Going the Extra Mile: Distance Lending and Credit Cycles

Joao Granja   Christian Leuz   Raghuram G. Rajan

University of Chicago Booth

CHICAGO BOOTH

Why this paper?

- We find an interesting pattern in the data
  - The distance between a small business borrower and its bank
    - increased sharply before the Global Financial Crisis (2004-2007), and collapsed as it hit
    - is associated with higher loan losses
    - is driven by loans made from banks in competitive areas to borrowers in concentrated areas
- Cyclicality in distance correlated with bank losses more generally
  - Proxy for bank risk taking behavior

Why...especially when the Fed is raising rates?

- Why?
  - The unanticipated consequences of slow monetary tightening (Bernanke vs Taylor)
    - A role for bank exercise of market power
    - A role for banker moral hazard in the face of deposit inflows: "Deposits burning a hole..."

Relevant literature

- Role of geographic distance in Banking
  - Petersen and Rajan (2002, JF); Degryse and Ongena (2005, JF); Agarwal and Hauswald (2010, RFS); Herpfer, Mjos, and Schmidt (2018, WP)
- Cyclical lending standards
  - Ruckes (2004, RFS); Dell'Aricia and Marquez (2006, JF); Berger and Udell (1995, JBus); Gianetti and Laeven (2012, JFE); Lisowski, Minnis, and Sutherland (2017, JAR); Madalloni and Peydro (2010, WP); Sufi and Mian (2009, QJE); Dell'Aricia, Igan, and Laeven (2012, JMCB); Jimenez, Ongena, Peydro, and Saurina (2014, ECMA); Ioannidou, Ongena, and Peydro (2014, RoF); Agarwal and Ben-David (2018, JFE); Meiselman, Nagel, and Purnanandam (2018, WP); Agarwal, Amronin, Ben-David, Chomsisengphet, and Evanoff (2018, WP); Bord, Ivashina, and Taliaferro (2018, WP)
- Role of Interbank Competition in Bank Lending
  - Hellmann, Murdock, and Stiglitz (2000, AER); Boyd and De Nicolo(2005, JF); Rajan and Ramcharan (2015, AER); Morgan, Rime, and Strahan (2004, QJE); Gilje, Loutskina, and Strahan (2016, JF)
- Consequences of Monetary Tightening Across Areas
  - Drechsler, Savov, and Schnabl (2017,2019)
- Managerial Myopia
  - Stein (1989), Rajan (1994), Agarwal and Ben-David (2014)
- Managerial Agency
  - Scharfstein and Falato (2016), Ellul and Yerramilli (2013), DeFond and Zhang (2014), Fahlenbrach and Stulz (2011)

Data

- Community Reinvestment Act Small Business Lending Dataset
  - Origination of Small Business Loans by County of the Borrower
  - Sample covers all banks with total assets above $1 billion
  - Small Business Loans are all loans with principal amount below $1 million
  - Annual Observations covering the 1996–2016 period

Data contd.

- **Summary of Deposits Dataset**
  - Ownership and Location of branches of all U.S. depository institutions
- Distance is the geodetic distance between the borrower's county centroid and the bank's closest branch
  - Also, population weighted centroid

Data contd.

- Small Business Administration Government Guaranteed Loans Dataset
  - Information about the origination date, borrower, and respective bank lender of all government guaranteed small business loans in the US.
  - Information about the address of the borrower allows geocoding of the coordinates and computation of distances to borrower.
  - Information on Loan Status (e.g. Paid-In-Full, Outstanding, Charge-off)
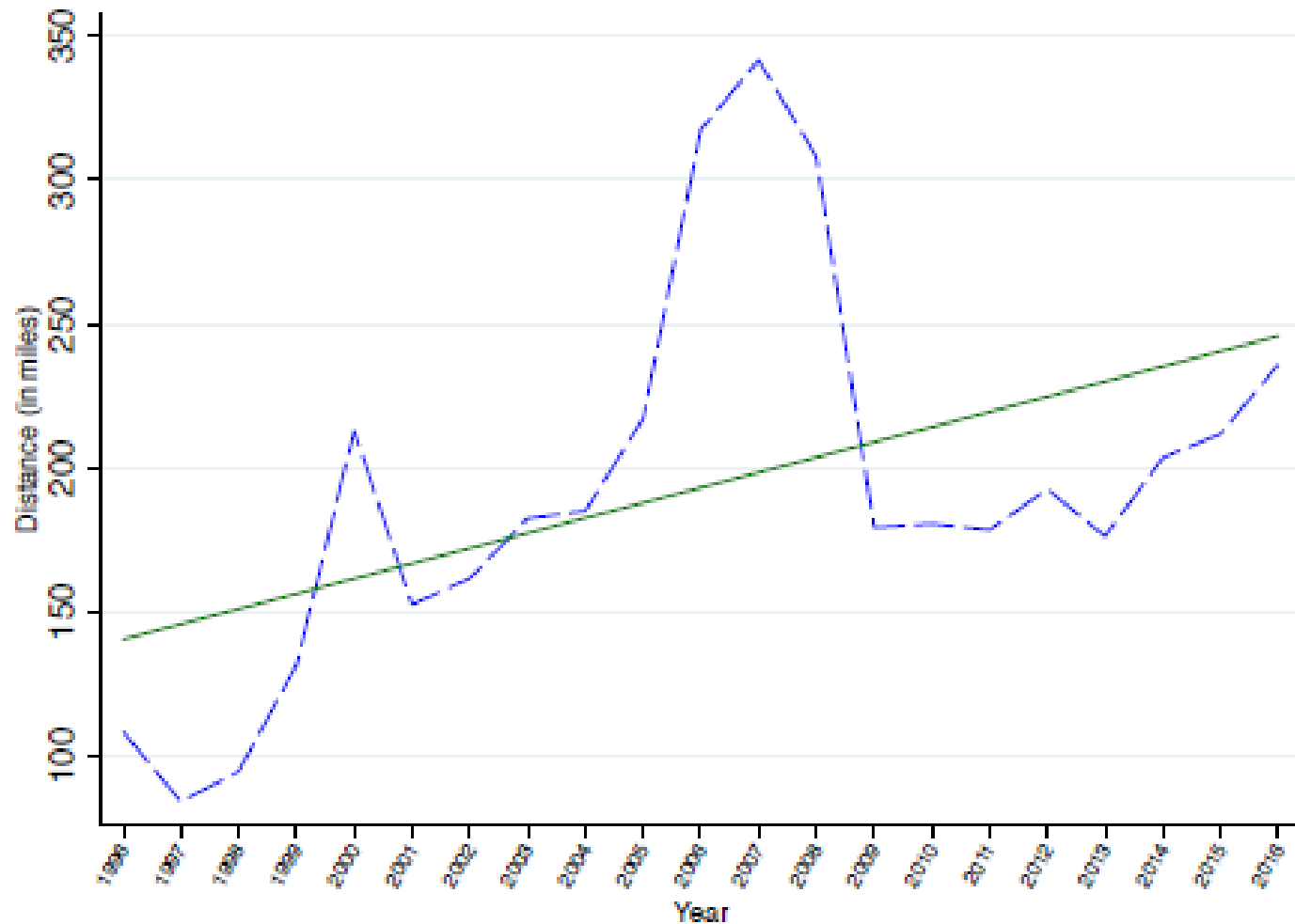 - Sample covers 2000–2016 period

