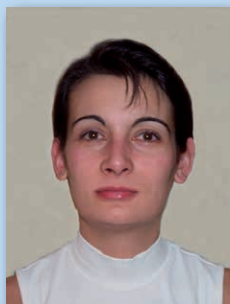


*originalni
naučni
rad*

UDK 336.717.22

336.717:336.76



dr. Nataša Kožul

Samostalni ekspert i konsultant za
investiciono bankarstvo
nkozul@gmail.com

Originalna verzija
teksta je na
engleskom jeziku

DETERMINANTE MEĐUBANKARSKE PREKONOĆNE STOPE

Rezime

Obavezna rezerva propis je većine centralnih banaka u svetu, po kome komercijalne banke moraju da drže određen deo depozita klijenata u rezervi, deponovano kod centralne banke ili u trezorima banaka. Dok se te rezerve obračunavaju periodično, banke obično vode svoje knjige dnevno, što može rezultirati manjkom ili viškom rezervi. Taj fenomen je doveo do pojave međubankarskog tržišta na kome banke transaktuju jedna sa drugom, trgujući instrumentima kamatne stope različite ročnosti. Ovaj rad se usredsređuje na prekonoćnu kamatnu stopu, jer se pretpostavlja da je ona indikator politike centralne banke. Dalje, pošto je prekonoćna stopa uključena u konstruisanje krive prinosa, ona implicitno utiče na stope dužih ročnosti. Najzad, kao ravnoteža u ponudi i tražnji za rezervama, kretanja prekonoćne kamatne stope odražavaju dinamiku na međubankarskom tržištu. Ovde se opisuju glavni međubankarski indeksi, pre diskusije o nekim važnim karakteristikama prekonoćne stope, kao i faktori koji utiču na njeno kretanje.

Ključne reči: međubankarsko tržište, prekonoćna stopa, rezerve, obavezna rezerva, LIBOR, EURIBOR, EONIA, SONIA, OIS

JEL: G21, E43, E58

UDC 336.717.22

336.717:336.76

*original
scientific
paper*

INTERBANK OVERNIGHT RATE DETERMINANTS

Nataša Kožul MSc, PhD

Independent expert and
investment banking consultant
nkozul@gmail.com

Summary

Reserve requirement is a regulation of most world's central banks, whereby commercial banks must hold a certain fraction of customer deposits in reserves, either deposited at the central bank or in the bank vaults. While these reserves are calculated periodically, banks usually manage their books daily, which may result in reserve shortfall or surplus. This phenomenon has led to the emergence of the interbank market where banks transact with one another, trading interest rate instruments of various maturities. This paper focuses on the overnight interest rate, as it is assumed to be an indicator of the central bank's policy. Moreover, as the overnight rate is included in the yield curve construction, it implicitly influences the rates for all longer maturities. Finally, as an equilibrium in the reserve supply and demand, movements in the overnight interest rate reflect the dynamics in the interbank market. Here, the main interbank indices are described, before discussing some important features of the overnight rate, and the factors underlying its movements.

Keywords: interbank market, overnight rate, reserve, reserve requirements, LIBOR, EURIBOR, EONIA, SONIA, OIS

JEL: G21, E43, E58

The original
version of the
text is in English

Uvod

Obavezna rezerva je propis većine centralnih banaka u svetu, po kome komercijalne banke moraju da drže izvestan deo depozita klijenata u rezervama, deponovane kod centralne banke ili u trezoru banke. Za komercijalne banke, sa mnogo klijenata koji mogu da povuku svoja sredstva u bilo koje vreme, bitno je držanje dovoljno rezervi. Međutim, pošto većina postavlja dnevne limite na povlačenje gotovine, procenjivanje rezervi je relativno jednostavan proces. Investicione banke, na drugoj strani, tipično trguju širokim dijapazonom kompleksnih finansijskih instrumenata za koje se izloženost obračunava dnevno i može da rezultira viškom ili manjkom rezervi. Da bi bilansirale knjige na kraju svakog radnog dana, banke moraju da pokriju bilo kakav manjak, tipično ulaskom u prekonoćnu trgovinu na međubankarskom tržištu. Međubankarsko tržište je vrlo likvidno, sa instrumentima kamatne stope u rasponu od prekonoćnih do višegodišnjih ročnosti. Međutim, od posebnog interesa za ovaj rad je prekonoćna stopa, jer je ona važan indikator politike centralne banke.

