“Collateral Reallocation in Commercial Real Estate in the Shadow of COVID-19”

by

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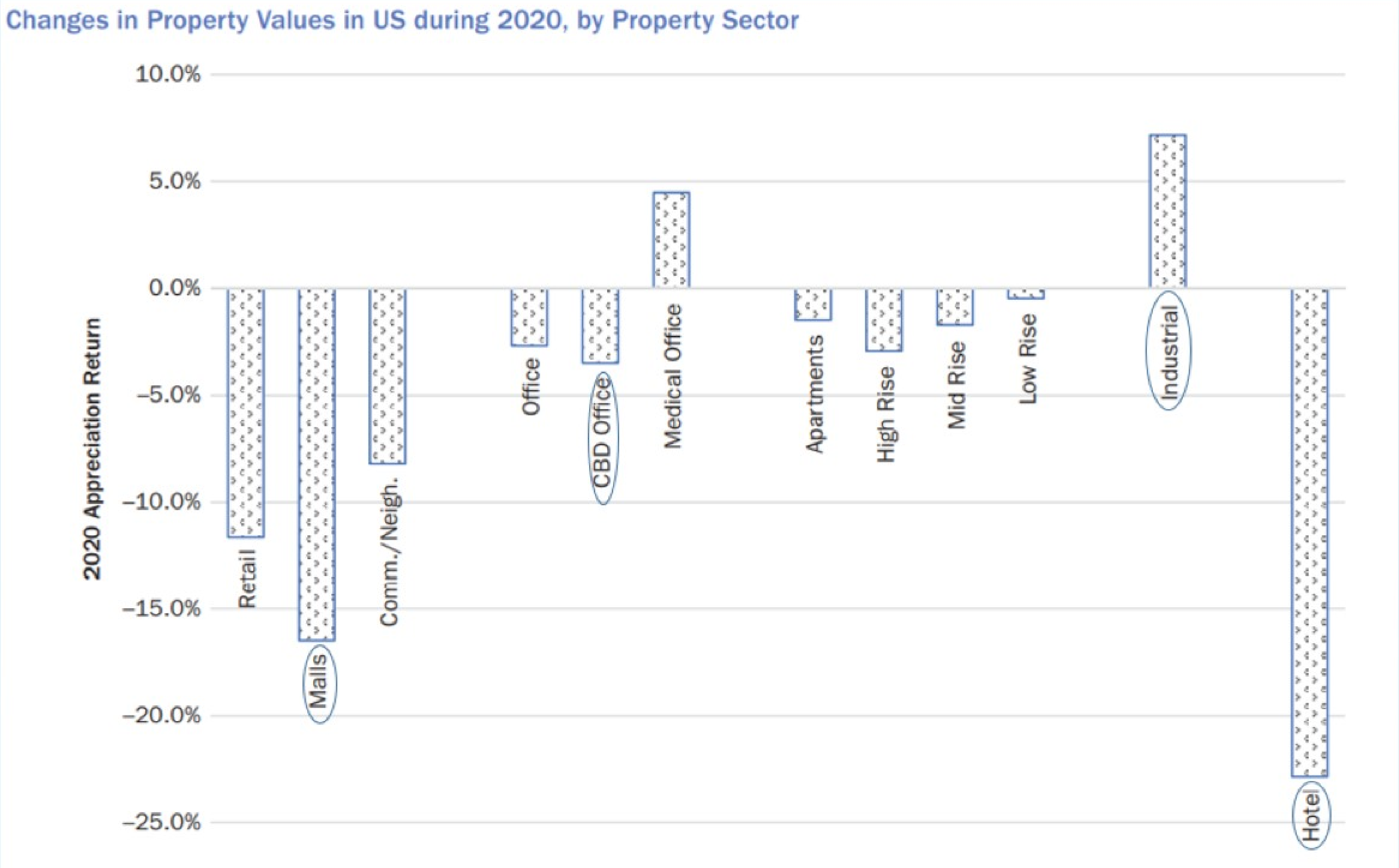
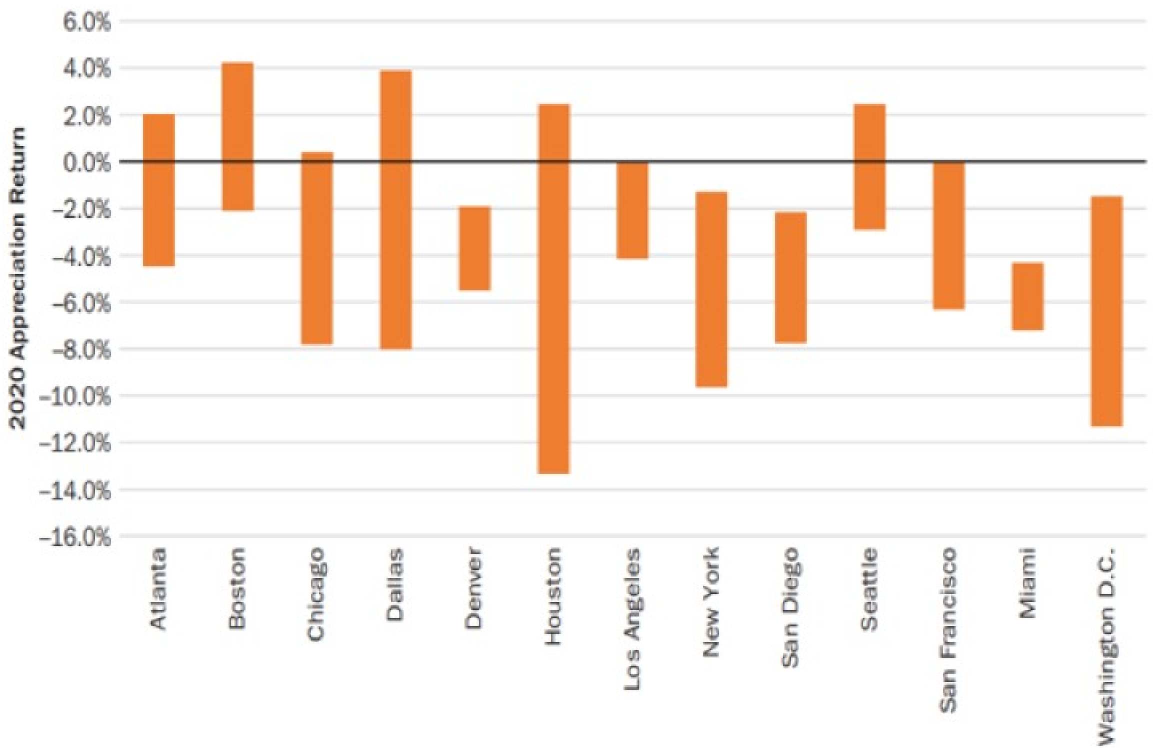
The Disparate Impact of COVID-19 on CRE



NOTE: Based on unlevered appreciation returns to properties held in the MSCI/PREA US Property Fund Index.

