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ALATI CENTRALNE BANKE ZA UTICAJ NA DINAMIKU HIPOTEKARNIH KREDITA U USLOVIMA VALUTNOG ODBORA I INFLACIJE

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Rezime

Cilj svake centralne banke i vlade je da održe cene stabilnim. U tom cilju, cilj njihove politike upravljanja novčanom masom je da održi inflaciju – stopu po kojoj se cene dobara i usluga menjaju tokom vremena – uvek niskom, održivom i predvidljivom. Cilj Bugarske narodne banke (BNB) je inflacija od 2% u srednjoročnom periodu kao kriterijum iz Mastrihta i predstojeće usvajanje evra kao nacionalne valute. Dodatna ograničenja su uslovi valutnog odbora kao sistema koji određuje mogućnosti centralne banke za intervencije. Inflacija kao proces stvara osećaj povećanog rizika od gubitka vrednosti, što navodi građane i ekonomske subjekte da traže dugoročne održive investicije. Kao rezultat toga, potražnja za hipotekarnim kreditima je porasla.
Nivo inflacije danas može uticati na očekivanja ljudi o kretanju cena u budućnosti. Ako potrošači i vlasnici preduzeća formiraju svoju politiku sa veoma niskom ili veoma visokom inflacijom, oni očekuju da će situacija i ostati takva. Ova očekivanja su važna. Građani ih koriste prilikom donošenja odluka o potrošnji, zaduživanju i ulaganju. Firme takođe uzimaju u obzir ova očekivanja prilikom određivanja cena svoje robe i usluga.
Kada se ova očekivanja udaljavaju od inflacionog cilja centralne banke, toj instituciji postaje sve teže da usmeri realnu dinamiku cena u privredi nazad ka inflacionom cilju. Centralna banka može doprineti izbegavanju stvaranja takvih očekivanja tako što će imati jasan cilj i zadržati inflaciju blizu tog cilja, koristeći svoj uticaj u takvim uslovima, premda je taj uticaj ograničen.
Da bi se proučio razvoj ovih važnih makroekonomskih varijabli, korišćene su metode ekonometrijske analize zasnovane na vremenskim serijama za analizu dinamike inflacionih očekivanja građana, inflacije, instrumenata koje centralna banka koristi za uticaj i dinamike hipotekarnih kredita odobrenih građanima.

Ključne reči: valutni odbor, inflaciona očekivanja, instrumenti centralne banke, hipotekarno kreditiranje.

JEL klasifikacija: G28, G52, E44, E52 G21, R31.

Uvod

Rast inflacije u poslednjih nekoliko godina od akumulacije nekoliko kriznih i postkriznih perioda, koje u ovom trenutku definišemo kao post-krizu, ponovo izaziva rasprave među političarima i stručnjacima u vezi sa determinantama i brzim rastom inflacije. Rast cena nekretnina, imovine iz sektora kojim se ne trguje,stručnjaci širom sveta su definisali kao postkriznu reakciju na kontrolu i uključivanje u investicioni proces značajnih inflatornih novčanih tokova.

Ako centralna banka predviđa inflatornu dinamiku na osnovu makroekonomskih modela, a oni sami se zasnivaju na interakciji agenata u ekonomskom ekosistemu, onda zaključci dovode do potrage za objašnjenjem u nekoliko hipoteza. Investicione odluke i poslovni i dokumenti za stvaranje rezervi, investicija ili otvaranje novih radnih mesta realizuju se u narednim periodima. Ulaganja u nekretnine pojavljuju se kao deo dugoročnog investicionog programa ekonomskih subjekata, što opravdava izbor da dinamiku ovog kreditnog kanala učinimo predmetom našeg istraživanja.

U ovoj studiji predlažemo okvir za analizu odnosa između determinanti monetarne politike centralne banke i tržišta hipotekarnih kredita u specifičnom kontekstu centralne banke u valutnom odboru. Na osnovu očekivanja domaćinstava za razvoj tržišta nekretnina i njihovog odnosa prema ponudi kredita, tražimo odgovor na prvo istraživačko pitanje: Da li inflaciona očekivanja ostvaruju direktnu vezu sa hipotekarnim tržištem, i drugo pitanje: mogu li instrumenti centralne banke ostvariti efikasnu intervenciju u koncentraciji rizika segmenta hipotekarnih finansijskih tržišta. Hipotekarni krediti su važan faktor u razvoju i stimulaciji ekonomskog ekosistema bilo koje zemlje. Stimulišu potražnju za nekretninama, što dovodi do ulaganja u građevinski sektor i stvara dodatna radna mesta. S druge strane, štednja građana ili rezerve preduzeća ulažu se u nekretnine, čime se utiče na prekomernu likvidnost banaka. A pošto su hipotekarni krediti tradicionalno dugoročni, rizici koje banke preuzimaju takođe zahtevaju dugoročne garancije i osiguranje kroz poslovne alate banke.

Poseban slučaj je funkcionisanje bankarskog sistema Republike Bugarske kao sistema valutnog odbora, uspostavljajući zakonom značajna ograničenja funkcija Centralne banke i svodeći ih na:

1. Određivanje obaveznih minimalnih rezervi
2. Zabranu direktnih intervencija na tržištima.
3. Utvrđivanje bafera, prema Bazelu-III: anticiklični, zaštitni kapital, za sistemski važne institucije, za sistemski rizik.

Pregled literature o problemu hipotekarnih kredita i ulozi centralne banke.

Kao što se može videti na **grafikonu broj 1** izdavanje novih kredita iz bankarskog sistema je veoma nestabilno tokom perioda sa vrhuncem u trećem kvartalu 2009. godine, značajnim dnom početkom 2016. godine i brzim oporavkom u 2019. i 2023. godini. Uočen je i uticaj pandemijskih ograničenja na rast tržišta nekretnina. Zbog globalnog uticaja ovog tržišta, istraživači iz mnogih jurisdikcija su ga takođe izabrali kao predmet svog istraživanja.

Kako tvrdi autor jednog istraživanja (Matteo Iacoviello, 2010), proučavanje odloženog tehnološkog napretka američkog tržišta nekretnina objašnjava trend rasta realnih cena kuća u proteklih 40 godina. Tokom poslovnog ciklusa, potražnja za stanovima i šokovi tehnologije izgradnje objašnjavaju četvrtinu varijabilnosti stambenih investicija i cene stanova. Monetarni faktori objašnjavaju manje od 20%, ali su odigrali veću ulogu u stambenom ciklusu na početku 21. veka. Autori su otkrili da je rast tržišta stambenih nekretnina beznačajan, koncentrisan na zadovoljavanje potrošnje, a ne poslovna investicija, a taj značaj se povećava u budućnosti.

Referentna kamatna stopa centralne banke je u osnovi transmisionog mehanizma monetarne politike centralne banke. Povećanje kamatnih stopa na hipotekarne kredite dovodi do povećanja potrošnje potrošača na budžete domaćinstava, čime se ograničava potražnja i time smanjuju dugoročna ulaganja domaćinstava, a samim tim i uticaj na sve industrije vezane za stambenu izgradnju. (R. Kelly, 2018)

Nakon analize uticaja COVID krize na stanje ekonomija EU, autor je otkrio da je pandemija izazvala ne samo strukturne promene u finansijskim sektorima zemalja, već i način na koji se kamatne stope prenose na finansijska tržišta.

Kamatne stope na kredite, s druge strane, predstavljaju ključni faktor koji određuje troškove hipotekarnih kredita. Odnos između ova dva faktora je dinamičan i može imati značajan uticaj na tržište nekretnina.

Slika 1 - Rast hipotekarnih kredita

Izvor: www.bnb.bg

Ograničenja u vezi sa izdavanjem hipotekarnih kredita (Brian E. Higgins, 2024), koje su uvele banke na osnovu odnosa kredita i vrednosti (LTV) i kredita i prihoda (LTI), naglašavaju razlike u ponašanju pri zaduživanju i dinamike tržišta nekretnina. Analiza to pokazuje kroz podatke da su zajmoprimci sa većim finansijskim sredstvima bolje u stanju da se prilagode ograničenjima kredita prilagođavanjem svog leveridža, a ne vrednosti imovine koju kupuju. Pored toga, analiza se i studije o uticaju kreditnih ograničenja na ravnotežne cene.