Figure 2A: Average Lending Distance
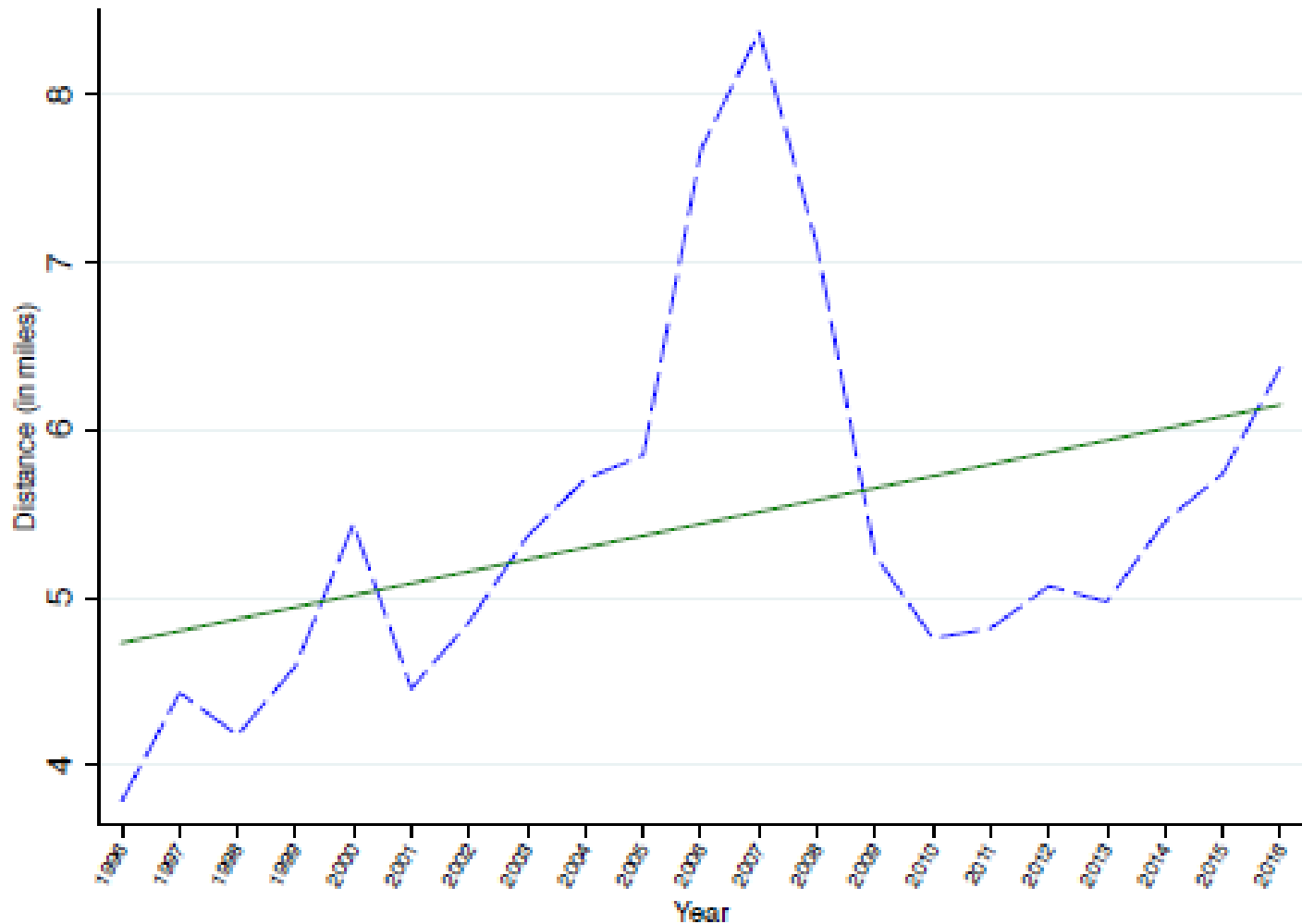
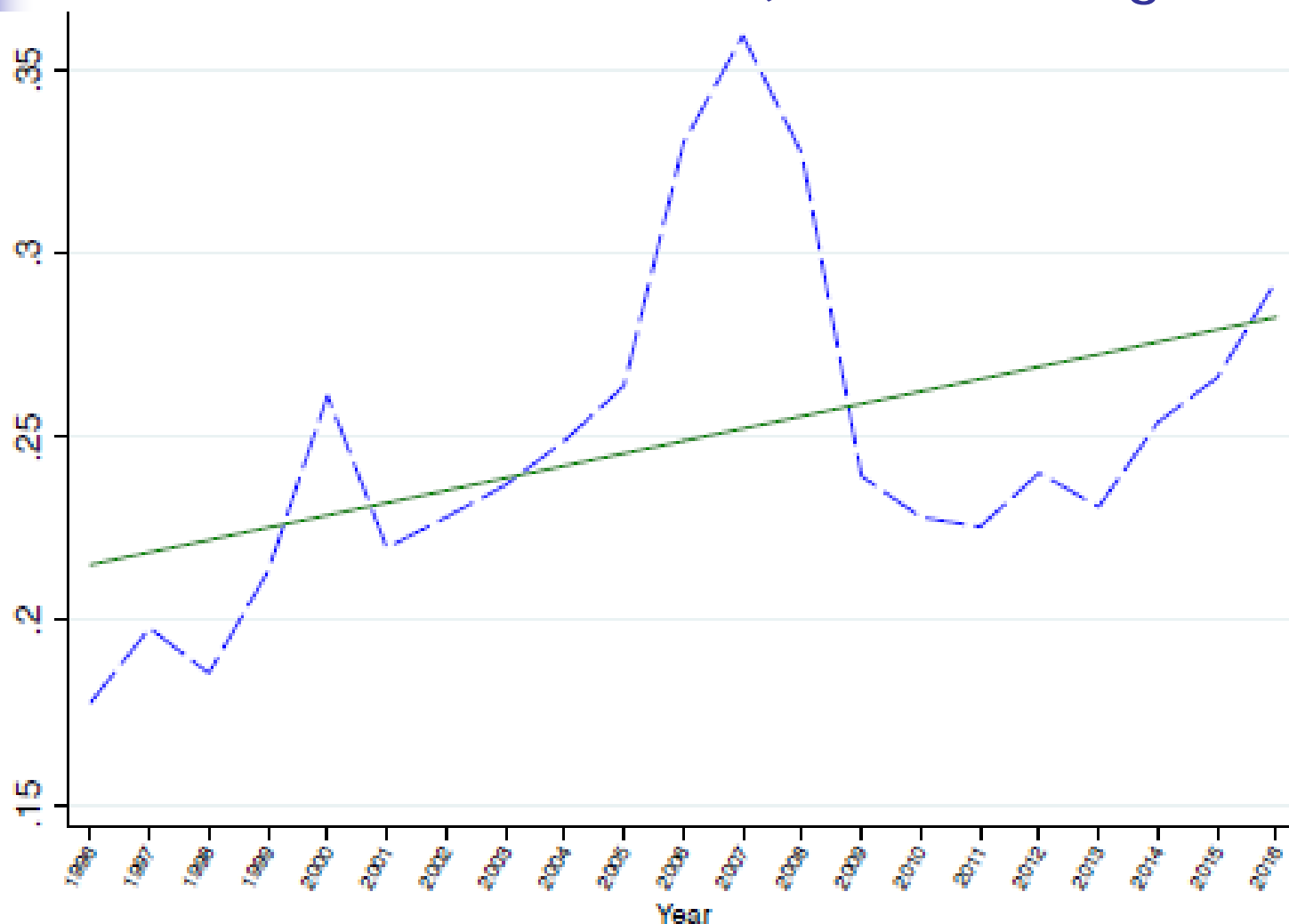# Figure 3A: Median Lending Distance (Volume-weighted)

Figure 2C: Proportion of Lending to Counties outside Branch Network (Volume-Weighted)

Empirical Methodology - Main Specification

$$\Delta\%\boldsymbol{SBL_{bct}}$$
$$= \boldsymbol{\alpha_{ct}} + \boldsymbol{\gamma_b} + \boldsymbol{\beta_1 Ln(Dist)_{bct}} + \boldsymbol{\beta_2\ Ln(Dist)_{bct}} \times \boldsymbol{Z_t} + \boldsymbol{\theta X_{bt}} + \boldsymbol{\epsilon_{bct}}\ (1)$$

- Bank b lending to county c in year t
- County time plus bank fixed effects.
- Z_t
  - Detrended change in real GDP
  - Log difference in US unemployment rate
  - Standardized net percentage of loan officers tightening standards
- X_{bt}
  - Bank size
  - Shares of different kinds of loans

Table 2: Summary Statistics

Panel A: CRA Sample

	N	Mean	St. Dev.	p10	p25	p50	p75	p90
Δ Volume Loans	5,234,549	0.135	1.985	-0.778	0	0	0	1.690
NPL Ratio (07-09)	4,235,461	0.0158	0.0122	0.00508	0.00889	0.0140	0.0206	0.0275
HHI Destination	5,220,264	295.0	668.0	18.55	51.14	132.4	308.7	633.6
HHI Origin	5,132,929	108.3	242.0	10.51	23.09	41.16	114.6	253.6
HHI Difference	5,119,738	184.4	691.2	-101.4	-3.577	55.79	221.1	529.8
Coefficient Variation HHI	3,763,276	0.874	0.427	0.376	0.610	0.872	1.085	1.308

Panel B: SBA Sample

	N	Mean	St. Dev.	p10	p25	p50	p75	p90
I(Charge-Off = 1)	1,065,304	0.146	0.353	0	0	0	0	1
SBA Loan Interest Rate	1,030,786	7.726	2.344	5.250	6	7.250	9.250	11
SBA Loan Amount	1,065,304	245.6	460.6	12.50	25.30	80	250	650
SBA Loan Maturity	1,065,304	105.1	74.21	36	60	84	120	240

Table 3: Distance and Small Business Lending: Business Cycle Indicators

	(1)	(2)	(3)
	Δ Volume Loans		
Ln(Distance)	-0.038***	-0.038***	-0.038***
	(0.001)	(0.001)	(0.001)
Ln(Distance) $\times$ HP-Filtered Real GDP	0.035***		
	(0.001)		
Ln(Distance) $\times$ Δ Ln(Unempld Rate)		-0.018***	
		(0.000)	
Ln(Distance) $\times$ Spreads			-0.017***
			(0.000)
Observations	5234549	5234549	5234549
Adjusted R^2	0.017	0.017	0.017
Baseline Controls	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Borrower County-Year Fixed Effects	Yes	Yes	Yes

