Introduction

The global financial crisis exposed deep flaws in the existing regime for bank capital regulation. The recognition of these flaws set in train a major upheaval of bank capital regulation through the G20 process. The Financial Stability Board (FSB) and the Basel Committee are examining two key strands in the proposed reform, which are:

- Capital requirements that vary over the financial cycle
- Capital surcharge for systemically important financial institutions (SIFIs)

Additionally, the G20 has mandated the IMF to examine financial sector burden sharing whereby the costs of government intervention during the financial crisis can be imposed on the financial industry itself.

So far, these initiatives have been conducted largely independently of each other in spite of the close conceptual affinities between them. There is a danger that each initiative is developed in isolation, to be piled on top of each other at the implementation stage in cumulative fashion. Such an outcome would be unfortunate, since the resulting regime will suffer from conceptual inconsistencies. There is also the danger that the cumulative application of the new charges will result in double- or triple-taxation of the same activities.

The purpose of this memo is to highlight the intimate connection between:

- Procyclicality
- Systemic risk spillovers, and
- Stock of non-core liabilities of the banking system
Background

The financial system channels funds from savers to borrowers. Some of the funding flows directly, such as through the direct sale of marketable securities to households, but much of the credit is channeled through the banking system.

The most important source of funding available to the banking sector is retail deposits of household savers. However, retail deposits grow in line with the aggregate wealth of the household sector. In a boom when credit is growing very rapidly, the growth of bank balance sheets outstrips the growth in the pool of retail deposits. As a result, the growth of bank lending results in greater lending and borrowing between the intermediaries themselves. See Figure 1.

Figure 1: Stylized Financial System

Figure 1 depicts a stylized financial system with two banks – Bank 1 and Bank 2. Both banks draw on retail deposits to lend to ultimate borrowers. They can also hold claims against each other, if they so choose.

Imagine a boom where the assets of both banks double in size, but the pool of retail deposits stays fixed. Then, the proportion of banking sector liabilities in the form of retail deposits must fall. In other words, rapidly expanding bank assets is mirrored by the increased cross-claims across banks. In this simple example, we see that growth in bank assets and increased systemic risk are two sides of the same coin.

The relationship between total banking sector assets and increased cross-exposure across banks holds more generally as an accounting identity.

Define the core liabilities of a bank as its liabilities to claimholders who are not financial intermediaries themselves. Retail deposits would be the best example of core liabilities. Covered bonds held by a pension fund would also count as a core liability. However, any liability of an intermediary held by another intermediary would be a non-core liability. Under this definition, we have the following expression for the total core liabilities of the banking sector consisting of $n$ banks:

$$\text{Total Core Liabilities} = \sum_{i=1}^{n} \epsilon_i z_i (\lambda_i - 1)$$
where $e_i$ is the equity of bank $i$, $\lambda_i$ is the leverage of bank $i$, and $z_i$ is the ratio of bank $i$’s core liabilities to its total liabilities.\(^1\)

Core liabilities grow slowly in line with household wealth. Thus, during a boom when bank assets grow rapidly due to an increase in bank leverage, there must be a corresponding fall in $z_i$, the proportion of bank $i$’s liabilities that are in the form of core liabilities. To put it another way, intermediaries lend and borrow from each other much more during a boom.

Figure 2 plots data from the United States. It charts the stock of repurchase agreements of US primary dealers\(^2\) plus the stock of financial commercial paper expressed as a proportion of the M2 money stock.

M2 consists of retail deposits and holdings in money market mutual funds, and thus can be regarded as retail depositors’ claim on the broader banking system. In contrast, repos and financial CPs are banking sector liabilities that are held by other intermediaries. They are examples of non-core liabilities.

It is apparent from Figure 2 that as recently as the early 1990s, repos and financial CP were only a quarter of the size of M2. However, the ratio rose rapidly and reached over 80% by August 2007, only to collapse with the onset of the financial crisis.

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2 US primary dealers are US banks and securities firms that have a daily trading relationship with the Federal Reserve, and which are permitted to bid at the auctions of US Treasury securities.
We see that the stock of M2 grew by a factor of 2.4 since 1994, but the stock of overnight repos grew almost seven-fold up to March 2008, before collapsing with the onset of the Bear Stearns crisis in 2008. Indeed, the use of overnight repos became so prevalent among US investment banks that, at its peak, the five Wall Street investment banks were rolling over a quarter of their balance sheets every night.

![Figure 3. Overnight Repos and M2 (weekly data)](Normalized to 1 on July 6th 1994. Source: Federal Reserve)

The increased use of short-maturity liabilities can be seen as the mirror image of the increased proportion of non-core liabilities in the banking system.

