The Cross Section of Bank Value

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Motivation

- Basic question: How do banks create value?
- Three possible answers:
  - Liabilities: consumers value deposits.
  - Assets: banks have an advantage at making loans.
  - Synergies: deposits allow banks to hold different assets than other intermediaries.
- Empirical evidence on existence of each channel.
- But little is known about the relative contributions of these channels.

This paper

- Treat the bank as a two-division firm:
  - Deposit producing division raises funding by offering services and interest payments.
  - Revenue producing division takes funding as an input and converts it into risk-adjusted revenue.

- Use tools from industrial organization to construct measures of productivity for each division:
  - **Deposit productivity:** A bank with higher deposit productivity collects more deposits, holding fixed inputs (e.g., deposit rate, number of branches).
  - **Asset productivity:** A bank with higher asset productivity generates more risk-adjusted revenue with the same asset base.

- We then relate these primitives to:
  - Stock market based measures of bank value.
  - Potential drivers of productivity (production technologies, banks' geographic/demographic footprints).
  - Each other.

Preview of Results

1. Deposit productivity explains 2-4x as much variation in bank value as asset productivity.
2. Multiple factors contribute to the productivity-value relationship.
   - Differences in production technologies across banks.
   - Consumer demographics/market power.
3. Synergies exist between lending and deposit-taking.
   - Deposit prod. explains 25% of variation in asset prod.

Data

Sources:

- Bank Income and Balance Sheet Data: Federal Reserve FR Y-9C reports
- Branch Level Deposit Data: Summary of Deposits
- Branch Level Deposit Rate Data: RateWatch
- Stock Market Data: CRSP

Sample:

- Unbalanced sample of 847 bank holding companies
- Quarterly observations over the period 1994-2015

- Per-period profits given by:

$$\pi_{jt} = f(A_{jt}; \phi_{jt}) - c(D_{jt}; \delta_{jt}).$$

  where
  - $A_{jt} = D_{jt} + E_{jt}$
  - $f(\cdot;\cdot)$ is the revenue production function, and ϕ_{jt} is asset productivity.
  - $c(\cdot;\cdot)$ is the funding cost function, and δ_{jt} is deposit productivity.

- Equilibrium profits (and scale) depend on both productivity measures.
- Market value of equity given by

$$M_{jt}(\phi_{jt}, \delta_{jt}) = \frac{\lambda \pi^*_{jt}(\phi_{jt}, \delta_{jt})}{k - g}.$$

- Cost of funding $\iff$ deposit demand curve bank faces.
  - High deposit productivity = deposit demand curve shifted up.
- Estimate the bank-level specification Link:

$$\ln(N_t s_{jt}) = \alpha i_{jt} + \beta X_{jt} + \mu_j + \mu_t + \xi_{jt}.$$

where
  - s_{jt} is market share of bank j at time t, and N_t is market size at time t
  - i_{jt} is deposit rate, and X_{jt} are other slow-moving bank characteristics
- Two sets of instruments Link:
  1. Traditional BLP instruments (i.e., characteristics of competitors' products).
  2. Deposit rate pass through.
- Recover each bank's quarterly deposit productivity as

$$\hat{\delta}_{jt} = \ln(N_t s_{jt}) - \hat{\alpha} i_{jt} - \hat{\beta} X_{jt} - \hat{\mu}_t.$$

- Estimate the bank's production function as Link

$$\ln Y_{jt} = \theta \ln A_{jt} + \Gamma X_{jt} + \phi_j + \phi_t + \varepsilon_{jt}.$$

- where:
  - Y_{jt} : Interest income
  - A_{jt} : Assets (lagged by one year)
  - X_{jt} : Bank observable controls, including proxies for risk taking.
- We instrument for $\ln A_{jt}$ using the demand productivity of a bank's competitors: δ_{-jt}.
- Recover each bank's quarterly asset productivity

$$\hat{\phi}_{jt} = \ln Y_{jt} - \hat{\theta} \ln A_{jt} - \hat{\Gamma} X_{jt} - \hat{\phi}_t.$$

What is productivity?

- Productivity is always a residual: what part of output cannot be explained by observed inputs.
- Conceptually, broad drivers of productivity differences across banks could include:
  1. Differences in production "technology."
     - E.g. better employees, better ATMs/website/branch hours, more innovative products.
  2. Differences in demographic and competitive factors.
     - E.g. better market selection, less within-market competition.