Banke igraju ključnu ulogu u stimulisanju investicija u nekretnine. Oni deluju kao posrednici između investitora i zajmoprimaca, obezbeđujući finansiranje u vidu hipotekarnih kredita. Kroz svoje aktivnosti, banke povećavaju dostupnost finansiranja. One pružaju investitorima mogućnost da dobiju sredstva za kupovinu nekretnina, čak i ako nemaju ceo potreban iznos. Ovo stimuliše potražnju za nekretninama i može dovesti do rasta cena.

Delujući kao posrednici, banke preuzimaju deo rizika u vezi sa ulaganjem u nekretnine zahtevajući od zajmoprimaca da obezbede učešće i kolateral u vidu hipoteke na imovinu koja se kupuje. Podela rizika može da podstakne investitore da preuzmu veće rizike, čineći ulaganja u više spekulativnih projekata verovatnijim.

Nekretnine mogu biti dragoceno sredstvo za diversifikaciju investicionih portfolija investitora. Banke nude različite vrste hipotekarnih proizvoda koji odgovaraju različitim potrebama i preferencijama investitora.

Bankarske institucije, koje finansiraju hipotekarnim kreditima, na kraju doprinose ekonomskom rastu. Ulaganje u nekretnine dovodi do stvaranja dodatnih radnih mesta u građevinskom sektoru i drugim srodnim industrijama. Ovaj proces dovodi do stimulacije ekonomskog rasta i može dovesti do povećanja životnog standarda ne samo zaposlenih, već i rastom poreskih prihoda - društva u celini.

Poslovni ciklus, koji se ogleda u dinamici rasta BDP-a, takođe igra neosporan uticaj na podsticanje ulaganja u nekretnine. Autori (Moramarco, 2024) pružaju nove empirijske rezultate o ulozi finansijskog ciklusa u predviđanju BDP-a u srednjem roku. Primenjujući različite metodologije, oni otkrivaju da dva racija imaju posebno jaku vezu sa ekonomskom aktivnošću u narednim godinama, i da oba kombinuju informacije o finansijskim uslovima i ekonomskim osnovama: odnos cene rentiranja i cene kupovine (rent-to-price) odražava stabilan odnos cena nekretnina na tržištu nekretnina; i odnos duga i prihoda (debt-to-income), koji pokriva teret duga domaćinstva. Visoke (niske) vrednosti ovih racija predviđaju nizak (visok) rast ponude na tržištu nekretnina u srednjem roku.

Specifičan slučaj direktne intervencije na tržištu su regulatorne mere kineske vlade. Autori (Hejia Zhuo, 2022) su napravili analizu zasnovanu na "brzini intervencije" kako bi ograničili rast cena u velikim gradovima, a zaključci nisu ohrabrujući i preduzete mere uglavnom nisu dale očekivane rezultate.

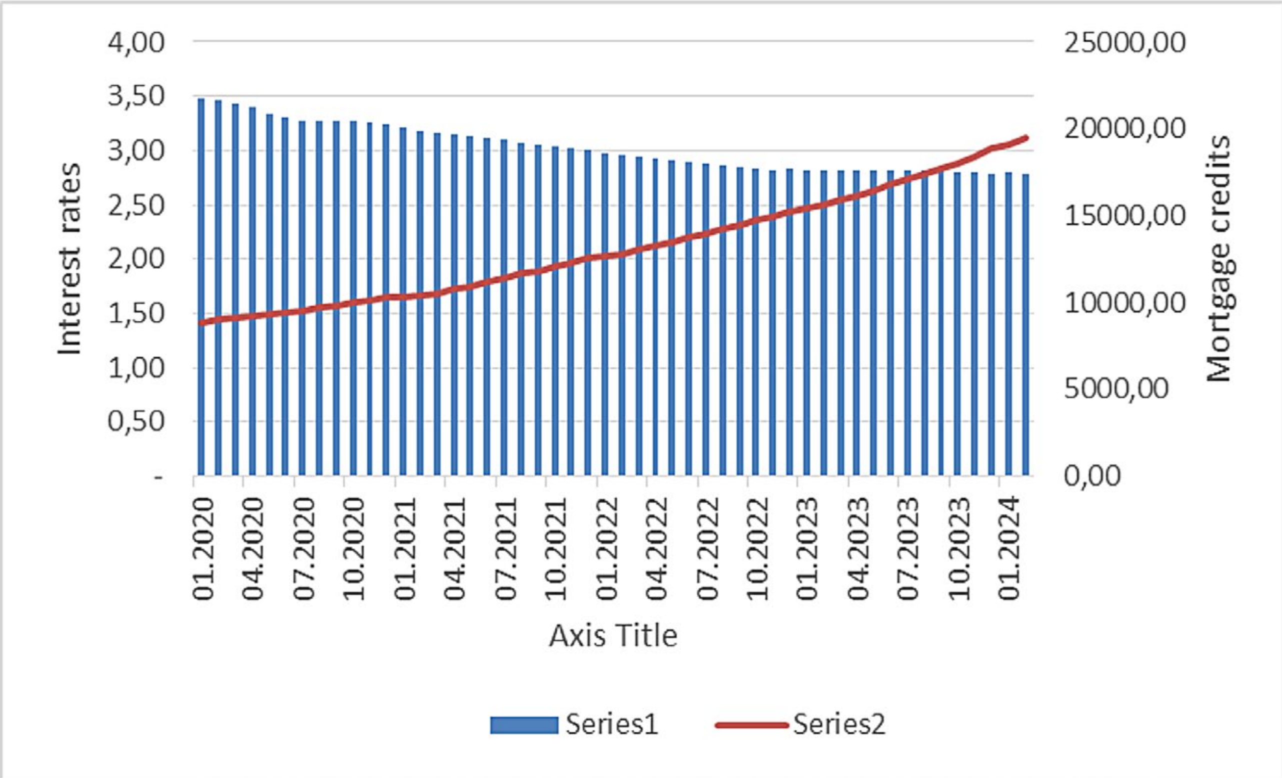
U cilju istraživanja i komparativne analize hipotekarnog tržišta u zemljama Višegradske četvorke (Češka, Poljska, Slovačka i Mađarska). Autori (R. Kracoskova, Z. Szkorupova, 2020) identifikuju mnoge faktore koji utiču na hipotekarno kreditiranje: BDP, inflacija, nezaposlenost, hipotekarne kamatne stope, cene nekretnina, poreske stope, državna podrška, finansijska pismenost i konkurencija u bankarskom sektoru. Oni su svoje empirijske alate zasnivali na makroekonomskim varijablama (BDP, inflacija i stopa nezaposlenosti i hipotekarna kamatna stopa) koje imaju značajan uticaj na obim hipotekarnih kredita.

Evo nekih od glavnih alata koje centralna banka može koristiti:

1. Kamata na hipotekarne kredite

Centralna banka može podići ili sniziti glavnu stopu, što je referentna stopa za banke. Veće kamatne stope čine hipoteke skupljim, što može ohladiti tržište nekretnina, kao što se vidi u grafikonu br. 2. Leva skala (crvena) pokazuje kamatne stope, a desna skala (plava) pokazuje rast fizičkih obima hipotekarnih kredita. Nasuprot tome, niže kamatne stope čine hipoteke pristupačnijim, stimulišući potražnju.

Slika 2 - Odnos „novi izdati krediti/kamatne stope"



Izvor: www.bnb.bg

Što se tiče odnosa između dinamike hipotekarnih kredita i kamatnih stopa na kredite, može se uspostaviti direktna veza. Niže kamatne stope obično rezultiraju nižim mesečnim otplatama hipoteke, čineći stanovanje pristupačnijim za zajmoprimce. Ovo stimuliše potražnju za hipotekarnim kreditima i može dovesti do rasta na tržištu nekretnina. Nasuprot tome, veće kamatne stope čine hipoteke skuplje, što može ohladiti tržište nekretnina i dovesti do pada potražnje hipoteke.