Većina finansijskih modela se bazira na tome da kamatnu stopu kontroliše centralna banka. Tako, u skladu sa tom pretpostavkom, na sve međubankarske stope, uključujući prekonoćnu stopu, direktno utiče politika centralne banke. Dalje, pošto banke sa viškom rezervi mogu da ih deponuju kod centralne banke, dok one koje moraju da pokriju manjak mogu direktno da se zaduže kod centralne banke, te dve stope deluju kao 'koridor' koji ograničava stope raspoložive na međubankarskom tržištu. Drugo, pošto kratkoročne stope, i time prekonoćne stope, predstavljaju gradivne blokove krive prinosa, one direktno utiču na stope svih dužih ročnosti. Dugoročne stope, sa svoje strane, usmeravaju odluke o štednji i investiranju, na nivou firmi i domaćinstava, što opet utiče na potrošnju i cene. Mada su to primarni ciljevi politike centralne banke, kamatne stope su u osnovi mnogih instrumenata kojima se trguje na tržištima i na taj način su, praktično, u velikoj meri određene ponudom i tražnjom.

Kratkoročne stope su takođe implicitno uključene u dugoročne stope, pošto da bi se izbegle prilike za arbitražu, prinos na instrument

N-ročnosti treba da bude ekvivalentan proseku prinosa N instrumenta na 1-rok. To se odražava na krive prinosa izgrađene korišćenjem međubankarskih stopa sve većih ročnosti, kao što su LIBOR (London Interbank Offered Rate), EURIBOR (Euro Interbank Offered Rate), itd.

LIBOR istorija i konstrukcija

Mada se poreklo LIBOR-a može pratiti unazad do 1969. godine (Ridley and Jones 2012), on je dobio na značaju 1980. godine kada su banke prateći praksu na evrodolarskim tržištima sve više počele da vezuju svoje kreditne stope za indeks, kao i da se zadužuju koristeći ugovore na bazi LIBOR-a. U odgovor potrebi da se formalizuje prikupljanje i procesiranje podataka korišćenih za utvrđivanje stopa na kojima je utemeljen LIBOR, Britanska bankarska asocijacija (BBA) preuzela je 1986. godine kontrolu, postavljajući standarde za relevantne finansijske instrumente. U to vreme, krive LIBOR-a bile su konstruisane za Britansku funtu (GBP), US dolar (USD) i japanski jen (JPY). Mada se broj valuta proširio tokom vremena, dostigavši maksimum od 16, on je opao posle integracije mnogih evropskih valuta u evro. Stope LIBOR-a u 2012. godini objavljivane su za deset valuta, ali LIBOR fiksing za NZD, SEK, DKK, AUD i CAD bio je prekinut u julu 2013. godine, kada je Hogov savetodavni komitet za tendere, nezavisan komitet koji je osnovala vlada Velike Britanije, odabrao ICE Benchmark Administrative Limited (IBA) kao novog administratora za LIBOR. Posle autorizacije Vlasti za finansijsko poslovanje (FCA), prenošenje administriranja LIBOR-a sa BBA na IBA završeno je 1. februara 2014. godine. Na taj način, IBA je odgovoran za nadzor fiksiranja stopa za pet valuta, naime

- Američki dolar - USD LIBOR
- Britanska funta - GBP LIBOR
- Evropski evro - EUR LIBOR
- Japanski jen - JPY LIBOR
- Švajcarski franak - CHF LIBOR

Stope ICE LIBOR-a (koje se tipično nazivaju jednostavno LIBOR) izračunavaju se na svaki radni dan za sedam ročnosti:

- Prekonoćni (1 dan)
- 1 nedelja
- 1 mesec

Introduction

Reserve requirement is a regulation of most world's central banks, whereby commercial banks must hold a certain fraction of customer deposits in reserves, either deposited at the central bank or in the bank vaults. For commercial banks, with many customers that might withdraw their funds at any time, holding sufficient reserves is essential. However, as most set daily limits on cash withdrawals, estimating the reserves is a relatively straightforward process. Investment banks, on the other hand, typically trade a wide range of complex financial instruments for which exposure is calculated daily, and may result in excess or shortfall in the reserves. In order to balance the books at the end of each trading day, banks must meet any shortfalls, typically by entering into an overnight trade in the interbank market. The interbank market is very liquid, with interest rate instruments ranging from overnight to long-term maturities. However, of particular interest for this work is the overnight rate, as it is an important indicator of the central bank's policy.

Most financial models assume that the interest rate is controlled by the central bank. Thus, according to this assumption, all interbank rates, including the overnight rate, are directly influenced by the central bank policy. Moreover, as the banks with surplus reserves can deposit those at the central bank, while those that need to meet the shortfall can borrow directly from the central bank, these two rates act as a 'corridor' that bounds the rates available in the interbank market. Secondly, as the short-term rates, and thus the overnight rate, are the building blocks of the yield curve, they directly affect the rates of all longer maturities. The long-term rates, in turn, drive the savings and investment decisions, both at the business and household level, which again affect the expenditure and prices. While these are the primary targets of the central bank's policy, interest rates are underlying many market-traded instruments and are thus, in practice, largely determined by supply and demand.

