

Community Banking  
in the 21st Century

# Financial Derivatives at Community Banks

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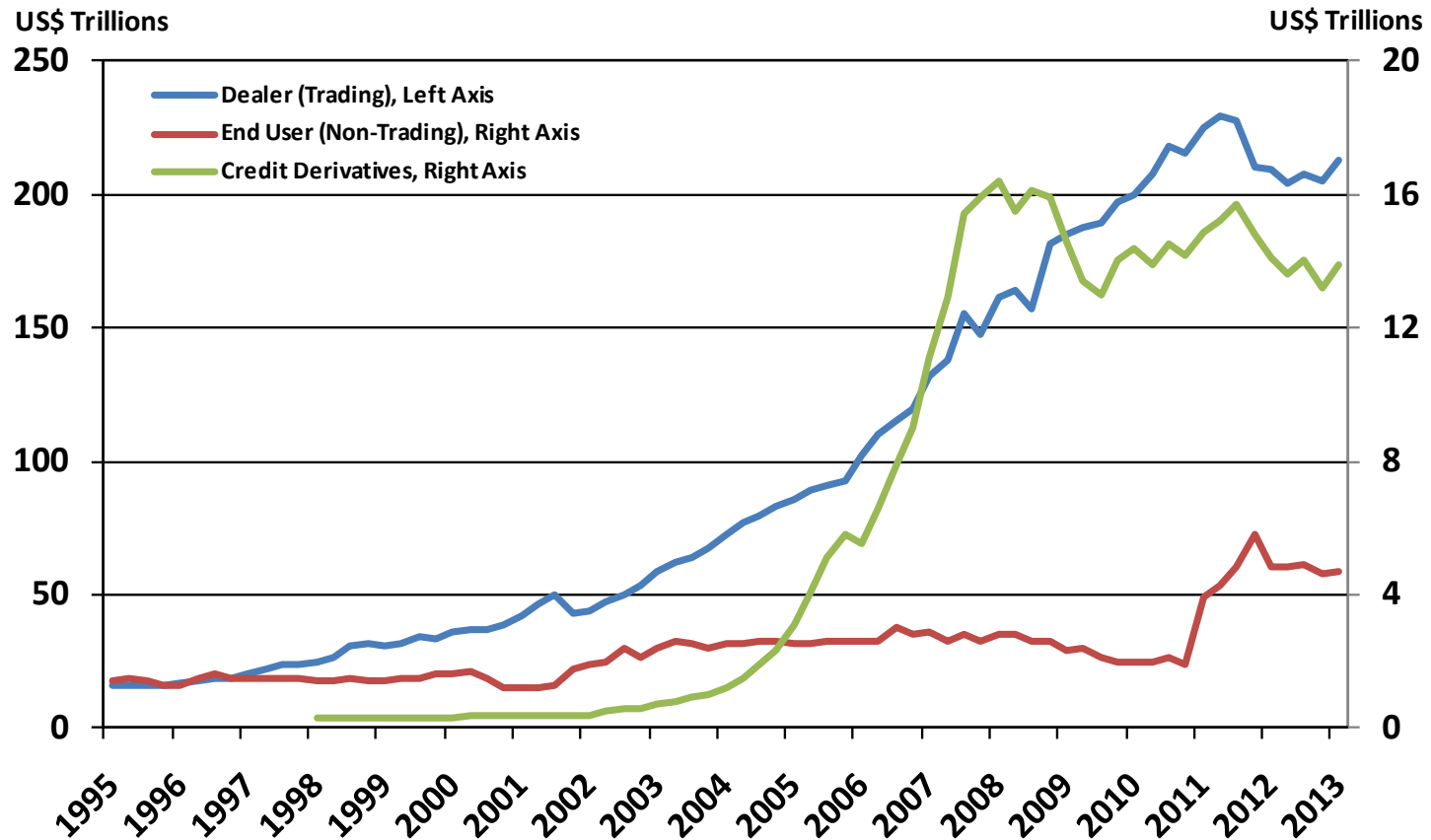


# Key Empirical Findings

- During 2003-2012, derivative use was beneficial for community banks.
- If derivatives were banned after 2008, more than half of the roughly 1,100 community banks using derivatives would have reported losses.

