors

Pricing Factors	Impact on the Spread/Premium in the Exchange
Quality of the Collateral	Positive
Quality of the Stock	Negative
Credit Quality of the Buyer	Positive
Seller's Control of the Swap	Positive
Size of the Contract	Positive

Shang (2013) discussed the pricing approaches for contingent capital. Although contingent capital is different from the CLS, some pricing models can be borrowed with some adjustments. The key to CLS pricing is taking the relationship of the liquidity risk and the credit risk into consideration. Some liquidity events are systemic and have a high correlation with credit events. Some are idiosyncratic. The models can be very complicated and consider credit risk, liquidity risk, market risk, seller's behavior risk, and their interactions. Because there is no complete market for transferring liquidity risk, there is little market data available. A real-world approach is more appropriate than a risk-neutral approach, which relies heavily on the market data for calibration.

The focus of this paper is not on the technical details of the pricing models. A simplified pricing model is described for illustration. Further in-depth research will be conducted for a complete pricing

model and its calibration in the near future.

In this model, the expected spread is calculated. The seller of the CLS pays the spread for two reasons: reduced market impact and reduced cost of capital.

$$S = \frac{\int_0^T e^{-R_B(t)t} h(t) (L(t) + CoC(t)) dt}{\int_0^T e^{-R_S(t)t} dt}$$

S : Spread that the seller pays

T : Maturity of the CLS

$R_S(t)$: The discount rate considering the credit conditions of the seller. If the seller is bankrupt, future spread income will be lost.

$R_B(t)$: The discount rate considering the credit conditions of the buyer. If the buyer is bankrupt, the seller is not able to get the benefit of reduced market impact and cost of capital.

$h(t)$: The hazard rate that measures the intensity that a liquidity event or the swap happens. It requires studies of the historical liquidity events, the seller's risk profile, strategies, and expected future change in the exposure to liquidity risk. If the swap is at the discretion of the seller, the behaviors of the seller need to be considered as well.

$L(t)$: The market impact if the stocks are sold for cash in a liquidity event

$CoC(t)$: Cost of capital. It can be measured as the product of the cost of capital rate and the reduced capital requirement because of the CLS. The cost of capital rate used in the economic capital calculation can be used here for consistency.

Other special pricing factors for the CLS discussed before can be used to further refine the estimate.

5. CONCLUSION

The contingent liquidity swap provides a prearranged source of liquidity to the seller when some liquidity event happens. The cost is determined at issue and lower than the cost of funding in a distressed situation. On the other hand, the buyer earns a fair amount of investment income without losing any market value if the swap happens. Potentially, this will become a convenient vehicle for liquidity risk transfer in the capital market.

However, there are some uncertainties about its implementation that need to be addressed.

1. The regulators may not give full credits to CLS as a liquidity source.
2. The trigger events may not be objective enough to attract investors.
3. The liquidity of the collateral may deteriorate in a systemic event and cause some loss to the seller.

4. CLS pricing is challenging.

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