

PRACE NAUKOWE

Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS

of Wrocław University of Economics

Nr 428

Wrocław Conference in Finance: Contemporary Trends and Challenges



Publishing House of Wrocław University of Economics
Wrocław 2016

Copy-editing: Marta Karaś
Layout: Barbara Łopusiewicz
Proof-reading: Barbara Cibis
Typesetting: Małgorzata Czupryńska
Cover design: Beata Dębska

Information on submitting and reviewing papers is available on websites
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Wrocław 2016

ISSN 1899-3192
e- ISSN 2392-0041

ISBN 978-83-7695-583-4

The original version: printed

Publication may be ordered in Publishing House
Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu
ul. Komandorska 118/120, 53-345 Wrocław

tel./fax 71 36-80-602; e-mail: econbook@ue.wroc.pl
www.ksiegarnia.ue.wroc.pl

Printing: TOTEM

Contents

Introduction	9
Andrzej Babiarczyk: Methods of valuing investment projects used by Venture Capital funds, financed from public funds / Metody wyceny projektów inwestycyjnych stosowane przez fundusze Venture Capital finansowane ze środków publicznych	11
Magdalena Bywalec: Updating the value of mortgage collateral in Polish banks / Aktualizacja wartości zabezpieczenia hipotecznego w polskich bankach	29
Maciej Ciolek: Market fundamental efficiency: Do prices really track fundamental value? / Efektywność fundamentalna rynku: Czy ceny naprawdę podążają za wartością fundamentalną?.....	38
Ewa Dziwok: The role of funds transfer pricing in liquidity management process of a commercial bank / Znaczenie cen transferowych w procesie zarządzania płynnością banku komercyjnego	55
Agata Gluzicka: Risk parity portfolios for selected measures of investment risk / Portfele parytetu ryzyka dla wybranych miar ryzyka inwestycyjnego	63
Ján Gogola, Viera Pacáková: Fitting frequency of claims by Generalized Linear Models / Dopasowanie częstotliwości roszczeń za pomocą uogólnionych modeli liniowych	72
Wojciech Grabowski, Ewa Stawasz: Daily changes of the sovereign bond yields of southern euro area countries during the recent crisis / Dzielne zmiany rentowności obligacji skarbowych południowych krajów strefy euro podczas ostatniego kryzysu zadłużeniowego	83
Małgorzata Jaworek, Marcin Kuzel, Aneta Szóstek: Risk measurement and methods of evaluating FDI effectiveness among Polish companies – foreign investors (evidence from a survey) / Pomiar ryzyka i metody oceny efektywności BIZ w praktyce polskich przedsiębiorstw – inwestorów zagranicznych (wyniki badania ankietowego)	93
Renata Karkowska: Bank solvency and liquidity risk in different banking profiles – the study of European banking sectors / Ryzyko niewypłacalności i płynności w różnych profilach działalności banków – badanie dla europejskiego sektora bankowego	104
Mariusz Kicia: Confidence in long-term financial decision making – case of pension system reform in Poland / Pewność w podejmowaniu długoterminowych decyzji finansowych na przykładzie reformy systemu emerytalnego w Polsce	117