Bank Productivity and Value

$$\left(\frac{M}{B}\right)_{jt} = \gamma_0 + \gamma_1 \hat{\delta}_{jt} + \gamma_2 \hat{\phi}_{jt} + \Gamma X_{jt} + \mu_t + \varepsilon_{jt}.$$

	(1)	(2)	(3)	(4)
Deposit Productivity	0.236***	0.496***		
	(0.0188)	(0.101)		
Asset Productivity			0.240***	0.154***
			(0.0264)	(0.0276)
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	26,742	26,742	26,742	26,742
R-squared	0.420	0.453	0.386	0.438

- Controls = size, leverage, equity beta, stdev of ROA.

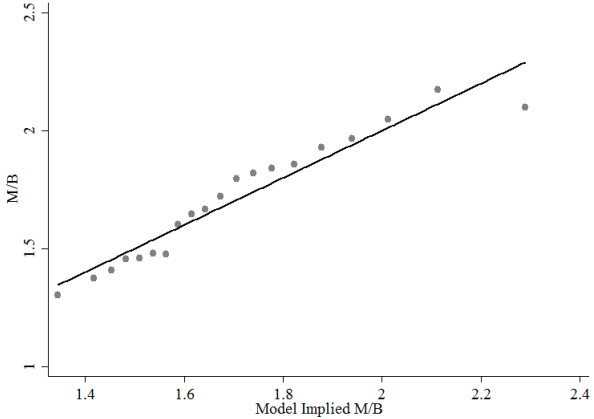
Deposit-driven Value vs. Asset-driven Value

$$\left(\frac{M}{B}\right)_{jt} = \gamma_0 + \gamma_1 \hat{\delta}_{jt} + \gamma_2 \hat{\phi}_{jt} + \Gamma X_{jt} + \mu_t + \varepsilon_{jt}.$$

	(1)	(2)
Deposit Productivity	0.200***	0.451***
	(0.0355)	(0.105)
Asset Productivity	0.0967***	0.113***
	(0.0294)	(0.0309)
Time F.E.	X	X
Other Controls		X
Observations	26,742	26,742
R-squared	0.425	0.459

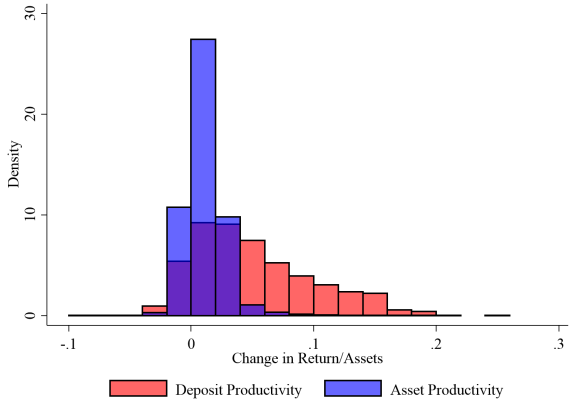
- Effect of deposit productivity 2-4x larger than asset productivity.

Deposit-driven Value vs. Asset-driven Value



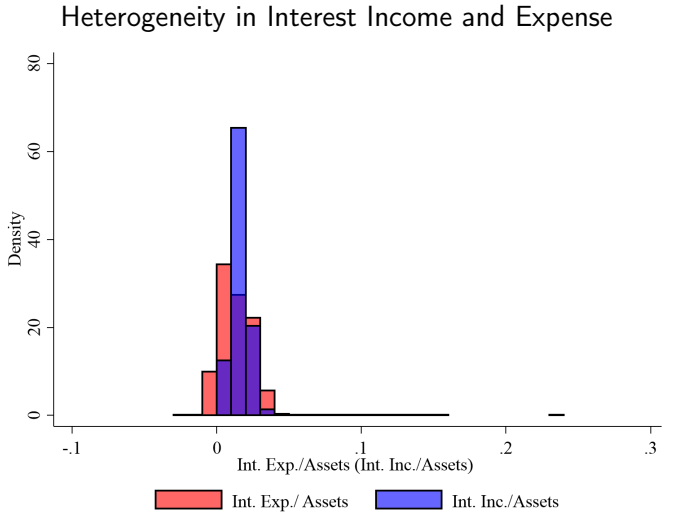
- Model generally fits empirical M/B well.

