

# The Bank Lending Channel of Monetary Policy Transmission in Azerbaijan

*A Journey into the Azerbaijani Black Box*

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**The Central Bank of the Republic of Azerbaijan**  
**10<sup>th</sup> Annual NBP-SNB Joint Seminar on Monetary Transmission**  
**Mechanism in Transition Countries**  
**2-4 June 2013**

# Agenda

- **Background on this research**
- **Monetary Policy Framework in Azerbaijan**
- **The Bank Lending Channel**
  - *Kashyap and Stein (1995, 2000) Framework*
  - *The Bernanke-Blinder (1988) Loan Supply Function*
- **Conclusion**
- **Future Research Plans**

# Research Background

- **Substance**

- “Lending Rate Pass-Through, Sectoral Analysis, Asymmetric Stickiness, and Bank Heterogeneity in a Small Transition Economy” (Top 10 New Downloads at SSRN)
- “Interest Rate Pass-Through and Monetary Policy Asymmetry: a Journey into the Caucasian Black Box” (with Balazs Egert), *CESifo Working Paper No. 4131*; *William Davidson Institute Working Paper No. 1041*; *EconomiX Working Paper No. 2013-9*
- “Under the Damocles Sword: the Bank Lending Channel in a Transition Economy”

- **Circulation**

- Presented and discussed at the monetary transmission technical assistance seminar organized by SNB in October, 2012.

- **Acknowledgments**

- Professor Peter Kugler (University of Basel) for continuous outstanding support and commentary. As well as Carlos Lenz, Herman Werner, Marcel Savioz, Gilbert Heim (All-SNB), Ulrich Camen (IHEID), Roman Horvath (IES, Prague), Jan Kakes (NCB), David Kemme (UMemphis), Balazs Egert (OECD), and the entire CBAR research team.

- **Outcome**

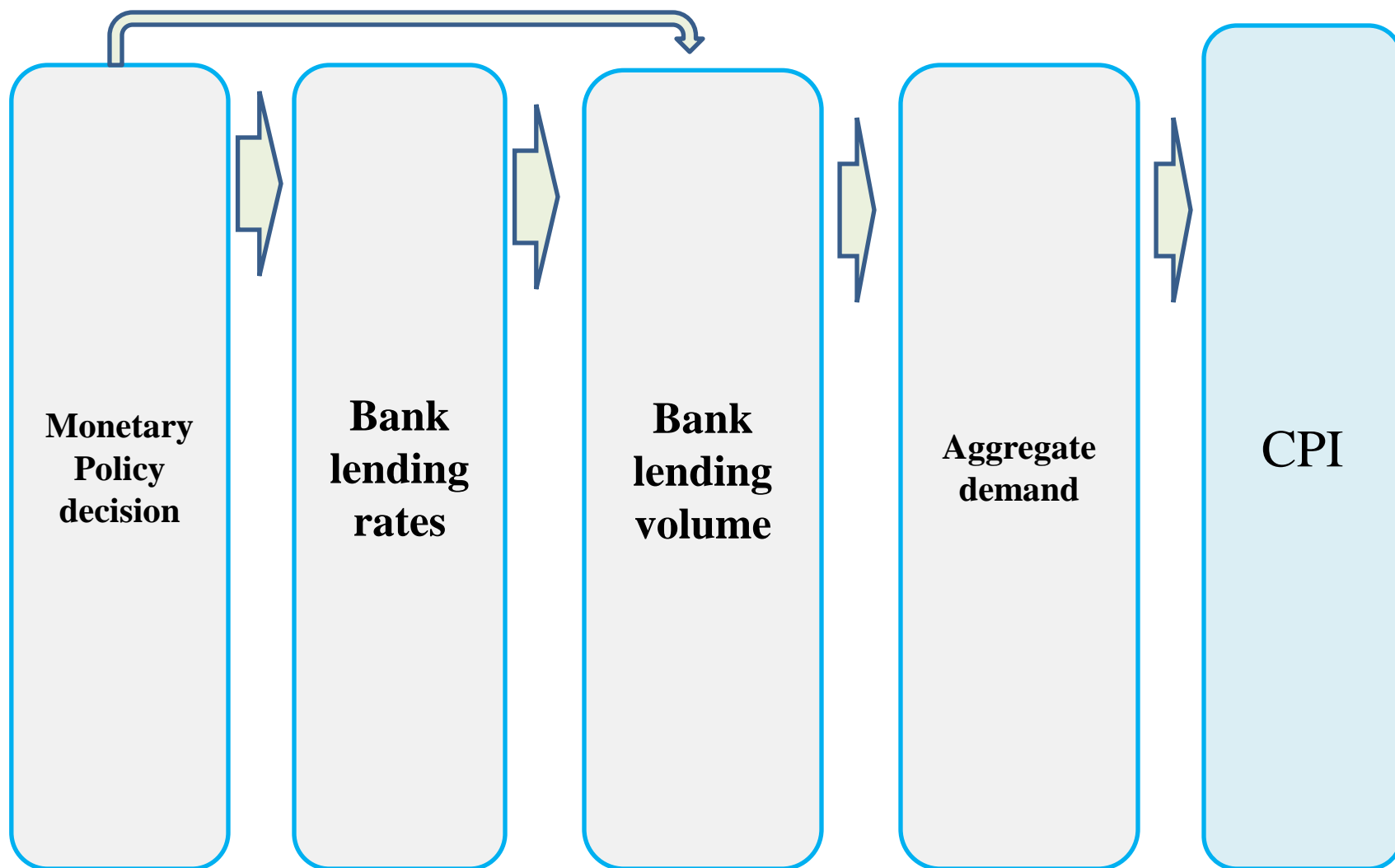
- Papers are currently under review at academic journals and have been considerably improved thanks to the commitment from SNB and all the seminar participants.
- Numerous policy questions have been clarified, important internal decisions and conclusions have been drawn

