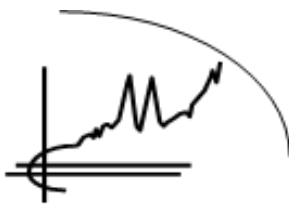


# Effects of Income Diversification on Bank Profitability and Risk: Empirical Evidence from German Savings Banks

by

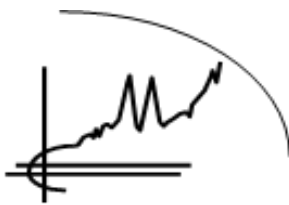
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## AGENDA

1. Introduction
2. Empirical Approach
3. Results
4. Robustness
5. Conclusions



## 1. Introduction

### **Declining profits burden the German banking sector over the last years:**

- Historically low interest rates
- Increased regulatory capital minimum requirements
- Banking sector continues for consolidation

### **Focus on Diversification:**

- Theoretical approaches highlight the advantages of Income Diversification

### **Empirical literature presents mixed results:**

- Negative effects for the U.S. banking industry (e.g. Stroh 2006, Stroh & Rumble 2006)
- Mixed results for European banks (e.g. Lepetit et al. 2008, Chiorazzo et al. 2008)
- Effects of Income Diversification on profitability and risk of German Savings Banks

## 2. Empirical Approach

### Sample:

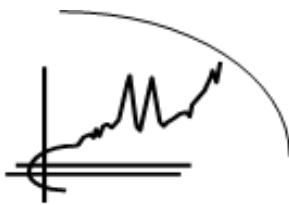
- Sample: 451 German Savings Banks from 2009-2018

### Diversification measure:

- $SH_{NET} = \frac{NET}{(NET+NON)}$  ;  $SH_{NON} = \frac{NON}{(NET+NON)}$
- $DIV = 1 - (SH_{NET}^2 + SH_{NON}^2)$

### Dependent variables:

- Profitability: ROA, RoRWA
- Risk Density:  $\frac{RWA}{TA}$

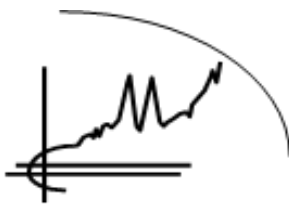


## 3. Results

### Effects of Income Diversification on bank profitability

	(1) ROA	(2) ROA	(3) ROA	(4) RoRWA2	(5) RoRWA2	(6) RoRWA2
L.DIV	-0.0034*** (0.017)	-0.0024*** (0.029)	-0.0031*** (0.004)	-0.0125*** (0.000)	-0.0113*** (0.007)	-0.0118*** (0.004)
L.SH_NON		-0.0016** (0.013)	-0.0013** (0.031)		-0.0040** (0.036)	-0.0035* (0.060)
L.Assetgro-Q		-0.0001 (0.547)	-0.0001 (0.455)		-0.0001 (0.613)	-0.0001 (0.584)
L.EQ		0.0634*** (0.000)	0.0636*** (0.000)		0.0726*** (0.000)	0.0777*** (0.000)
L.LLP		-0.0261* (0.058)	-0.0180 (0.128)		-0.0466 (0.283)	-0.0491 (0.270)
L.LOAN		-0.0011 (0.107)	-0.0005 (0.406)		-0.0070*** (0.000)	-0.0058*** (0.000)
L.Size_M		0.0004*** (0.000)	0.0004*** (0.000)		0.0010*** (0.000)	0.0009*** (0.000)
L.CPI			0.0001 (0.490)			0.0004 (0.446)
L.C2GDP_GAP			0.0005*** (0.001)			0.0012** (0.010)
L.DeltaGDP			0.0001*** (0.003)			0.0001* (0.086)
L.HPI			-0.0001 (0.396)			-0.0005** (0.010)
L.UNEMP			-0.0000 (0.891)			-0.0005 (0.140)
_cons	0.0056*** (0.000)	0.0002 (0.797)	-0.0102 (0.527)	0.0126*** (0.000)	0.0078*** (0.000)	-0.0209 (0.673)
N	3745	3690	3596	1878	1849	1825
r2_a	0.0618	0.1880	0.1982	0.1722	0.2665	0.2803