Deposit-driven Value vs. Asset-driven Value

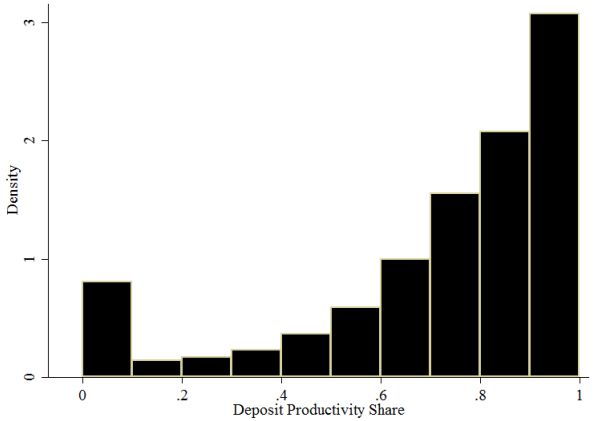


- Our framework implies that 1σ of deposit productivity has $\approx$ 2x impact on net income as 1σ of asset productivity.
- Red: $\delta_j \times \overline{\frac{Deposits}{Assets}} \frac{1}{\alpha}$; Blue: $exp(\phi_j) \times \frac{\overline{Assets}^{\theta}}{\overline{Assets}} exp(\overline{\Gamma X_{jt}})$

Interest Income vs. Interest Expense



Deposit-driven Value vs. Asset-driven Value



- Heterogeneity in share of net income framework attributes to deposit productivity.

Decomposing Our Productivity Measures

Dimensions of Productivity and Market to Book

Dep. Var	Market to Book	
Deposit Productivity:		
Savings	0.237***	0.344***
	(0.0419)	(0.0751)
Small Time	-0.242***	-0.194***
	(0.0461)	(0.0601)
Large Time	0.0257	0.0602**
	(0.0290)	(0.0294)
Transaction	0.0626*	0.102***
	(0.0337)	(0.0358)
Asset Productivity		
Loans	0.115***	0.110***
	(0.0274)	(0.0319)
Securities	0.0608***	0.0788***
	(0.0230)	(0.0237)
Time F.E.	X	X
Other Controls		X

- Savings deposit productivity explains 3x as much M/B variation as much as any other measure. Link

Determinants of Productivity

- **What are our productivity measures capturing?**
  - Traditional: differences in production technologies.
  - Alternative: differences in banks' market footprints, within-market competition.
- **Technology-based determinants:**
  - Better employees, better rate-setting technologies, and so on.
  - Look at CFPB complaints, adviser misconduct filings, rate-setting technologies.
- **Customer-based determinants:**
  - Market power; catering to specific demographic groups, etc.
  - Look at correlations between regional demographic and economic conditions and productivity measures.

Dep. Var	Deposit Productivity		Asset Productivity	
	(1)	(2)	(3)	(4)
Variation in Deposit Rates (σ_{CD})	0.237***	0.0299**		
	(0.0359)	(0.0131)		
Variation in Mortgage Rates (σ_{MTG})			0.132***	0.0215
			(0.0465)	(0.0193)
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	3,141	3,141	1,282	1,282
R-squared	0.059	0.910	0.368	0.633

- Deposit productivity positively correlated with cross-county hetereogeneity in deposit rates.
- Asset productivity less correlated with heterogeneity in mortgage rates.

Dep. Var	Deposit Productivity		Asset Productivity	
	(1)	(2)	(3)	(4)
CFPB Complaints	-0.274**	-0.0961***	0.0627	-0.0148
	(0.108)	(0.0247)	(0.172)	(0.152)
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	222	222	222	222
R-squared	0.100	0.923	0.036	0.195

- Productivity negatively correlated with customer complaints.

Bank Footprint and Productivity

Dep. Var.	Asset Productivity	Deposit Productivity
	(1)	(2)
ln(Population)	0.244***	0.593***
	(0.0347)	(0.0558)
ln(Population)^2	-0.0457***	-0.119***
	(0.0158)	(0.0244)
ln(Wage)	-0.194***	-0.163**
	(0.0505)	(0.0753)
ln(Wage)^2	-0.0522*	0.0241
	(0.0280)	(0.0237)
ln(Branch Age)	-0.0013	0.383***
	(0.0259)	(0.0371)
ln(House Prices)	0.141***	0.103
	(0.0459)	(0.0661)
HMDA HHI	0.108***	
	(0.0246)	
Deposit HHI		0.177***
		(0.0352)