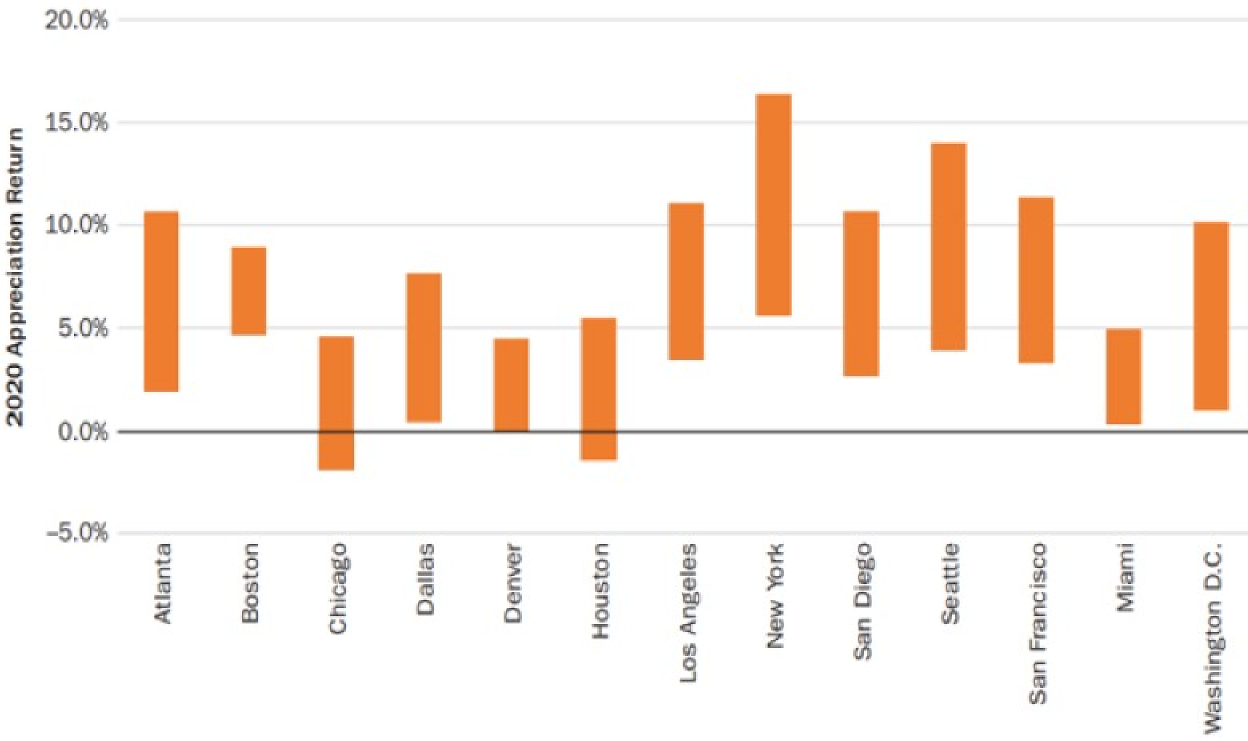
The Disparate Impact of COVID-19 on CRE

Interquartile Range of 2020 Appreciation Returns for Office Properties, by City



NOTE: Based on unlevered appreciation returns to properties held in the MSCI/PREA US Property Fund Index.

Interquartile Range of 2020 Appreciation Returns for Industrial Properties, by City