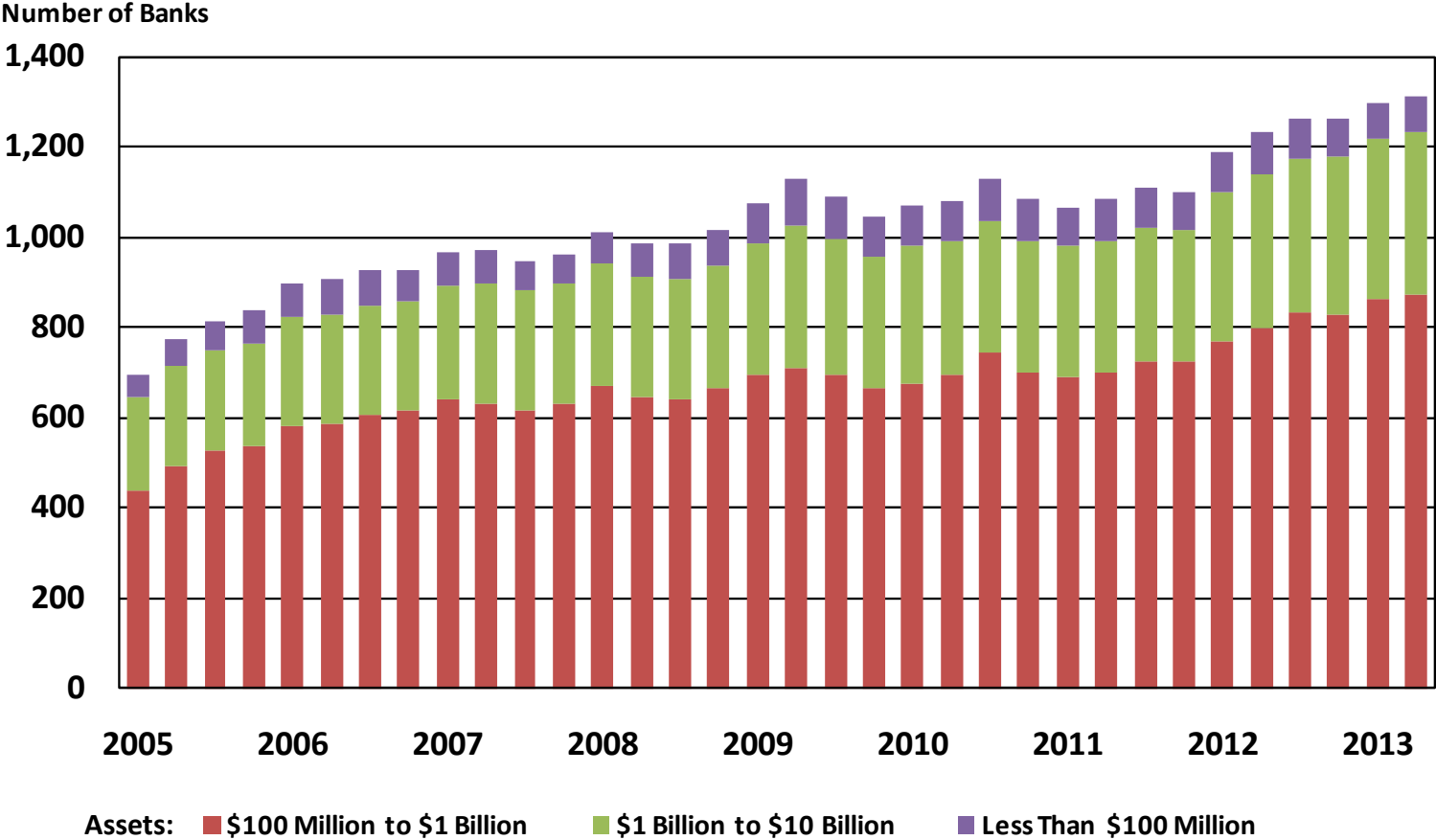
# Dealer and Credit Derivative Activity Surged at Banks After 2001

Notional Amounts



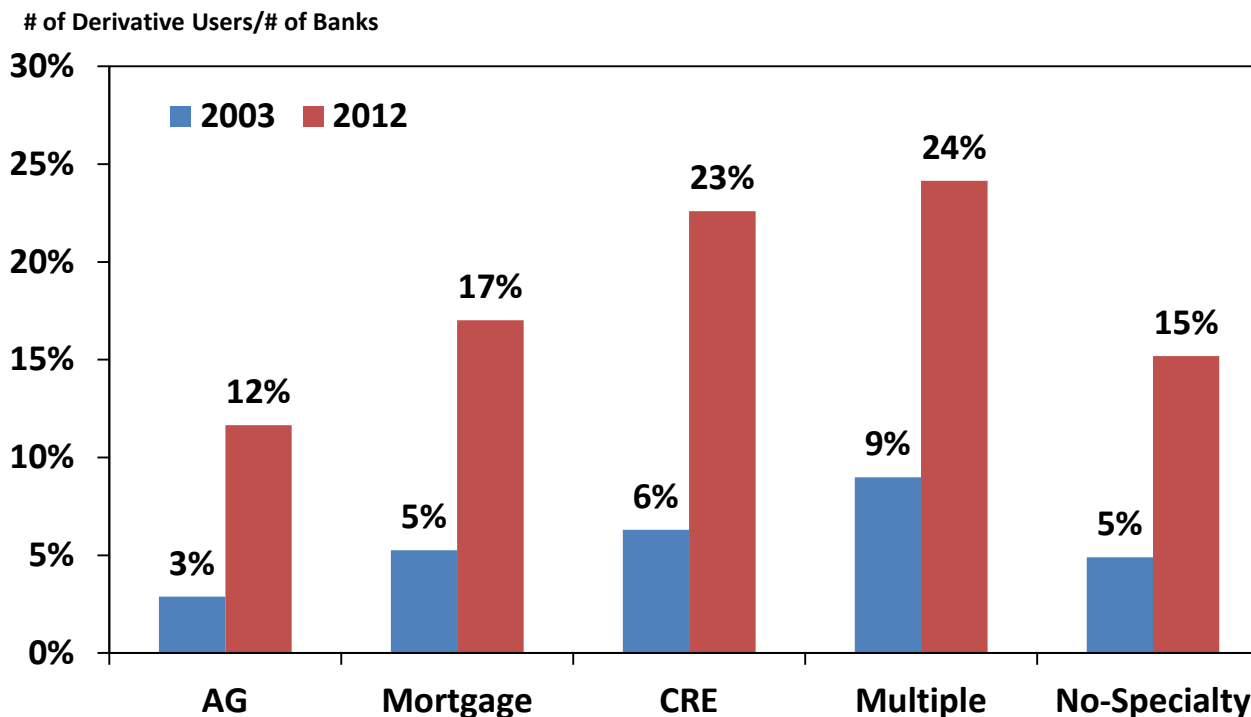
Source: Quarterly Report on Bank Derivatives Activities, OCC