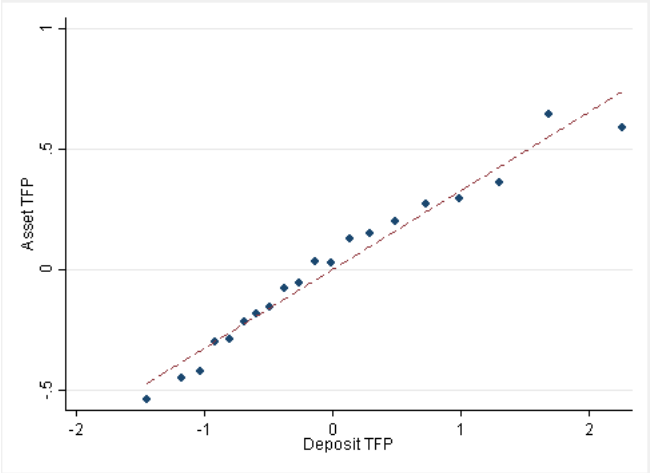
- Demographic characteristics matter...

Bank Footprint and Productivity

Dep. Var.	Market-to-Book	
	(1)	(2)
Deposit Productivity	0.330***	0.506***
	(0.0607)	(0.108)
Asset Productivity	0.171***	0.169***
	(0.0389)	(0.0382)
Time F.E.	X	X
MSA F.E.	X	X
Other Controls		X
Observations	23,617	23,617
R-squared	0.608	0.628

- However, controlling for geographic/demographic footprint does not change our previous conclusions.
- Suggests there is a role for techology in driving productivity differences.

Synergies



- Deposit productivity explains 25% of the variation in asset productivity.

	(1)	(2)
Deposit Productivity	0.198***	0.501***
	(0.0355)	(0.114)
Asset Productivity	0.0817***	0.0882***
	(0.0292)	(0.0306)
Deposit Productivity × Asset Productivity	0.0349*	0.0536***
	(0.0181)	(0.0155)
Time F.E.	X	X
Other Controls		X
Observations	26,742	26,742
R-squared	0.427	0.464

- Deposit productivity correlated with C&I loans and credit lines.

Dep. Var	RE Loans / Assets (1)	C&I Loan / Assets (2)	Loan Commit. / Assets (3)	Securities / Assets (4)	Cash / Assets (5)	FF+Repo / Assets (6)
Deposit Prod.	0.165	0.705***	0.255***	-0.0280	-0.131	-0.665*
	(0.141)	(0.146)	(0.119)	(0.167)	(0.079)	(0.276)
Time F.E.	X	X	X	X	X	X
Other Controls	X	X	X	X	X	X
Observations	24,633	23,685	26,742	26,713	26,732	18,047
R-squared	0.314	0.090	0.136	0.068	0.193	0.123

- Deposit productivity correlated with C&I loans and credit lines.

Robustness

1. Alternative Production Function and Demand Estimates
   1. Semi-Parametric Production Function Estimates ▸ Link
   2. Alternative Measures of Risk ▸ Link
   3. County-Level Demand Estimates ▸ Link
2. Measurement Error
   1. IV ▸ Link
   2. Empirical Bayes Estimates ▸ Link
3. Alternative Measures of Value
   1. ROE ▸ Link
   2. Tobin's Q ▸ Link
4. Sub-sample Analysis
   1. Exclude Large Banks ▸ Link
   2. Excluding the Financial Crisis ▸ Link
   3. Restricting to "Traditional" Banks ▸ Link

Conclusion

- Take an IO-motivated approach to understanding bank value creation.
- Deposit productivity explains 2-4x as much variation in bank value as asset productivity.
  - Deposit productivity is primarily driven by savings deposits.
  - Asset productivity is primarily driven by illiquid assets.
  - Both customer-driven and technological aspects of productivity matter.
- Synergies: deposit productivity explains 25% of variation in asset productivity.

Thanks!

Bank Liabilities: Deposit Demand Estimation

	(1)	(2)
Deposit Rate	12.61***	20.88***
	(1.848)	(4.620)
No. Branches	0.0405***	0.0441***
	(0.0093)	(0.0096)
No. Empl	0.0271***	0.0278***
	(0.0082)	(0.0084)
Non-Int. Exp.	-0.0886	-0.120
	(0.101)	(0.104)
Time Fixed Effects	X	X
Bank Fixed Effects	X	X
IV-1		X
IV-2		X
Observations	26,742	26,742
R-squared	0.981	0.981

- 1% in rate raises market share from 10% to 11.8%.