Tony Klein, Hien Pham Thu, Thomas Walther: Evidence of long memory and asymmetry in the EUR/PLN exchange rate volatility / Empiryczna analiza długiej pamięci procesu i asymetrii zmienności kursu wymiany walut EUR/PLN.....	128
Zbigniew Krysiak: Risk management model balancing financial priorities of the bank with safety of the enterprise / Model zarządzania ryzykiem równoważący cele finansowe banku z bezpieczeństwem przedsiębiorstwa.....	141
Agnieszka Kurdyś-Kujawska: Factors affecting the possession of an insurance in farms of Middle Pomerania – empirical verification / Czynniki wpływające na posiadanie ochrony ubezpieczeniowej w gospodarstwach rolnych Pomorza Środkowego – weryfikacja empiryczna	152
Ewa Miklaszewska, Krzysztof Kil, Mateusz Folwaski: Factors influencing bank lending policies in CEE countries / Czynniki wpływające na politykę kredytową banków w krajach Europy Środkowo-Wschodniej	162
Rafał Muda, Paweł Niszczota: Self-control and financial decision-making: a test of a novel depleting task / Samokontrola a decyzje finansowe: test nowego narzędzia do wyczerpywania samokontroli	175
Sabina Nowak, Joanna Olbryś: Direct evidence of non-trading on the Warsaw Stock Exchange / Problem braku transakcji na Giełdzie Papierów Wartościowych w Warszawie	184
Dariusz Porębski: Managerial control of the hospital with special use of BSC and DEA methods / Kontrola menedżerska szpitali z wykorzystaniem ZKW i DEA	195
Agnieszka Przybylska-Mazur: Fiscal rules as instrument of economic policy / Reguły fiskalne jako narzędzie prowadzenia polityki gospodarczej ...	207
Andrzej Rutkowski: Capital structure and takeover decisions – analysis of acquirers listed on WSE / Struktura kapitału a decyzje o przejęciach – analiza spółek nabywców notowanych na GPW w Warszawie	217
Andrzej Sławiński: The role of the ECB's QE in alleviating the Eurozone debt crisis / Rola QE EBC w łagodzeniu kryzysu zadłużeniowego w strefie euro	236
Anna Sroczyńska-Baron: The unit root test for collectible coins' market as a preeliminary to the analysis of efficiency of on-line auctions in Poland / Test pierwiastka jednostkowego dla monet kolekcjonerskich jako wstęp do badania efektywności aukcji internetowych w Polsce	251
Michał Stachura, Barbara Wodecka: Extreme value theory for detecting heavy tails of large claims / Rozpoznawanie grubości ogona rozkładów wielkich roszczeń z użyciem teorii wartości ekstremalnych.....	261
Tomasz Szkutnik: The impact of data censoring on estimation of operational risk by LDA method / Wpływ cenzurowania obserwacji na szacowanie ryzyka operacyjnego metodą LDA	270

Grzegorz Urbanek: The impact of the brand value on profitability ratios – example of selected companies listed on the Warsaw Stock Exchange / Wpływ wartości marki na wskaźniki rentowności przedsiębiorstwa – na przykładzie wybranych spółek notowanych na GPW w Warszawie	282
Ewa Widz: The day returns of WIG20 futures on the Warsaw Stock Exchange – the analysis of the day of the week effect / Dienne stopy zwrotu kontraktów futures na WIG20 na GPW w Warszawie – analiza efektu dnia tygodnia	298
Anna Wojewnik-Filipkowska: The impact of financing strategies on efficiency of a municipal development project / Wpływ strategii finansowania na opłacalność gminnego projektu deweloperskiego	308
Katarzyna Wojtacka-Pawlak: The analysis of supervisory regulations in the context of reputational risk in banking business in Poland / Analiza regulacji nadzorczych w kontekście ryzyka utraty reputacji w działalności bankowej w Polsce	325

Introduction

One of the fastest growing areas in the economic sciences is broadly defined area of finance, with particular emphasis on the financial markets, financial institutions and risk management. Real world challenges stimulate the development of new theories and methods. A large part of the theoretical research concerns the analysis of the risk of not only economic entities, but also households.

The first Wrocław Conference in Finance WROFIN was held in Wrocław between 22nd and 24th of September 2015. The participants of the conference were the leading representatives of academia, practitioners at corporate finance, financial and insurance markets. The conference is a continuation of the two long-standing conferences: INVEST (Financial Investments and Insurance) and ZAFIN (Financial Management – Theory and Practice).

The Conference constitutes a vibrant forum for presenting scientific ideas and results of new research in the areas of investment theory, financial markets, banking, corporate finance, insurance and risk management. Much emphasis is put on practical issues within the fields of finance and insurance. The conference was organized by Finance Management Institute of the Wrocław University of Economics. Scientific Committee of the conference consisted of prof. Diarmuid Bradley, prof. dr hab. Jan Czekaj, prof. dr hab. Andrzej Gospodarowicz, prof. dr hab. Krzysztof Jajuga, prof. dr hab. Adam Kopiński, prof. dr. Hermann Locarek-Junge, prof. dr hab. Monika Marcinkowska, prof. dr hab. Paweł Miłobędzki, prof. dr hab. Jan Monkiewicz, prof. dr Lucjan T. Orłowski, prof. dr hab. Stanisław Owsiak, prof. dr hab. Wanda Ronka-Chmielowiec, prof. dr hab. Jerzy Różański, prof. dr hab. Andrzej Sławiński, dr hab. Tomasz Słoński, prof. Karsten Staehr, prof. dr hab. Jerzy Węclawski, prof. dr hab. Małgorzata Zaleska and prof. dr hab. Dariusz Zarzecki. The Committee on Financial Sciences of Polish Academy of Sciences held the patronage of content and the Rector of the University of Economics in Wrocław, Prof. Andrzej Gospodarowicz, held the honorary patronage.