# Ever More Community Banks Used Derivatives After 2005



Source: Quarterly Banking Profile, FDIC

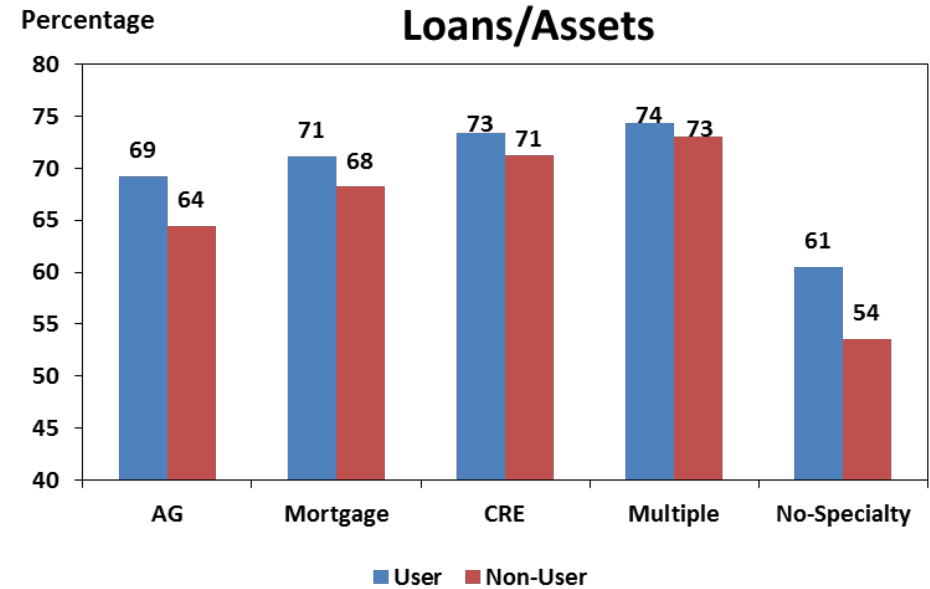
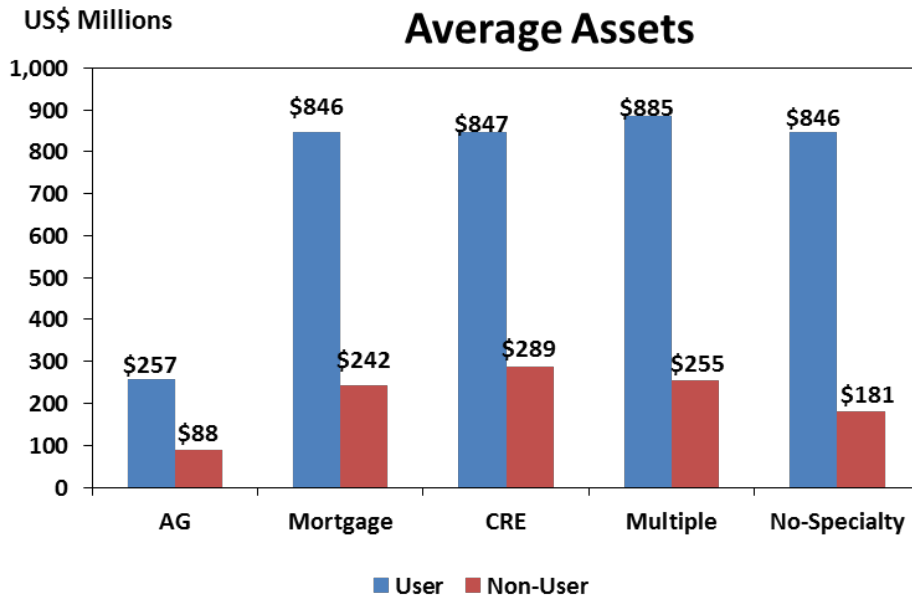
# Derivative Activity at Community Banks by Lending Specialty