Go back

- **BLP instruments:** lagged average of competitors' characteristics: number of bank branches, number of employees, non-interest expenditures, and banking fees.
  - First stage: bank must offer higher deposit rates if its competitors offer better products.
  - Exclusion restriction: lagged average competitor product characteristics are orthogonal to ξ_{jt}, the bank-quarter specific demand shock.

- **Deposit rate pass through:** fitted value of a bank-specific regression of i_{jt} on 3-month LIBOR.
  - First stage: pass through is driven by supply (investment opportunities, market power).
  - Exclusion restriction: average degree of pass-through interacted with rate changes in the time series is orthogonal to ξ_{jt}.

Go back

Bank Assets: Bank Production Function Estimation

	(1)	(2)	(3)	(4)
$\ln A_{kt}$ (θ)	0.848***	0.837***	0.887***	0.859***
	(0.0132)	(0.0144)	(0.0454)	(0.0504)
Beta		-0.0067		-0.0076
		(0.0058)		(0.0061)
Beta (fwd 2 yr)		0.0173***		0.0164***
		(0.0049)		(0.0052)
SD ROA		-0.0258***		-0.0261***
		(0.0030)		(0.0034)
SD ROA (fwd 2 yr)		0.0030		0.00217
		(0.0029)		(0.0035)
Bank F.E.	X	X	X	X
Time F.E.	X	X	X	X
IV			X	X
Observations	26,742	21,289	26,742	21,289
R-squared	0.992	0.992	0.992	0.992

Go back

Decomposing Our Productivity Measures

Demand Estimates by Type of Deposit

	Deposit Type			
	Savings	Small Time	Large Time	Transaction
	(1)	(2)	(3)	(4)
Deposit Rate	-9.594	63.17***	75.39***	-1.188
	(12.73)	(23.21)	(18.25)	(12.51)
No. Branches	0.0825***	0.113***	0.0265	0.0142
	(0.0211)	(0.0412)	(0.0263)	(0.0143)
No. Empl	0.00932	0.0241	0.0479***	0.0377***
	(0.0102)	(0.0185)	(0.0135)	(0.0104)
Non-Int. Exp.	-0.192	-0.920***	-0.656***	0.0724
	(0.154)	(0.347)	(0.247)	(0.0881)
Time Fixed Effects	X	X	X	X
Bank Fixed Effects	X	X	X	X
IV	X	X	X	X
Observations	24,609	24,500	24,556	22,345
R-squared	0.970	0.868	0.809	0.941

Go back

Dep. Var	Asset Productivity (1)	Loan Productivity (2)	Sec. Productivity (3)
Deposit Prod.:			
Savings	0.275***	0.215***	0.0667
	(0.0429)	(0.0676))	(0.0506)
Small Time	0.194***	0.296***	0.00589
	(0.0270)	(0.0645)	(0.0255)
Large Time	0.124***	0.109***	0.0193
	(0.0268)	(0.0339)	(0.0226)
Transaction	0.0414	-0.0172	-0.0510
	(0.0406)	(0.0408)	(0.0381)
Time F.E.	X	X	X
Other Controls	X	X	X
Observations	22,345	16,753	17,269
R-squared	0.666	0.607	0.650

- Transactions deposit productivity not correlated with asset productivity.

Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.233***	0.329***	0.543***	0.511**
	(0.0315)	(0.128)	(0.0507)	(0.238)
Asset Productivity	0.0467	0.131***		
	(0.0326)	(0.0350)		
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	21,362	21,362	21,362	21,362
R-squared	0.414	0.455	0.664	0.708

Go back

Additional Risk Measures:

- Fama French Factors
- Asset Composition

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.193***	0.467***	0.383**	0.421**
	(0.0518)	(0.117)	(0.161)	(0.203)
Asset Productivity	0.169***	0.166***		
	(0.0394)	(0.0437)		
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	18,564	18,564	18,564	18,564
R-squared	0.436	0.468	0.703	0.708