# **Monetary Policy Framework in Azerbaijan**

## Key Features

- Fairly stable and vibrant financial sector. But...
- Declining but still high levels of dollarization
- Uncertain channels of monetary transmission
- Low levels of monetization and financial intermediation
- Shallow financial markets; low elasticity of bank credit to interest rates
  - Excess structural liquidity in the banking system
  - High credit-deposit spreads
- Significance of informal cash remittances

## Interest Rate and Lending Channels of Transmission



## A Challenge of Monetary Transmission in Azerbaijan

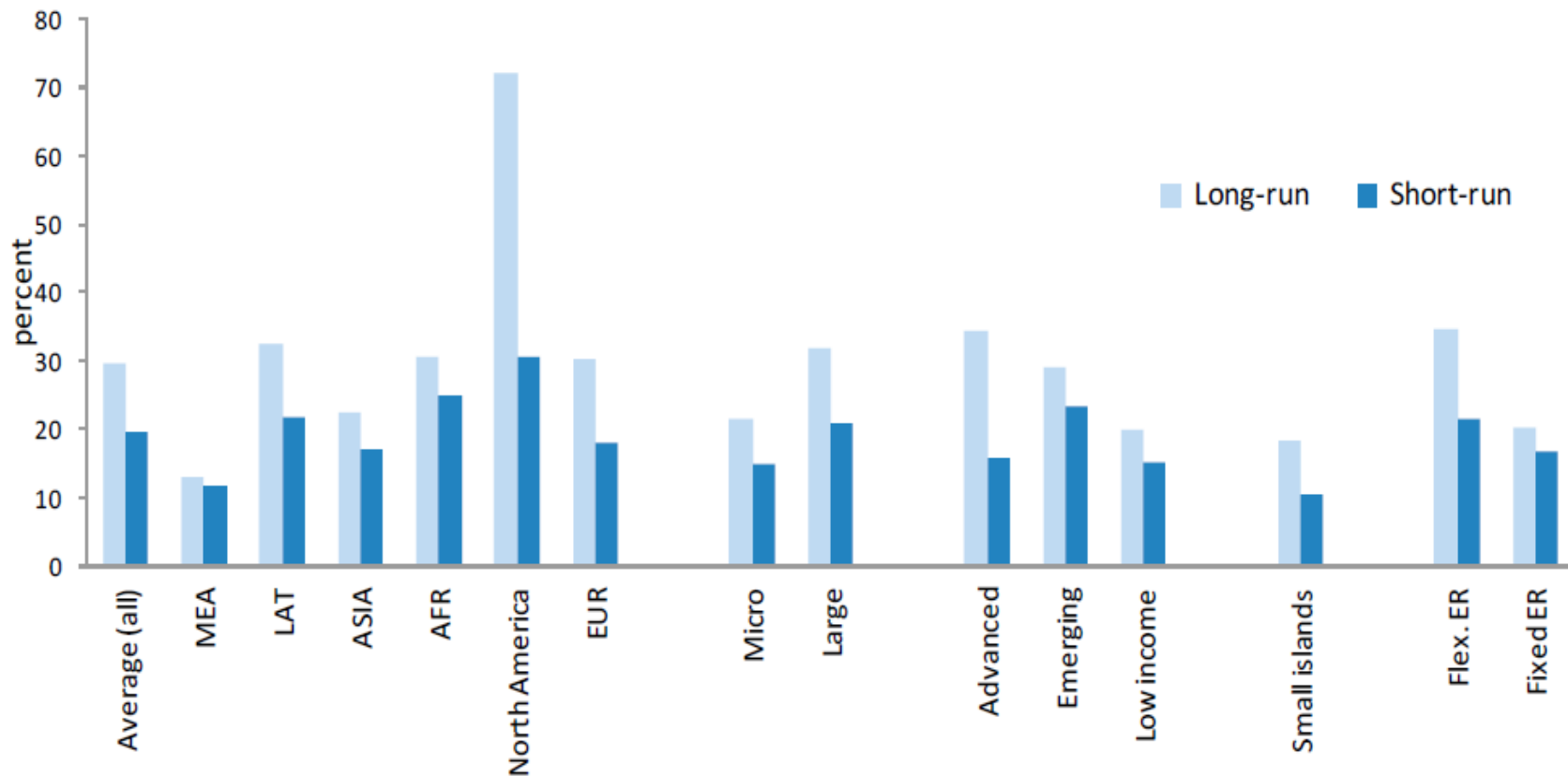
- “Shooting at a moving target in the fog is not an easy task” (Favero *et al.*, 1999)
- “Monetary policy is like a black box” (Bernanke and Gertler, 1995)
- The bank lending component is indeed a black box of monetary policy transmission in Azerbaijan.
- We know that it is operational and existent, we know that we can affect it and that bank lending influences the macro-economy, but we often can not explain its unstable character.