	Agricultural Specialists (AG)		Mortgage Specialists (Mortgage)		Commercial Real Estate Specialists (CRE)		Multi-Specialists (Multiple)		No-Specialty	
	User	Non-User	User	Non-User	User	Non-User	User	Non-User	User	Non-User
Assets (US\$ Millions)	\$257	\$88	\$846	\$242	\$847	\$288	\$885	\$255	\$846	\$181
Number of Banks (2012)	119	902	193	941	296	1,014	157	493	375	2,096

Source: Call Reports, FDIC

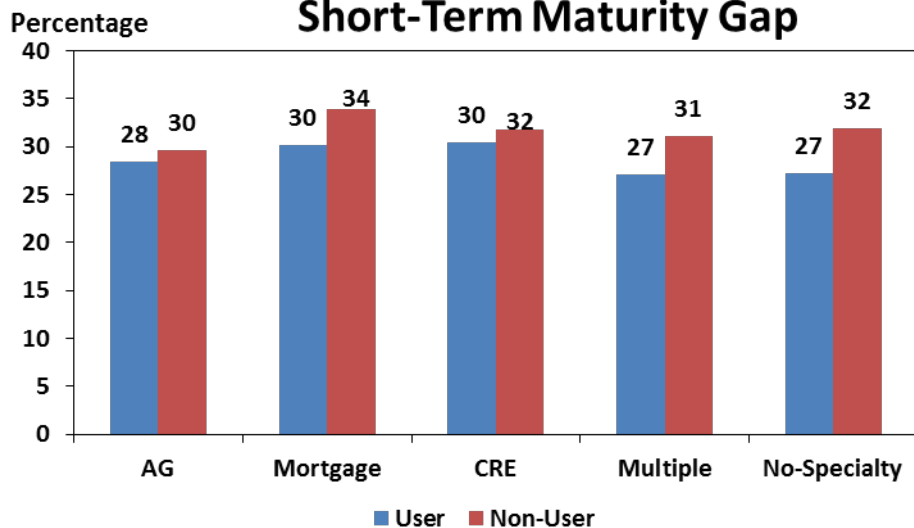
# Community Bank Derivative Users Are Larger and Make More Loans