The conference was attended by about 120 persons representing the academic, financial and insurance sector, including several people from abroad. During the conference 45 papers on finance and insurance, all in English, were presented. There were also 26 posters.

This publication contains 27 articles. They are listed in alphabetical order. The editors of the book on behalf of the authors and themselves express their deep gratitude to the reviewers of articles – Professors: Jacek Batóg, Joanna Bruzda, Katarzyna Byrka-Kita, Jerzy Dzieża, Teresa Famulska, Piotr Fiszeder, Jerzy Gajdka, Marek Gruszczyński, Magdalena Jerzemowska, Jarosław Kubiak, Tadeusz Kufel, Jacek Li-

sowski, Sebastian Majewski, Agnieszka Majewska, Monika Marcinkowska, Paweł Miłobędzki, Paweł Niedziółka, Tomasz Panek, Mateusz Pipień, Izabela Pruchnicka-Grabias, Wiesława Przybylska-Kapuścińska, Jan Sobiech, Jadwiga Suchecka, Włodzimierz Szkutnik, Mirosław Szreder, Małgorzata Tarczyńska-Łuniewska, Waldemar Tarczyński, Tadeusz Trzaskalik, Tomasz Wiśniewski, Ryszard Węgrzyn, Anna Zamojska, Piotr Zielonka – for comments, which helped to give the publication a better shape.

Wanda Ronka-Chmielowiec, Krzysztof Jajuga

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THE ROLE OF FUNDS TRANSFER PRICING IN LIQUIDITY MANAGEMENT PROCESS OF A COMMERCIAL BANK

ZNACZENIE CEN TRANSFEROWYCH W PROCESIE ZARZĄDZANIA PŁYNNOŚCIĄ BANKU KOMERCYJNEGO

DOI: 10.15611/pn.2016.428.04

JEL Classification: G31, D81

Abstract: The changes introduced by Basel III framework tend to reflect on the impact that new regulations, particularly those relating to liquidity, will have on the banking sector. Implementation of new liquidity measures, in the case of Polish market will force banks to raise a substantial amount of high quality assets while the need to achieve an adequate indicators' level will significantly reduce the supply of credit. These indicators, although transparent, are not able to capture the specificity of the banks and the market in which they operate. The aim of the article is to present the current methods of risk measurement: those introduced by EU guidelines, as well as those that have been implemented only in the Polish market. Separately, the role of funds transfer pricing will be presented and their application to estimate the costs and benefits of liquidity.

Keywords: fund transfer pricing, liquidity risk measurement.

Streszczenie: Regulacje, jakie wprowadzone zostały przez nowe ramy Bazylei III będą miały istotny wpływ na sektor bankowy. Wdrożenie nowych, bardziej restrykcyjnych miar płynności, zmusza banki funkcjonujące na polskim rynku, do podniesienia jakości aktywów niezbędnych do osiągnięcia odpowiedniego poziomu wskaźników. Wskaźniki te, choć w samej konstrukcji przejrzyste, nie odzwierciedlają specyfiki banków oraz rynku, na którym działają. Celem artykułu jest przedstawienie aktualnych metod pomiaru ryzyka: tych wprowadzonych przez Komitet Bazylejski, jak również tych, które zostały wdrożone wyłącznie na polskim rynku. Dodatkowo scharakteryzowana została rola cen transferowych i ich zastosowanie do szacowania kosztów i korzyści związanych z płynnością banku.

Słowa kluczowe: ceny transferowe, zarządzanie ryzykiem płynności.

