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ЭМПИРИЧЕСКАЯ ОЦЕНКА ЛИКВИДНОСТИ И МАКРОЭКОНОМИЧЕСКОЙ НЕУСТОЙЧИВОСТИ БАНКОВ

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Аннотация

Регулирование банковской ликвидности - один из основных вопросов, рассматриваемых в методических рекомендациях в области банковского регулирования (Базель III). В настоящей статье мы анализируем два аспекта, которые не были учтены в Базеле III, но имеют первостепенное значение для эффективного регулирования ликвидности. Главной проблемой является необходимость прогноза ликвидности в динамике, с учетом ее изменении во времени при стабильности балансовых статей банка, а также другие проблемы, касающиеся требований к ликвидности, с учетом макроэкономической неустойчивости. Тем не менее, мы представляем эмпирические данные, свидетельствующие о том, что банковская система не обеспечивает соблюдение нормативов ликвидности. Полученные данные позволяют установить наличие связи между требованиями к банковской ликвидности и неустойчивостью макроэкономических показателей.

Ключевые слова: макроэкономическая неустойчивость, ликвидность, регулирование, банк

AN EMPIRICAL ASSESSMENT OF BANK LIQUIDITY AND MACROECONOMIC FRAGILITY OF BANKS

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Abstract

The regulation of bank liquidity has been one of the primary issues in the developed regulatory requirements of banks (Basel III). We by this paper examine two concerns that have not been addressed in Basel III and are of prime importance for the realization of a more effective liquidity regulation. Chief of the concerns is the need for a dynamic definition of liquidity that takes into account the time-varying liquidity and stability of banks' balance sheet items as well as other issues regarding macro fragility-related liquidity requirements. We however offer empirical evidence which suggesting that the banking industry does not enforce such requirements. It is by virtue of this evidence that we seek to put in place a positive link between bank liquidity requirements as well as fragility in terms of macroeconomic fundamentals.

Key words: macroeconomic fragility, liquidity, regulation, bank

Overview

It is worthy to note that the actual financial risk of banks' assets and liabilities is not wholly reflected on interest rate spreads. This risk dependent on several macroeconomic factors, not limited to the following;

- The unemployment rate of banks' borrowers,
- The rate of growth of the economy,
- The level of growth with respect to the housing industry and or market etc.

The benefit, though, of the use of interest rates is its availability for each balance sheet category and thus it's easily employed to provide a general overview regarding the time-varying liquidity positions of banks.

Methodology

Per the requirements of the Basel III regulation, a banks liquidity position in the medium to long term is determined by the Net Stable Funding Ratio (*NSFR*), which in its formulation could be defined as the ratio of the stable amount of funding available to the individual bank (*ASF*) to the required amount of stable funds being held by the bank as its required reserves as mandated by the central banks of global economies (*RSF*). From that we can then formulate the ratio as:

$$NSFR_t = \frac{ASF_t}{RSF_t}\frac{\sum sw_j SL_{jt}}{\sum sw_i SA_{it}} \tag{1}$$

that is to say sw_j is considered as the static weight of liability *j*, sw_i on the other hand is the static weight of asset i , SL_{jt} is also the stock of liability *j* in time period *t* and SA_{it} is the stock of asset *i* in time period *t*. from our assumption as indicated in Equation (1) we can then define the ASF as weighted sum of the stock of liabilities that are considered stable within an organization. The larger the weight given to a liability the more stables the liability could be conceived.

We however describe the process through which the time-varying weights of assets and liabilities are determined. The time-varying weights are assessed for individual countries separately taking into account the assets of the entire sample.

We however consider the actual interest rate spread of asset *i* within time period *t* (spr_{it}) we then define the spread as the difference between the rate of interest an asset in period *t* (r_{it}) and its corresponding benchmark rate of interest (rb_t):

$$spr_{it} = r_{it} - rb_t \tag{2}$$

that notwithstanding, the adjusted interest rate spread of asset *i* ($aspr_{it}$), is employed in the calculation of the time-varying weight by the formula below:

$$aspr_{it} = \begin{cases} spr_{it} - \min(spr_i), \text{in the event the asset's spread is invariant to the degree of oligopoly} \\ \dfrac{spr_{it} - \min(spr_i)}{|lnCl_t|}, \quad \text{in the event the asset's spread is affected by a degree of oligopoly} \end{cases}$$

i.e. min(spr_i) is considered as the minimum value of the interest rate spread of asset *i* which is calculated across time and individual countries, and CI_t it is however a concentration index whose values are taken between 0 and 1.

We realize from our formula above in respect of the oligopoly, the adjusted interest rate spread tend to be non-negative in nature with minimum values over the sample which happens to be equal to zero. This is determined by taking out the minimum value of the spread [to the entire sample] from the interest rate spread.

With regards to loan facilities granted households as well as organizations outside the finance industry whose spread are considered to depend positively on the degree of oligopoly, we assume that its credit risk rises as the spread rises relative to its degree of oligopoly. As such as we adopt a simplified formula, we assume further that the adjustments made on the spread for loans is equals the ratio of the actual spread i.e . [After taking out of the minimum value over the entire sample] to the concentration index. It is worthy to note that the work of the concentration index which is an absolute value is to smoothen absolute the values of the index as well as avoid any unnecessary high impact of very low or high values.