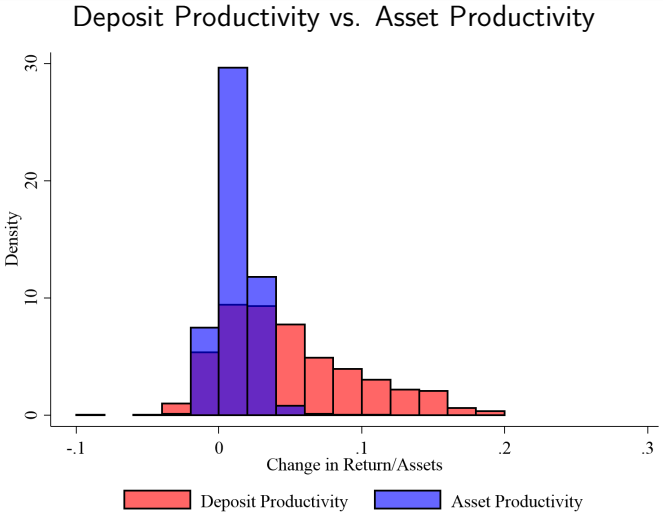
Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.123***	0.138***	0.441***	0.212***
	(0.0323)	(0.0387)	(0.0383)	(0.0416)
Asset Productivity	0.0785**	0.0806**		
	(0.0345)	(0.0368)		
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	3,045	3,045	3,045	3,045
R-squared	0.436	0.487	0.499	0.525

Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.184***	0.508***	0.393***	0.533***
	(0.0331)	(0.106)	(0.0265)	(0.130)
Asset Productivity	0.0692	0.0933**		
	(0.0461)	(0.0458)		
Time F.E.	X	X	X	X
Other Controls		X		X
IV	X	X	X	X
Observations	16,724	16,724	22,345	22,345
R-squared	0.428	0.470	0.633	0.646

Go back


Deposit Productivity vs. Asset Productivity
Density
0
10
20
30
-.1
0
.1
.2
.3
Change in Return/Assets
Deposit Productivity
Asset Productivity

Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.218***	0.458***	0.378***	0.973***
	(0.0350)	(0.115)	(0.116)	(0.251)
Asset Productivity	0.103***	0.112***		
	(0.0294)	(0.0337)		
Time F.E.	X	X	X	X
Other Controls		X		X
IV	X	X	X	X
Observations	24,881	24,881	24,881	24,881
R-squared	0.427	0.459	0.655	0.686

Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.205***	0.463***	0.370***	0.416**
	(0.0374)	(0.105)	(0.121)	(0.189)
Asset Productivity	0.117***	0.127***		
	(0.0299)	(0.0311)		
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	24,211	24,211	24,211	24,211
R-squared	0.403	0.433	0.650	0.659

Go back

Dep. Var.	Market-to-Book		Asset Productivity	
	(1)	(2)	(3)	(4)
Deposit Productivity	0.156***	0.761***	0.425***	0.568***
	(0.0355)	(0.105)	(0.121)	(0.188)
Asset Productivity	0.204***	0.199***		
	(0.0294)	(0.0309)		
Time F.E.	X	X	X	X
Other Controls		X		X
Observations	23,942	23,942	23,942	23,942
R-squared	0.467	0.534	0.706	0.710

Go back

	(1)	(2)	(3)	(4)	(5)	(6)
Deposit Productivity	0.232***	0.527***			0.244***	0.515***
	(0.0228)	(0.108)			(0.0306)	(0.116)
Asset Productivity			0.141***	0.0772***	-0.0329	0.0309
			(0.0303)	(0.0299)	(0.0376)	(0.0379)
Time F.E.	X	X	X	X	X	X
Other Controls		X		X		X
Observations	26,742	26,742	26,742	26,742	26,742	26,742
R-squared	0.388	0.462	0.346	0.442	0.388	0.462

Go back

	(1)	(2)	(3)	(4)	(5)	(6)
Deposit Productivity	0.113***	0.313***			0.0726***	0.264***
	(0.0129)	(0.0795)			(0.0257)	(0.0907)
Asset Productivity			0.161***	0.151***	0.110***	0.128***
			(0.0208)	(0.0217)	(0.0234)	(0.0256)
Time F.E.	X	X	X	X	X	X
Other Controls		X		X		X
Observations	26,742	26,742	26,742	26,742	26,742	26,742
R-squared	0.194	0.223	0.195	0.223	0.198	0.228