1. Introduction

The uncertainty in financial markets caused by the crisis of 2007-2009, which in many countries is still high, forced to reform the existing methods of measuring financial risk. One of its important elements is the liquidity risk, which significantly affects the situation of the banks themselves and the whole financial system. Despite the fact that, according to the recommendations of the Basel Committee (i.e. Basel I and Basel II), the liquidity risk has not been measured in the strict sense, the collapse of Lehman Brothers made regulators improve the rules.

The purpose of this article is to present the current liquidity measures, both existing and introduced, as well as funds transfer pricing to identify its role in the process of bank's liquidity risk management.

Measures previously used are compared with new ones introduced by Basel III regulations. A particular emphasis is placed on specifics of the bank and its role in the process of measuring liquidity risk. For this reason, the funds transfer pricing process will be presented separately to underline its role in an estimation of liquidity costs and benefits.

2. Bank liquidity and current measurement methods

Following the Recommendation P introduced by Polish Financial Supervision Authority (KNF), bank's liquidity was defined as the ability to settle obligations on time, to raise funds to finance the unexpected withdrawal of deposits, and by the bank to generate a positive balance of cash flows within a specified time horizon. The KNF also selected five basic types of liquidity: immediate (for a period of one day), current (up to 7 days), short-term (up to 30 days), medium-term (between 1 month to 3 months) and long term (for the period of 3 months to 12 months) [KNB 2002, p. 2]

In this document (Recommendation P) the concept of liquidity risk was defined, described as a threat which means the inability to repay the obligations at maturity due to an insufficient amount of cash. IMF [2008] defines liquidity risk as the inability of a financial intermediary to service their liabilities as they fall due. Other definitions, similarly to Polish one proposed by KNF, usually involve a time horizon [Borio 2000; Matz, Neu 2006; Strahan 2008; Brunnermeier, Pedersen 2009] and can differ significantly according to the length of the period. In these circumstances, the probability of liquidity shortage is typically measured for a given period ahead.

Financial market 2007-2009 crisis exposed the shortcomings in the process of risk monitoring. Despite the systematic implementation of new procedures introduced by the Basel Committee on Banking Supervision (BCBS) (in a form of Basel I and Basel II), it turned out that only a little attention was paid to liquidity and associated risk. The answer of BCBS for the crisis is the third edition of the Basel regulations, which propose two standards for liquidity risk: liquidity coverage

ratio (LCR) and the net stable funding ratio (NSFR); the indicators that allow to measure and monitor the short-term and long-term liquidity. These ratios are to be progressively implemented until 2018.

Additionally, other initiatives concerning the problem of liquidity are observed. A Committee of European Banking Supervisors (CEBS) issued Recommendation 2 for the European Commission (CEBS 2008/147), which requires that institutions have to introduce a mechanism for identifying and monitoring of liquidity risk. The European Parliament in its directive raises the need of liquidity management, as well as liquidity risk management, and postulates that credit institutions should establish their own strategies, policies, processes which allow to maintain appropriate liquidity buffers [Directive 2009/11/EC... 2009].

Contrary to Basel standards, Polish recommendations regarding liquidity risk measurement were much more restrictive. The banks are obliged to measure, monitor and report to the National Bank of Poland the gap calculated for different terms (called Available Net Liquidity, ANL) and additional regulatory measures M1, M2, M3, M4.

ANL takes into account the different crisis scenarios which involve, among others, an excessive withdrawal of funds by bank's customers or the inability to sell some assets as a result of an external crisis. The measure introduced from July 2008 [KNB 2007] on, and applied to short-term liquidity (the short-term liquidity gap M1 and the short-term liquidity ratio M2) and to the long term (the M3 coverage ratio of illiquid assets by own funds of and the M4 coverage ratio of illiquid assets and assets with limited liquidity by own funds and stable external funds). We can conclude, that in the Polish banking system the instruments which allow to monitor the liquidity of individual institutions have been already implemented and new decisions of the Basel Committee will cause only a slight modification of the existing measures.

3. The new liquidity measures

The Basel Committee, seeing a threat that has emerged in a whole banking system during the recent crisis, in the third stage of regulations, it established the LCR and NSFR indicators.