Očekivanja zajmoprimaca o budućim kamatnim stopama takođe mogu igrati ulogu. Ako zajmoprimci očekuju da će kamatne stope porasti u budućnosti, oni mogu biti skloni da uzmu hipoteke sada da bi iskoristili nižu stopu. Obrnuto, ako zajmoprimci očekuju da će kamatne stope pasti u budućnosti, oni mogu odložiti kupovinu kuće i čekati niže kamatne stope.

Centralna banka igra ključnu ulogu u određivanju kamatnih stopa. Kada centralna banka podigne kamatne stope, to obično dovodi do povećanja hipotekarnih stopa. Nasuprot tome, kada centralna banka snižava kamatne stope, to može stimulisati hipotekarno kreditiranje.

Centralna banka takođe može koristiti makroprudencijalne alate za regulisanje tržišta nekretnina. Ovi alati mogu uključivati ograničenja odnosa duga i prihoda zajmoprimaca, ograničenja iznosa učešća ili ograničenja varijabilnih kamatnih stopa. Makroprudencijalni instrumenti mogu pomoći u smanjenju sistemskih rizika na tržištu nekretnina, ali mogu imati i negativan uticaj na dinamiku hipotekarnih kredita.

2. Odnos kredita i vrednosti (LTV) postavlja maksimalni procenat vrednosti imovine koji se može finansirati putem hipotekarnog kredita. Na primer, LTV ograničenje od 80% znači da dužnik mora da obezbedi 20% učešća.

Neformalne smernice i nadzor: Narodna banka Bugarske (BNB) prati LTV koeficijente u bankama i može da utiče na banke da pooštre kreditne standarde ako sistemski rizici rastu. Banke u Bugarskoj obično primenjuju LTV limite od 80-85%, u zavisnosti od interne politike rizika, pod uticajem nadzora BNB-a.

3. Odnos duga i prihoda (DTI) – ograničava udeo prihoda zajmoprimca koji može ići ka otplati duga. Iako nije striktno propisano od strane BNB-a, mnoge banke dobrovoljno primenjuju **DSTI ograničenja (obično oko 40-50%)**, posebno ohrabrene od strane BNB-a tokom perioda rasta kredita.

4. Kontraciklični zaštitni slojevi kapitala – zahtevaju od banaka da drže dodatni kapital tokom kreditnog buma. BNB koristi ovaj **instrument zasnovan na kapitalu** kako bi povećao otpornost banaka u kreditnim bumovima. U **2022. godini**, BNB je počeo postepeno povećavati CCyB na 1,5% (na snazi od 2023. godine) kao odgovor na ubrzani rast kredita, posebno u stambenim kreditima

5. Ponderi rizika na hipotekarne kredite – utiču na to koliko kapitala banke moraju se uzdržavaju od hipotekarne imovine.

6. Ograničenja na hipoteke samo sa kamatom ili promenljivom stopom – smanjuju rizike od neplaćanja pod promenljivim uslovima.

Ovde možemo rezimirati da je odnos između dinamike hipotekarnih kredita i kreditnih stopa složen i zavisi od faktora kao što su kamatne stope, inflaciona očekivanja, akcije centralne banke i makroprudencijalni instrumenti, a to su samo neki od faktora koji mogu uticati na dinamiku tržišta nekretnina. Razumevanje ovog odnosa je važno za zajmoprimce, investitore i regulatore koji su uključeni u tržište nekretnina.

Konvencionalna Centralna banka ima skup alata pomoću kojih može uticati na hipotekarne kredite. Ovi alati se mogu koristiti za stimulisanje ili hlađenje tržišta nekretnina, u zavisnosti od ekonomskih uslova i ciljeva centralne banke.

U Bugarskoj, Narodna banka Bugarske je centralna banka. BNB koristi niz alata za uticaj na hipotekarne kredite, uključujući glavnu kamatnu stopu, obavezne rezerve i makroprudencijalne alate. Cilj BNB-a je održavanje stabilnosti cena i finansijske stabilnosti, što uključuje obezbeđivanje stabilnog tržišta nekretnina.

Prema Todorovu (I. Todorov, 2023) pod uslovima monetarnog odbora, BNB je lišena prva dva instrumenta i ima pravo da odredi samo minimalne potrebne rezerve. Međutim, specifična struktura bugarskog valutnog odbora podrazumeva mogućnost monetarnih uticaja fiskalnim sredstvima. Kroz promene u veličini svojih depozita u obavezama BNB-a, bugarska vlada može da utiče na stopu inflacije u Bugarskoj.

Slično mišljenje o ulozi valutnog odbora deli još autora (PEYKOV, 2022), da, s druge strane, odgovarajući izbor instrumenta monetarne politike centralne banke ima potencijal za sektorske politike. U zavisnosti od strukture javne proizvodnje i nivoa ekonomskog razvoja, centralna banka može da izabere inovativnu strategiju monetarne politike, možda održavanjem fiksnog ili upravljanog plutajućeg kursa na početku, kako je regulisano regulatornim okvirom, postepeno prelazeći na drugačiji cilj - na kontrolu inflacije nakon dostizanja višeg stepena razvoja ili strukture javne proizvodnje, što manje zavisi od dinamike realnog efektivnog deviznog kursa.

Centralna banka može da promeni obavezne rezerve, koje su minimalni udeo depozita koje banke moraju držati u rezervi. Veće obavezne rezerve smanjuju količinu novca koju banke mogu pozajmiti u obliku kredita, uključujući hipoteke.

Centralna banka može da kupuje imovinu, kao što su državne obveznice ili hartije od vrednosti, direktno sa tržišta. Ovo povećava količinu novca u opticaju i može dovesti do nižih kamatnih stopa i stimulisanja hipotekarnih kredita.

Centralna banka može aktivirati makroprudencijalne instrumente koji ciljaju specifične aspekte tržišta nekretnina kako bi smanjila sistemske rizike. Ovi alati mogu uključivati ograničenja odnosa duga i prihoda zajmoprimaca, ograničenja iznosa učešća ili ograničenja varijabilnih kamatnih stopa.

Važno je napomenuti da centralna banka ne koristi samo jedan instrument, već kombinaciju instrumenata za postizanje željenih ciljeva. Izbor instrumenata zavisi od različitih faktora, kao što su ekonomski uslovi, stanje na tržištu nekretnina i inflaciona očekivanja. Uticaj instrumenata centralne banke na hipotekarno kreditiranje može biti značajan. Promene u kamatnim stopama, na primer, mogu imati brz i direktan uticaj na potražnju hipoteke. Makroprudencijalni instrumenti, s druge strane, mogu imati indirektniji i dugoročni efekat, ali i dalje mogu biti efikasni u smanjenju sistemskih rizika na tržištu nekretnina. Uključivanje ovih instrumenata u uslovima hipotekarnog balona je od posebnog značaja, a posebno u uslovima krize, kada je asimetrija u pristupu informacijama od banke poverioca i vlasnika hipoteke značajna i stvara rizike značajne po obimu i snazi, baš kao što je to opisao Belski (E. S. Belsky, 2010). Razlog za ovakvo stanje je širok spektar kreditnih usluga kao rezultat konkurencije, što je otežalo informisani izbor i eroziju kreditnih standarda.

2. Makroekonomske varijable:

2.1 Inflaciona očekivanja **(INFL. OČ.)** – predstavljaju očekivanja javnosti o nivou inflacije u periodu u bliskoj budućnosti. Oni igraju ključnu ulogu u ponašanju potrošača i preduzeća. Inflaciona očekivanja mogu delovati kao samoispunjavajuće proročanstvo. Ako domaćinstva i preduzeća očekuju visoku inflaciju i već su sklopili ugovore o kreditima sa fiksnom stopom, to može dovesti do ponašanja koje zapravo uzrokuje veću inflaciju. Potrošači i firme imaju veću verovatnoću da troše ili ulažu, podstičući dalju potražnju i povećanje cena. Ako zajmoprimci očekuju da će kamatne stope porasti u budućnosti, oni mogu biti skloni da uzmu hipoteke sada kako bi osigurali nižu kamatnu stopu.