# The Bank Lending Channel



## Some a Priori Expectations

Figure 1. Interest Rate Pass-Through Coefficients



*According to these estimates, Azerbaijan is a typical small Asian transition economy with a fixed exchange rate regime*

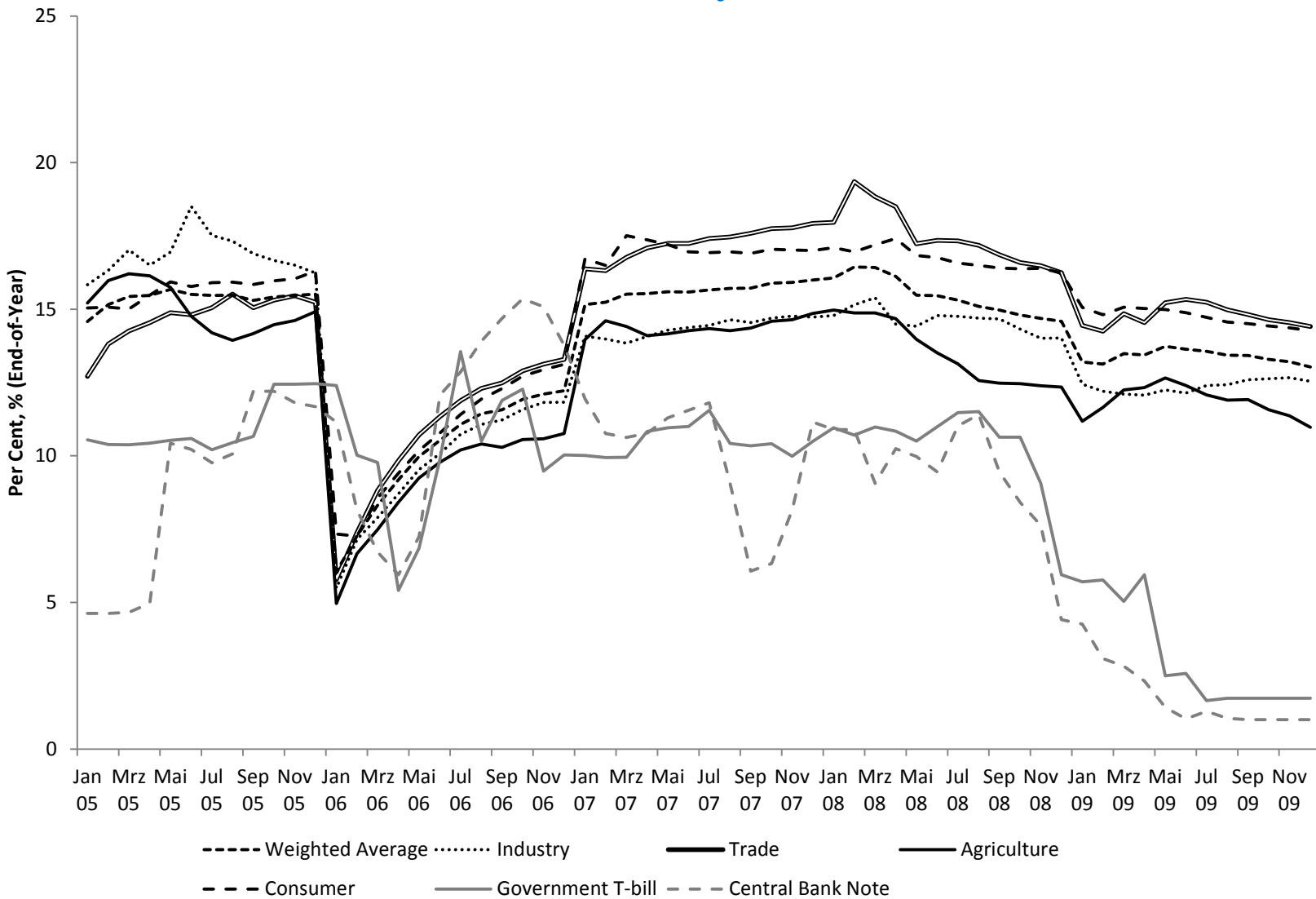
## General Information on Financial Institutions