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

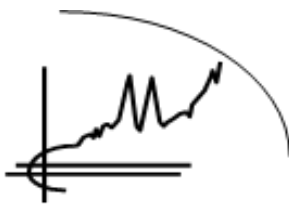


## 3. Results

### Effects of Income Diversification on bank risk

	(1) RD	(2) RD	(3) RD
L.DIV	0.1711** (0.020)	0.1544** (0.039)	0.1647** (0.028)
L.SH_NON		0.1810*** (0.000)	0.1676*** (0.000)
L.Assetgro-Q		0.0002 (0.854)	0.0002 (0.903)
L.EQ		1.8633*** (0.000)	1.8254*** (0.000)
L.LLP		1.3253* (0.056)	1.3981** (0.045)
L.LOAN		0.3830*** (0.000)	0.3667*** (0.000)
L.Size_M		-0.0087** (0.018)	-0.0085** (0.023)
L.RoE_ENG2		0.4214*** (0.000)	0.4261*** (0.000)
L.CPI			-0.0069 (0.359)
L.C2GDP_GAP			-0.0030 (0.708)
L.DeltaGDP			-0.0018** (0.043)
L.HPI			0.0049 (0.140)
L.UNEMP			-0.0038 (0.457)
_cons	0.4887*** (0.000)	0.1087*** (0.003)	0.7695 (0.304)
N	1878	1849	1825
r2_a	0.3837	0.5686	0.5685

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



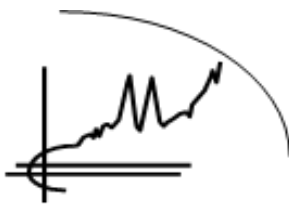
## 4. Robustness

### Profitability

	(1) ROA	(2) ROA	(3) RoRWA2	(4) RoRWA2
L.DIV	-0.0046*** (0.000)		-0.0163*** (0.000)	
L.Assetgro~Q	-0.0001 (0.463)	-0.0001 (0.452)	-0.0001 (0.599)	-0.0001 (0.561)
L.EQ	0.0639*** (0.000)	0.0634*** (0.000)	0.0782*** (0.000)	0.0770*** (0.000)
L.LLP	-0.0180 (0.126)	-0.0179 (0.134)	-0.0475 (0.282)	-0.0498 (0.267)
L.LOAN	-0.0004 (0.545)	-0.0006 (0.357)	-0.0056*** (0.000)	-0.0059*** (0.000)
L.Size_M	0.0004*** (0.000)	0.0004*** (0.000)	0.0010*** (0.000)	0.0009*** (0.000)
L.CPI	0.0001 (0.453)	0.0001 (0.488)	0.0003 (0.486)	0.0004 (0.383)
L.C2GDP_GAP	0.0005*** (0.001)	0.0005*** (0.001)	0.0012*** (0.009)	0.0012** (0.013)
L.DeltaGDP	0.0001*** (0.003)	0.0001*** (0.003)	0.0001* (0.088)	0.0002* (0.074)
L.HPI	-0.0001 (0.387)	-0.0001 (0.400)	-0.0005** (0.010)	-0.0005** (0.012)
L.UNEMP	-0.0000 (0.959)	-0.0000 (0.765)	-0.0005 (0.149)	-0.0006 (0.128)
L.SH_NON		-0.0029*** (0.000)		-0.0104*** (0.000)
_cons	-0.0111 (0.489)	-0.0109 (0.503)	-0.0169 (0.731)	-0.0294 (0.557)
N	3596	3596	1825	1825
r2 a	0.1974	0.1961	0.2798	0.2763

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





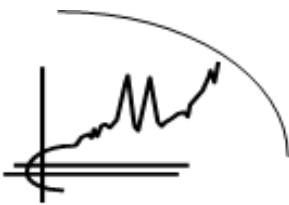
## 4. Robustness

### Bank risk

	(1) RD	(2) RD	(3) RDrb
L.DIV	0.3335*** (0.000)		0.1030** (0.022)
L.Assetgro~Q	0.0002 (0.905)	0.0004 (0.764)	0.0008 (0.687)
L.EQ	1.7673*** (0.000)	1.7975*** (0.000)	2.1024*** (0.000)
L.LLP	0.7055 (0.308)	0.7814 (0.258)	-0.0928 (0.781)
L.LOAN	0.3490*** (0.000)	0.3613*** (0.000)	0.3940*** (0.000)
L.Size_M	-0.0056 (0.138)	-0.0050 (0.185)	-0.0027 (0.427)
L.CPI	-0.0091 (0.228)	-0.0113 (0.135)	-0.0062 (0.363)
L.C2GDP_GAP	-0.0022 (0.776)	-0.0012 (0.872)	-0.0156*** (0.008)
L.DeltaGDP	-0.0018** (0.047)	-0.0019** (0.034)	0.0015** (0.014)
L.HPI	0.0032 (0.341)	0.0030 (0.374)	0.0047* (0.061)
L.UNEMP	-0.0076 (0.137)	-0.0067 (0.188)	-0.0028 (0.232)
L.SH_NON		0.2329*** (0.000)	0.0923*** (0.001)
_cons	1.0522 (0.165)	1.3218* (0.081)	0.6227 (0.343)
N	1825	1825	3587
r2_a	0.5506	0.5524	0.7040