2.2 Inflacija u Bugarskoj **(BG INFL.)-** Inflacija je stalan i sveobuhvatan porast opšteg nivoa cena roba i usluga u privredi. To znači da novac gubi kupovnu moć tokom vremena. Iako to šteti štednji, rastuća inflacija može biti od koristi za dugoročne kredite kao što su hipoteke, zbog opadanja realne vrednosti novca. Dok su hipotekarne rate obično fiksne, njihova realna vrednost se vremenom smanjuje zbog inflacije. Međutim, efekat inflacije na obim hipotekarnih kredita nije jasan, ali razumevanje je važno za donošenje informisanih finansijskih odluka.

2.3 GINI koeficijent **(GINI)** – pokazuje društvenu homogenost nacije.

2.4 BNB anticiklični bafer (**Anticik. bafer**) - Anticiklični bafer je alat makrobonitetne politike koji centralne banke koriste za povećanje otpornosti bankarskog sistema tokom perioda ekonomskog procvata. Njegova svrha je da akumulira kapitalne rezerve u "dobrim" vremenima koja će se koristiti za apsorpciju gubitaka u "lošim" vremenima kada je kreditni rizik veći.

2.5 Minimalne rezerve banaka u BNB-u (**RMR**) – udeo privučenih depozita, koji se čuva na računima banaka u BNB-u kako bi se garantovala sigurnost ulaganja u sistem.

2.6 Stopa rasta novih hipotekarnih kredita (**Hipotekarni kredit**) – relativne vrednosti novih kredita odobrenih od strane banaka u vremenskim serijama

2.7 Indeks nekretnina u Bugarskoj (**REPI**) – indeks rasta cena nekretnina, koji je izračunao Nacionalni zavod za statistiku.

Ovako generisana baza podataka, koju su objavili Nacionalni zavod za statistiku i Narodna banka Bugarske, kao i sopstveni proračuni autora, pružaju priliku za analizu i traženje veza i zavisnosti, opisujući kako stanje na tržištu nekretnina, tako i glavne alate koje banka primenjuje kako bi ograničila neopravdani razvoj kreditnog tržišta i garantovala stabilnost sistema u celini.

3. Metodologija empirijskog istraživanja

Za sprovođenje empirijskog eksperimenta korišćena je vremenska serija kvartalnih podataka za period od 2020/Q1 do 2024/Q1.

Baza podataka objavljena na sajtu centralne banke (BNB) i Nacionalnog zavoda za statistiku bili su glavni izvori empirijskih podataka za glavne makroekonomske varijable. Opis pojedinačnih varijabli je prikazan u tabeli br. 1.

Tabela 1 - Značaj varijabli za ekonometrijski model

Br	Skraćenica	Varijable	Izvor baze podataka
1.	Infl.oč.	Inflaciona očekivanja: Očekivanja domaćinstava i preduzeća, očekivana inflacija je nivo inflacije koji se očekuje u određenom vremenskom periodu u bliskoj budućnosti. Oni mogu imati kontradiktoran efekat - pozitivan efekat (njihov rast uzrokuje povećanje potražnje u nastojanju da se očuva vrednost pre povećanja cena) i negativan efekat (prognoze rasta mogu povećati kamatne stope na kredite, ohladiti potražnju za kreditima na tržištu i ohladiti potražnju).	www.nsi.bg

2.	BgInfl.	Stalni i sveobuhvatni rast cena koji uzrokuje stalni pad kupovne moći novca. Pretpostavljamo da će porast indeksa cena ili povećanje inflacije prouzrokovati smanjenje iznosa novih odobrenih hipotekarnih kredita.	www.bnb.bg
3.	GINI	Visok GINI koeficijent ukazuje na veću osetljivost na inflatorna očekivanja, tj. da promene u očekivanoj inflaciji mogu imati veći uticaj na donošenje odluka od strane različitih društvenih grupa.	https://countryeconomy.com/demografija/ Gini-indeks
4.	RMR	Sredstva koja banke moraju da drže na računima u centralnoj banci kao rezervu imaju za cilj da obezbede stabilnost bankarskog sistema i podrže monetarnu politiku centralne banke.	www.bnb.bg
5.	Hipotekarni krediti	Rast ponude hipotekarnih kredita iz bankarskog sistema u inflatornom stanju privrede.	www.bnb.bg
6.	REPI	Indeks rasta cena nekretnina, u inflatornim uslovima cene rastu mnogo brže nego što padaju u dezinflatornim uslovima.	www.nsi.bg

Autorovi proračuni

Korelacijska matrica se koristi da pokaže snagu i pravac interakcije između skupa varijabli.

Tabela br. 2 Korelacijska matrica

	Infl. oč.	BG INFL.	GINI	Anticik. bafer	RMR	Hipotekarni kredit	REPI
Infl.oč.	1,000						
BG INFL.	0,08085	1,000					
GINI	0,82744	-0,4252	1,000				
Anticik. Bafer	-0,4103	-0,2039	-0,3765	1,000			
RMR	-0,7877	0,28106	-0,8515	0,33333	1,000		
Hipotekarni kredit	0,28496	0,3891	0,16114	-0,9364	-0,1175	1,000	
REPI	-0,7572	0,45814	-0,9588	0,45946	0,86628	-0,2085	1,000

Autorovi proračuni

Analiza koeficijenata u korelacijskoj matrici pokazuje pravac i snagu uticaja glavnih analiziranih varijabli. Najjača pozitivna korelacija nalazi se između inflacionih očekivanja Inf.oč. i koeficijent nejednakosti GINI (0,827), a između potrebnih minimalnih rezervi RMR i indeksa cena nekretnina REPI (0,866). Možemo videti najjače korelacijske zavisnosti sa negativnim predznakom korelacijske matrice sa obaveznim minimalnim rezervama RMR i inflacionim očekivanjima Infl. oč. i RMR- (-0.8515) i najjači je između stope rasta hipotekarnih kredita i kontracikličnog bafera (-0.9364). Pošto nalazimo koeficijente koji su <0,7, možemo reći prisustvo multikolinearnosti.

Tabela br. 3 Regresijska statistika

Model	R	R2	Prilagođen R2	Standardna greška
1	0,9652	0,9316	0,8860	4,2251

Autorovi proračuni

Kvadratni koeficijent korelacije (R2), koji se naziva i koeficijent određivanja, pokazuje koji procenat varijanse varijable ishoda se objašnjava delovanjem faktorske varijable. Za naš primer, R2 = 0,9316, tj. 93,16% inflacionih očekivanja zavisi od vrednosti varijabli uključenih u jednačinu. Ovo je još jedan dokaz adekvatnosti modela i rezultata ekonometrijskog eksperimenta.

D(Infl.oč.) = C(1) + C(2) (BG.INFL.) + C(3) (GINI) + C(4) (Anticik. bafer)) + C(5) RMR)
+ C(6) Hipo.kred.+ C(7) REPI

Ako stavimo koeficijente dobijene u ekonometrijskom modelu i sastavimo regresijsku jednačinu, koja ima sledeći oblik:

DInfl.oč. = -359,773 + C(2).1,142 + C(3). 10,684 + C(4) .24,001- C(5)*1,892 + *C(6) 0,425 - C(7).0,017

Rezultati analize dobijene ekonometrijske matrice prikazani su u tabeli br. 4.