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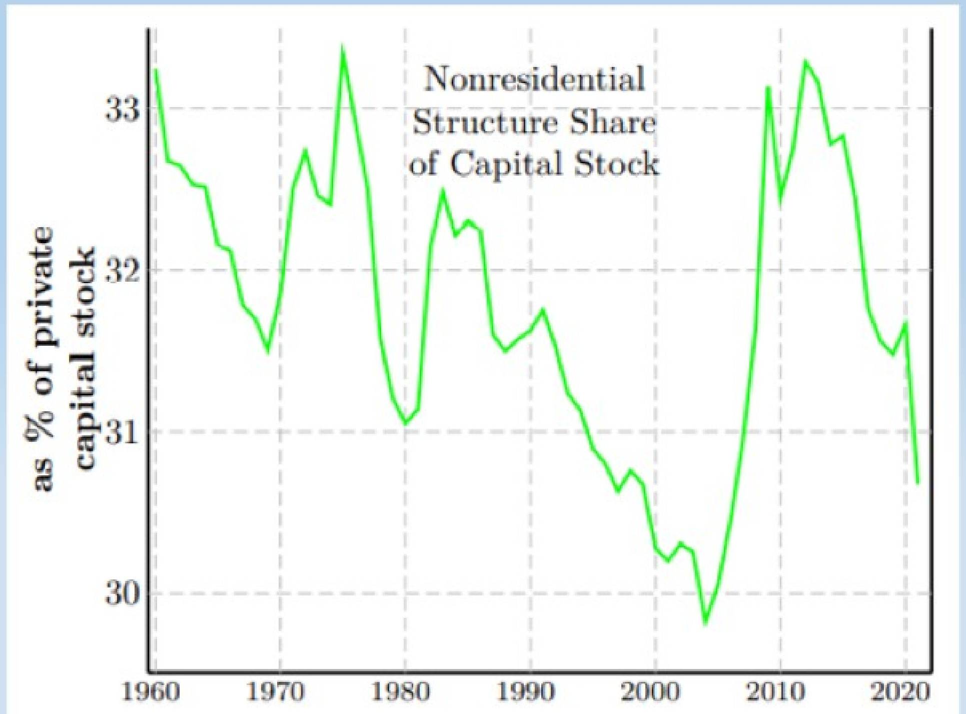
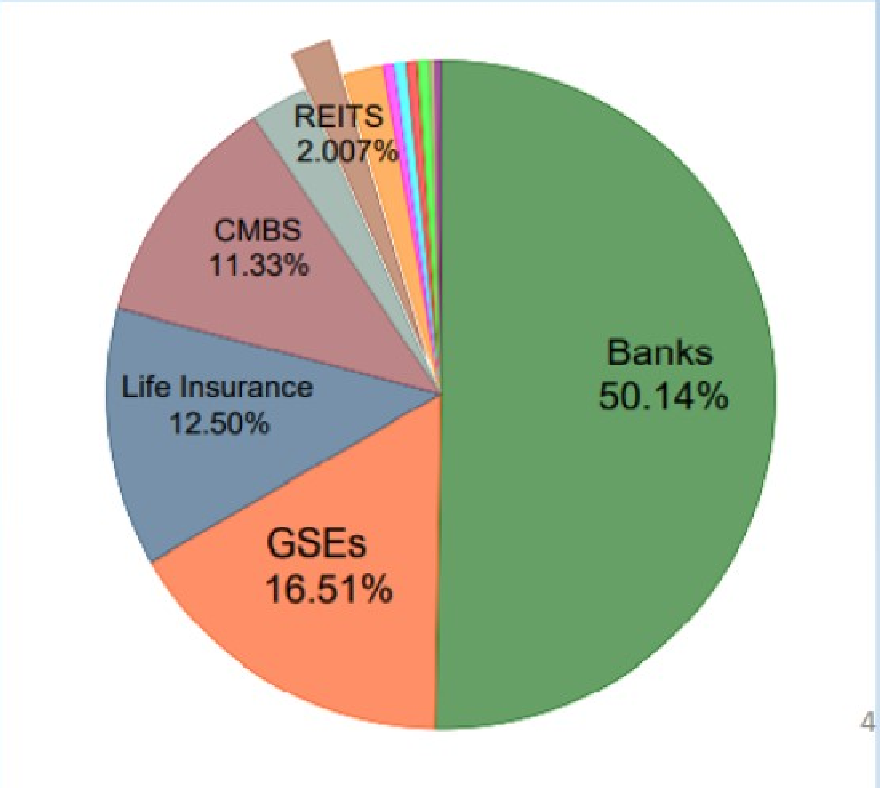
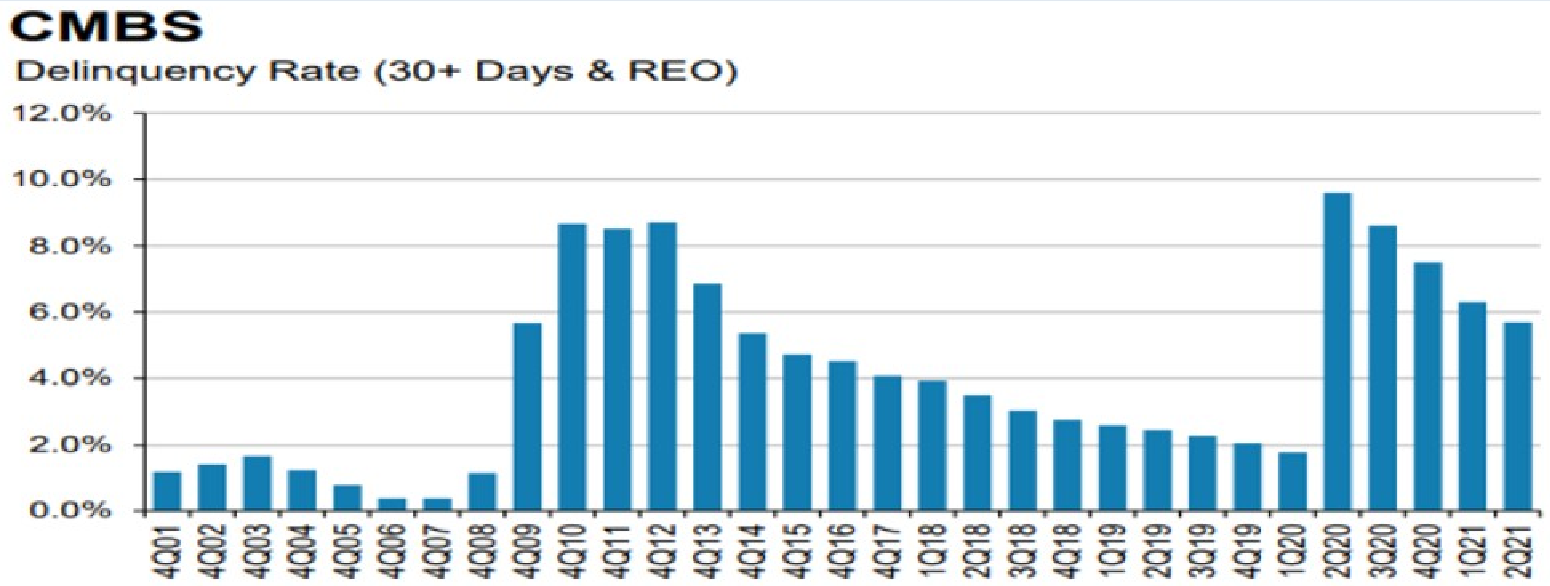
CRE Prominent in Bank Asset Portfolios