Figure 4: Distance and Lending Growth over the Business Cycle

$$\Delta\% Volume_{bct} = \alpha_{ct} + \theta_b + \sum \beta_t Ln(Dist)_{bct} \times Year_t + \Gamma X_{bt} + \epsilon_{bct}$$
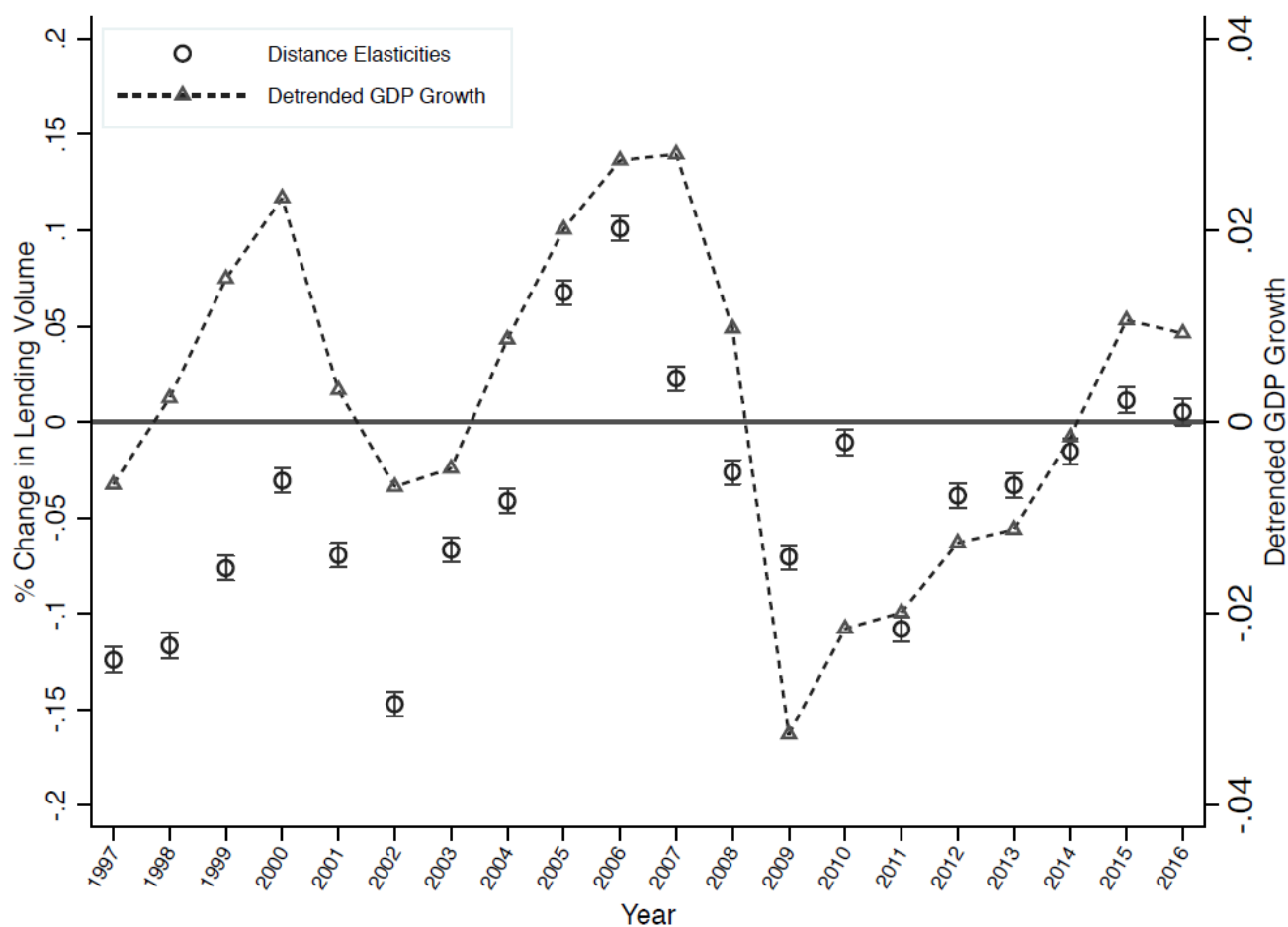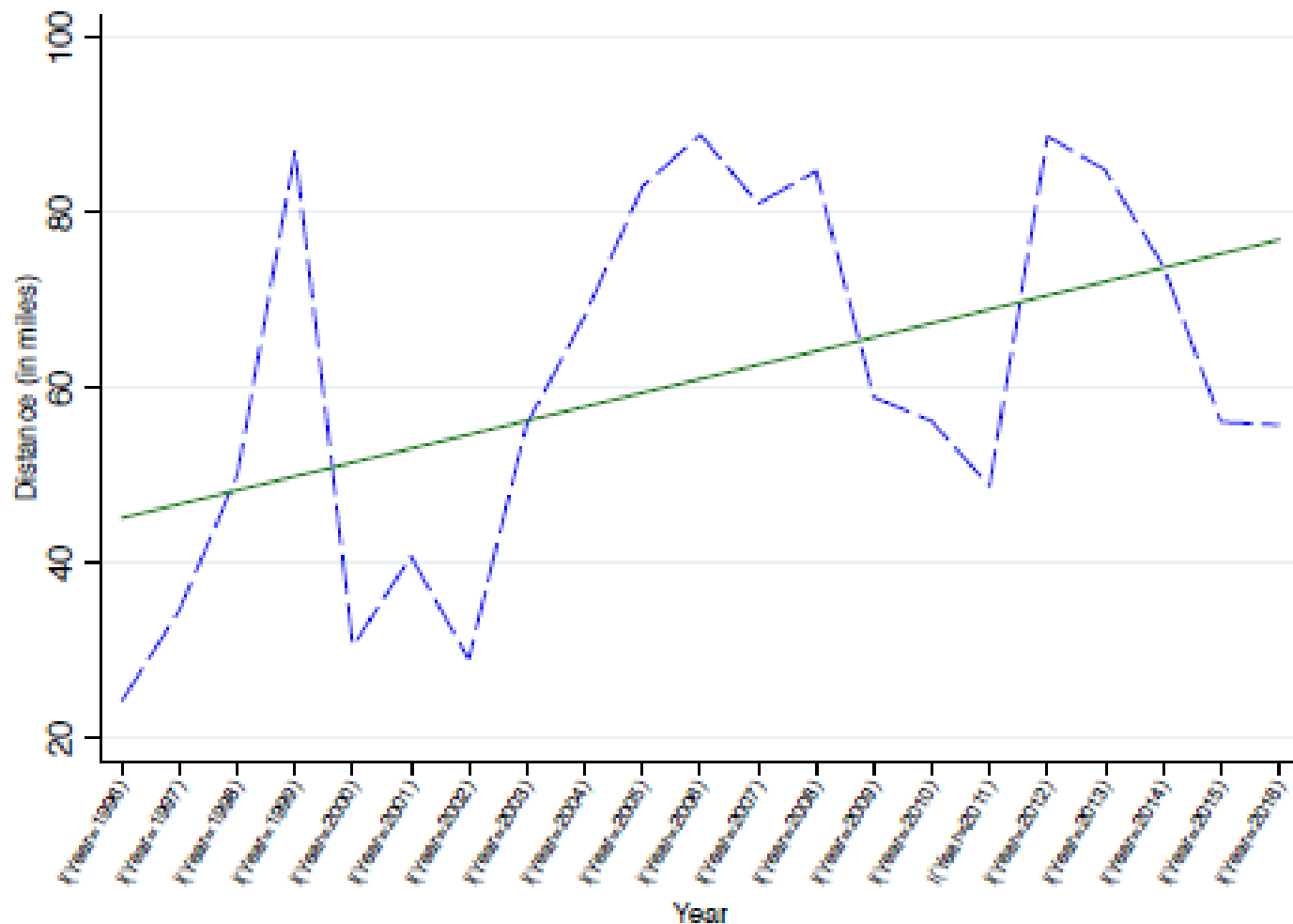
Robustness

- Alternative measures of distance
  - Proportion out of county
- Other specifications
  - Eliminating one state at a time
  - Requiring minimum number of loans to a county
  - Bank mergers and acquisitions
  - For various bank sizes
- For specific industry

Figure 5: Small farm lending distance

CYCLICAL DISTANCE AND DEFAULT

Distance and default

- Are above-trend increases and subsequent declines in lending distance associated with default?
- Turn to SBA data set where we have data on charge-offs