Short-term rates are also implicitly included in the long-term rates, as in order to avoid arbitrage opportunities, yield on an N-period instrument should be equivalent to the average of N 1-period instrument yields. This is reflected

in the yield curves built using the interbank rates of ever-increasing maturities, such as LIBOR (London Interbank Offered Rate), EURIBOR (Euro Interbank Offered Rate), etc.

LIBOR History and Construction

While the origins of LIBOR can be traced back to 1969 (Ridley & Jones 2012), it rose in prominence in 1980, when banks started to tie their loan rates to the index, as well as borrow using LIBOR-based contracts. In response to the need to formalize the collection and processing of data used to determine the rates underpinning LIBOR, in 1986, British Bankers' Association (BBA) took over the control, establishing the standards for the contributing financial instruments. At the time, LIBOR curves were constructed for the British Pound (GBP), US Dollar (USD) and Japanese Yen (JPY). While the number of currencies expanded over time, reaching the maximum of 16, it declined following the integration of many European currencies into euro. In 2012, LIBOR rates for ten currencies were published, but LIBOR fixing for NZD, SEK, DKK, AUD and CAD was discontinued when, in July 2013, the Hogg Tendering Advisory Committee, an independent committee set up by the UK government, selected ICE Benchmark Administration Limited (IBA) as the new administrator for the LIBOR. Following the authorisation by the Financial Conduct Authority (FCA), the transfer of the LIBOR administration from BBA to IBA was completed on February 1st, 2014. Thus, presently IBA is responsible for the oversight of fixing rates in five currencies, namely:

- American dollar - USD LIBOR
- British pound sterling - GBP LIBOR
- European euro - EUR LIBOR
- Japanese yen - JPY LIBOR
- Swiss franc - CHF LIBOR

The ICE LIBOR rates (typically referred simply as LIBOR) are calculated on each business day for seven maturities:

- Overnight (1 day)
- 1 week
- 1 month
- 2 months
- 3 months
- 6 months
- 12 months

- 2 meseca
- 3 meseca
- 6 meseci
- 12 meseci

Svaki par valuta-ročnost izračunava se na osnovu podnesaka banaka doprinosilaca, u kojima prikazuju stope po kojima te banke očekuju da će biti u stanju da dobiju neobezbeđene kredite na Londonskom novčanom tržištu. Te banke se nazivaju Panel banke i godišnje ih bira ICE reporna administracija (IBA) u saradnji sa Komitetom za FX i novčana tržišta (FX&MMC). Panel se bira za svaku valutu i obuhvata 8-16 banaka za koje se smatra da su reprezentativne za datu valutu. Članice panela određuju se na osnovu aktivnog učešća u trgovini odnosnom valutom, tržišnog volumena i reputacije. Kao rezultat tog striktnog procesa selekcije, podaci dobijeni od banaka doprinosilaca smatraju se verodostojnim.

Finalni ICE LIBOR objavljen oko 11:45 am po Londonskom vremenu predstavlja 'skraćenu aritmetičku sredinu' svih podnesaka Panel banaka. Ona se izračunava uklanjanjem najviših i najnižih 25% vrednosti (stvarni broj banaka čiji podaci su uklonjeni zavisi od broja panel članica za svaku valutu) pre izračunavanja sredine. Rezultirajuća stopa za konkretnu ročnost generalno se smatra najnižom međubankarskom aktivnom stopom na londonskom novčanom tržištu.

EURIBOR istorija i konstrukcija

EURIBOR je kreiran 1999. godine kao odgovor na uvođenje evro valute (EUR). U to vreme, Belgija, Nemačka, Irska, Španija, Francuska, Italija, Luksemburg, Holandija, Austrija, Portugalija i Finska usvojile su evro, koji je kasnije postao valuta Grčke (2001), Slovenije (2007), Kipra i Malte (2008), Estonije (2011) i Letonije (2014). Kao rezultat, EURIBOR služi kao reporna kamatna stopa jer pruža indikaciju prosečne stope po kojoj prvoklasne banke mogu da pristupe neobezbeđenom finansiranju na evro međubankarskom tržištu za dati period. Od svog uvođenja, njegov značaj za odluke o monetarnoj politici povećan je, jer se vidi kao alat za evropsku finansijsku stabilnost. Njegova kreacija i širenje uređeno je EURIBOR

Kodeksom ponašanja, koji sadrži pravila koja važe za Panel banke i EURIBOR. Nacrt Kodeksa ponašanja koji su sačinili Evropska bankarska federacija (EBF), Asocijacija finansijskih tržišta (ACI), Grupa evropskih štedionica i Evropska asocijacija kooperativnih banaka, odobrila je evropska bankarska industrija 15. decembra 1997. godine. Nadzor nad EURIBOR-om je odgovornost Stiring komiteta, koji čine devet istaknutih tržišnih praktičara i glavni direktor EBF-a, koji takođe prati događaje i postavlja zahteve za podnošenje stopa.