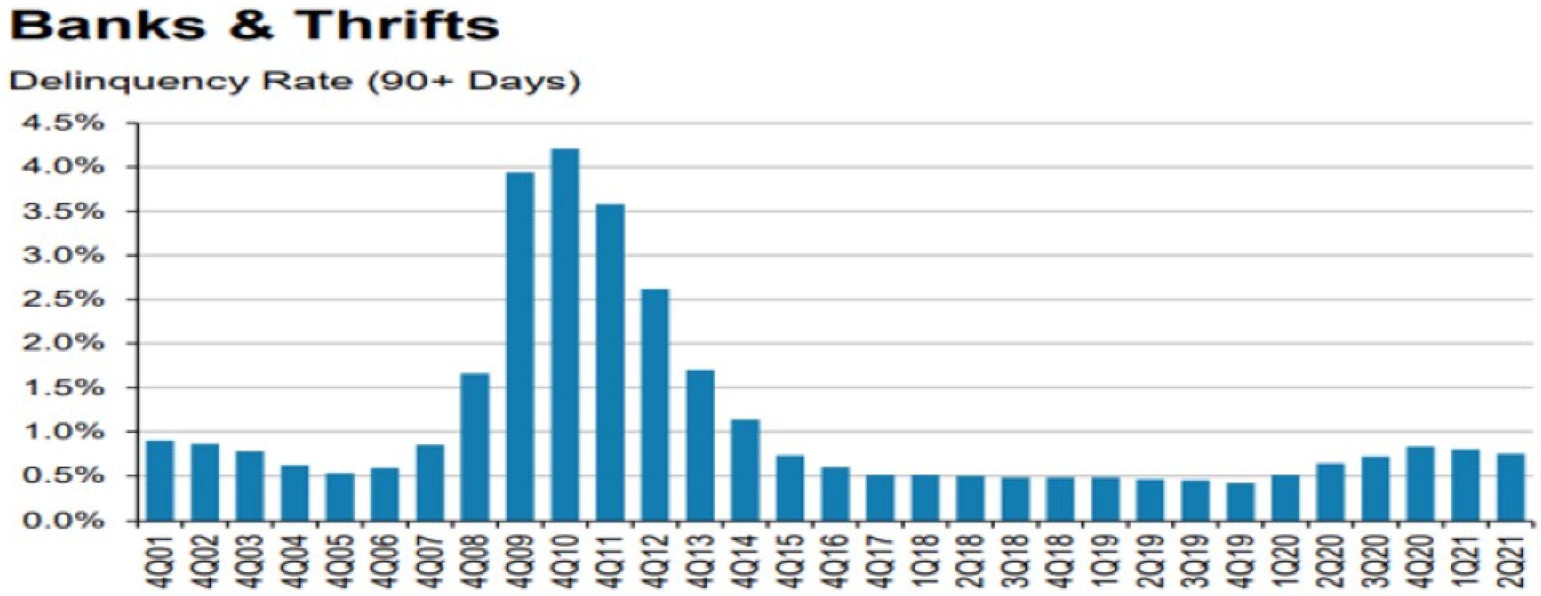
- *CRE loans constitute more than 40% of banks assets outside 30 largest banks*
- *Over 500 banks failed during and shortly after GFC*
  - *Most failures caused by poor CRE loan performance, not residential loan or MBS losses*
- *Banks an important source of debt funding for CRE*
  - *Smaller loans, re/development loans*