Tabela br. 4 Koeficijenti jednačine regresije

Promenljive	Koeficijente	Standardna greška	T-statistika	Verovatnoća
C1	- 395,773	171,579	-2,307	0,0464
BG INFL.	1,142	0,265	4,306	0,0019
GINI	10,684	3,878	2,756	0,0222
Anticik. bafer	24,001	44,303	0,542	0,6011
RMR	-1,892	2,415	-0,783	0,4534
Hipotekarni kredit	0,425	1,546	0,275	0,7894
REPI	-0,017	0,288	-0,059	0,9541

Autorovi proračuni

Ako tumačimo vrednosti koeficijenata ispred makroekonomskih varijabli uključenih u regresijsku jednačinu, otkrili bismo da:

1. *142 (BG.INFL.) Povećanje bugarske inflacije od 1 procentnog poena dovodi do povećanja inflacionih očekivanja od 1,142 jedinice. Pozitivno i intuitivno: Ljudi očekuju da će buduća inflacija porasti kada se trenutna inflacija poveća.*

2. *C (3) = + 10.684 (GINI) Povećanje Ginijevog koeficijenta od 1 poena (više nejednakosti) dovodi do povećanja inflacionih očekivanja od 10.684 jedinica. Sugeriše da rastuća nejednakost može podstaći strahove od inflacije, možda kroz percipiranu socijalnu nestabilnost ili smanjeno poverenje u politiku.*

3. *C(4) = +24.001 (Anticik. bafer) Povećanje kontracikličnog bafera od 1 poena povezano je sa velikim porastom inflacionih očekivanja. Ovo može izgledati kontraintuitivno (tamponi su restriktivni), ali to može odražavati reakciju politike: tamponi rastu kada je rizik od inflacije već vidljiv.*

4. *C (5) = -1,892 (RMR) Povećanje referentne tržišne stope od 1 poena smanjuje očekivanja inflacije za 1,892 jedinice. Očekivani rezultat: Više kamatne stope prigušuju inflaciona očekivanja pooštravanjem monetarnih uslova.*

5. *C (6) = + 0,425 (Hipo.kred) Povećanje hipotekarnih kredita od 1 jedinice dovodi do povećanja inflacionih očekivanja od 0,425 jedinica. Sugeriše da kreditna ekspanzija, posebno u stanovanju, izaziva zabrinutost zbog buduće inflacije.*

6. *C(7) = -0,017 (REPI) Povećanje indeksa cena nekretnina od 1 poena neznatno smanjuje inflaciona očekivanja. Verovatno odražava efekat stabilizacije bogatstva ili da se inflacija nekretnina ne doživljava kao opšta potrošačka inflacija.*

   Faktor varijanse inflacije (VIF): 7, VIF > 5: možemo reći da je umerena multikolinearnost.

Uprkos mogućnostima za poboljšanje regresijskog modela, u svom sadašnjem obliku on ima značajan kapacitet informisanja da objasni odnose između glavnih makroekonomskih varijabli koje se proučavaju. Njegovo poboljšanje predstoji i napori u tom pravcu neće biti prekinuti.

Zaključak

Stabilnost cena je glavni cilj monetarne politike centralnih banaka, a njeno održavanje omogućava domaćinstvima i privrednim subjektima da ostvare svoje finansijske planove. Fluktuirajuća inflacija utiče na dugoročne investicije, planiranje štednje i podriva poverenje u finansijski sistem. Uzimanje hipotekarni kredit za kupovinu kuće obično je povezan sa sticanjem najvrednije imovine u svom životu. Dodajući da se tradicionalno radi o dugoročnom finansiranju, postaje jasno zašto inflaciona očekivanja igraju tako važnu ulogu u transmisiji impulsa monetarne politike i uticaju monetarnih instrumenata na realnu kamatnu stopu. Iako relativno novi alat koji ECB koristi nakon 2020. godine, inflaciona očekivanja našla su odgovarajuće mesto u njenom alatu, i odmah u razvoju srednjoročnih i dugoročnih prognoza za dinamiku ključnih makroekonomskih posmatranja, kao što je kreditni kanal, tačnije – hipotekarni krediti.

Konvencionalni alati centralne banke koji se koriste u ekonometrijskim alatima, kao što su obavezne rezerve, kontraciklični bafer pokazuju značajan nivo povezanosti u regresijskom modelu sa varijablama Bg-inflacija i GINI koeficijent nejednakosti, koji procenjuje socijalnu homogenost društva.

Nasuprot tome, inflaciona očekivanja i dinamika rasta hipotekarnih kredita, kao i indeks cena nekretnina, pokazali su veoma nisku korelaciju sa čistim alatima centralne banke – obaveznim minimalnim rezervama i kontracikličnim baferom. Iz svega ovoga zaključuje se da centralna banka u uslovima monetarnog odbora, u kojem posluje BNB, nema instrument za direktan uticaj na dinamiku rasta hipotekarnih kredita. Iz toga sledi da usvajanje čisto administrativnih mera ostaje da reguliše ili ograniči spontani rast hipotekarnih tržišta sa rizikom od pregrevanja finansijskog ekosistema.

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CENTRAL BANK TOOLS FOR AFFECTING THE DYNAMICS OF MORTGAGE LENDING IN THE CONDITIONS OF A CURRENCY BOARD AND INFLATION ENVIRONMENT

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Summary

It is the goal of every central bank and government to keep prices stable. To this end, the object of its money supply management policy is to keep inflation—the rate at which the prices of goods and services change over time—always low, sustainable and predictable. The Bulgarian National Bank's (BNB) target is an inflation target of 2% in the medium term as a criterion from Maastricht and the upcoming adoption of the euro as the national currency. Additional limitations are the conditions of the currency board as a system that determines the possibilities of the central bank for interventions. Inflation as a process creates a sense of increased risk of loss of value, which leads citizens and economic agents to seek long-term sustainable investments. As a result, the demand for mortgage loans has increased.

The level of inflation today can affect people's expectations of price developments in the future. If consumers and business owners form their policies with very low or very high inflation, they have an expectation that it will stay that way. These expectations are important. Citizens use them when making decisions about spending, borrowing and investing. Firms also consider these expectations when pricing their goods and services. When these expectations move away from the central bank's inflation target, it becomes very difficult for it to direct real price dynamics in the economy back to this target. The central bank can contribute to avoiding the creation of such expectations by having a clear target and keeping inflation close to it, using, albeit limited, its influence in such conditions.

To study the development of these important macroeconomic variables, the methods of econometric analysis based on time series were used for the dynamics of inflation expectations of citizens, inflation, the instruments used by the central bank for influence and the dynamics of mortgage loans granted to citizens.

Keywords: currency board, inflation expectations, central bank instruments, mortgage lending.

JEL classification: G28, G52, E44, E52 G21, R31.

Introduction

The growth of inflation in the last few years from the accumulation of several crisis and post-crisis periods, which at this point we define as post-crisis, is again provoking debates among the observing politicians and experts regarding its determinants and its rapid development. The growth of real estate prices, an asset from the non-tradable sector, worldwide, has been defined by experts as a post-crisis reaction to control and involve in the investment process significant inflationary cash flows.

If the central bank predicts inflationary dynamics on the basis of macroeconomic models, and they themselves are based on the interaction of agents in the economic ecosystem, then the conclusions lead to the search for an explanation in several hypotheses. Your investment decisions and business and documents for creating reserves, investments or opening new jobs are realized in future periods. Investments in real estate appear as part of the long-term investment program of economic agents, and this justifies our choice to make the dynamics of this credit channel the subject of our research.

In this study, we propose a framework for analyzing the relationship between determinants of central bank monetary policy and the mortgage lending market in the specific context of a central bank in a currency board. On the basis of the expectations of households for the development of the real estate market and their relationship with the supply of credits, we seek the answer to the first research question: Do inflation expectations realize a direct connection with the mortgage market and the Second: can the instruments of the central bank realize an effective intervention in risk concentration of a segment of the mortgage financial markets. Mortgage lending is an important factor in the development and stimulation of the economic ecosystem of any country. It stimulates the demand for housing, which leads to investment in the construction sector and creates additional employment. On the other hand, citizens' savings or company reserves are invested in real estate, thus influencing the banks' over-liquidity.And since mortgage loans are traditionally long-term, the risks that banks take also need long-term guarantees and insurance through the bank's business tools.