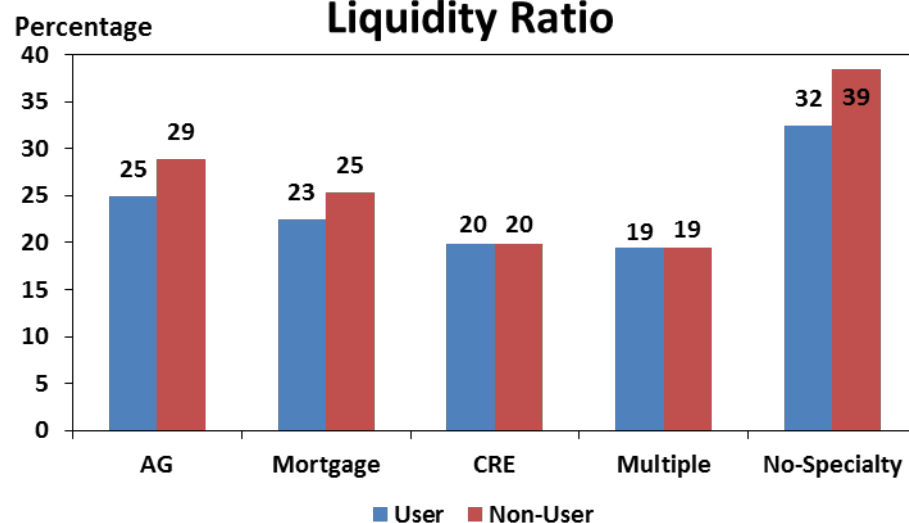
Source: Call Reports, FDIC

# Community Bank Derivative Users Have Less Interest Rate Risk but More Liquidity Risk

## Short-Term Maturity Gap



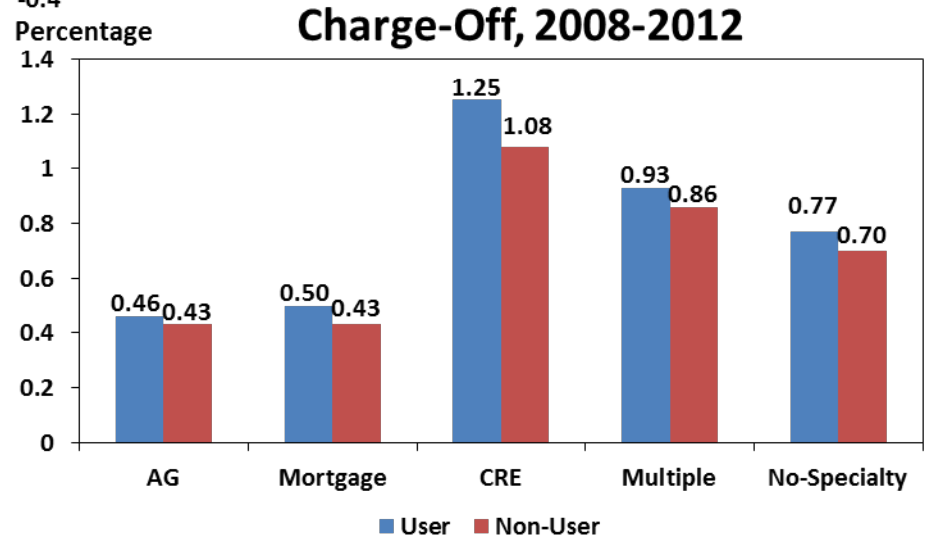
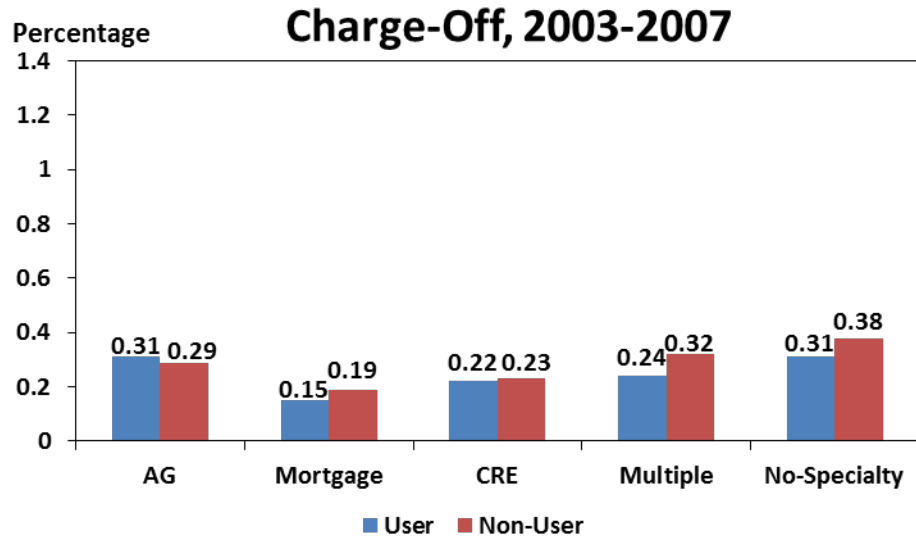
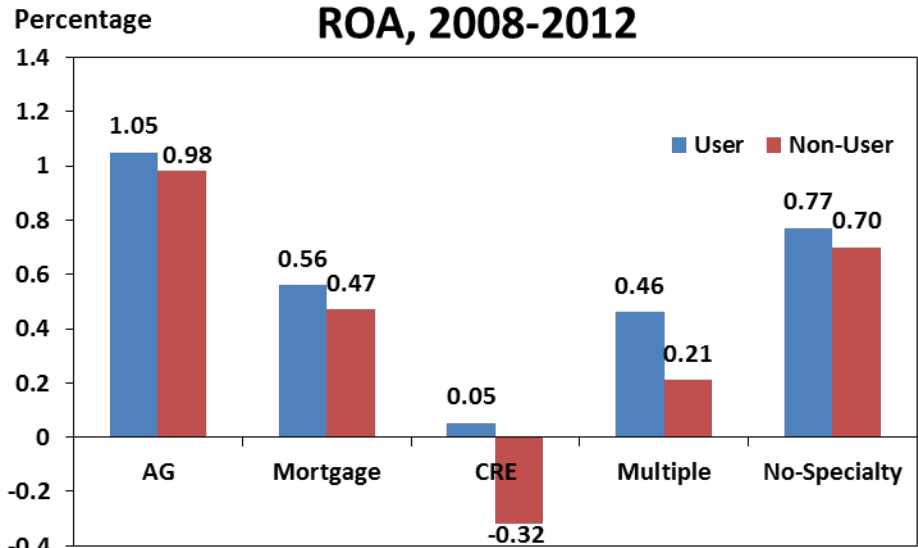
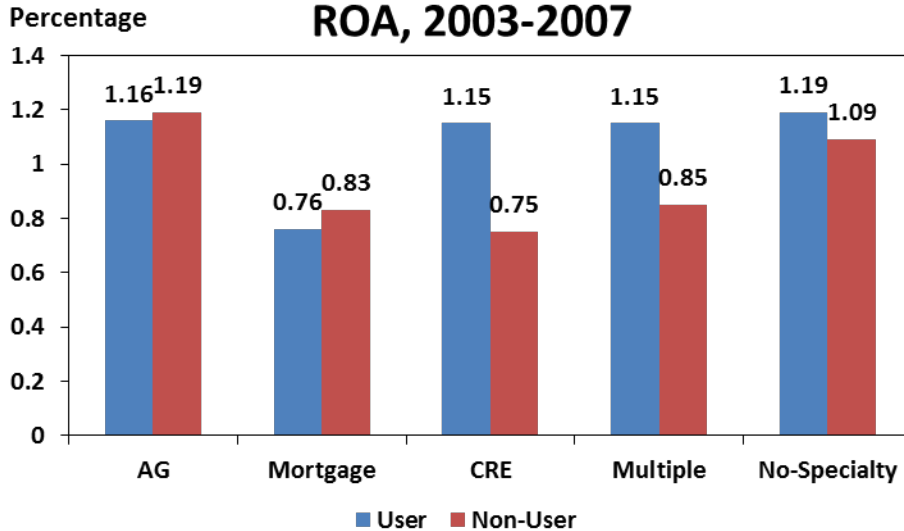
## Liquidity Ratio