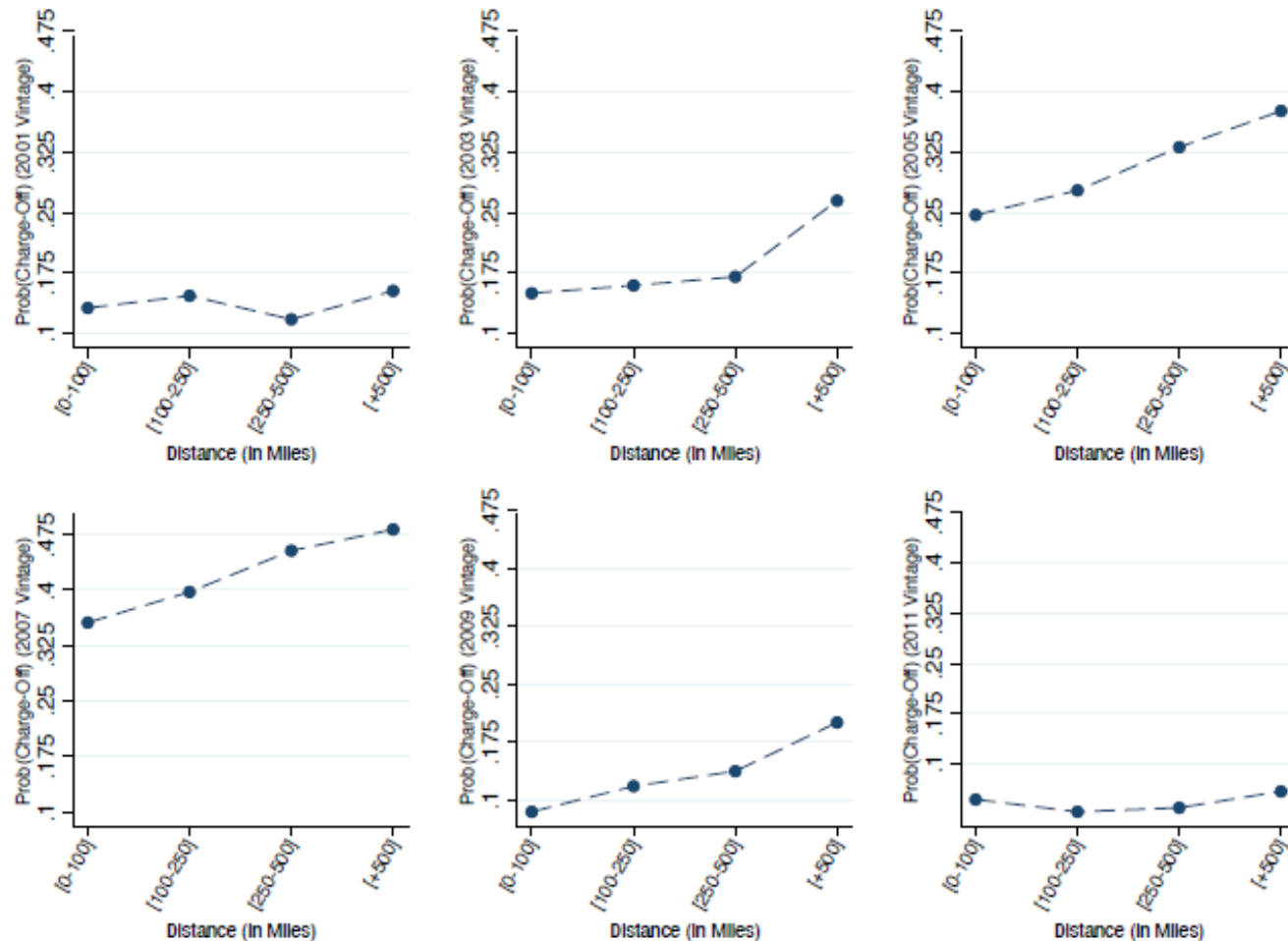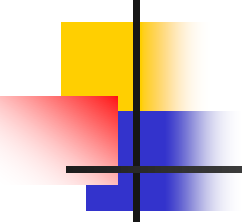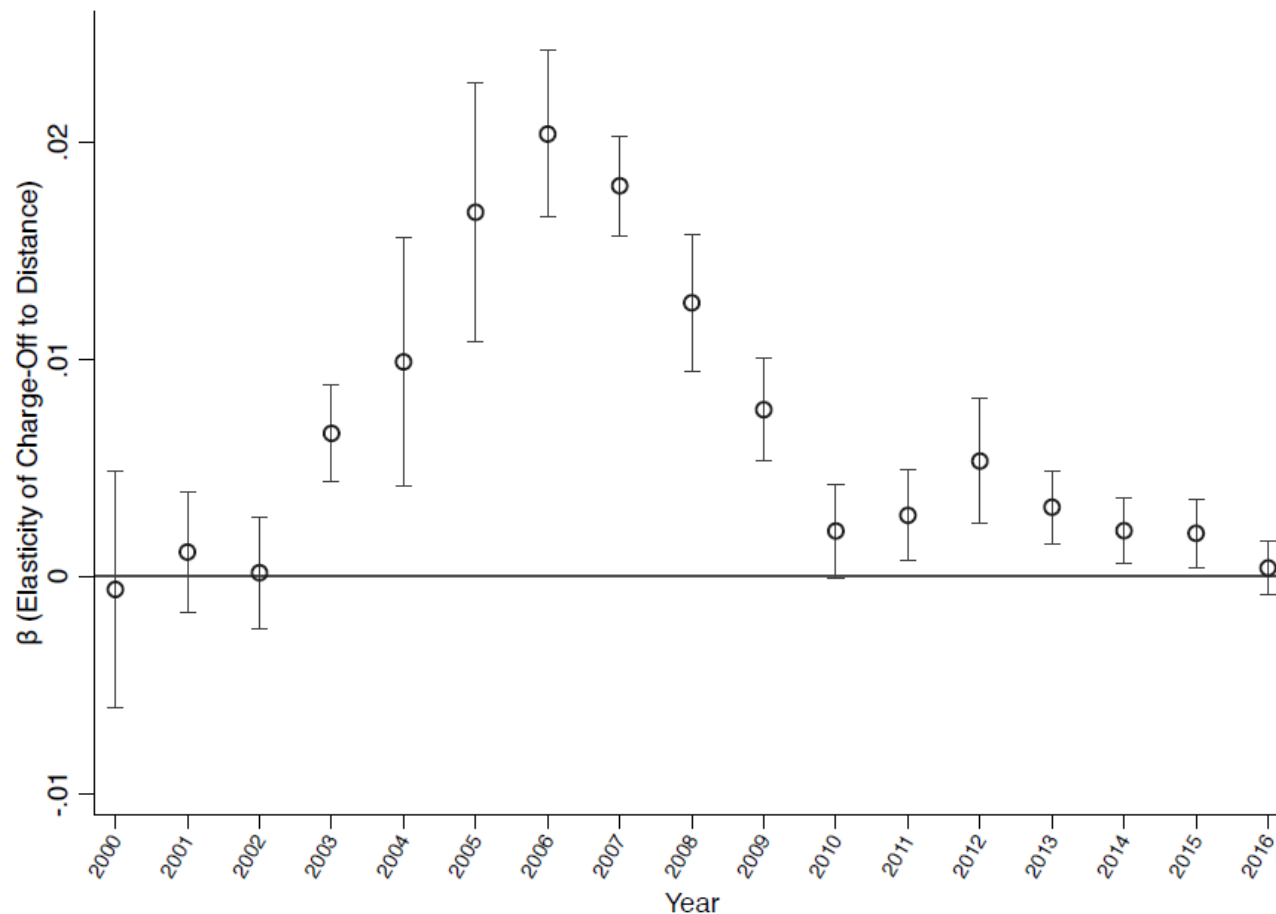# Figure 6: Charge-offs by distance across years

Figure 7: Distance and Likelihood of Charge offs

$$\mathbf{P}\,\mathbf{r}(CO_{ibct} = 1) = \alpha_{ct} + \gamma_b + \sum_t \delta_t \, Ln(Dist)_{ibt} \times Year_t + \theta X_i + \epsilon_{ibct}$$

Are distant loans different?
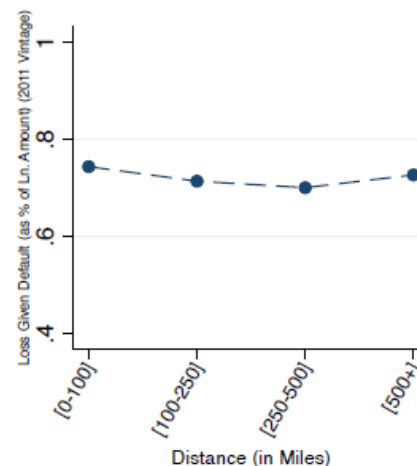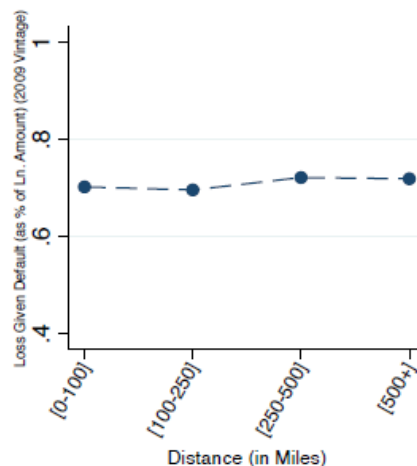# Loss given default by distance by year

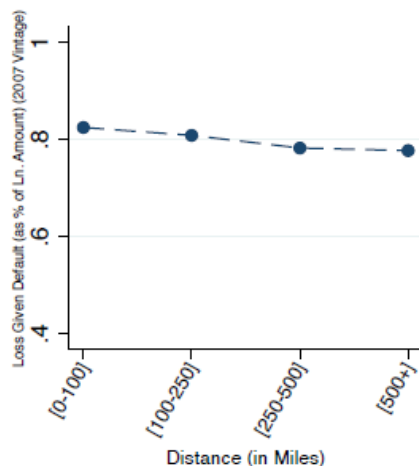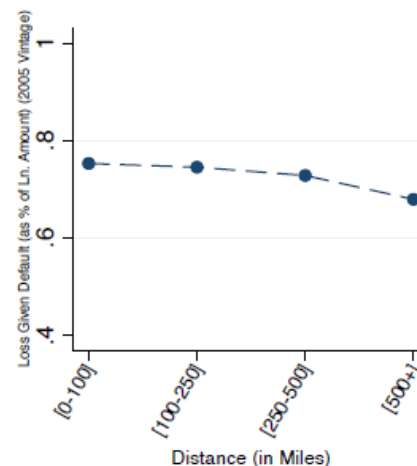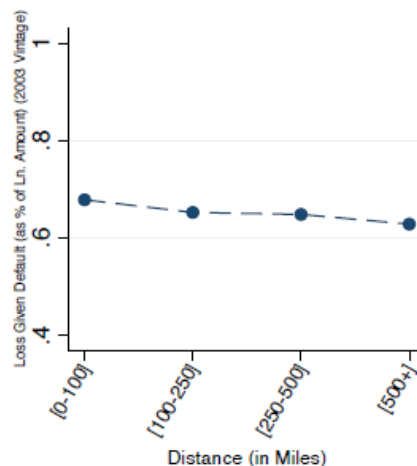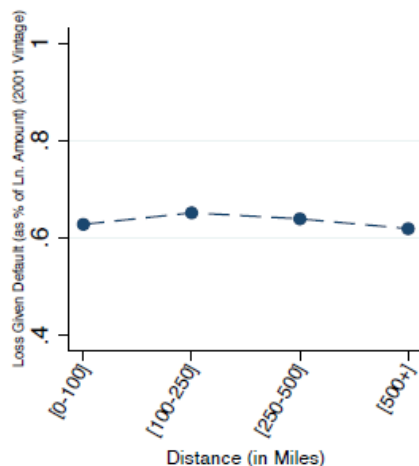# Figure 8: Distance and Loan Interest Rate