	2008	2009	2010	2011
Number of Financial Institutions Having a Bank License	140	142	146	169
Number of Banks	46	46	45	44
State banks	2	1	1	1
Private banks	44	45	44	43
Private banks with Foreign Capital	23	23	23	23
Banks with foreign capital from 50% to 100%	7	7	7	7
Banks with foreign capital from 0% to 50%	14	14	13	14
Local branches of Foreign banks	2	2	2	2
Number of Banks branches	567	626	646	666
State Banks	37	38	38	37
Private Banks	530	588	606	629
Number of Bank Divisions	99	109	120	161
Number of Banks with Local Branches	38	40	40	40
Number of Local Representatives of Foreign Banks	4	4	5	5
Number of banks operating abroad	9	9	8	9
Affiliate banks	2	2	2	2
Branches	1	1	1	1
Representations	6	6	5	6
Number of banks under liquidation process	3	2	4	5

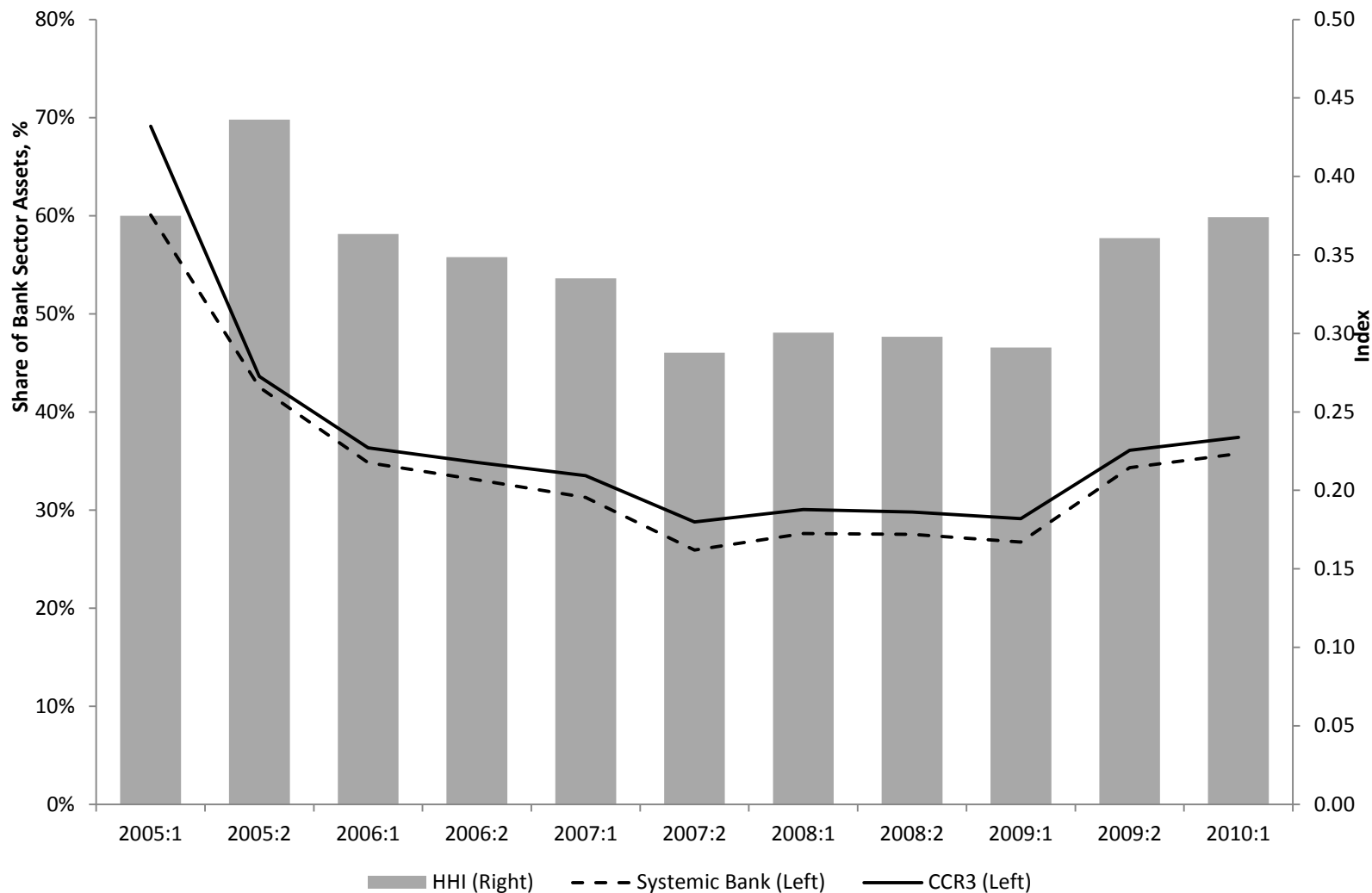
## Main Bank System Indicators

	2006	2007	2008	2009	2010	2011
Total Assets, <i>mln. AZN</i>	3778	6726	10274	11665	13291	13134
Assets/GDP	21	25	26	34	32	32
Assets/non-oil GDP, %	53	71	68	74	72	77
Capital Stock, <i>mln., AZN</i>	524	1009	1492	1759	1897	1894
Capital/GDP, %	3	4	4	5	5	5
Capital/Non-oil GDP, %	7	11	10	11	10	11
Capital/Assets, %	14	15	15	15	14	14
Credit to Real Economy, <i>mln., AZN</i>	2298	4554	7017	8230	8972	8941