Source: Call Reports, FDIC

# Community Bank Profitability and Losses

by Lending Specialty and by Derivative User/Non-User  
**ROA, 2003-2007**





# Method

- Estimate impact of risk on ROA for derivative user and non-user community banks.
- Use endogenous switching model to control for banks' endogenous choice to use derivatives in ROA estimation and compute the counterfactual effects .

# Community Bank Profitability by Lending Specialty:

Risk Factors Affect Derivative Users and Non-Users Differently

Variables	Mortgage Specialists				CRE Specialists			
	2003-2007		2008-2012		2003-2007		2008-2012	
	(1) User	(2) Non-User	(3) User	(4) Non-User	(5) User	(6) Non-User	(7) User	(8) Non-User
Employee	<-0.001 (0.001)	<0.001 (0.001)	0.001 (0.002)	0.005** (0.003)	-0.002** (0.001)	0.001 (0.001)	<0.001 (0.001)	0.002* (0.001)
Charge-off	<b>-0.411***</b> (0.074)	<b>-0.116*</b> (0.064)	<b>-0.368***</b> (0.068)	<b>-0.651***</b> (0.131)	<b>-0.403***</b> (0.067)	<b>-0.362***</b> (0.045)	<b>-0.578***</b> (0.045)	<b>-0.499***</b> (0.018)
Manage	0.001 (0.115)	0.132*** (0.029)	0.003 (0.057)	0.036 (0.063)	0.045 (0.037)	0.145*** (0.031)	-0.073** (0.033)	0.099*** (0.021)
Leverage	0.012 (0.037)	-0.016 (0.045)	-0.071** (0.034)	-0.034 (0.048)	-0.095*** (0.024)	0.194*** (0.024)	-0.059*** (0.021)	0.001 (0.007)
Int. Rate Risk	<b>-0.001</b> (0.003)	<b>-0.005***</b> (0.002)	<b>-0.011***</b> (0.002)	<b>-0.006***</b> (0.002)	<b>-0.007***</b> (0.002)	<b>-0.010***</b> (0.002)	<b>0.004</b> (0.006)	<b>-0.012***</b> (0.002)
Liquidity	0.011 (0.007)	-0.007 (0.006)	-0.002 (0.005)	-0.001 (0.003)	0.018*** (0.006)	-0.027*** (0.004)	0.025*** (0.008)	0.004 (0.005)
IMR	0.062 (0.107)	0.490* (0.256)	-0.043 (0.099)	0.153 (0.219)	-0.459*** (0.124)	-1.021*** (0.228)	-0.267 (0.233)	-2.187*** (0.468)
Constant	-4.09 (4.61)	-8.41*** (2.46)	-1.61 (4.54)	-4.31*** (1.58)	2.11 (4.10)	-11.14*** (1.99)	2.13 (1.93)	-6.09*** (1.33)
Obs.	1192	13,007	2,299	12,708	2191	17,719	4,456	19,429
R <sup>2</sup>	0.187	0.055	0.247	0.229	0.155	0.226	0.323	0.271

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Community Bank Profitability by Lending Specialty:

Risk Factors Affect Derivative Users and Non-Users Differently

Variables	Agricultural Specialists				Multi-Specialists				No-Specialty			
	2003-2007		2008-2012		2003-2007		2008-2012		2003-2007		2008-2012	
	(1) User	(2) Non-User	(3) User	(4) Non-User	(5) User	(6) Non-User	(7) User	(8) Non-User	(9) User	(10) Non-User	(11) User	(12) Non-User
Employee	-0.008* (0.005)	-0.004*** (0.002)	0.002 (0.003)	-0.002 (0.002)	-0.001 ( $<0.001$ )	$<0.001$ (0.002)	0.002* (0.001)	0.007* (0.004)	-0.001 (0.001)	-0.001 (0.001)	$<0.001$ (0.001)	-0.001 (0.002)
Charge-off	-0.451*** (0.167)	-0.357*** (0.028)	-0.412*** (0.075)	-0.379*** (0.021)	-0.414*** (0.063)	-0.420*** (0.047)	-0.518*** (0.032)	-0.532*** (0.027)	-0.082 (0.074)	-0.001 (0.097)	-0.339*** (0.046)	-0.01 (0.163)
Manage	0.074** (0.037)	0.148*** (0.035)	0.073 (0.048)	0.162*** (0.029)	0.439* (0.245)	0.157*** (0.045)	0.118 (0.077)	0.054** (0.023)	0.188** (0.077)	0.043 (0.055)	0.057 (0.054)	0.179*** (0.054)
Leverage	-0.195*** (0.040)	-0.113*** (0.035)	-0.273*** (0.046)	-0.150*** (0.021)	-0.246** (0.102)	0.224*** (0.041)	-0.056 (0.055)	-0.002 (0.018)	-0.180** (0.089)	-0.086*** (0.025)	-0.123** (0.054)	-0.041* (0.021)
Int. Rate Risk	-0.001 (0.003)	-0.001 (0.001)	0.001 (0.003)	-0.001 (0.001)	-0.003 (0.003)	-0.010*** (0.002)	-0.010*** (0.003)	-0.006*** (0.002)	-0.001 (0.003)	-0.003*** (0.001)	-0.008** (0.003)	-0.008*** (0.002)
Liquidity	0.011 (0.009)	-0.001 (0.002)	0.004 (0.004)	-0.004*** (0.001)	0.008 (0.010)	-0.040*** (0.010)	0.013* (0.007)	0.009 (0.006)	0.004 (0.005)	0.003 (0.002)	0.010* (0.006)	-0.001 (0.003)
IMR	-0.079 (0.157)	-0.760*** (0.206)	-0.215 (0.134)	-1.134*** (0.272)	-0.127 (0.156)	-0.551*** (0.207)	-0.380*** (0.112)	-1.444*** (0.235)	0.063 (0.099)	-0.457 (0.278)	0.14 (0.119)	-0.266 (0.359)
Constant	-5.29 (3.58)	-9.92*** (2.46)	-14.68*** (3.06)	-11.14*** (1.62)	7.40 (7.08)	-11.10*** (3.18)	-2.30 (1.95)	-6.03*** (1.99)	3.86 (5.08)	4.34 (5.94)	-6.66*** (1.85)	5.17 (9.55)
Obs.	945	19,166	1,751	17,965	1478	8,987	2,568	8,938	3,157	42,919	5,557	39,593
R <sup>2</sup>	0.352	0.189	0.392	0.278	0.124	0.234	0.381	0.315	0.054	0.065	0.302	0.075

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Community Bank Derivative Users Would Have Reported Losses if Not Using Derivatives

Lending Specialty	2003-2007			2008-2012		
	Reported ROA	ROA, had they not used derivatives	Difference	Reported ROA	ROA, had they not used derivatives	Difference
Agricultural Specialists	1.16 (0.60)	-0.26 (0.51)	1.42*** (0.45)	1.04 (0.65)	-0.95 (0.71)	1.99*** (0.48)
Mortgage Specialists	0.76 (0.26)	1.69 (0.27)	-0.92*** (0.28)	0.56 (0.50)	0.74 (0.69)	-0.17*** (0.29)
CRE Specialists	1.15 (0.37)	-0.5 (0.93)	1.64*** (0.87)	0.05 (1.43)	-3.65 (1.45)	3.70*** (0.93)
Multi-Specialists	1.15 (0.46)	0.23 (0.62)	0.92*** (0.81)	0.46 (1.06)	-2.02 (1.17)	2.48*** (0.48)
No-Specialty	1.19 (0.29)	0.39 (0.32)	0.81*** (0.34)	0.77 (0.81)	0.31 (0.41)	0.47*** (0.76)

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Profitability of Community Bank Non-Derivative Users Would Be Higher if Using Derivatives

Lending Specialty	2003-2007			2008-2012		
	ROA, had they used derivatives	Reported ROA	Difference	ROA, had they used derivatives	Reported ROA	Difference
Agricultural Specialists	1.39 (0.60)	1.18 (0.43)	0.21*** (0.30)	1.57 (0.76)	0.98 (0.64)	0.60*** (0.30)
Mortgage Specialists	0.64 (0.42)	0.83 (0.28)	-0.18** (0.38)	0.62 (0.50)	0.47 (0.71)	0.16*** (0.29)
CRE Specialists	1.97 (0.44)	0.75 (0.90)	1.22*** (0.99)	0.56 (2.02)	-0.32 (1.34)	0.88*** (1.47)
Multi-Specialists	1.42 (0.75)	0.85 (0.82)	0.57*** (1.00)	0.96 (1.19)	0.21 (1.19)	0.75*** (0.28)
No-Specialty	1.21 (14.10)	1.09 (0.31)	0.12** (13.90)	0.64 (5.38)	0.7 (0.50)	-0.06** (5.07)

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Conclusions

- Derivatives increased, rather than lowered, profitability for the majority of community banks over the period 2003-2012.
- Prohibiting the use of derivatives would have made some community banks more vulnerable to interest rate risk and credit risk.
- While derivatives like any financial instrument can be misused, evidence shows benefits for community banks.