$$IntRate_{bcti} = \alpha_{ct} + \theta_b + \omega_i + \sum_t \beta_t Distance_{bcti} \times Year_t + \epsilon_{bcti}$$
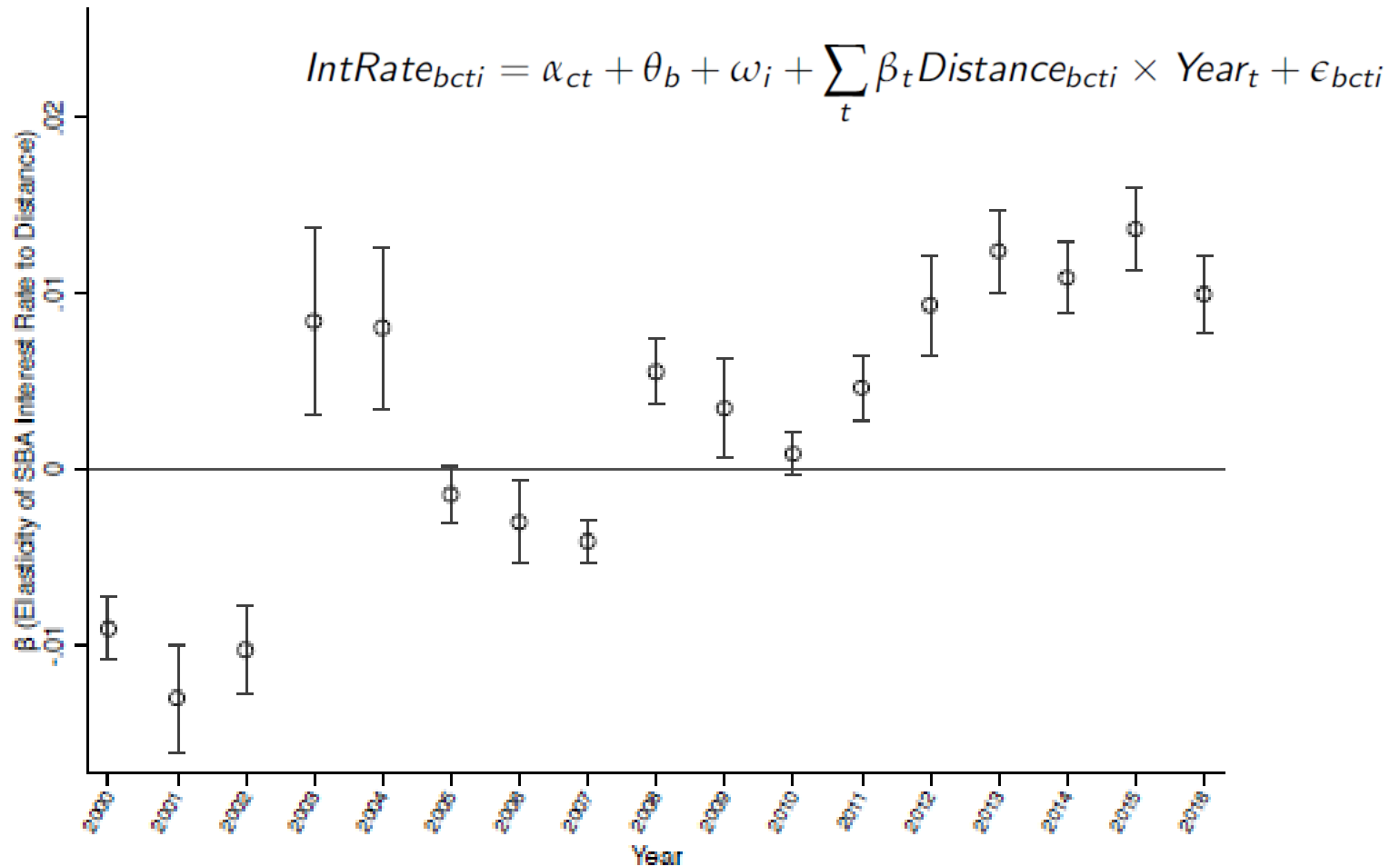
CYCLICAL DISTANCE AND BANK LOAN MARKET CONCENTRATION

Figure 9A: Distance and HHI at Origin
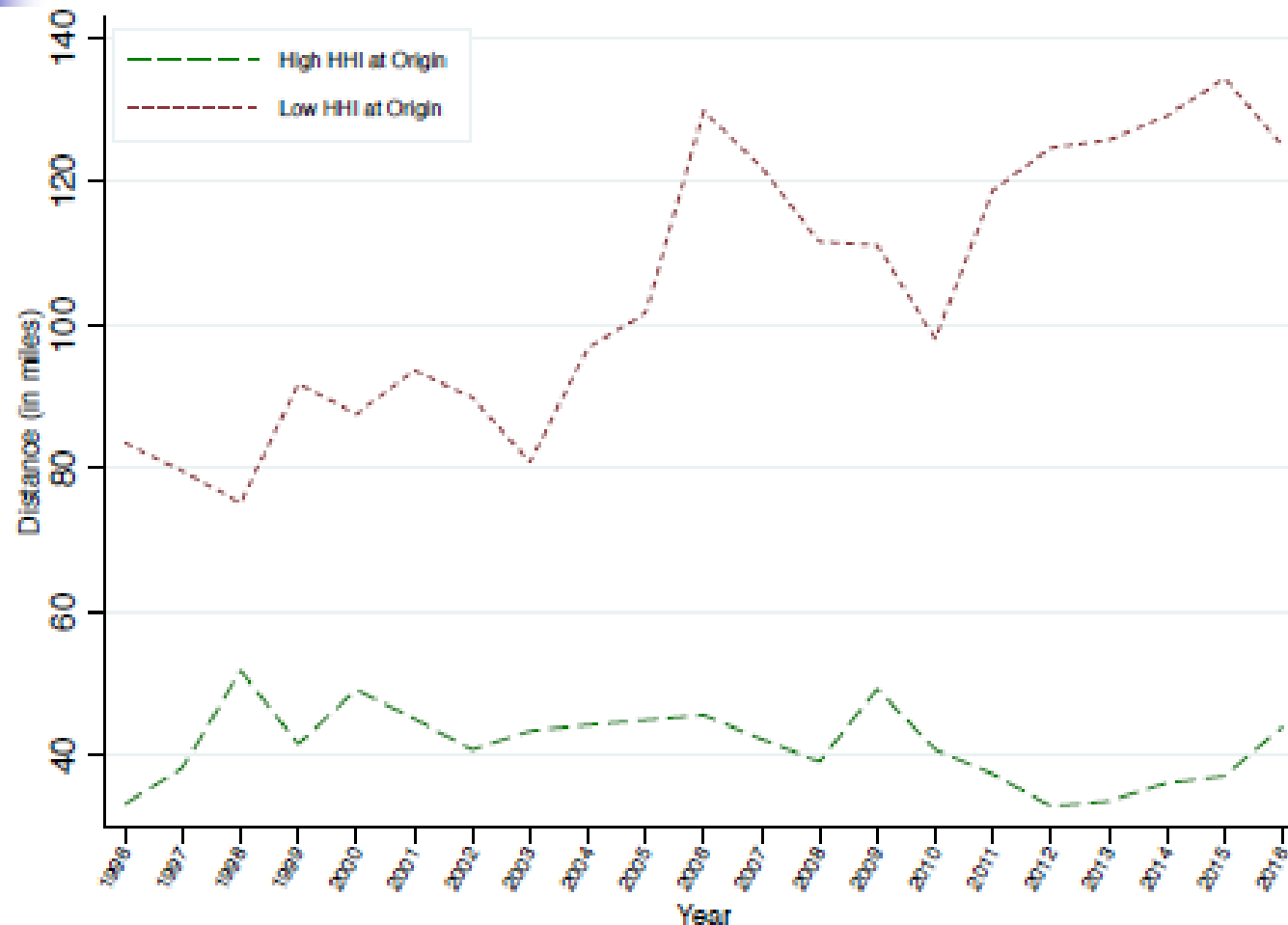
Table 5: Distance and Loan Mkt Concentration

	(1)	(2)	(3)
Ln(Distance)	-0.038***	-0.037***	-0.038***
	(0.001)	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP	0.036***	0.035***	0.035***
	(0.001)	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP × HHI Destination	0.006***		
	(0.001)		
Ln(Distance) × HP-Filtered Real GDP × HHI Origin		-0.007***	
		(0.001)	
Ln(Distance) × HP-Filtered Real GDP × HHI Difference			0.008***
			(0.001)

Outflows, Inflows, or Both

$$\text{HHI share} = \frac{HHI_{c1}}{HHI_{c1} + HHI_{c2}}$$

- HHI Share =1
  - County 1 very concentrated relative to 2
  - Loans into 1 from 2
- HHI Share = 0
  - County 1 very competitive relative to 2
  - Loans from 1 to 2