Credit/GDP, %	13	17	17	24	22	22
Credit/Non-oil GDP, %	32	48	46	52	49	53
Total Population Deposits, <i>mln., AZN</i>	820	1468	1905	2335	3030	3072
Deposits/GDP, %	5	5	5	7	7	7
Deposits/non-oil GDP, %	12	15	13	15	16	18
Deposits in AZN	250	676	1037	966	1410	1389
Deposits in AZN, % of Total	31	46	54	41	47	45
Deposits in Foreign Currency	569	792	869	1369	1620	1684
Deposits in Foreign Currency, % of Total	69	54	46	59	53	55
Total Non-Population Deposits, <i>mln., AZN</i>	1343	1943	2855	2319	2419	2110
Non-Population Deposits/GDP, %	7	7	7	7	6	0
Non-Population Deposits/Non-Oil GDP, %	19	20	19	15	13	2

# Interest Rate Dynamics



# Bank Sector Concentration Dynamic



## Bank Lending Channel; Kashyap and Stein (1995, 2000)

$$\ln L_{i,t} = \sum_i^t \alpha_j \ln(L)_{i,t-j} + \sum_i^t \beta_j MP_{i,t-j} + \sum_i^t \gamma_j Z_{i,t-1} MP_{i,t-j} + \sum_i^t \delta_j Z_{i,t-1} + \sum_i^t \theta_j W_{i,t-j} + \varphi_i + \varepsilon_{i,t}$$

where L are real loans, MP is the monetary policy rate, Z is the bank specific characteristic, W is a vector of control variables such as GDP and inflation,  $\varphi$  represents the individual bank effects,  $\varepsilon$  is the error term.