![Figure 4: Short Intermediation Chain](households mortgage bank households deposit mortgage assets mortgage bank households)

Figure 4 depicts a traditional deposit-taking bank that collects deposits and holds mortgage assets against household borrowers. All banking sector liabilities are core liabilities in such a system. However, greater use of non-core liabilities is associated with lengthening intermediation chains, as illustrated in Figure 5.

In this illustration, the mortgage asset is held in a mortgage pool, a passive firm whose sole role is to hold mortgage assets and issue liabilities (mortgage-backed securities, MBSs) against those assets. The mortgage-backed securities might then be owned by an asset-backed security (ABS) issuer who pools and tranches the MBSs into another layer of claims, such as collateralized debt obligations (CDOs). Then, a securities firm might hold CDOs on their own books for their yield, but finances such assets by collateralized borrowing through repurchase agreements (repos) with a larger commercial bank. In
turn, the commercial bank would fund its lending to the securities firm by issuing short term liabilities, such as financial commercial paper. Money market mutual funds would be natural buyers of such short-term paper, and ultimately the money market fund would complete the circle, since household savers would own shares to these funds.

**Figure 5: Long Intermediation Chain**

The illustration in Figure 5 is a simple example of potentially much more complex and intertwined relationships. What is noticeable from the institutions involved in Figure 5 is that they were precisely those institutions that were at the sharp end of the financial crisis of 2007 and 2008. Subprime mortgages cropped up in this chain, and the failure of Bear Stearns and Lehman Brothers owed to problems in the smooth function of this chain.

At each stage of the intermediation chain, the funding interest rate must be lower than the asset interest rate. As the intermediation chain becomes longer, more short-term funding must be used to support the chain, as short-term funding tends to be the cheapest.

In this way, the growth of non-core liabilities and the increased use of short-term debt are all consequences of the rapid growth of bank assets during a boom.

**Tax on Non-Core Liabilities as a Prudential Tool**

To the extent that the ratio of non-core to core liabilities reflects the stage of the financial cycle, it also reflects the degree of risk-taking by the banking sector and the extent of under-pricing of risk. Risk is being “under-priced” in the sense that banks take cues from current buoyant market conditions to take on additional exposures now, without taking sufficient account of the fallout to the rest of the economy when the bubble eventually bursts. Having gone through the recent financial crisis, we are now very familiar with this type of market failure.

In the terminology of economics the cause of the market failure is an externality. Banks take account of their own short-term objectives without taking account of the spillover effects of their actions on other banks and on the economy as a whole. The textbook method to correct an economic externality is to impose a corrective tax (a Pigou tax) that better aligns the incentives of the individual actors to the interests of society as a whole.

A tax on non-core liabilities can serve as such a corrective tax. During a boom, the tax on non-core liabilities makes the non-core funding more expensive, and hence can dampen the boom in the upswing caused by the underpricing of risk. In order that a tax
can serve its purpose most effectively, the tax should have the twin properties that it be targeted at those activities that cause the greatest spillover effects, and it should not be easily evaded. The non-core liabilities tax scores highly on both scores.

The revenue raised by the tax is secondary. The main purpose of the tax is to align incentives. A good analogy is with the Congestion Charge used to control car traffic into central London. Under this charge, car drivers pay a daily fee of 8 pounds to drive into central London. The main purpose of the charge is to discourage drivers from bringing their cars into central London, thereby alleviating the externalities associated with traffic congestion.

In the same way, the non-core liabilities tax should be seen primarily as a tool for aligning the incentives of banks closer to the social optimum. The revenue raised by the tax would also be of benefit – perhaps for the purpose of a resolution fund – but the revenue is a secondary issue.

**Concluding Remarks**

The purpose of this memo has been to highlight the intimate conceptual links between procyclicality, systemic risk spillovers and the stock of non-core liabilities of the banking system.

The stage of the financial cycle is reflected in the composition of the liabilities of the banking sector. In a boom, we have the conjunction of three features:

- Total lending increases
- Non-core liabilities increase as a proportion of total liabilities
- Systemic risk increases through greater cross-holdings between intermediaries

Therefore, if systemic risk is to be taxed, it must be done in procyclical fashion. Merely slapping on a time-invariant “systemic surcharge” is not sufficient. By the same token, a procyclical capital requirement can, by itself, serve as a tax on systemic risk spillovers.

Finally, the non-core liabilities of the banking sector can be regarded as a measure both of the stage of the financial cycle, and of the vulnerability of systemic risk spillovers. Therefore, a tax on non-core liabilities of the banking system (as recently proposed in the United States) can be regarded as a way to achieve the twin goals on dampening procyclicality of the financial system, as well as to mitigate systemic risk spillovers.

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