Figure 11: Flows based on HHI share
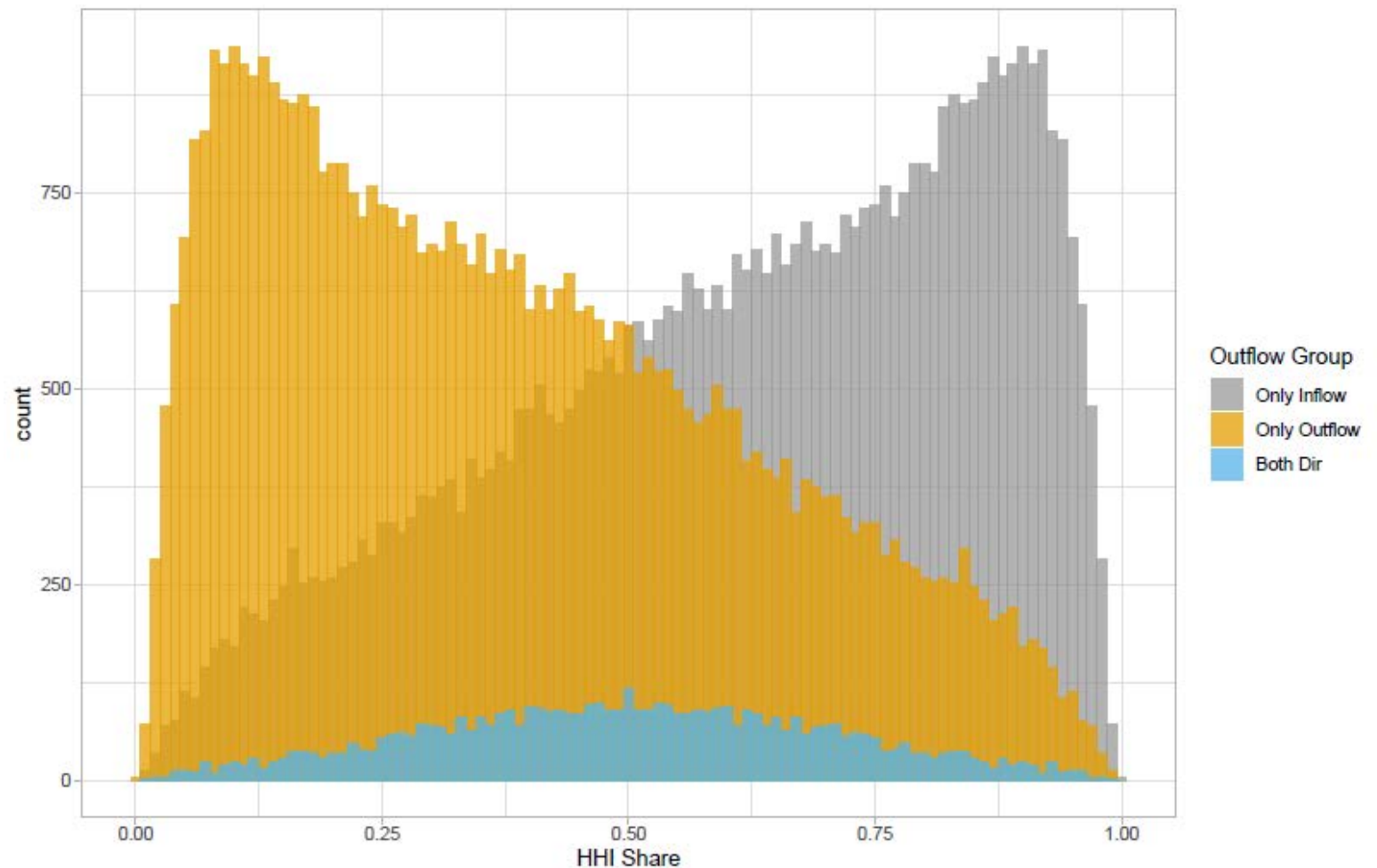
POSSIBLE EXPLANATIONS?

Is it low cost of funding? Timing seems off

Evolution of Average Deposit Rate
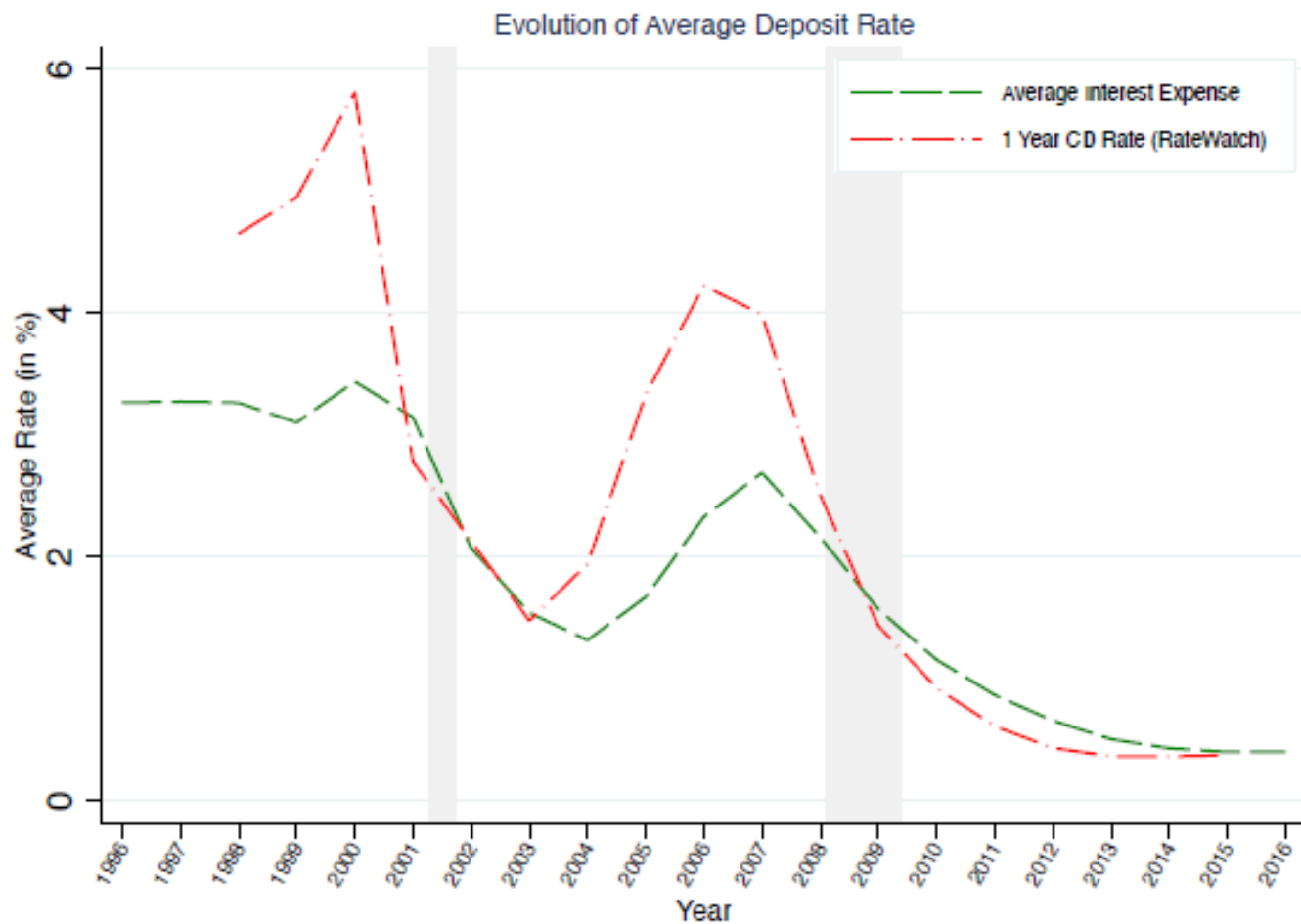
Table 8: Distance and Cost of Funding

	(1)	(2)
Ln(Distance)	-0.056***	-0.072***
	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP	0.036***	0.064***
	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP × 1YR CD Rate	0.022***	
	(0.001)	
Ln(Distance) × HP-Filtered Real GDP × Interest Expense Rate		0.048***
		(0.001)

Facts so far
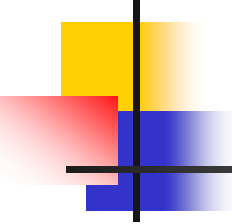
- Distance lending originated from counties in which banking was competitive and went to concentrated counties.

- Distance lending at a time the Fed started raising interest rates.

- Could this have anything to do with Drechsler, Schnabl, and Savov (2017)?

DSS (2017)

- Banks have varying degrees of market power in their deposit markets.
- When Fed raises rates, they are passed through fully only in competitive banking markets
  - High deposit interest expense beta
- Deposit growth lower in concentrated areas.
  - Loan growth lower – the "deposit channel"

Our elaboration:

- Where do dissatisfied flighty depositors in concentrated areas go?

- Perhaps some redeposit in banks in competitive areas.

- But borrowers are already well-supplied in these areas.

- Banks in competitive areas have additional funds!