A special case is the functioning of the banking system of the Republic of Bulgaria as a currency board system, establishing by law significant restrictions on the functions of the Central Bank and reducing them to:

1. Determination of mandatory minimum reserves
2. Prohibition of direct interventions in the markets.
3. Determination, according to Basel-3, buffers: anti-cyclical, protective capital, for systemically important institutions, for systemic risk.

A review of the literature on the problem of mortgage lending and the role of the central bank.

As can be seen on Graff. No. 1 the issuance of new loans from the banking system is highly volatile during the period with a peak in the third quarter of 2009, a marked bottom in early 2016 and a rapid recovery in 2019 and 2023. The influence of the pandemic restrictions on the growth of the real estate market was also noted. Due to the global influence of this market, researchers from many jurisdictions have also chosen it as an object of their research.

As he claims (Matteo Iacoviello, 2010), studying the USA real estate market delayed technological advances in the housing sector explain the upward trend in real home prices over the past 40 years.

Over the business cycle, housing demand and housing technology shocks each explain a quarter of the variability in housing investment and housing prices. Monetary factors explain less than 20%, but played a larger role in the housing cycle at the turn of the century. The authors found that the growth of the residential real estate market is insignificant, concentrated on satisfying consumption rather than as a business investment, and this importance increases in the future.

The central bank's key interest rate not only underlies the central bank's monetary policy transmission mechanism. The increase in interest rates on mortgage loans leads to an increase in consumer spending on household budgets, thus limiting demand and hence reducing long-term household investment, and hence the effect on all industries related to housing construction. (R. Kelly, 2018)

After analyzing the impact of the COVID crisis on the state of EU economies, the author found that the pandemic has caused not only structural changes in the countries' financial sectors, but also in the way interest rates are transmitted to financial markets.

Loan interest rates, on the other hand, are a key factor that determines mortgage-lending costs. The relationship between these two factors is dynamic and can have a significant impact on the real estate market.

Figure 1 - The Growth of Mortgage Credits

Source: www.bnb.bg

The restrictions on the issue of mortgage loans (Brian E. Higgins, 2024), introduced by banks based on Loan-To-Value (LTV) and Loan-To-Income (LTI) ratios, highlighting the nuances of borrowing behavior and housing market dynamics. The analysis shows that because it shows that borrowers with greater financial resources are better able to adapt to the loan restrictions by adjusting their leverage rather than the value of the property they are buying. Additionally, the study analyses of the impact of loan limits on equilibrium prices.

Banks play a key role in stimulating real estate investment. They act as intermediaries between investors and borrowers, providing financing in the form of mortgage loans. Through their activities, banks increase the availability of financing. They provide investors with the opportunity to obtain funds for the purchase of real estate, even if they do not have the entire required amount. This stimulates the demand for real estate and can lead to a rise in prices.

By acting as intermediaries, banks take on some of the risk associated with real estate investment by requiring borrowers to provide a down payment and collateral in the form of a mortgage on the property being purchased. Risk-sharing can encourage investors to take greater risks, making investments in more speculative projects more likely.

Real estate can be a valuable asset for diversifying investors' investment portfolios. Banks offer different types of mortgage products that suit the different needs and preferences of investors.

The Banking institutions, financing with mortgage loans, ultimately contribute to economic growth. Investment in real estate leads to the creation of additional jobs in the construction sector and other related industries. This process leads to the stimulation of economic growth and can lead to an increase in the standard of living not only of employed persons, but through the growth of tax revenues - of society as a whole.

The business cycle, reflected by the dynamics of GDP' growth, also plays an indisputable influence on stimulating investment in real estate. The authors (Moramarco, 2024) provide new empirical results on the role of the financial cycle in forecasting GDP in the medium term. Applying a variety of methodologies, they find that two ratios have a particularly strong relationship with economic activity in subsequent years, both combining information about financial conditions and economic fundamentals: the rent-to-price ratio reflects a stable ratio of property prices in the housing market; and the Debt-to-Income ratio, covering the household debt burden. High (low) values of these ratios predict low (high) growth in real estate market supply in the medium term.

A specific case of direct market intervention is regulatory measures by the Chinese government. The authors (Hejia Zhuo, 2022) have made an analysis based on "speed of intervention" to limit the growth of prices in large cities, and the conclusions are not encouraging and the measures taken generally did not give the expected results.

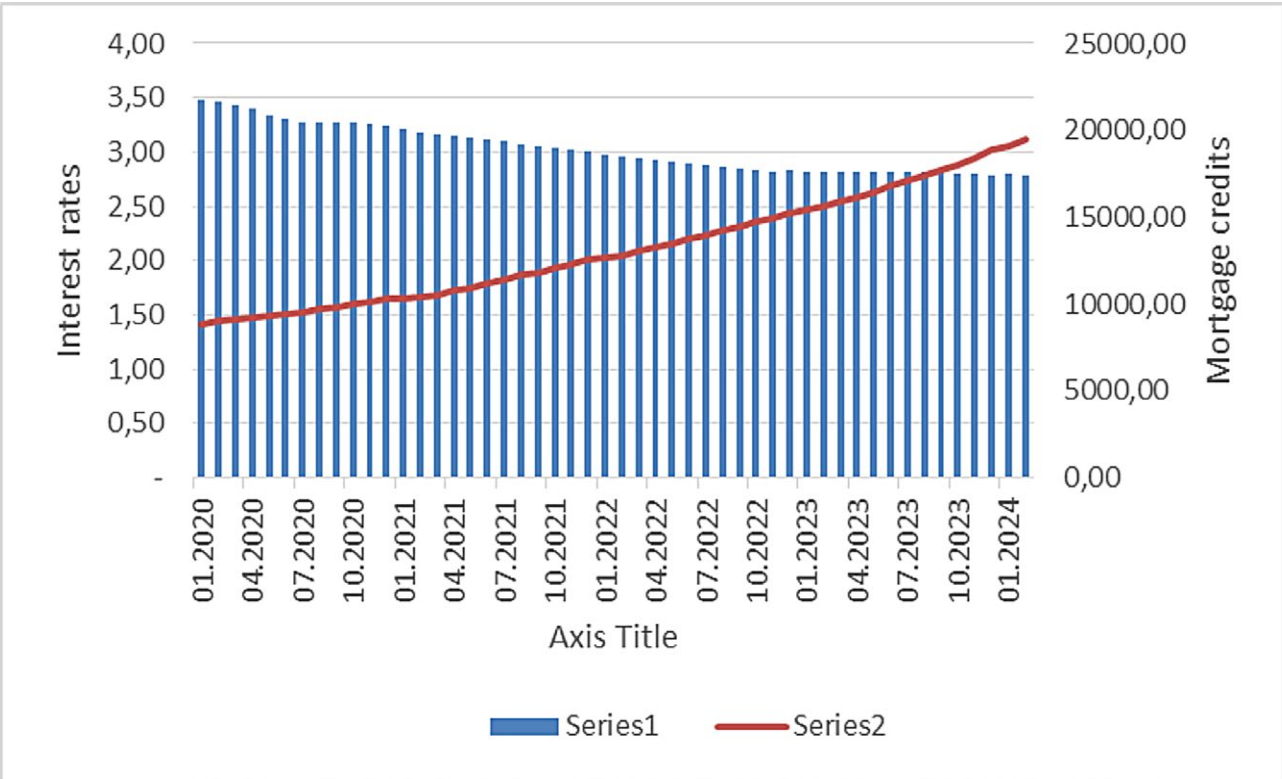
With a view to research and comparative analysis of the mortgage market in the countries of the Vishegrad Four (Czech Republic, Poland, Slovakia and Hungary) (R. Kracoskova, Z. Szkorupova, 2020). The authors identify many factors that influence mortgage lending: GDP, inflation, unemployment, mortgage interest rates, real estate prices, tax rates, government support, financial literacy, and competition in the banking sector. They based their empirical toolkit on macroeconomic variables (GDP, inflation, and unemployment rate and mortgage interest rate) that have a significant impact on the volume of mortgage loans.