$$Size_{i,t} = \ln TA_{i,t} - \frac{\sum_i \ln TA_{i,t}}{N_t} \qquad Profitability_{i,t} = ROA_{i,t} - \frac{\sum_i ROA_{i,t}}{N_t}$$

$$Liquidity_{i,t} = \frac{CA_{i,t}}{TA_{i,t}} - \frac{\sum_i CA_{i,t}/TA_{i,t}}{N_t} \qquad Capitalization_{i,t} = \frac{CAP_{i,t}}{TA_{i,t}} - \frac{\sum_i CAP_{i,t}/TA_{i,t}}{N_t}$$

Estimation method: Pooled Mean Group panel cointegration (Pesaran, 1999). Will allow for short-term parameter heterogeneity and the long-run homogeneity restriction.

## Bank Lending Channel Results

	Baseline	Bank Characteristics			
		Size	Liquidity	Capitalization	Profitability
<b>Monetary Policy</b>	0.16 (12.91)*	0.61 (22.93)*	0.30 (17.058)*	0.14 (6.78)*	0.22 (15.07)*
<b>GDP Growth</b>	1.21 (133.52)*	0.60 (36.99)*	1.00 (57.57)*	1.15 (81.80)*	1.13 (87.35)*
<b>Inflation</b>	-0.10 (-14.19)*	0.02 (2.58)*	-0.06 (-8.08)*	-0.06 (-6.18)*	-0.09 (-11.20)*
<b>Bank Factor</b>		-5.78 (12.49)*	-17.86 (-7.83)*	-21.03 (-4.53)*	-0.28 (-3.16)*
<b>Bank Factor X Monetary Policy</b>		0.56 (16.93)*	1.57 (7.03)*	1.46 (2.99)*	0.03 (12.46)*

■ Monetary policy is stronger for smaller, less liquid, less capitalized, less profitable banks. Profitability is a new and relevant addition to literature. The bank lending channel is generally operational and existent. GDP growth has a positive (as expected) impact on lending. But monetary policy instrument has a positive effect which is probably due to interest rate endogeneity and the fiscal-stimulus driven oil boom effect.

## Concentration Analysis

	Baseline	Concentration Measure		
		HHI	CCR3	Systemic Bank
<b>Monetary Policy</b>	0.16 (12.91)*	0.78 (28.96)*	1.42 (28.84)*	1.02 (36.65)*
<b>GDP Growth</b>	1.21 (133.52)*	0.37 (17.58)*	0.18 (12.23)*	0.22 (12.70)*
<b>Inflation</b>	-0.10 (-14.19)*	0.05 (8.23)*	0.09 (20.90)*	0.07 (15.79)*
<b>Concentration Measure</b>		25.48 (41.64)*	15.17 (70.44)*	18.06 (59.92)*
<b>Concentration Measure X Monetary Policy</b>		-2.77 (-31.83)*	-2.36 (-32.78)*	-2.17 (-41.09)*

▪ Bank sector concentration is positively correlated with bank lending, probably due to economies of scale effect and information spillovers with few large banks. Monetary policy gets stronger as concentration intensifies, suggesting that the transmission mechanism values the top largest banks as important for shock dispersion.



## Loan Supply Function; Bernanke and Blinder (1988)

$$\ln L_{i,t} = \alpha + \beta(lr_t - br_t) + \gamma \ln D_{i,t} + \delta \ln Z_{i,t} D_{i,t}$$

where L and D are loans and deposits of bank  $i$  at time  $t$ , respectively.  $lr$  and  $br$  are the interest rates on bank credit and government bonds, respectively, at time  $t$ ,  $Z$  is the bank-specific characteristic vector.

$$\ln L_{i,t} = \alpha + \beta(lr_{i,t} - br_t) + \gamma \ln D_{i,t} + \delta \ln Z_{i,t} D_{i,t}$$

Is the same model but under a more restrictive imperfect competition assumption where lending rates are heterogeneous across the banks.

Estimation method: Pooled Mean Group panel cointegration (Pesaran, 1999). Will allow for short-term parameter heterogeneity and the long-run homogeneity restriction.