Deposits "burning a hole"

- If they have few local lending opportunities, they could simply invest the funds in Treasuries.
- CEO short termism might preclude that (Stein (1989), Rajan (1994), Agarwal and Ben-David (2014)).
    - Loans source of immediate fees, and nearby competitors raking it in.
    - Lower loan growth might suggest fewer lending opportunities.
- Form of CEO vs shareholder moral hazard

Deposit growth and concentration: 2004-07
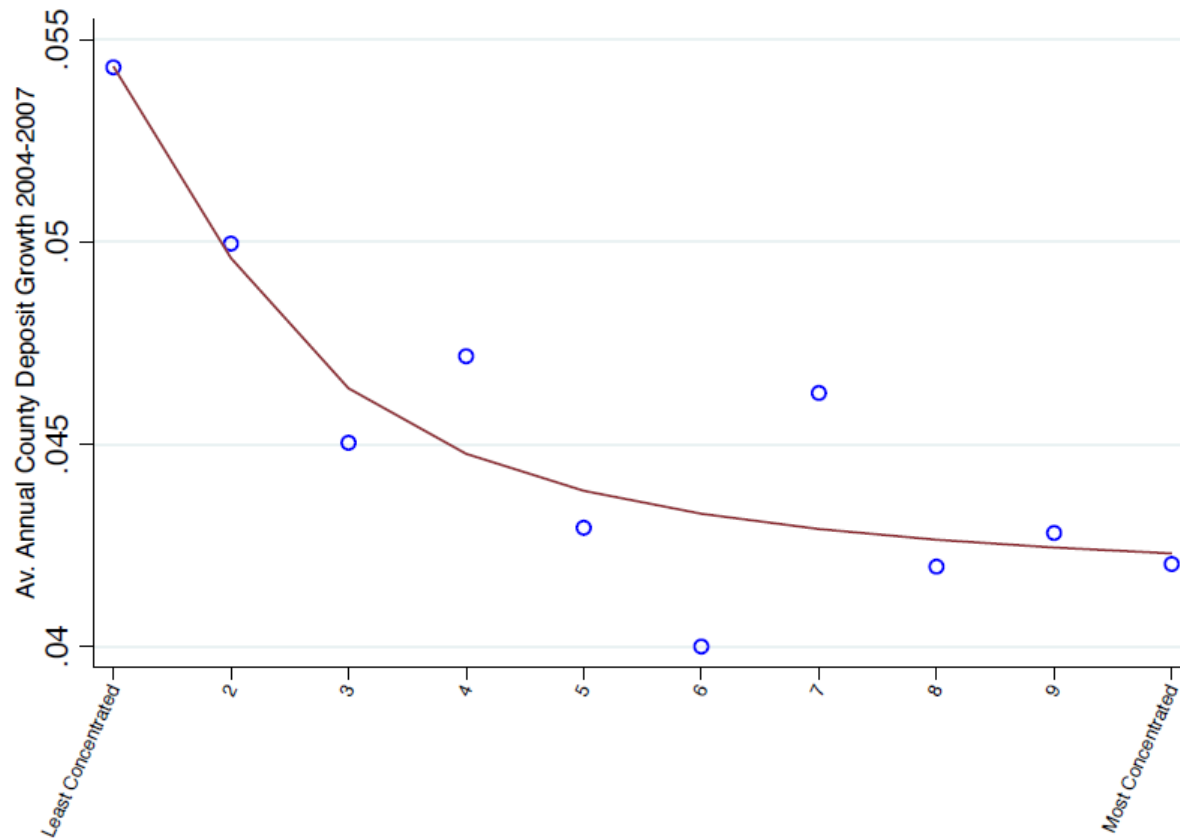
Figure 10: Local market concentration and charge-offs

$$CO_{bcti} = \theta_t + \omega_b + \theta_i + \sum_t \beta_t HHI_c \times Year_t + \epsilon_{bcti}$$
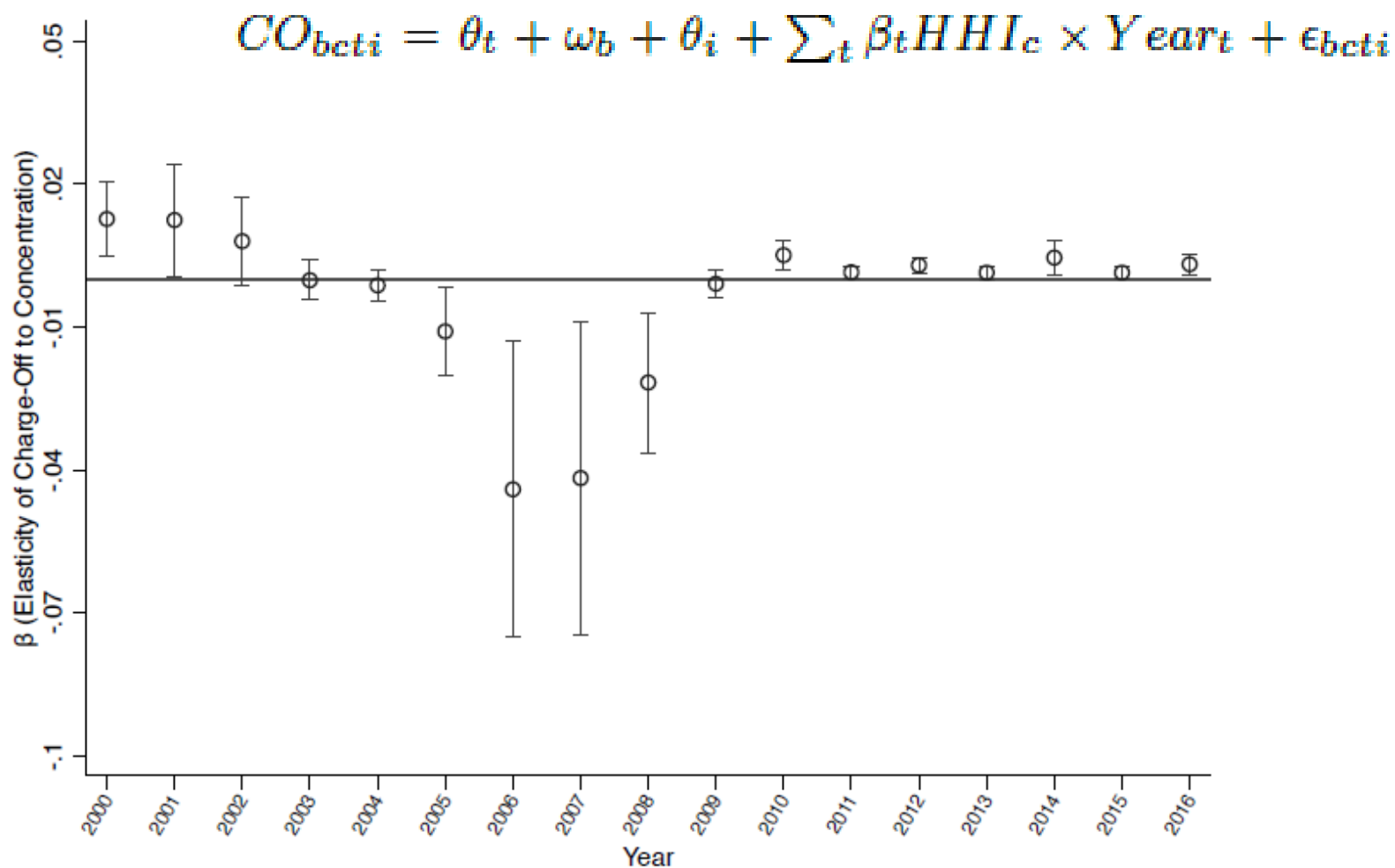
Table 9: Distance and Interest Expense Beta

	(1)	(2)	(3)
Ln(Distance)	-0.040***	-0.024***	-0.037***
	(0.002)	(0.002)	(0.001)
Ln(Distance) × HP-Filtered Real GDP	0.039***	-0.008***	0.028***
	(0.002)	(0.002)	(0.001)
Ln(Distance) × HP-Filtered Real GDP × β_{Dest}^{Exp}	-0.010**		
	(0.004)		
Ln(Distance) × HP-Filtered Real GDP × β_{Origin}^{Exp}		0.094***	
		(0.005)	
Ln(Distance) × HP-Filtered Real GDP × β_{Diff}^{Exp}			-0.051***
			(0.004)

Proxies for short termism (or constraints on it)

- Public vs private banks (Falato and Scharfstein (2016))
- Risk controls (Ellul and Yerramilli (2013))
- Big-4 auditor (DeFond and Zhang (2014))
- Pct of CEO pay in bonuses and options (Fahlenbrach and Stulz (2011))

Table 10: Distant lending and short-termism

	(1)	(2)	(3)	(4)	(5)
			Δ Volume Loans		
Ln(Distance)	-0.031***	-0.077***	-0.039***	-0.036***	-0.034***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Ln(Distance) $\times$ HP-Filtered Real GDP	0.017***	0.159***	0.035***	0.015***	-0.022
	(0.002)	(0.003)	(0.001)	(0.001)	(0.014)
Ln(Distance) $\times$ HP-Filtered Real GDP $\times$ Publicly-Listed Bank	0.017***				0.092***
	(0.002)				(0.009)
Ln(Distance) $\times$ HP-Filtered Real GDP $\times$ Risk Management Index (Ellul and Yerramilli)		-0.146***			-0.008***
		(0.003)			(0.001)
Ln(Distance) $\times$ HP-Filtered Real GDP $\times$ Big-4 Auditor			-0.007***		-0.044***
			(0.001)		(0.011)
Ln(Distance) $\times$ HP-Filtered Real GDP $\times$ % Bonus Compensation				0.025***	0.041***
				(0.001)	(0.001)
Observations	1431079	1419428	4554136	2101050	1140384
Adjusted R^2	0.029	0.015	0.018	0.010	0.017
Baseline Controls	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes
Borrower County-Year Fixed Effects	Yes	Yes	Yes		

Table 11: Distant lending, agency and market concentration.