We could however employ a simple normalisation method [1] i.e, the adjusted interest rate spread is however transformed into the normalised spread ($nspr_{it}$), which falls between 0 and 1:

$$nspr_{it} = \frac{aspr_{it} - \min(aspr)}{\max(aspr_i) - \min(aspr_i)i} \tag{4}$$

in this case min($aspr_i$) and max($aspr_i$) are considered the minimum and maximum values of the adjusted interest rate spread of an asset i which is calculated across time as well as in individual countries; we however recall that min($aspr_i$)= 0; The time-varying weight of asset on the other hand is i in time t (tw_{it}) and we can then put up the linear function as;

$$tw_{it} = a_i(nspr_{it} - median(nspr_i) \tag{5}$$

that is to say $a_i > 0$ is considered the level of responsiveness of the time-varying weight of asset i to the divergence between the normalised spread of the asset and the median value of the normalised spread across time and the respective and or individual countries (*median* ($nspr_i$)). We realize that when $nspr_{it}$ = *median* ($nspr_{i)}$, its dynamic weight is equal to its static one. This however suggests that the static weight of each asset relates to the median financial risk in the sample. Further in each asset class we can define a minimum value for the time-varying weight which is equal to a proportion, q<1, of the static weight (i.e. min (tw_i)= qsw_i). This however stems from the fact that the time varying weight takes its minimum value when the normalised spread is at its minimum level, and as such we have:

$$\min(tw_i) = qsw_i = sw_i + a_i(\min(nspr_i) - median(nspr_i)) \quad (6)$$

this is so because by definition min ($nspr_i$)= 0, from (6) we can easily derive:

$$a_i = \frac{(1-q)sw_i}{median(nspr_i)} \quad (7)$$

Also, you realize that in the case of the loans to financial institutions, in which the static weight equals 0 we can however employ the formula above instead of 5 below

$$tw_{it} = sw_i + a_i(nspr_{it} - 0) \quad (5)$$

the formula (5') above denotes that regarding the loans to financial institutions the minimum dynamic weight is always equal to the static weight. Furthermore, for this type of asset we express that a_i = 0.05 in order for the maximum dynamic weight not to go beyond the following most liquid asset according the static approach, i.e. the sovereign securities.

A related technique could be followed for the assessment of the time-varying weights of liabilities. The actual interest rate spread of liability j in period t (spr_{jt}) could then be expressed as:

$$spr_{jt} = r_{jt} - rb_t \quad (8)$$

i.e. r_{jt} is defined as the applied rate of interest of the liability component j expressed in time period t.

We then consider the adjusted interest rate spread of the firms liability j in time period t ($aspr_{jt}$) we can then express the relation as below;

$$aspr_{it} = \begin{cases} spr_{jt} - \min(spr_j), & \text{if the firms liability's spread is invariant to the degree of oligopoly} \\ \frac{spr_{jt} - \min(spr_j)}{|\ln(1-Cl_t)|}, & \text{if the firms liability's spread is affected by the degree of oligopoly} \end{cases} \quad (9)$$

On the other breadth in the case where deposits find itself with households (consumption) as well as with non-finance firms whose spreads are considered to rely inversely within the degree of competition, we can assume that their financial risk rises when the spread rises relative to the degree of competition within the banking sector. Thus, the adjusted spread for these deposits is however equal to the ratio of the actual spread [after the deduction of the minimum value over the entire sample] to the absolute log of 1 less the concentration index; i.e. $1-CI_t$ this is however used to capturing the degree of competitiveness. Moreover, as earlier indicated the work of the concentration index which is an absolute value of the natural log is for the purpose of smoothening.

We then compute the normalised spread of liability j ($nspr_{jt}$) in time period t is as:

$$nspr_{jt} = \frac{aspr_{jt} - \min(aspr_j)}{\max(aspr_j) - \min(aspr_j)} \qquad (10)$$

We can also estimate the time-varying weight of liability j in time t (tw_{jt}) as:

$$tw_{jt} = sw_j + b_j(nspr_{jt} - median(nspr_j)) \qquad (11)$$

That is to say $b_j < 0$ is the responsiveness of the time-varying weight of liability j to the divergence between the normalised spread of the firms liability and the median value of the normalised spread. The parameter b_j is however negative since a higher spread implies a less stable liability. Also the static weight of each liability denotes the median financial risk in our entire sample.

Regarding each liability we can then define a maximum value for the time-varying weight which is equal to p times the static weight, i.e.,
$p > 1$ (implies ($\max(tw_j) = psw_j$). That is the time-varying weight should take its maximum value when the normalised spread is at its minimum level, we then have:

$$\max(tw_j) = sw_j + b_j\big(\min(nspr_j) - median(nspr_j)\big) \qquad (12)$$

Subsequently by explanation $\min(nspr_j) = 0$ from (12) it can be easily determined that:

$$b_j = \frac{(p-1)sw_j}{median(nspr_j)} \qquad (13)$$

Also, it is worthy to note that the ratio based on the time-varying balance sheet weights is termed Dynamic Net Stable Funding Ratio (*DNSFR*) and its expressed as:

$$DNSFR_t = \frac{ASF_t}{RSF_t} = \frac{\sum tw_{jt}SL_{jt}}{\sum tw_{it}SA_{it}} \tag{14}$$

Conclusion

We can conclude by saying that the interest rates that have been employed for each balance sheet item in the formulation of the above ratio; it is worthy to note that in each case of capital and reserves, debt securities issued for longer than 1 year, deposits of the central government as well as all other liabilities and all other assets the dynamic weight is assumed to be invariably equal to the static weight.

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