Slično LIBOR-u, banke koje doprinose podatke za izračunavanje EURIBOR-a moraju da ispunjavaju stroge kriterijume. One su aktivni učesnici evro novčanog tržišta, u evro zoni ili međunarodno i mogu da rukuju velikim volumenom trgovine. Još važnije, te banke imaju najviši kreditni rang i uživaju odličnu reputaciju u smislu svog poslovanja i etičkog ponašanja.

Svakog radnog dana, od članica Panela se traži da podnesu svoje podatke, koji odražavaju stope po kojima prvoklasne banke mogu da dobiju neobezbeđeno finansiranje na evro međubankarskom tržištu u 11:00 am po Briselskom vremenu.

Za razliku od LIBOR-a, EURIBOR ne uključuje prekonoćne stope, koje se kotiraju odvojeno kao EONIA. Dok je originalno kotirano 15 ročnosti, njihov broj je 1. novembra 2013. godine smanjen na sledećih osam:

- 1 nedelja
- 2 nedelje
- 1 mesec
- 2 meseca
- 3 meseca
- 6 meseci
- 12 meseci

EONIA (Evro prekonoćni prosečni indeks) objavljuje se odvojeno i odražava stope po kojima prvoklasne banke pružaju kredite denominirane u evrima jedna drugoj preko noći. Izračunava se kao ponderisani prosek svih prekonoćnih neobezbeđenih kreditnih transakcija na međubankarskom tržištu, koje su unutar evro zone inicirale Panel banke. Otuda, može se smatrati kao ekvivalent 1-dnevnoj EURIBOR stopi.

Danas, do 44 evropske banke doprinose svojim podacima za izračunavanje EURIBOR-a

Each currency-maturity pair is calculated based on the contributing banks' submissions, indicating the rates at which these banks expect to be able to obtain unsecured loans on the London money market. These banks are called Panel Banks and are selected annually by the ICE Benchmark Administration (IBA) in collaboration with the Foreign Exchange and Money Markets Committee (FX&MMC). A panel is selected for each currency and comprises 8-16 banks deemed representative for the particular currency. The panel members are determined based on the active participation in trading the particular currency, market volume and reputation. As a result of this strict selection process, the data provided by the contributing banks is deemed trustworthy.

The final ICE LIBOR published around 11:45 am London time is the 'trimmed arithmetic mean' of all of the Panel Banks' submissions. It is calculated by removing the highest and the lowest 25% values (the actual number of banks whose data is removed depends on the number of panel members for each currency) before calculating the average. The resulting rate for a particular maturity is generally considered the lowest interbank lending rate on the London money market.

EURIBOR History and Construction

EURIBOR was created in 1999, in response to the introduction of the euro currency (EUR).

At the time, Belgium, Germany, Ireland, Spain, France, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland adopted euro, which later became the currency of Greece (2001), Slovenia (2007), Cyprus and Malta (2008), Slovakia (2009), Estonia (2011) and Latvia (2014). As a result, EURIBOR serves as the interest rate benchmark, as it provides an indication of the average rate at which prime banks can access unsecured funding in the euro interbank market for a given period. Since its introduction, its importance in monetary policy decisions increased, as it is seen as instrumental for the European financial stability. Its creation and dissemination is governed by The Euribor Code of Conduct, which stipulates the rules that apply to the Panel Banks and the EURIBOR. Drawn up by the European Banking Federation (EBF), the Financial Markets Association (ACI), the European Savings Banks Group and the European Association of Cooperative Banks, the Code of Conduct was approved by the European banking industry on December 15th, 1997. The oversight of EURIBOR is the responsibility of the Steering Committee, comprising nine prominent market practitioners and the Chief Executive of the EBF, which also follows market developments and sets the requirements for rate submissions.

Similarly to LIBOR, the banks contributing data for the calculation of EURIBOR need to meet stringent criteria. They are active participants in the euro money market, either in euro-zone or internationally, and can handle



i objavljene stope za različite ročnosti predstavljaju prosek, posle otklanjanja najviših i najnižih 15%.

Determinante prekonoćne stope

S obzirom na to da banke pribegavaju prekonoćnoj trgovini da bi upravljale viškom/manjkom svojih rezervi, prekonoćne kamatne stope mogu jednostavno da se vide kao ravnoteža u rezervama koje drže ugledne banke. Međutim, pošto su stope takođe utrživi instrumenti, njima upravljaju tržišni trendovi. Slično, obavezne rezerve određuju upravna tela i na taj način one odražavaju promene politike. Najzad, mada su pre finansijske krize transakcije na međubankarskom tržištu smatrane sigurnim od neizvršenja, gubitak poverenja u bankarski sektor, kao i ograničen pristup finansiranju, uveo je kreditni rizik u tu trgovinu. Kao rezultat, na prekonoćne stope utiče kompleksno uzajamno delovanje mnogih faktora, što se ovde ukratko razmatra.