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





## 5. Conclusions

### ➤ **Main results:**

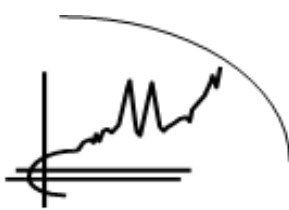
- Income diversification lowers profitability of German Savings Banks (in line with Mercieca et al. 2007)
- Income diversification enhances risk density of German Savings Banks
- Results are robust to several checks

### ➤ **Limitations:**

- Additional risk measures (e.g. ratings)

### ➤ **Future research aspects:**

- Reinstate the findings with actual data
- Determinants analysis



## Contact



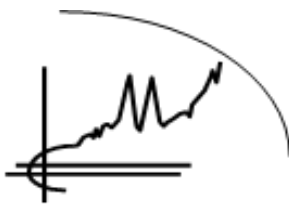
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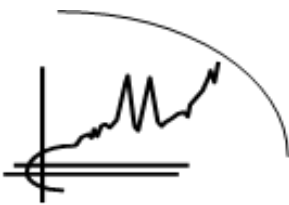


## Appendix

### Correlation Matrix

	DIV	SH_NON	ROA	Assetg~Q	EQ	LLP	LOAN	Size_M	CPI	C2GDP~P	DeltaGDP	HPI	UNEMP
DIV	1.0000												
SH_NON	0.7746	1.0000											
ROA	-0.1523	-0.1710	1.0000										
Assetg~Q	0.0113	0.0041	-0.0102	1.0000									
EQ	-0.0689	-0.1158	0.3221	-0.0093	1.0000								
LLP	0.0164	0.0665	-0.1719	0.0001	-0.2241	1.0000							
LOAN	-0.1169	-0.1817	-0.0461	0.0029	0.2850	-0.3483	1.0000						
Size_M	0.1048	0.0106	0.0891	0.0070	0.0672	-0.0172	0.0685	1.0000					
CPI	0.1060	0.0369	0.0057	0.0168	0.2278	-0.5619	0.1496	-0.0260	1.0000				
C2GDP_GAP	0.0223	-0.0255	0.0941	0.0024	-0.0343	0.1755	-0.2761	0.0643	0.0397	1.0000			
DeltaGDP	0.0656	0.0494	0.0316	0.0031	0.0737	-0.1651	0.0438	0.0130	0.1470	-0.1712	1.0000		
HPI	0.0630	0.0779	-0.1003	0.0165	0.0577	-0.2590	0.4118	-0.0611	0.1905	-0.7455	0.0453	1.0000	
UNEMP	0.0230	0.0583	0.0231	0.0051	-0.2971	0.5232	-0.3169	-0.0902	-0.5293	0.1500	-0.1400	-0.2612	1.0000

	DIV	SH_NON	ROA	RoRWA2	RD	Assetg~Q	EQ	LLP	LOAN	Size_M	CPI	C2GDP~P	DeltaGDP	HPI	UNEMP
DIV	1.0000														
SH_NON	0.8773	1.0000													
ROA	-0.1615	-0.1732	1.0000												
RoRWA2	-0.1981	-0.1960	0.9117	1.0000											
RD	0.0915	0.0550	0.1130	-0.2631	1.0000										
Assetg~Q	0.0085	0.0026	0.0024	-0.0051	0.0211	1.0000									
EQ	-0.1004	-0.1395	0.3325	0.1940	0.3186	-0.0128	1.0000								
LLP	0.0020	0.0010	-0.1032	-0.0258	-0.1552	-0.0187	-0.0201	1.0000							
LOAN	-0.1764	-0.2282	-0.0194	-0.2683	0.6231	0.0190	0.2275	-0.2540	1.0000						
Size_M	0.0389	0.0070	0.1758	0.1494	0.0410	-0.0012	0.1065	-0.0702	0.1371	1.0000					
CPI	0.3540	0.3184	-0.1306	-0.1687	0.1212	0.0082	-0.0506	0.0327	0.0478	0.0042	1.0000				
C2GDP_GAP	0.1699	0.1393	0.0077	0.0912	-0.1640	-0.0081	0.0282	0.1152	-0.2286	0.0310	0.6024	1.0000			
DeltaGDP	-0.0661	-0.0485	0.0283	0.0203	0.0360	0.0005	0.0026	-0.0588	-0.0010	0.0366	-0.1708	-0.1513	1.0000		
HPI	0.0835	0.0882	-0.1330	-0.2724	0.3384	0.0327	-0.0643	-0.1289	0.3708	-0.0309	0.0817	-0.6502	0.0915	1.0000	
UNEMP	-0.0600	-0.0281	0.0597	0.1757	-0.2742	0.0049	-0.1447	0.1082	-0.1431	-0.1370	-0.2682	-0.1280	-0.1486	-0.0395	1.0000



## Literature

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