Go back

The bank sets the deposit rate to maximize

$$\max_i \phi_j A_j^\theta - i_j Ms_j - r_j K_j.$$

The corresponding bank first order condition is given by

$$\phi_j \theta A_j^{\theta-1} = \left(\frac{1}{\alpha(1-s_j)} + i_j \right).$$

Bank Liabilities: Deposit Demand Estimation

Results: County Level Demand

	(1)	(2)	(3)
Deposit Rate	20.33	18.19**	21.02**
	(13.59)	(8.213)	(8.812)
Deposit Rate × Avg. Weekly Wage			11.78***
			(2.353)
Deposit Rate × Pct College			-10.87***
			(1.762)
Deposit Rate × Pct Over 65			6.013***
			(1.916)
No. of Branches (County Level)		1.257***	1.256***
		(0.0272)	(0.0269)
County×Year Fixed Effects	X	X	X
Bank Fixed Effects	X	X	X
IV	X	X	X
Observations	260,881	260,881	254,662
R-squared	0.659	0.779	0.777

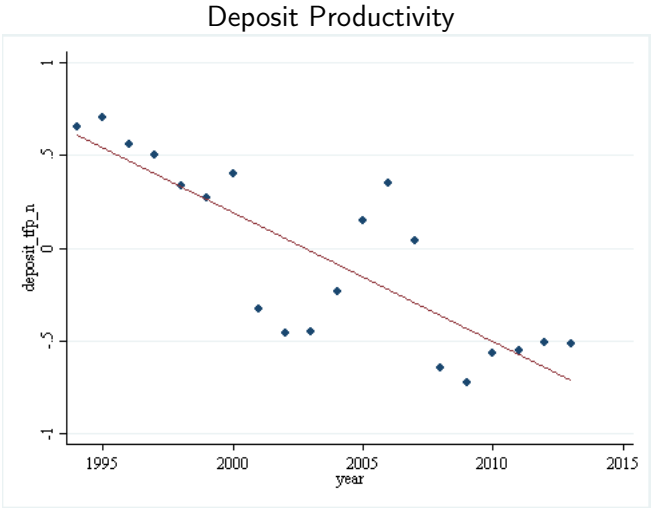
Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Deposit Int. Expense	26,742	2.18%	1.34%	0.11%	6.53%
Deposit Int. Expense (Net of Fees)	26,742	1.73%	1.36%	-0.46%	6.16%
Non Int. Expense (Millions)	26,742	142.44	517.53	1.27	3,662.00
No. Branches	26,742	119.50	307.73	1.00	2,024.00
No. Employees	26,742	3,456.47	10,511.54	54.00	68,396.00
Assets (Billions)	26,742	26.50	161.00	0.10	2,580.00
Interest Income (Millions)	26,742	281.85	1,524.57	1.50	33,000.00
Deposits (Billions)	26,742	14.20	78.90	0.01	1,370.00
Leverage	26,742	0.91	0.04	0.19	1.02
Beta	26,742	0.63	0.58	-0.66	2.46
Std. Dev. ROA	26,742	0.14%	0.18%	0.01%	0.91%
Market-to-Book	26,742	1.71	0.85	0.18	5.30

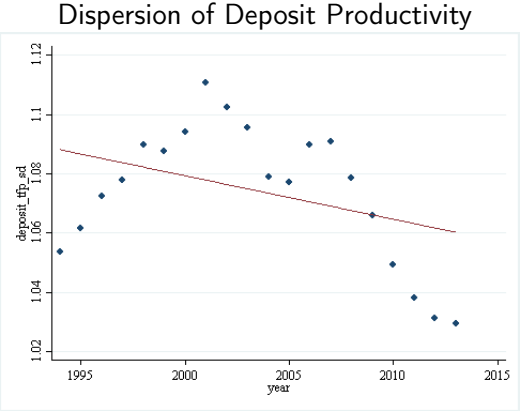
Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Liabilities (Relative to Total Liabilities)					
Deposits	26,742	0.83	0.13	0.00	1.00
Small Time Deposits	26,736	0.20	0.11	0.00	0.68
Large Time Deposits	26,736	0.13	0.08	0.00	0.89
Savings Deposits	24,633	0.34	0.15	0.00	0.89
Transaction Deposits	24,627	0.15	0.10	-0.30	0.81
FF+Repo	18,051	0.04	0.06	0.00	0.69
Assets (Relative to Total Assets)					
Loans	26,742	0.65	0.13	0.00	0.96
RE Loans	24,633	0.46	0.16	0.00	0.91
C&I Loan	23,685	0.11	0.07	0.00	0.58
Loan Commitments	26,742	0.14	0.17	0.00	21.10
Securities	26,713	0.22	0.12	0.00	0.94
Cash	26,732	0.02	0.04	0.00	0.41
FF+Repo	18,047	0.01	0.03	0.00	0.45