Uprkos svom značaju, prekonoćna stopa nije bila proučavana ekstenzivno u literaturi. Hamilton (1996, 1997) bio jedan od prvih koji je analizirao njeno ponašanje u SAD, i taj rad su kasnije nastavili Bartolini, Bertola i Prati (2001, 2002). U evro zoni, studije su radili Bindsel i Seltz (2001), Välimäki (2002). Würtz (2003), Pérez

Quirós i Rodríguez Mendizábal (2003) i Gaspar et al. (2004) vredni su pomena, jer pružaju uvide u faktore koji su u osnovi kretanja prekonoćne stope za evro denominirane neobezbeđene kredite. Međutim, ti radovi su pretežno teoretski i zasnovani na nekoliko pretpostavki, kao što je dnevno pristupanje rezervama, mada su one raspoložive jednom nedeljno u evro zoni. Nasuprot tome, Moschitz (2004) sproveo je empirijsku analizu zasnovanu na strukturnom modelu ponude i tražnje za rezervama, omogućavajući precizniju identifikaciju faktora koji utiču na utvrđivanje prekonoćne stope. Prikazano je da na prekonoćnu stopu najviše utiču očekivanja promene politike, dok ona teži da se odupre promenama u ponudi i tražnji.

Dalje, efekti raznih šokova na tržištu zavise od dinamike tih događaja i da li su oni predviđeni ili su neočekivani.

Održavanje rezervi

Komercijalne banke imaju obavezu da drže izvestan iznos depozita (rezervi) kod centralne banke. Međutim, očekuje se da se ti zahtevi za rezervama ispune, u proseku, unutar jednog kalendarskog meseca. Tako, na kraju svakog radnog dana, banke mogu imati manjak ili višak rezervi i naći se pred odlukom da li da to rešavaju odmah. Ako žele da bilansiraju



large trade volumes. Most importantly, these banks are of the highest credit standing and enjoy excellent reputation in terms of their business and ethical conduct.

Each business day, the panel members are required to submit their data, which reflects the rates at which prime banks can obtain unsecured funding in the euro interbank market at 11:00 am Brussels time.

Unlike LIBOR, EURIBOR does not include overnight rates, which are quoted separately as EONIA. While 15 maturities were originally quoted, their number was reduced on November 1st, 2013 to the following eight:

- 1 week
- 2 weeks
- 1 month
- 2 months
- 3 months
- 6 months
- 9 months
- 12 months

EONIA (Euro Overnight Index Average) is published separately and reflects the rate at which prime banks provide euro-denominated loans to each other overnight. It is calculated as a weighted average of all overnight unsecured lending transactions in the interbank market, initiated within the euro area by the contributing panel banks. Thus, it can be considered as equivalent to 1-day EURIBOR rate.

Presently, up to 44 European banks contribute their data for the calculation of EURIBOR, and the published rates for different maturities represent the average, after removing the highest and the lowest 15%.

Overnight Rate Determinants

Given that banks resort to overnight trading in order to manage the surplus/shortfall in their reserves, overnight interest rate can be simply viewed as an equilibrium in reserves held by prominent banks. However, as rates are also trading instruments, they are governed by market trends. Similarly, reserve requirements are set by the governing bodies and thus reflect the policy changes. Finally, while prior to the financial crisis transactions in the interbank market were seen as safe from default, the loss of trust in the banking sector, as well as

limited access to funding, introduced credit risk to these trades. As a result, overnight rates are affected by a complex interplay of many factors, which are briefly discussed here.

Despite its importance, overnight rate has not been extensively studied in the literature. Hamilton (1996, 1997) was one of the first to analyze its behaviour in the US, and this work was later continued by Bartolini, Bertola, and Prati (2001, 2002). In the euro area, studies conducted by Bindseil and Seitz (2001), Välimäki (2002), Würtz (2003), Pérez Quirós and Rodríguez Mendizábal (2003) and Gaspar et al. (2004) are noteworthy, as they provide insights into the factors underlying the movements in the overnight rate for euro-denominated unsecured loans. However, these works are largely theoretical and based on several assumptions, such as daily access to reserves, even though these are usually supplied once a week in the euro area. In contrast, Moschitz (2004) conducted an empirical analysis based on the structural model of reserve supply and demand, allowing for a more precise identification of factors affecting the determination of the overnight rate. It has been shown that overnight rate is mostly affected by the expectations in policy changes, while it tends to resist changes in supply and demand. Moreover, effects of various shocks in the market are dependent on the timing of these events and whether these are foreseen or unexpected.