Here are some of the main tools a central bank can use:

1. Interest on mortgage loans

The central bank can raise or lower the prime rate, which is the reference rate for banks. Higher interest rates make mortgages more expensive, which can cool the real estate market, as seen in Graff №.2. The left scale (red) shows interest rates, and the right scale (blue) shows the growth in physical volumes of mortgage loans. Conversely, lower interest rates make mortgages more affordable, stimulating demand.

Figure 2 - Ratio „new loans issued/interest rates»



Source: www.bnb.bg

In terms of the relationship between the dynamics of mortgage lending and interest rates on loans, a direct link can be established. Lower interest rates typically result in lower monthly mortgage payments, making housing more affordable for borrowers. This stimulates the demand for mortgage loans and can lead to growth in the real estate market. Conversely, higher interest rates make mortgages more expensive, which can cool the real estate market and lead to a decline in mortgage demand.

Borrowers' expectations of future interest rates may also play a role. If borrowers expect interest rates to rise in the future, they may be inclined to take out mortgages now to lock in a lower rate. Conversely, if borrowers expect interest rates to fall in the future, they may delay buying a home and wait for lower interest rates.

The central bank plays a key role in setting interest rates. When the central bank raises interest rates, it usually leads to an increase in mortgage rates. Conversely, when the central bank lowers interest rates, this can stimulate mortgage lending.

The central bank can also use macroprudential tools to regulate the real estate market. These tools may include limits on borrowers' debt-to-income ratios, limits on the amount of down payments, or limits on variable interest rates. Macroprudential instruments can help reduce systemic risks in the real estate market, but they can also have a negative impact on the dynamics of mortgage lending.

2. Loan-to-Value (LTV) ratio sets a maximum percentage of the property's value that can be financed through a mortgage loan. For example, an LTV limit of 80% means the borrower must provide a 20% down payment.

Informal guidance and supervision: BNB monitors LTV ratios in banks and can influence banks to tighten credit standards if systemic risks rise. Banks in Bulgaria typically apply LTV limits of 80–85%, depending on internal risk policies, influenced by BNB's oversight.

3. Debt-to-Income (DTI) Ratio – limits the share of a borrower's income that can go toward debt repayments. While not strictly mandated by BNB, many banks voluntarily apply DSTI caps (typically around 40–50%), especially encouraged by the BNB during periods of credit growth.

4. Countercyclical Capital Buffers – require banks to hold extra capital during credit booms. BNB uses this capital-based instrument to increase banks' resilience in credit booms. In 2022, BNB began gradually increasing the CCyB to 1.5% (effective from 2023) in response to accelerated credit growth, especially in housing loans

5. Risk Weights on Mortgage Loans – influence how much capital banks must hold against mortgage assets.

6. Limits on Interest-Only or Variable-Rate Mortgages – reduce default risks under changing conditions.

Here we can summarize that the relationship between the dynamics of mortgage lending and loan rates is complex and depends on factors such as interest rates, inflation expectations, central bank actions and macroprudential instruments, and these are just some of the factors that can affect dynamics of the real estate market. Understanding this relationship is important for borrowers, investors and regulators involved in the real estate market.

The conventional Central Bank has a set of tools with which it can influence mortgage lending. These tools can be used to stimulate or cool the real estate market, depending on economic conditions and central bank objectives.

In Bulgaria, the Bulgarian National Bank (BNB) is the central bank. The BNB uses a range of tools to influence mortgage lending, including the prime interest rate, reserve requirements and macroprudential tools. The goal of the BNB is to maintain price and financial stability, which includes ensuring a stable real estate market.

According (I. Todorov, 2023) under the conditions of a monetary board, the Bulgarian National Bank (BNB) is deprived of the first two instruments and has the right to determine only the minimum required reserves. However, the specific structure of the Bulgarian currency board implies the possibility of monetary impacts with fiscal means. Through changes in the size of its deposits in the liabilities of the "Issue" management of the BNB, the Bulgarian government can influence the rate of inflation in Bulgaria.

A similar opinion about the role of the currency board is shared by (PEYKOV, 2022), that on the other hand, an appropriate choice of the central bank's monetary policy instrument has the potential for sectoral policies. Depending on the structure of public production and the level of economic development, it can choose an innovative monetary policy strategy, perhaps by maintaining a fixed or managed floating exchange rate at the beginning, as regulated by the regulatory framework, gradually moving to a different target - on inflation after reaching a higher stage of development or public output structure, which is less dependent on the dynamics of the real effective exchange rate.

The central bank can change reserve requirements, which are the minimum proportion of deposits that banks must hold in reserve. Higher reserve requirements reduce the amount of money that banks can lend in the form of loans, including mortgages.

The central bank can buy assets, such as government bonds or securities, directly from the market. This increases the amount of money in circulation and can lead to lower interest rates, stimulating mortgage lending.

The central bank can activate macroprudential instruments that target specific aspects of the real estate market in order to reduce systemic risks. These tools may include limits on borrowers' debt-to-income ratios, limits on the amount of down payments, or limits on variable interest rates.

It is important to note that the central bank does not use only one instrument, but rather a combination of instruments to achieve the desired objectives. The choice of instruments depends on various factors, such as economic conditions, the state of the real estate market and inflation expectations. The impact of central bank instruments on mortgage lending can be significant. Changes in interest rates, for example, can have a quick and direct effect on mortgage demand. Macroprudential instruments, on the other hand, can have a more indirect and long-term effect, but can still be effective in reducing systemic risks in the real estate market. The inclusion of these instruments in conditions of a mortgage bubble is of particular importance, and especially in conditions of crisis, when the asymmetry in access to information from the creditor bank and the owner of the mortgage is significantly significant and generates risks significant in scale and strength, just as they described it (E. S. Belsky, 2010). The reason for this state of affairs is the wide variety of credit services as a result of competition, which has made it difficult to make an informed choice and the erosion of lending standards.

2. Macroeconomic variables:

2.1 Inflation Expectations **(INFL.EXP)** – represent the public's expectation of the level of inflation over a period in the near future. They play a key role in the behavior of both consumers and businesses. Inflation expectations can act as a self-fulfilling prophecy. If households and businesses expect high inflation and they have already entered into fixed-rate loan agreements, this can lead to behavior that actually causes higher inflation. Consumers and firms are more likely to spend or invest, fueling further demand and price increases. If borrowers expect interest rates to rise in the future, they may be inclined to take out mortgages now to secure a lower interest rate.

2.2 Inflation in Bulgaria **(BG INFL.)-** Inflation is a constant and comprehensive increase in the general level of prices of goods and services in an economy. This means that money loses purchasing power over time. Although it hurts savings, rising inflation can benefit long-term loans such as mortgages. This is due to the declining real value of money. While mortgage payments are usually fixed, their real value decreases over time due to inflation. However, the effect of inflation on mortgage loan volume is not clear, but understanding it is important for making informed financial decisions.

2.3 GINI coefficient **(GINI)** – shows the social homogeneity of the nation.

2.4 BNB Anticyclical Buffer (**Anticicl. Buffer**) - The anticyclical buffer is a macro prudential policy tool used by central banks to increase the resilience of the banking system during periods of economic boom. Its purpose is to accumulate capital reserves in "good" times to be used to absorb losses in "bad" times when credit risk is higher.

2.5 Minimum reserves of the banks in the BNB **(RMR**) – share of attracted deposits, which is kept in the accounts of the banks in the BNB to guarantee the security of investments in the system

2.6 Growth rate of new mortgage loans (**Mortgage credit**) – the relative values of new loans granted by banks in time series

2.7 Real estate index in Bulgaria (**REPI**) – an index for the growth of real estate prices, calculated by the National Statistical Institute.

The database generated in this way, made public by the National Statistical Institute and the Bulgarian National Bank, as well as the author's own calculations, provide an opportunity for analysis and search for connections and dependencies, describing both the state of the real estate market and the main tools that the bank applies to limit the unjustified development of the credit market and guarantee the stability of the system as a whole.