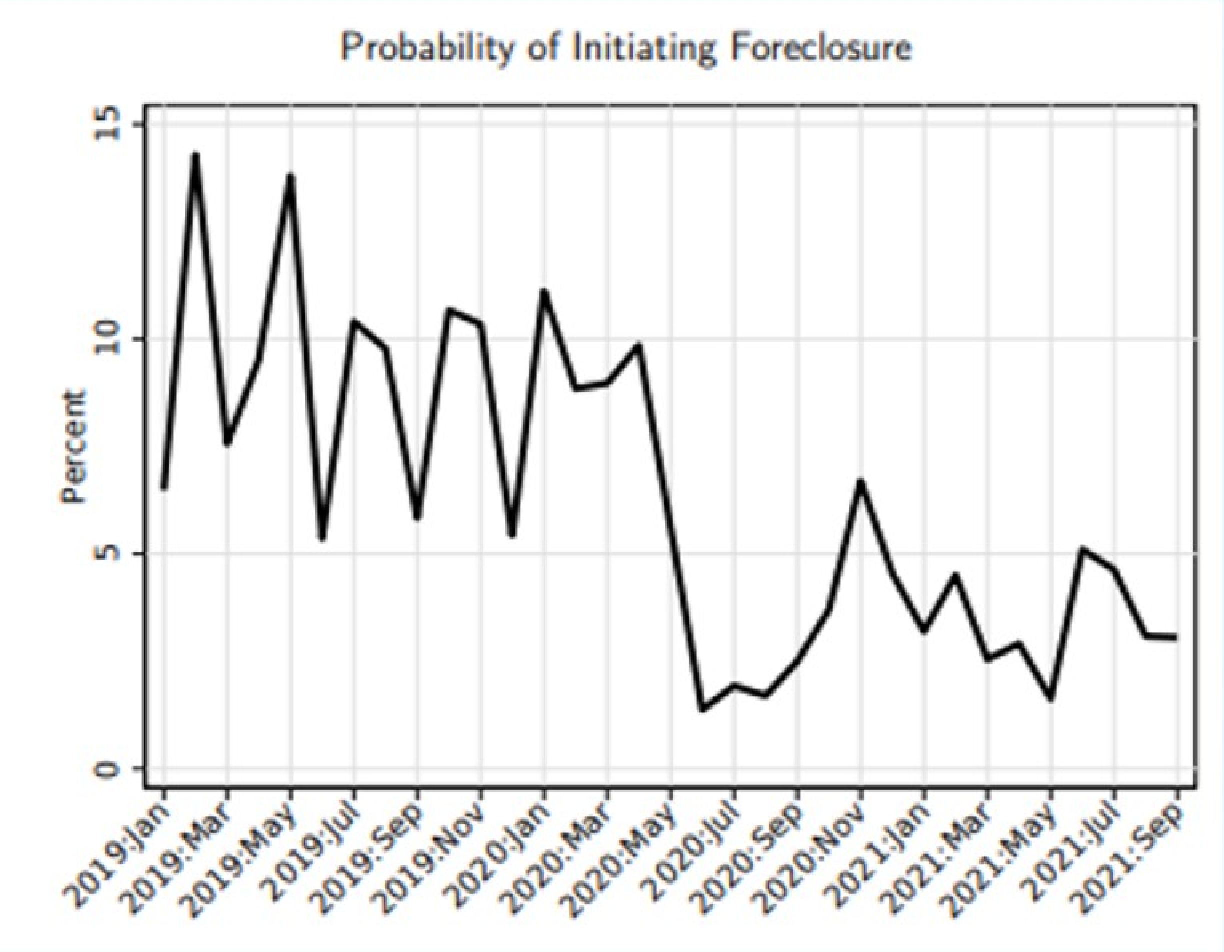


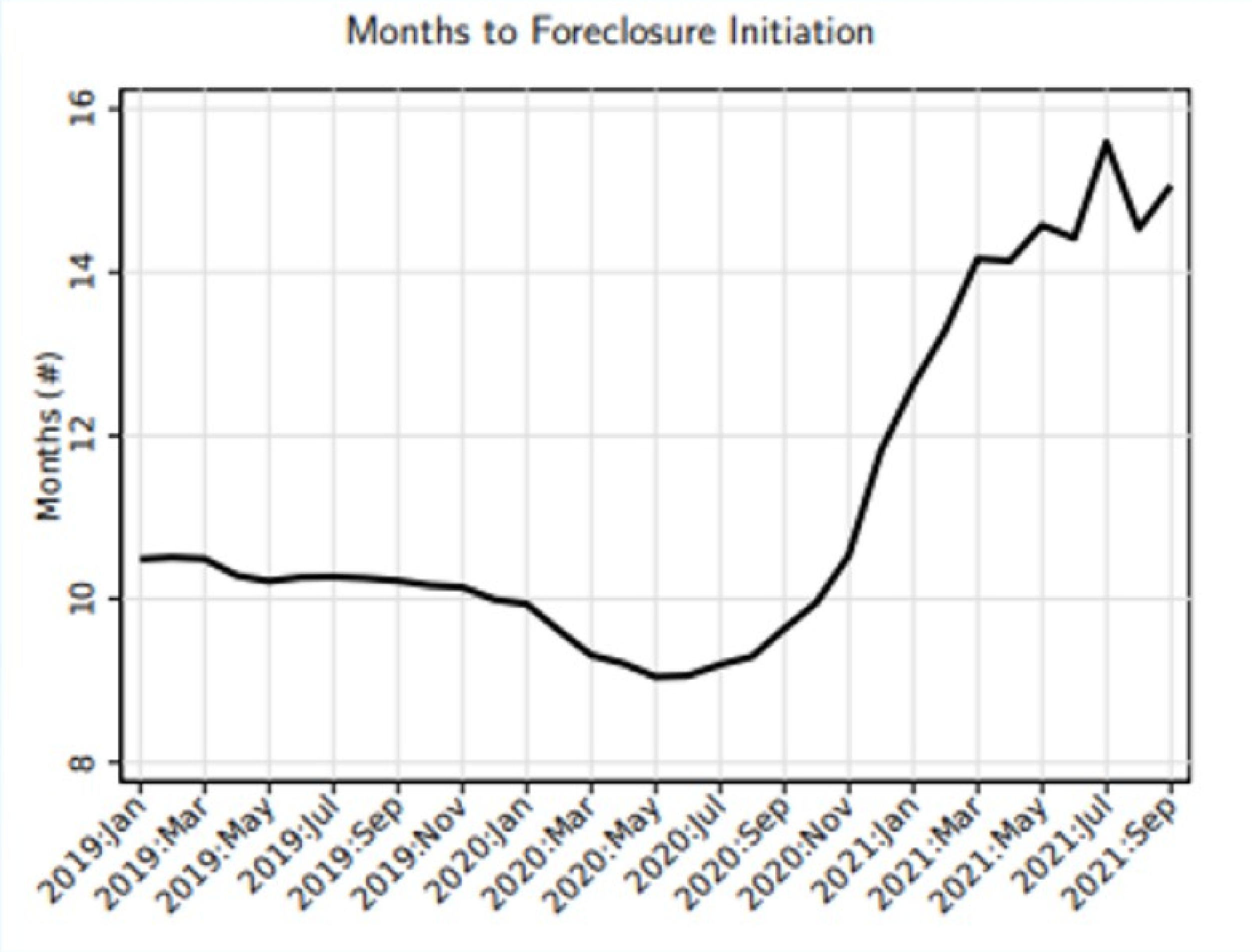
Bank v. CMBS Delinquency Rates





Foreclosure Has Stalled Even with CMBS





Argument – Things are Somewhat Different This Time

- ***Last Time (GFC): Playing for time (forbearance) was generally a good policy***
  - ***A common financial-systemic shock that equally affected all property types in all locations***
  - ***Wait for financial system to stabilize before taking action***
  - ***Concerns over negative foreclosure externalities***
  - ***CRE located in urban areas recovered relatively quickly, and without long-term distress***

- ***This time: COVID-19 morphed into a technology shock with disparate impacts***
  - ***People-oriented activities in dense urban areas negatively impacted (hotel, retail, office)***
  - ***Technology–oriented activities positively impacted (logistical warehouse, data centers, cell towers)***

- ***Argues for Resource Reallocation through Redeployment***
  - ***Especially for vulnerable assets: older capital in denser urban areas***
  - ***But there are several currents that run against redeployment: Unmotivated property owners, unmotivated lenders, COVID-based uncertainty***
  - ***A fair amount of distressed debt, with more coming in retail and especially office***
  - ***Negative forbearance externalities in the form of lost agglomeration economies and increased urban blight***