Reserve Maintenance

Commercial banks are obliged to keep certain amount of deposits (reserves) with the central bank. However, these reserve requirements are usually expected to be met, on average, within one calendar month. Thus, at the end of each business day, banks may have deficit or surplus in reserves and face a decision of whether to address it immediately. If they wish to balance the reserve holding on a daily basis, they can transact in the interbank market through overnight lending/borrowing. Alternatively, the required liquidity can be obtained from the central bank, where additional deposits can also be made. The choice between interbank transaction and borrowing from (depositing at) the central bank is governed by the profit maximization. In other words, if the reserve

holding rezervi na dnevnoj osnovi, one mogu da obavljaju transakcije na međubankarskom tržištu kroz prekonočno kreditiranje/zaduživanje. Alternativno, potrebna likvidnost može da se dobije od centralne banke, gde takođe mogu da se drže dodatni depoziti. Izbor između međubankarskih i zaduživanja kod (deponovanja kod) centralne banke reguliše maksimizacija profita. Drugim rečima, ako se upravljanjem rezervama postigne viša troškovna efikasnost kroz transakcije sa centralnom bankom, međubankarska trgovina će biti manje likvidna i obrnuto. U tom pogledu centralna banka može da kontroliše međubankarske prekonočne stope, držeći ih blizu svojih ciljanih nivoa. Međutim, ako se očekuju smanjenje stopa ili druge promene tržišnih uslova, banke mogu odlučiti da odlože bilansiranje za kasniji datum. Slično, zaduživanje za velike iznose može se videti kao signal finansijskih teškoća i to može da podstakne banke da usvoje strategija upravljanja rezervama koje nisu obavezno najoptimalnije. Najzad, mada privremene promene u ponudi rezervi tipično nemaju efekat na prekonočnu stopu, to više ne može da važi pri kraju perioda održavanja rezervi, kada se očekuje da banke kompenzuju bilo koji manjak svojih rezervi, što rezultira povećanjem stope. Taj trend se odmah posle preokreće, čim počne novi period održavanja.

SONIA (Sterling Overnight Index Average)

Za razliku od LIBOR-a i EURIBOR-a, koji su odraz očekivanih stopa po kojima se mogu davati neobezbeđeni krediti na međubankarskom tržištu, SONIA je indeks koji prati stvarne prekonočne stope finansiranja. Uvedena je marta 1997. godine kao odgovor na rastući obim trgovine koja se obavlja posle zvaničnog radnog vremena. U sve više globalizovanoj investicionoj bankarskoj industriji, nepostojanje sterlinške prekonočne stope finansiranja uzrokovalo je volatilnost, jer je postalo teško da se predviđa nivo obavezne reserve. Zato je Wholesale Markets Brokers' Association (WMBA) u Velikoj Britaniji uspostavila SONIU, koja je ponderisani prosek svih neobezbeđenih gotovinskih transakcija koje su posredovale firma članice WMBA. Minimalna veličina transakcije je £25 miliona i

stope su ponderisane iznosom posla pre nego što se izračuna prosek. Zbog toga što je vezana za aktuelne transakcije, SONIA je važan indikator dnevnog obima trgovine i ostvarenih stopa. Međutim, to je takođe dovelo do još važnijeg instrumenta - svop prekonočnog indeksa (OIS) - koji se blisko prati u odnosu na LIBOR, jer je on odraz kreditne sposobnosti banaka učesnica i samim tim zdravlja finansijskog sistema (Sengupta & Tam, 2008).

OIS (svop prekonočnog indeksa)

Kao svaki svop, OIS ne zahteva razmenu glavnice i na taj način smanjuje rizik partnera. Dva partnera sporazumeju se da razmene razliku između fiksne i varijabilne stope (kao što su stopa federalnih fondova za američki dolar, EONIA za evro ili SONIA za funtu sterlinga). S obzirom na to da LIBOR, EURIBOR i drugi indeksi odražavaju stope po kojima se mogu dobiti neobezbeđena sredstva, oni implicitno uključuju rizik partnera. OIS, na drugoj strani, ograničava izloženost, pri čemu spread LIBOR-OIS pruža vrednu informaciju o verovatnoći neizvršenja ugovornih strana. To se najbolje može ilustrovati brzim širenjem spreda u vreme finansijske krize, kada je povećan sa prosečnih 10 baznih poena na 364 u oktobru 2008. godine.

Međutim, pošto je izbegavanje rizika partnera važan pokretač tržišta OIS-a, mnoge banke se opredeljuju za ovu finansijsku opciju kao zgodnu alternativu za obavezu da refinansiraju postojeći kredit.