## Loan Supply Function Results

	Baseline	Bank Characteristics			
		Size	Liquidity	Capitalization	Profitability
<b>Interest Rate Spread</b>	0.05 (10.64)**	0.03 (12.99)**	0.05 (4.96)**	0.04 (2.81)**	0.06 (4.87)**
<b>Deposits</b>	0.98 (254.78)**	1.00 (154.34)**	1.00 (126.02)**	1.00 (78.36)**	0.97 (91.58)**
<b>Bank Factor</b>		1.14 (2.32)*	9.36 (0.00)	-18.74 (0.00)	0.15 (0.00)
<b>Bank Factor X Deposits</b>		-0.09 (-2.07)*	-1.13 (0.00)	1.53 (0.00)	-0.01 (0.00)

•The spread between lending rates and government bond rates is positive and significant, identifying the bank lending channel as operational; agents don't view the two instruments as perfect substitutes. Deposits closely connected with loan issuance. Bank factors are not important anymore, which is normal for LSF.

## Loan Supply Function; Imperfect Competition Assumption

	Baseline	Bank Characteristics			
		Size	Liquidity	Capitalization	Profitability
<b>Interest Rate Spread</b>	0.03 (9.12)*	0.02 *8.82)*	0.02 (9.01)*	0.03 (3.01)*	0.02 (3.20)*
<b>Deposits</b>	0.99 (347.76)*	1.00 *147.25)*	0.01 0.06	1.01 (76.32)*	1.01 (172.85)*
<b>Bank Factor</b>		2.06 (3.67)*	-4.42 (-3.44)*	-13.17 (0.00)	-12.65 (0.00)
<b>Bank Factor X Deposits</b>		-0.17 (-3.46)*	0.28 (2.93)*	0.96 (0.00)	1.30 (0.00)

Estimates are systematically lower than in the less realistic perfect competition assumption. Thus, imposition of the imperfect competition condition in the bank sector eliminates the upward estimation bias. Nevertheless, the bank lending channel is still operational.

## Loan Supply Function; Sectoral Analysis

	Baseline	Industrial	Trade	Agricultural	Consumer
<b>Interest Rate Spread</b>	0.05	0.02	0.03	0.03	0.04
	(10.64) *	(5.52)*	(7.19)*	(9.79)*	(10.89)*
<b>Deposits</b>	0.98	1.01	1.00	1.01	0.99
	(254.78)*	(512.91)*	(427.46)*	(450.68)*	(309.80)*
<b>Rank</b>	1	5	3	4	2

▪ Among the sectoral instruments, the spread coefficient is highest for consumer loans suggesting that the bank lending channel operates more fluidly through consumer lending rather than, say, industrial credit. This is in line with literature (Jamilov 2013). The congruence between deposits and loans is remarkably consistent.

## Bank Lending Channel: Summary

- Bank lending channel in a transition economy framework is functional and existent according to both the BB and the KS models
- Monetary policy power is decreasing with size, liquidity, profitability, and capitalization.
- Lending and sector concentration are positively correlated; monetary policy is more efficient in more concentrated bank sectors
- Deposits and loans are systematically congruent in the long run, as expected
- Bank loans and government bonds (or central bank notes) are imperfect substitutes
- Imperfect competition in the bank capital and lending markets attenuates the efficacy of the channel
- Sectoral analysis reveals that the bank lending channel is most effective for consumer loans and least effective for industrial loans

# Call for Collaborative Research

- “Neo-Transitional Economics” – reference (edited) book on the fresh challenges to post-transition countries in the post-crisis paradigm. With special emphasis on macroeconomic policy, monetary economics, finance and banking.
- Theoretical, empirical, single-country, panel studies, policy essays on the transition region dealing with new and relevant issues.
- Nexus between analytical rigor and concrete policy relevance. Can become the “go-to” reference source for policy-makers in transition states.
- Aspires to assist policy-makers with national developmental agendas (China 2030, Azerbaijan 2020, etc)
- Expected publisher: Emerald Publishing, Contemporary Studies in Economics and Finance book series.
- Invitations for:
  - Editorship
  - Keynote Address
  - Chapter Contributions
- Marketing: LSE, Bocconi, CEU, CBAR, OECD, UNDP, EACES, SNB, Emerald, central banks/universities/ministries in transition states

Thank you for your attention!