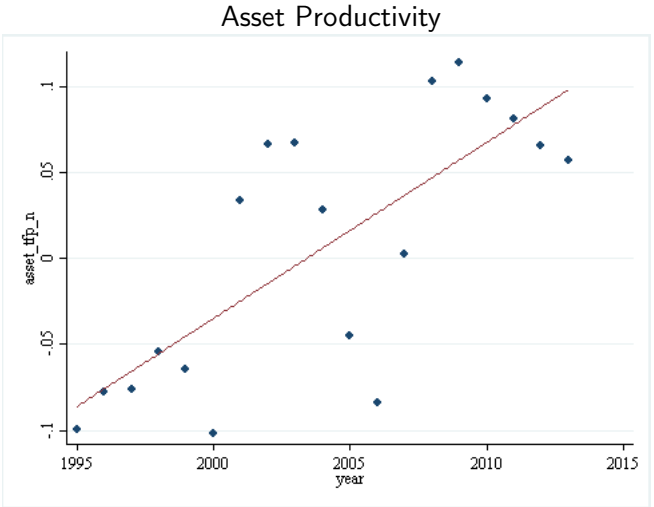
Trends in Productivity



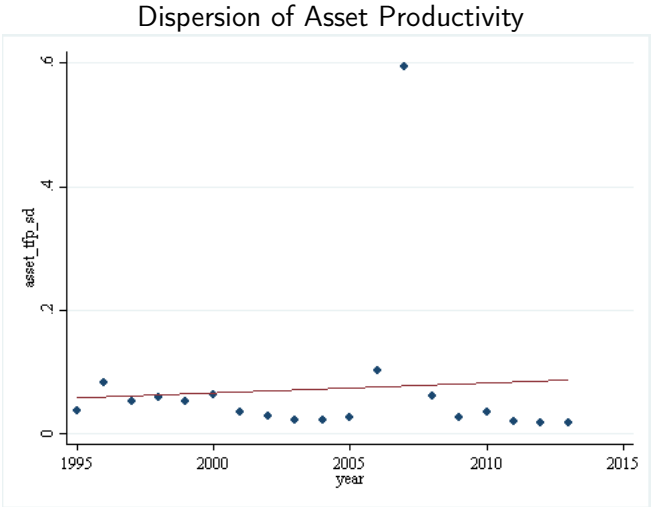
Trends in Productivity



Trends in Productivity



Trends in Productivity



Dep. Var	Leverage	Deposits / Liabilities	Small Time / Liabilities	Large Time / Liabilities	Savings / Liabilities	Trans. / Liabilities	FF+Repo / Liabilities
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deposit Prod.	0.0225***	1.773***	-0.347*	0.137	1.354***	0.432**	-0.320
	(0.00843)	(0.255)	(0.186)	(0.146)	(0.199)	(0.177)	(0.290)
Time F.E.	X	X	X	X	X	X	X
Other Controls	X	X	X	X	X	X	X
Observations	26,742	26,742	26,736	26,736	24,633	24,627	18,051
R-squared	0.969	0.558	0.376	0.160	0.383	0.232	0.142

- Deposit productivity strongly correlated with savings deposits.
- Little correlation with overall leverage.

Dep. Var	Asset Productivity	Loan Productivity	Sec. Productivity
	(1)	(2)	(3)
Deposit Productivity	0.441***	0.340***	0.0985
	(0.0937)	(0.110)	(0.0966)
Time F.E.	X	X	X
Other Controls	X	X	X
Observations	26,742	18,360	19,467
R-squared	0.644	0.420	0.647

- Deposit productivity mostly correlated with loan productivity, not security productivity. Link

Dep. Var	RE Loans / Assets	C&I Loan / Assets	Loan Commit. / Assets	Securities / Assets	Cash / Assets	FF+Repo / Assets
	(1)	(2)	(3)	(4)	(5)	(6)
Asset Prod.	0.319***	0.134***	0.0805**	-0.460***	-0.308***	-0.248**
	(0.0427)	(0.0438)	(0.0378)	(0.0678)	(0.0315)	(0.0985)
Time F.E.	X	X	X	X	X	X
Other Controls	X	X	X	X	X	X
Observations	24,633	23,685	26,742	26,713	26,732	18,047
R-squared	0.346	0.054	0.133	0.145	0.226	0.106

- Asset productivity associated with loans.