Thank You  
Questions and Comments

# Classification of Community Banks

Lending Specialty	Definition
Agricultural Specialists	Agricultural production loan plus loans secured by farmland greater than 20% of total assets
Mortgage Specialists	Residential mortgage loans greater than 30% of total assets
Commercial Real Estate (CRE) Specialists	Construction and development (C&D) loans greater than 10% of total assets OR total CRE loans (C&D, multifamily, and secured by other commercial properties) greater than 30% of total assets
Multi-Specialists	Meets more than one of the single-specialty definitions above OR holds either retail loans* or commercial loans** greater than 40% of total assets
No-Specialty	All other institutions

Source: FDIC

Note: All specialty groups require the bank to hold loans greater than 33% of total assets. \*retail loans include 1-4 family residential real estate loans and loans to individual. \*\*commercial loans include CRE loans and C&I loans.



# Determinants of Bank Decisions to Use Derivatives

Variables	AG		Mortgage		CRE		Multi-Specialists		No-Specialty	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	2003-2007	2008-2012	2003-2007	2008-2012	2003-2007	2008-2012	2003-2007	2008-2012	2003-2007	2008-2012
Log(asset)	<b>0.922***</b> (0.178)	<b>0.571***</b> (0.162)	<b>0.562***</b> (0.214)	<b>0.987***</b> (0.233)	<b>1.148***</b> (0.125)	<b>0.435***</b> (0.079)	<b>1.062***</b> (0.153)	<b>0.488***</b> (0.093)	<b>0.965***</b> (0.144)	<b>0.517***</b> (0.095)
Charge-off	<b>0.01</b> (0.008)	<b>-0.003</b> (0.008)	<b>0.022</b> (0.026)	<b>-0.001</b> (0.012)	<b>-0.007</b> (0.021)	<b>0.003</b> (0.004)	<b>-0.017</b> (0.024)	<b>-0.006</b> (0.005)	<b>-0.009</b> (0.017)	<b>&lt;-0.001</b> (0.009)
Manage	<b>-0.034</b> (0.050)	<b>-0.015</b> (0.028)	<b>0.009</b> (0.038)	<b>0.002</b> (0.018)	<b>0.011</b> (0.021)	<b>-0.002</b> (0.010)	<b>-0.066*</b> (0.035)	<b>-0.007</b> (0.012)	<b>-0.018</b> (0.020)	<b>-0.02</b> (0.014)
Leverage	<b>-0.018</b> (0.019)	<b>-0.018</b> (0.011)	<b>-0.001</b> (0.023)	<b>-0.007</b> (0.011)	<b>-0.015</b> (0.017)	<b>-0.001</b> (0.002)	<b>-0.04</b> (0.028)	<b>-0.005</b> (0.006)	<b>-0.001</b> (0.016)	<b>-0.005**</b> (0.002)
Int. Rate Risk	<b>0.001***</b> ( <b>&lt;0.001</b> )	<b>-0.003*</b> (0.002)	<b>0.005***</b> (0.002)	<b>-0.003*</b> (0.002)	<b>0.002</b> (0.002)	<b>-0.002**</b> (0.001)	<b>0.002</b> (0.002)	<b>-0.003**</b> (0.001)	<b>0.003**</b> (0.001)	<b>-0.002**</b> (0.001)
Liquidity	<b>-0.015**</b> (0.007)	<b>0.001</b> (0.003)	<b>-0.017***</b> (0.006)	<b>-0.002</b> (0.005)	<b>-0.005</b> (0.005)	<b>0.001</b> (0.002)	<b>0.008</b> (0.009)	<b>0.004</b> (0.003)	<b>-0.005</b> (0.003)	<b>0.003</b> (0.002)
BHC	<b>0.163</b> (0.242)	<b>-0.032</b> (0.247)	<b>-0.345***</b> (0.126)	<b>0.023</b> (0.104)	<b>0.207*</b> (0.121)	<b>0.239**</b> (0.099)	<b>0.017</b> (0.181)	<b>0.519***</b> (0.164)	<b>0.165</b> (0.118)	<b>0.172*</b> (0.101)
Constant	<b>-4.21</b> (5.050)	<b>-0.04</b> (3.802)	<b>-9.295*</b> (5.401)	<b>-4.444</b> (2.843)	<b>-0.445</b> (2.483)	<b>-6.027***</b> (1.615)	<b>-4.691</b> (3.736)	<b>-2.833</b> (2.797)	<b>-6.745***</b> (1.410)	<b>-8.516***</b> (1.458)
Observations	20,111	19,200	14,199	15,007	19,910	23,885	10,465	11,506	46,076	45,150
$\chi^2$	79.72	136	154.6	150.5	248.6	257.5	175.8	195.6	410.3	484.1
Log Likelihood	-3,302	-4,497	-3,256	-5,269	-5,464	-9,820	-3,228	-4,799	-8,591	-12,463
#of Institutions	1009	1,022	734	1,136	1,171	1,321	582	651	2354	2,480

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1