Diskusija

Istorijski, centralne banke su uvek imale važnu ulogu u donošenju politike i obezbeđivanju da se ona primeni kroz različite mere, kao što su smanjenje ili povećanje kamatne stope i rezervi uvedenih za banke. Međutim, sa rastom tržišta derivata, investicione banke su našle način da smanje svoje kapitalne zahteve, uz stvaranje znatne izloženosti. Čak su se na međubankarskom tržištu pojavili instrumenti koji nisu zahtevali razmenu glavnice, ko što su OIS, stvarajući mogućnosti za bilansiranje knjiga ili postizanje zahtevanih kamatnih stopa. Mada LIBOR, EURIBOR i drugi indeksi ostaju visoko relevantni za investiture i privatne

management is achieved more cost-effectively by transacting with the central bank, interbank trading will be less liquid and vice versa. In that respect, central bank can control the interbank overnight rates, keeping them close to its target levels. However, if a rate cut or other changes in market conditions are expected, banks may decide to differ reserve balancing to a later date. Similarly, borrowing large amounts can be seen as a signal of financial difficulties, and can thus also prompt banks to adopt reserve management strategies that are not necessarily most optimal. Finally, while temporary changes in the reserve supply typically have no effect on the overnight rate, this may no longer be true towards the end of the reserve maintenance period, when banks are expected to compensate for any shortfall in their reserves, resulting in the rate increase. This trend is reversed immediately after, once the new maintenance period begins.

SONIA (Sterling Overnight Index Average)

Unlike LIBOR and EURIBOR, which are a reflection of the expected rates at which unsecured loans can be made in the interbank market, SONIA is an index that tracks the actual overnight funding rates. It was introduced in March 1997 in response to the increasing volume of trades executed after the official business hours. In the increasingly globalized investment banking industry, having no Sterling overnight funding rate was causing volatility, as it became difficult to predict the level of required reserves. Thus, the Wholesale Markets Brokers' Association (WMBA) in Great Britain established SONIA, which is a weighted average of all unsecured cash transactions brokered in London by the WMBA member firms. The minimum transaction size is £25 million and the rates are weighted by the deal amount before the average is calculated. Due to it being linked to the actual transactions, SONIA is an important indicator of the daily trading volume and rates achieved. However, it also gave rise to an even more important instrument-Overnight Index Swap (OIS)-which is closely monitored relative to LIBOR, as it is a reflection of the participating banks'

creditworthiness and thus the health of the financial system (Sengupta & Tam, 2008).

OIS (Overnight Index Swap)

As any swap, OIS does not require exchange of the principal, and thus reduces the counterparty risk. The two counterparties agree to exchange the difference between a fixed and a floating rate (such as the Federal funds rate for US dollar, Eonia for euro or Sonia for pound sterling). Given that LIBOR, EURIBOR and other indices reflect the rates at which unsecured funds can be obtained, they implicitly include counterparty risk. OIS, on the other hand, limits the exposure, with the LIBOR-OIS spread providing valuable information on the likelihood of default by the counterparties. This is best exemplified in the rapid widening of the spread at the time of financial crisis, when it increased from an average 10 basis points to 364 in October 2008.

However, while avoiding counterparty risk is an important driver of the OIS market, many banks choose this financing option as a convenient alternative to having to refinance the existing loan.

Discussion

Historically, central banks have always played an important role in setting the policy and ensuring that it is implemented through various measures, such as interest rate cuts or increases and reserves imposed on the banks. However, with the expansion of derivatives markets, investment banks found the way to reduce their capital requirements, while creating significant exposure. Even in the interbank market, instruments that did not require principal exchange, such as OIS, have emerged, creating opportunities for balancing books or achieving required interest rates. While LIBOR, EURIBOR and other indices remain highly relevant both to the investors and private individuals, the recent economic crisis has revealed that they too can be affected by credit and liquidity issues. Thus, the implicit assumption that prominent institutions can obtain substantial unsecured loans from other institutions of equal standing may no longer be