Redeployment is More Common Than You Might Think

	Parcels in 2020 (#,000)	Gross Outflow (%)	Gross Inflow (%)	Sources of Inflows: Rede-ployment (%)	Sources of Inflows: New Deve-lopment (%)	Net Inflow (%)	Avg. Value of Unchanged ($,000)	Avg. Value of Outflows ($,000)
Major Commercial Property Types								
Multifamily	50	9	16	15	0.7	7	1,279	1,470
Industrial	26	15	15	12	2.7	0	1,494	1,086
Office	20	20	38	38	0.8	19	2,268	1,193
Retail	34	17	24	23	1.2	7	1,205	1,037
Lodging	2	19	37	37	0.8	19	4,873	2,536
Overall	132	14	22	20	1.2	8	1,241	1,463
Other Property Types								
Single Family	2,435	1	1	1	0.7	0	380	552
Other Residential	3	39	44	39	4.9	5	1,288	1,309
Parking	7	16	19	11	7.8	3	198	467
Religious	10	21	27	24	3.4	6	1,257	1,272
Government	33	23	16	11	5.1	–7	1,965	2,034
Education	4	28	32	28	4.7	4	6,714	4,067
Mixed	37	31	25	21	3.7	–6	713	974
Land	80	32	14	14	.	–18	99	198
Other	53	39	35	29	6.4	–4	1,121	1,179

Determinants of CRE Redeployment

	Income Producing Commercial				Residential				Land
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age of Building	0.0822***	0.0845***	0.0835***	0.0835***	0.00959***	0.0113***	0.0112***	0.0112***	
	(0.00475)	(0.00478)	(0.00482)	(0.00482)	(0.000254)	(0.000259)	(0.000260)	(0.000260)	
Population Density (Normalized)	1.276***	1.519***	1.512***	1.513***	0.203***	0.542***	0.549***	0.549***	-4.454***
	(0.153)	(0.159)	(0.159)	(0.159)	(0.0140)	(0.0155)	(0.0160)	(0.0160)	(0.162)
Mortgaged Property	-0.731**	-0.718**	-0.687**	-0.686**	-0.762***	-0.756***	-0.752***	-0.749***	
	(0.311)	(0.311)	(0.312)	(0.312)	(0.0175)	(0.0174)	(0.0174)	(0.0174)	
Sale Occurred Between, 2012–2020	6.759***	6.740***	6.745***	6.743***	0.217***	0.246***	0.246***	0.244***	
	(0.374)	(0.374)	(0.374)	(0.374)	(0.0148)	(0.0148)	(0.0148)	(0.0148)	
ln(Value Per Square Foot of Lot Size)		-0.748***	-0.704***	-0.703***		-0.691***	-0.694***	-0.693***	3.542***
		(0.141)	(0.142)	(0.142)		(0.0132)	(0.0136)	(0.0136)	(0.0692)
Land Share of Assessed Value			1.476*	1.477*			0.148**	0.150**	
			(0.833)	(0.833)			(0.0590)	(0.0590)	
Foreclosure Sale				0.144				0.301***	
				(0.961)				(0.0681)	
N	55,850	55,850	55,850	55,850	2,316,962	2,316,962	2,316,962	2,316,962	93,006
R2	0.07	0.07	0.07	0.07	0.03	0.03	0.03	0.03	0.03
State FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Initial Prop Type FE	Y	Y	Y	Y	Y	Y	Y	Y	-
Mean(Y) (%)	17.46	17.46	17.46	17.46	1.03	1.03	1.03	1.03	26.75

The Delay Channels: Evergreening v. Uncertainty

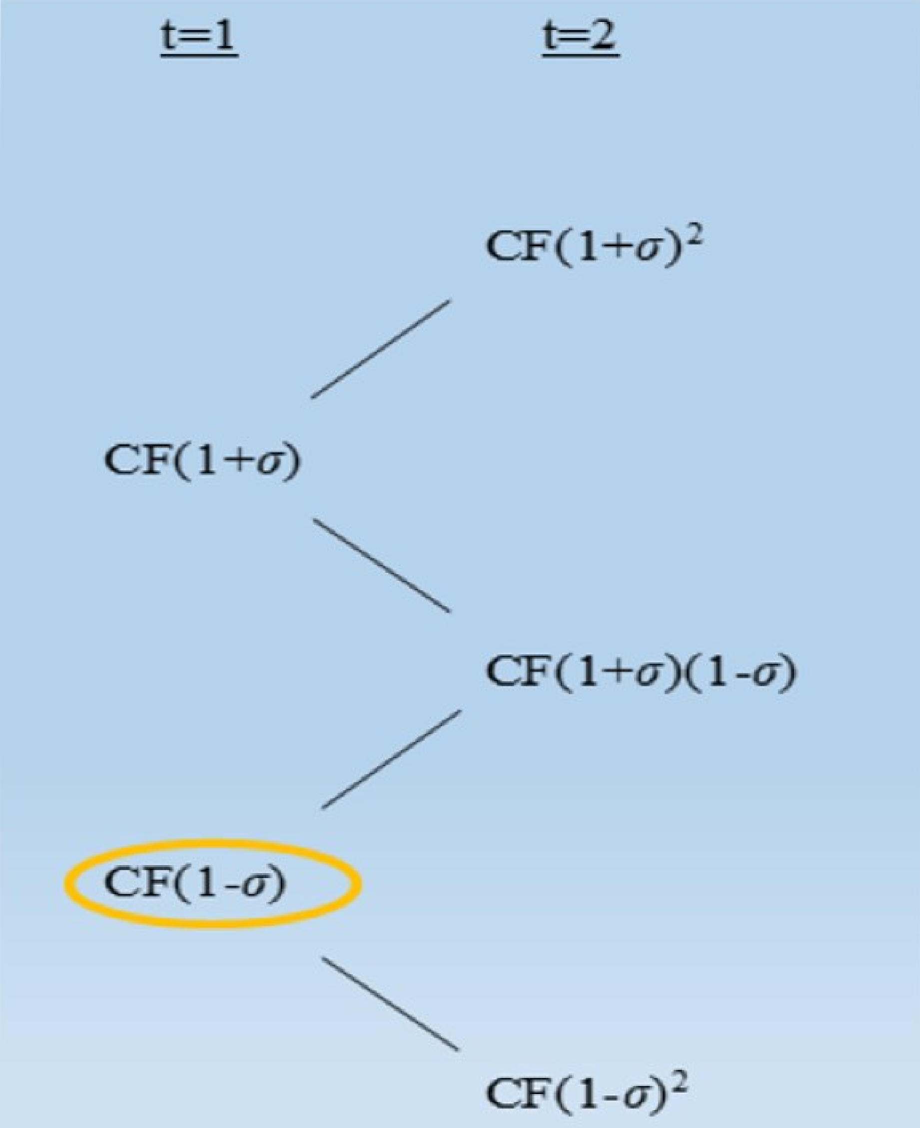
- ***Bank incentives to evergreen perpetuates zombie real estate collateral***
  - ***Property owners that specialize by property type and age of capital willing to play along***
  - ***Collectively, a source of inefficiency for cities that need to transform themselves (e.g., zombie downtowns)***