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Δ Volume Loans				
Ln(Distance)	-0.059***	-0.027***	-0.034***	-0.036***	-0.046***	-0.047***	-0.036***	-0.036***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP	0.035***	0.013***	-0.011***	0.076***	0.034***	0.035***	0.034***	-0.005***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Ln(Distance) × HP-Filtered Real GDP × HHI Difference	0.017***	-0.000	0.009***	0.014***	-0.002	0.008***	0.013***	-0.005***
	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Observations	863470	516215	679446	708686	919604	2474049	1031797	1027050
Adjusted R^2	0.039	0.005	0.005	0.020	0.019	0.025	0.013	0.002
Subsample	Pub Bks.	Priv Bks.	Hi. RMI	Low RMI	Big-4	Non-Big-4	Hi. Bonus	Low Bonus
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower County-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Alternative sources of moral hazard

- Maximizing shareholder/deposit insurance put (Keeley (1990))
  - Why not make risky loans locally?
  - No unidirectional correlation with bank capital
- Distant branch manager/loan officer career concerns
  - Small banks
  - Banks diversified across areas

Figure IA 11 Internal Capital Markets: Variation of HHI across the Branch Network
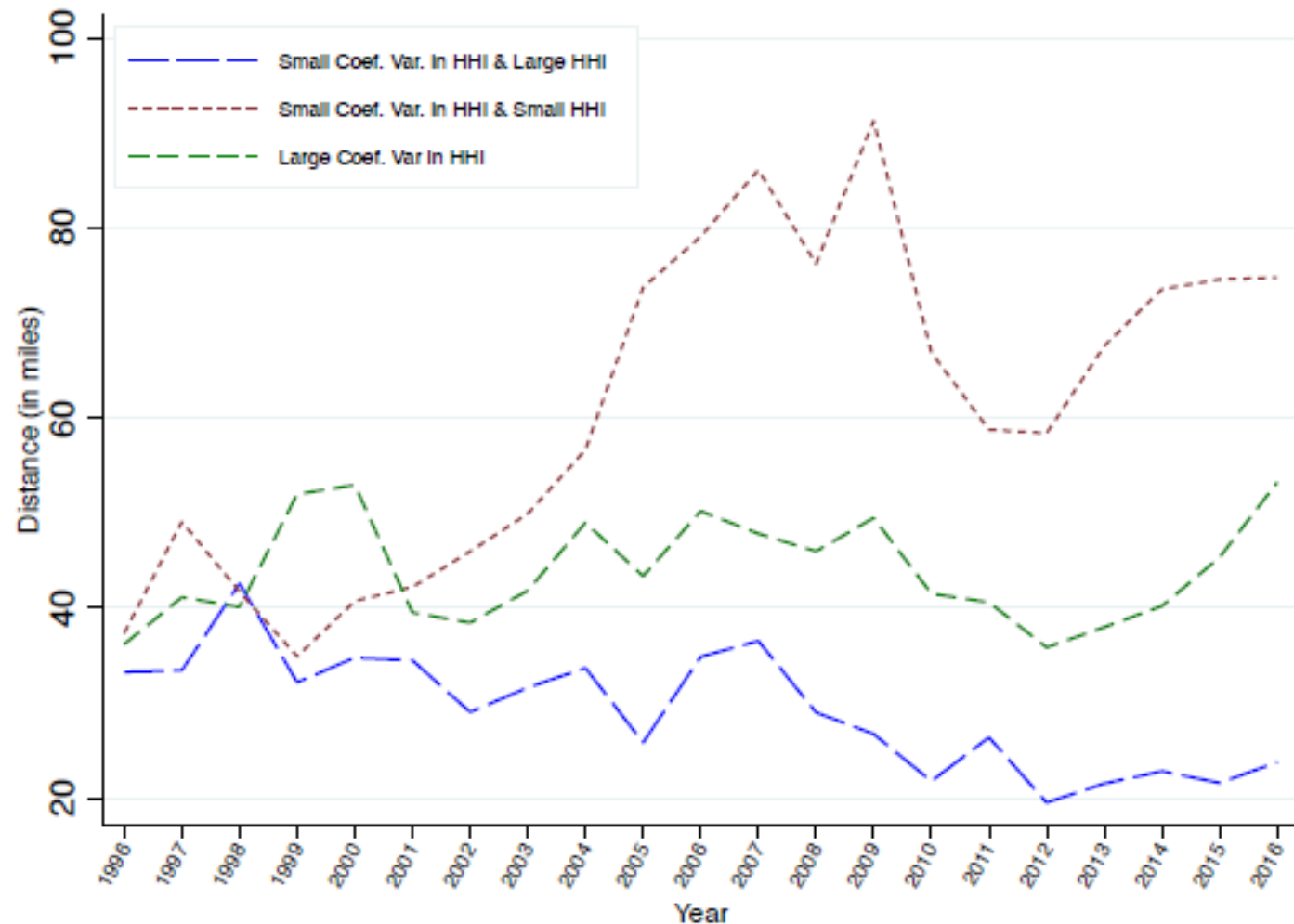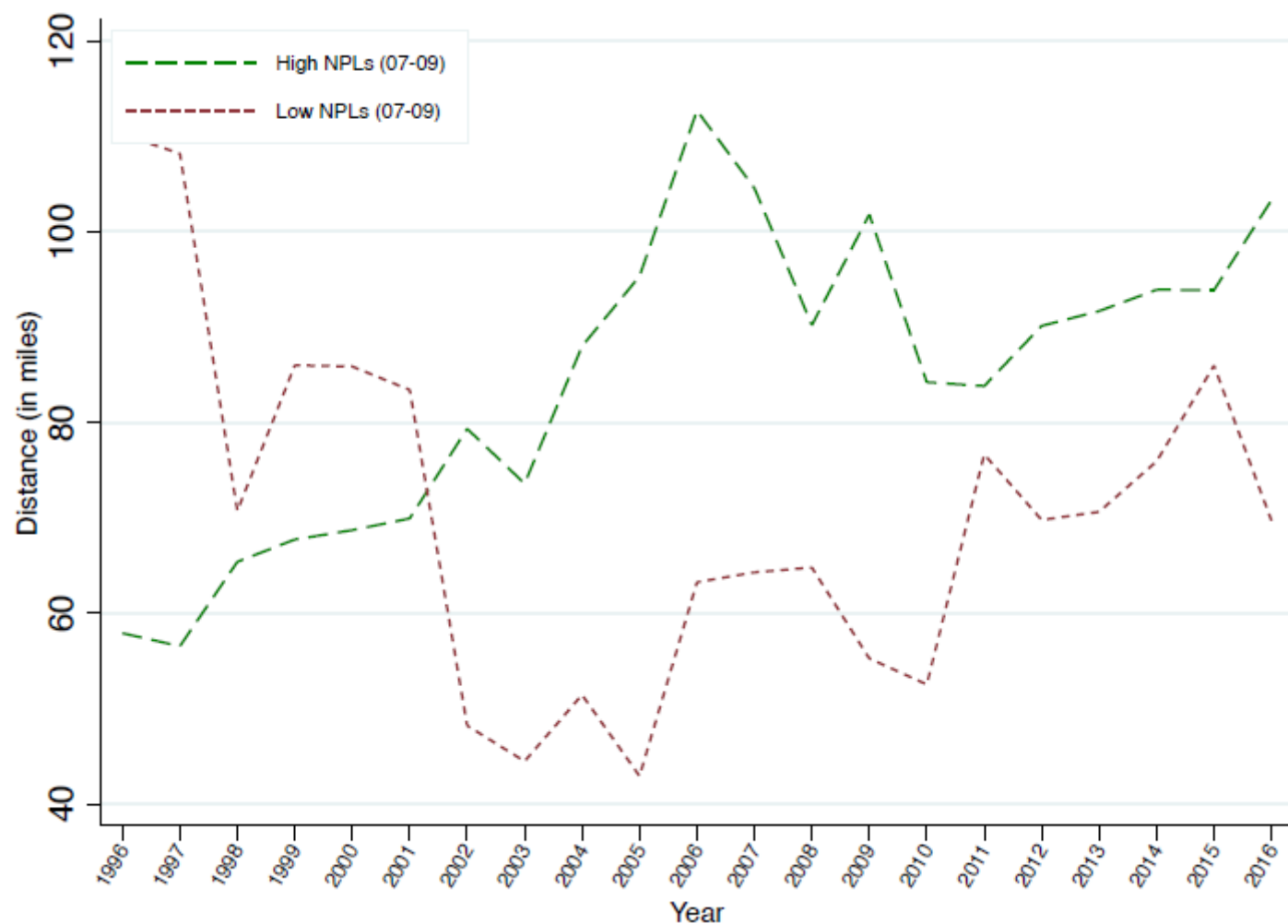
Why care about small business lending?

- Example of interaction between monetary policy and incentives.
- Representative of more systemic behavior.
  - Banks with higher overall NPAs (not just SBL) over 07-09
    - Were more likely to experience pro-cyclical distance lending.

Figure 14: Distance Lending and Bank NPAs (2007-09)

Conclusion

- Risky distant lending accompanied monetary policy tightening.
    - Does it imply all monetary tightening will have similar effects?
        - Interaction between pace of tightening, competition, and managerial myopia key.
    - Does not preclude other reasons for risk taking.
- Could distant lending be the canary in the coal mine?
    - Goodhart's law