Literatura / References

1. Bartolini, L., Bertola, G., & Prati, A. (2001). Banks' reserve management, transaction costs, and the timing of federal reserve management. *Journal of Banking and Finance*, 25, 1287-1317.
2. Bartolini, L., Bertola, G., & Prati, A. (2002). Day-to-day monetary policy and the volatility of the federal funds rate. *Journal of Money, Credit and Banking* 34, 137-159
3. Bindseil, U., & Seitz, F. (2001). The supply and demand for eurosystem deposits the first 18 months. *ECB Working Paper No. 44*.
4. Gaspar, V., Pérez-Quirós, G., & Rodríguez Mendizábal, H. (2004). Interest rate determination in the interbank market. *ECB Working Paper No. 351*.
5. Hamilton, J. (1996). The daily market for federal funds. *Journal of Political Economy*, 104(1), 26-56.
6. Hamilton, J. (1997). Measuring the liquidity effect. *American Economic Review*, 87, 80-97.
7. Moschitz, J. (2004). The determinants of the overnight interest rate in the Euro area. *European Central Bank Working Paper Series*, September, No. 393.
8. Pérez-Quirós, G., & Rodríguez Mendizábal, H. (2003). The market for funds in Europe: What has changed with the EMU? *UAB-IAE Working Paper 559.03*.
9. Ridley, K., & Jones, H. (2012). A Greek Banker Spills on the Early Days of the LIBOR and His First Deal with the Shah of Iran. *Reuters*, August 8, 2012.
10. Sengupta R., & Tam, Y. M. (2008). The LIBOR-OIS Spread as a Summary Indicator. *Economic Synopses*, Number 25. Federal Reserve Bank of St. Louis.
11. Välimäki, T., 2002. Variable rate liquidity tenders. *Bank of Finland Discussion Papers* 24/2002.
12. Würtz, F. (2003), A comprehensive model on the euro overnight rate. *ECB Working Paper No. 207*.

pojedince, nedavna ekonomska kriza otkrila je da i na njih takođe mogu da utiču kreditni i likvidnosni problemi. Tako, implicitna pretpostavka da ugledne institucije mogu da dobiju znatne neobezbeđene kredite od drugih institucija podjednake reputacije više ne može da se primenjuje u istoj meri kao što je to bilo ranije i to stvara kaskadni efekat, jer više kamatne stope obično otežavaju firmama i privatnim pojedincima da dobiju kredite, što dovodi do stagnacije potrošnje, stambenog tržišta i drugih sektora.

Zaključak

Svi modeli utvrđivanja cena zasnovani su na premisi da nema mogućnosti za arbitražu na tržištu, tj. nije moguće, na primer, uzeti na zajam sredstva na određen vremenski period i odmah ih deponovati na isti period da bi se ostvario nerizični profit. Isto važi za međubankarske transakcije, gde se očekuje da prekonoćne stope budu povezane sa stopama koje pripadaju dužim ročnostima, da bi se izbegla arbitraža. Ako to nije istina, banke bi zapazile diskrepanciju između stopa na ročne depozite i stopa ostvarenih revolving prekonoćnom trgovinom i eksploatisale bi je. Mada je taj odnos, poznat kao 'hipoteza očekivanja', široko prihvaćen, događaji tokom i posle nedavne finansijske krize pokazali su da to ne mora da bude uvek tako. Percepcije povećanog kreditnog rizika partnera, likvidnosni problem i potreba za višim premijama za dugoročnije kredite i depozite vezano za neizvesnost u pogledu budućeg puta kratkoročnih kamatnih stopa mogu stvoriti disbalans između plaćenih stopa na dve vrste depozita. Veća tržišna neizvesnost čini taj odnos sve više volatilnim, uzrokujući da banke traže druge forme finansiranja ili da ograniče obim svog poslovanja. Na taj način, mada je centralna banka uvek imala ključnu ulogu u oblikovanju politike i određivanju kamatne stope, te promene ne moraju nužno da se odraze na međubankarsko tržište i stope prenete na klijente. Otuda, pojedinačni investitori treba pažljivo da posmatraju indekse, kao što su LIBOR i EURIBOR, jer su mnogi proizvodi koje banke nude, uključujući hipoteke, povezani sa tim stopama i direktno utiču na finansijsku snagu potrošača.

applicable to the same extent as it once was. This creates a cascading effect, as higher interbank rates usually make it difficult for businesses and private individuals to obtain loans, resulting in stagnation in spending, housing market and other sectors.

Conclusion

All pricing models are based on the premise that there are no arbitrage opportunities in the market, i.e., it is not possible to, for example, borrow funds for a certain period of time and immediately deposit them for the same period to make a risk-free profit. The same applies to interbank transactions, whereby overnight rates are expected to be related to those pertaining to longer maturities, in order to avoid arbitrage. If this does not hold true, the discrepancy between rates on term deposits and those achieved by revolving overnight trades would be noticed and exploited by the banks. While this relationship, known as the 'expectations hypothesis', is widely accepted,

the developments during and after the recent financial crisis have shown that it may not always hold. The perceptions of increased counterparty credit risk, liquidity issues and the need for higher premiums for longer-dated loans and deposits related to the uncertainty about the future path of short-term interest rates may create an imbalance between the rates paid on the two types of deposits. Greater market uncertainty makes this relationship increasingly volatile, causing banks to seek other forms of financing or to restrict the scope of their business. Thus, while central banks have always played the key role in shaping policy and determining the interest rates, these changes may not necessarily be reflected in the interbank market and the rates passed onto the clients. Thus, individual investors should closely watch the indices, such as LIBOR and EURIBOR, as many products banks offer, including the mortgages, are linked to these rates and directly affect the spending power of consumers.