- ***Macro and CRE market uncertainty associated with consequences of COVID starting to clear up***
  - ***Many properties on the road to zombiness due to negative technology shock that also increased rate of obsolescence***
  - ***More "normal" sources of value uncertainty are re-emerging***

- ***Redeploying CRE is an irreversible decision, where uncertainty and timing flexibility can cause a more efficient form of delay (Bernanke's Bad News Principle)***
  - ***But "normalized" value uncertainty may actually be a friend when it comes to redeployment***
  - ***Given disparate impact of COVID shock, greater uncertainty can actually increase the immediate benefits of changing from zombie to viable use-type***

- ***Incentives to evergreen combined with incentives to delay to resolve uncertainty have significantly slowed the collateral reallocation process***

The Hedging Correlation Effect with Redeployment



Partial Policy Solution: Lenders Facilitate Redeployment

- ***Key Observation: Incentives to evergreen combined with incentives to delay to resolve uncertainty have significantly slowed the collateral reallocation process when reallocation rates should probably be higher***

- ***Regulation: Consider implementing a more discriminating capital cost policy that varies by property type, location, age of capital***

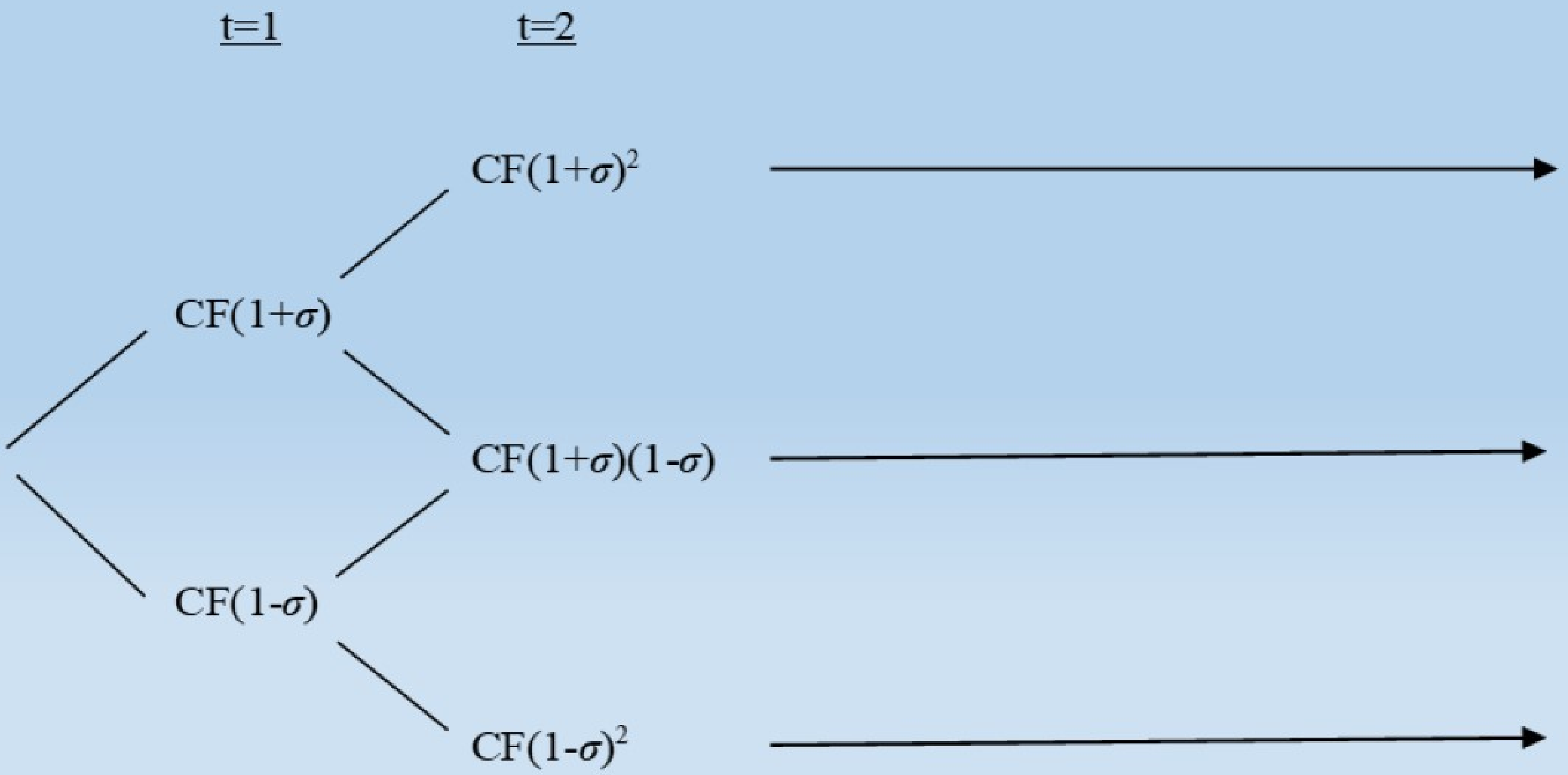
- ***Require lenders to engage in a HAMP-like cost-benefit analysis of forbearance v. foreclosure***
  - ***Extend analysis to consider alternative uses***
  - ***Incorporate agglomeration effects as well as uncertainty into analysis***

- ***Work aggressively to facilitate transition to new ownership if conditions dictate***
  - ***Foreclosure can possibly inhibit the local politics of redeployment (e.g., retail malls)***