First of them, the liquidity coverage ratio (LCR), is defined as the ratio of the stock of high-quality liquid assets to the total net cash outflows over the next 30 calendar days. It expresses the percentage coverage of the amount of possible net outflows by liquid assets. The need to achieve the required level of at least 100% for this indicator, forces banks to maintain a level of high-quality assets, which in a critical situation allow to cover the possible outflow of funds for 30 days. The transition period, which lasts from 2015 till 2018, is necessary to reshuffle the structure of assets and liabilities of credit institutions to meet the required levels (which in the coming years are as follows: 2015 – 60%, 2016 – 70%, 2017 – 90% 2018 – 100%).

During the period of implementation of the LCR measure, each country may use its own regulations defining the requirements for the liquidity of credit institutions. In Poland till 2015, banks have been using the M2 index, a construction of which is based on internal models, and reflects the specifics of the institution and the market in which it operates. The new LCR index, although less restrictive comparing to the M2, does not allow for an individual composition, which on the one hand improves its transparency, but on the other does not reflect the specifics of the institution.

Table 1. Comparison of measures: LCR and M2

	LCR	M2
Definition	fixed percentage of sources considered unstable should be covered by liquid assets	all funds considered unstable should be covered by basic and supplementary liquidity reserve
Covered liabilities	liabilities definable as unstable („regulatory stress scenario”)	core balance modeled individually
Advantages	transparency	the ability to take into account the specifics of the bank and the market (through the use of internal models)
Disadvantages	the inability to consider the specifics of the institutions, market, country	the use of individual models makes it difficult or even impossible to compare the indices among banks

Source: Author’s own study.

Table 2. Comparison of measures: NFSR and M4

	NFSR	M3/M4
Valid from	the beginning of 2019 – 100%	from July 2008 – 100%
Range of coverage	depends on classifications of different assets and liabilities categories, and the weights assigned to these categories	all of the assets (not included in the liquidity reserve) should be covered by stable and own funds
Covered liabilities	weights for core balances of liabilities up to 1 year are determined arbitrarily	it uses the internal model approved by the supervisor, which calculates the level of stable funds
Advantages	stable sources of funds represent 76%-85% of assets requiring funding	It takes into account the specificity of bank liquidity, and the market (consumer behavior)

Source: Author’s own study.

The second indicator proposed by the Basel Committee – the net stable funding ratio (NSFR) – expresses the relation of available stable funding (own funds and foreign stable funds) to required stable funding (illiquid assets and assets of limited liquidity). Similarly to the LCR ratio, the NSFR indicator has also its equivalent in Polish regulations, but the difference between them involves the classification of assets and liabilities.

The research carried by Polish Financial Supervision Authority (KNF), conducted in 2012 has showed that while 14 of 44 banks have not reached the minimum required for the LCR measure, the average level of LCR was 150%. For the NSFR ratio 11 (of 44), did not reach the required minimum, but at the same time the average was 107% [Jakubiak 2012].

The consequence is that there is a necessity to change the whole structure of the securities market, because the current one does not allow the banks for quick achievement of the required level, particularly the NSFR ratio. It is estimated that the banks will be obliged to get approximately PLN 34.3 billion in assets with specific quality parameters (rating), which in the case of the Polish market could be very expensive.

4. The mechanism of transfer pricing

The liquidity measures introduced by the Basel Committee significantly affect the whole financial system, particularly in these countries where the financial market is still small or at a certain stage of development. New indices, that impose rigorous methods of measurement, significantly reduced the possibility of using the internal models which – till now – have allowed to consider the specifics of the institution and the country.

One of the elements that can be used to manage liquidity risk are transfer prices which lie within sole bank's competence. The Recommendation 2 of the Committee for European Banking Supervisors (CEBS) to the European Commission on liquidity risk management (CEBS 2008/147) states that "Institutions should have in place an adequate internal mechanism – supported where appropriate by a transfer pricing mechanism – which provides appropriate incentives regarding the contribution to liquidity risk of the different business activities. This mechanism should incorporate all costs of liquidity (from short to long-term, including contingent risk)" [CEBS 2008].

Transfer pricing is a management tool that allows, among others, for: the allocation of liquidity costs and benefits, the improvement of product pricing, the measurement of efficiency. In case of liquidity risk management, transfer pricing is primarily used to control the risk-taking of the individual units of the bank itself (incentives). The whole process takes part in a particular department in the bank headquarter dedicated precisely to the process of transfer pricing. Through a system of incentives and penalties reflected in the level of the transfer prices, the management board encourages the staff to change the structure of assets and liabilities to be optimal from the bank's liquidity position point of view. It is generally accepted that the methodology of transfer prices' creation should reward liquidity providers and charge those who use it, should be transparent and determined by reliable methods.