3. Methodology of empirical research

A time series of quarterly data for the period from 2020/Q1 to 2024/Q1 was used to conduct the empirical experiment.

The database published on the website of the central bank (Bulgarian National Bank) and the National Statistical Institute were the main sources of empirical data for the main macroeconomic variables. The description of the individual variables is shown in Table No. 1.

Table 1 - The importance of the variables for the econometric model

№	Abbvr.	Variable	Source of data base
1.	Infl.exprct.	Inflation Expectations: The expectations of households and businesses, expected inflation is the level of inflation expected over a period of time in the near future. They can have a contradictory effect - a positive effect (their growth causes an increase in demand in an effort to preserve value before price increases) and a negative effect (growth forecasts can increase loan interest rates, cool the demand for loans in the market and cool demand)	www.nsi.bg

2.	BgInfl.	The constant and comprehensive rise in prices which causes a constant decline in the purchasing power of money. We assume that a rise in the price index or an increase in inflation will cause a decrease in the amount of new mortgage loans granted	www.bnb.bg
3.	GINI	A high GINI coefficient indicates greater sensitivity to inflationary expectations, i.e., that changes in expected inflation may have a greater impact on decision-making by different social groups	https://countryecono-my. com/demography/ gini-index
4.	RMR	The resources that banks are required to keep in accounts at the central bank as a reserve are aimed at ensuring the stability of the banking system and supporting the monetary policy of the central bank.	www.bnb.bg
5.	Mortgage credits	Growth in the supply of mortgage loans from the banking system in an inflationary state of the economy	www.bnb.bg
6.	REPI	Real estate price growth index, in inflationary conditions prices rise at a much faster rate than they fall in disinflationary conditions	www.nsi.bg

Author›s calculations

The correlation matrix is used to demonstrate the strength and direction of interaction between a set of variables.

Table No. 2 Correlation matrix

	Infl. exp.	BG INFL.	GINI	Anticicl.buffer	RMR	Mortgage credit	REPI
Infl.exp.	1.000						
BG INFL.	0.08085	1.000					
GINI	0.82744	-0.4252	1.000				
Anticicl. buffer	-0.4103	-0.2039	-0.3765	1.000			
RMR	-0.7877	0.28106	-0.8515	0.33333	1.000		
Mortgage credit	0.28496	0.3891	0.16114	-0.9364	-0.1175	1.000	
REPI	-0.7572	0.45814	-0.9588	0.45946	0.86628	-0.2085	1.000

Author’s calculations

The analysis of the coefficients in the correlation matrix show the direction and strength of impact of the main analyzed variables. The strongest positive correlation is found between inflation expectations Inf.exp. and the GINI inequality coefficient (0.827), and between the required minimum reserves RMR and the real estate price index REPI (0.866). We can see the strongest correlation dependences with a negative sign of the correlation matrix with the mandatory minimum reserves RMR and the inflation expectations Infl. exp. And RMR- (-0.8515) and the strongest is between the mortgage loan growth rate and the countercyclical buffer (-0.9364). Since we find coefficients that are <0.7, we can state the presence of multicollinearity.

Table No. **3 Regression statistic**

Model	R	R^2	Adjusted R^2	Standard Error
1	0.9652	0.9316	0.8860	4.2251

Author's calculations

The squared correlation coefficient (R2), also called the coefficient of determination, indicates what percentage of the variance of the outcome variable is explained by the action of the factor variable. For our example, R2 = 0.9316, i.e. 93.16% of inflation expectations depend on the values of the variables included in the equation. This is another proof of the adequacy of the model and the results of the econometric experiment.

D(Infl.Exp.) = C(1) + C(2) (BG.INFL.) + C(3) (GINI) + C(4) (Anticicl.Bufer)) + C(5) RMR)
+ C(6) Mort.Credit+ C(7) REPI

If we put the coefficients obtained in the econometric model and compile the regression equation, which takes the following form:

DInfl.Exp. = -359,773 + C(2).1,142 + C(3). 10,684 + C(4) .24,001- C(5)1,892 + ***C(6) 0,425 - C(7).0,017***

The results of the analysis of the obtained econometric matrix are presented in Table No. 4.

Table No. 4 Regression equation coefficients

Variables	Coefficients	Standard Error	T-statistics	Probability
C1	- 395.773	171.579	-2.307	0.0464
BG INFL.	1.142	0.265	4.306	0.0019
GINI	10.684	3.878	2.756	0.0222
Anticycl. Buffer	24.001	44.303	0.542	0.6011
RMR	-1.892	2.415	-0.783	0.4534
Mortgage Credit	0.425	1.546	0.275	0.7894
REPI	-0.017	0.288	-0.059	0.9541

Author's calculations

If we interpret the values of the coefficients in front of the macroeconomic variables included in the regression equation, we would find that:

1.142 (BG.INFL.) A 1 percentage point increase in Bulgarian inflation leads to a 1.142 unit increase in inflation expectations. Positive and intuitive: People expect future inflation to rise when current inflation increases.

2. C(3) = +10.684 (GINI) A 1-point increase in the Gini coefficient (more inequality) leads to a 10.684 unit increase in inflation expectations. Suggests that rising inequality might fuel inflation fears, perhaps through perceived social instability or reduced trust in policy.

3. C(4) = +24.001 (Anticicl.Bufer) A 1-point increase in the countercyclical buffer is associated with a large rise in inflation expectations. This may appear counterintuitive (buffers are restrictive), but it might reflect policy reaction: buffers rise when inflation risk is already visible.

4. C(5) = -1.892 (RMR) A 1-point increase in the reference market rate reduces inflation expectations by 1.892 units. Expected result: Higher interest rates dampen inflation expectations by tightening monetary conditions.

5. C(6) = +0.425 (Mort.Credit) A 1-unit increase in mortgage credit leads to a 0.425 unit increase in inflation expectations. Suggests that credit expansion, especially in housing, raises future inflation concerns.

6. C(7) = -0.017 (REPI) A 1-point increase in the real estate price index slightly reduces inflation expectations. Possibly reflects a wealth stabilization effect or that real estate inflation is not perceived as general consumer inflation.

Variance Inflation Factor (VIF) : there is 7, VIF > 5: we may say it is moderate multicollinearity.

Despite the possibilities for improving the regression model, in its current form it has a significant information capacity to account for the relationships between the main macroeconomic variables under study. Its improvement is forthcoming and efforts in this direction will not be discontinued.

Conclusions

Price stability is the main objective of the monetary policy of central banks, and its maintenance enables households and economic agents to realize their financial plans. Fluctuating inflation affects long-term investments, savings planning and undermines confidence in the financial system. Taking out a mortgage loan for the purchase of a home is usually associated with the acquisition of the most valuable asset in their lifetime. Adding that it has traditionally been about long-term financing, it becomes clear why inflation expectations play such an important role in the transmission of monetary policy impulses and the impact of monetary instruments on the real interest rate. Although a relatively new tool that the ECB uses after 2020, inflation expectations have found a proper place in its toolkit, and immediately in the development of medium- and long-term forecasts for the dynamics of key macroeconomic observables, such as the credit channel, and more precisely – the mortgage ones.

The conventional tools of the central bank used in the econometric toolkit such as minimum reserve requirements, countercyclical buffer show a significant level of association in the regression model with the variables Bg-Inflation and the GINI inequality coefficient, which assesses the social homogeneity of the society.

Conversely, inflation expectations and the dynamics of mortgage loan growth, as well as the real estate price index, showed a very low correlation with the pure tools of the central bank – the mandatory minimum reserves and the countercyclical buffer. From all this, the conclusion is that the central bank in the conditions of a monetary board, in which the BNB operates, does not have an instrument for direct impact on the dynamics of the growth of mortgage lending. It follows that the adoption of purely administrative measures remains to regulate or limit the spontaneous growth of the mortgage markets with the risk of overheating the financial ecosystem.

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