The construction scheme of the bank transfer pricing is based on the market rate (i.e. a reference rate), an instrument or a group of instruments whose value is often

given in the form of fixing (i.e. WIBOR, fixing of bonds). The next step is to take into account the spread between offer and bid price concerning the transaction's side. While elements mentioned above depend on the market situation, a maturity of the transaction and its size, the factors that are in charge of the bank itself include: their own institutions' spread and the adjustments arising from the cost of liquidity.

Table 3. Components of transfer pricing and sources of information about them

	FTP components	The source
FTP	the reference rate	inter-bank market
	spread between sale and purchase price	inter-bank market
	own (institution) spread	the bank
	adjustments resulting from liquidity costs	the bank

Source: Author's own study.

Liquidity costs include the price for an acquiring of liquidity, e.g. in a form of the difference between the market interest rates and swap rate adjustments (the swap points for the financing of investments in foreign currency), in a form of country risk or credit risk.

5. The construction of a reference yield curve

Banks set the number of transfer pricing, the amount of which is determined only by a range of offered operations. There is a general division determined by the type of the currency, maturity, and, in some cases, the unique characteristics of the institution or instrument.

For the purpose of this article, the construction of a yield curve is presented as a base for transfer prices' calculations. In this case, the yield curve, which presents the relationship between the interest rate and time, is based on the WIBOR reference rate, as well as interest rate swap rate (IRS). The yield curve is constructed following the Svensson model [Svensson 1994], and illustrates the basis for the bank to calculate the transfer price. The Figure 1 reflects daily changes in the shape and level of the yield curve which took place between August and October 2014 in the Polish inter-bank market.

The level of the yield curve may vary between institutions not only because of market conditions but also due to the banks' autonomy in model's choice used for the curve construction. Banks also decide about their own levels of spreads and estimate the cost of liquidity. This is why the fund transfer pricing can vary among institutions and start to become the crucial tool in liquidity management. It is worth to notice that the fund transfer pricing – as a result of the process based on the yield curve plus additional subjective margins – plays an important role in decreasing the liquidity costs.

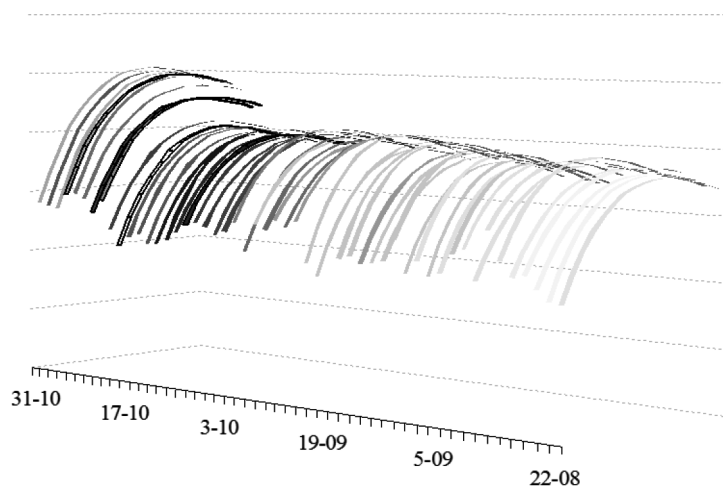


Figure 1. The changes of reference yield curve

Source: Author's own study.

6. Conclusion

The introduction of new recommendations concerning the liquidity risk measurement significantly reduces the possibility of individual bank approach and takes into account both its specifics and the market itself. However, there are recommendations that allow to monitor the risk using individual characteristics of the credit institutions. This is the place where the fund transfer pricing could be introduced together with the yield curve modeling as a base. Banks may use their own models to construct the yield curve and then utilize the fund transfer pricing as a source of additional savings. More precisely, if the yield curve is constructed the better results the bank can obtain. It is possible that in the near future the fund transfer pricing will probably be one of the most crucial elements of liquidity risk management.

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