Model

Figure 1

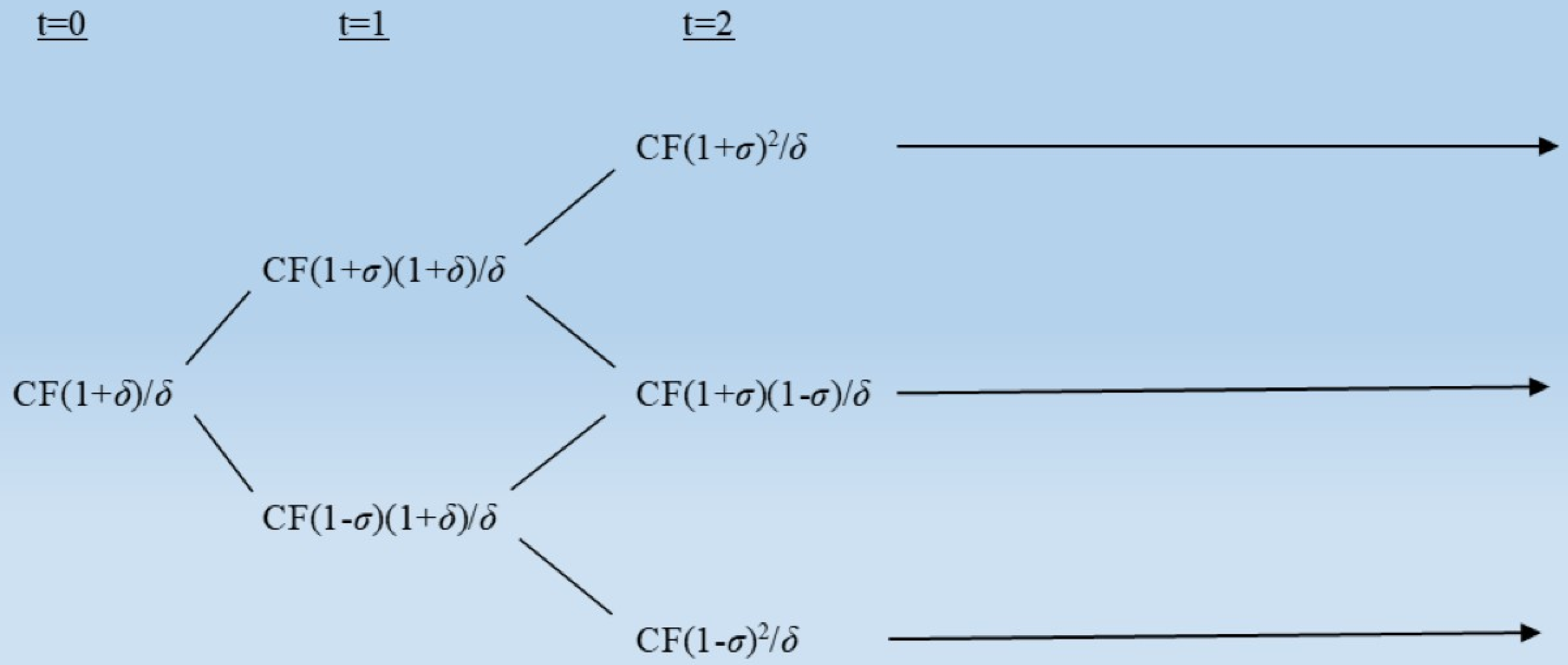
Evolution of Cash Flows Over Time



Model

Figure 2

Evolution of Asset Values Over Time



Model

- *2-period loan*
- *Interest only*
- *Property owner cash constrained → Wants to max out debt, even if it means possible default and loss of control*
- *Lender has two underwriting constraints*
  - *LPC1:* : $\iota L + L \leq \frac{CF(1+\sigma)(1-\sigma)}{\delta}$ *(LTV constraint)*
  - *LPC2:* $\iota L \leq CF(1+\sigma)$ *(DCR constraint)*
- *Interest rate and loan amount endogenously determined based on anticipated state outcomes and anticipated equilibrium responses*
- *Everything boils down to analyzing the effects of σ and δ*

Model

Panel A: Regime 1
$\boldsymbol{\delta \geq \sigma/4}$

t=1 t=2

CF$(1+\sigma)^2$

CF$(1+\sigma)$

CF$(1+\sigma)(1-\sigma)$

CF$(1-\sigma)$

CF$(1-\sigma)^2$

LPC1 Binding – Term Default

Panel B: Regime 2
$\boldsymbol{\sigma(1-\sigma)/(4+2\sigma) \leq \delta < \sigma/4}$

t=1 t=2

CF$(1+\sigma)^2$

CF$(1+\sigma)$

CF$(1+\sigma)(1-\sigma)$

CF$(1-\sigma)$

CF$(1-\sigma)^2$

LPC1 Binding – CF Default

Panel C: Regime 3
$\boldsymbol{\delta < \sigma(1-\sigma)/(4+2\sigma)}$

t=1 t=2

CF$(1+\sigma)^2$

CF$(1+\sigma)$

CF$(1+\sigma)(1-\sigma)$

CF$(1-\sigma)$

CF$(1-\sigma)^2$

LPC2 Binding – CF Default

COVID Shock

- *It's now t=1*
- *Negative shock to collateral asset (office, retail or hotel)*
  - *This is a negative outcome, but not unanticipated*
- *Increase in rate of obsolescence from δ to δ^Z*
  - *This is an unanticipated negative outcome*
- *Asset now on "zombie real estate" path*
- *To make more interesting, assume CF default at t=1 (although not necessary if there is an LTV maintenance provision in the loan contract)*
  - *Implies $\delta < \sigma/4$*
- *Bank regulators are concerned about foreclosure externalities*
  - *During crisis period (t=1), impose a transitory capital charge that incentivizes forbearance instead of foreclosure*
  - *Myopic, in that it does not consider the possibility of redevelopment or redeployment*
  - *Without considering re-use options, lender always forbears, with certain distress outcomes in the next period (i.e., an example of evergreening and zombie lending)*

Redevelopment Option

- *Can do nothing and stay on path to zombiness*
- *Or can consider the option to maintain the same use, replacing older capital with newer capital*
- *Two steps to the analysis*
  - *Assess NPV_1, which is net value to redeveloping right away at t=1*

$$NPV_1^{RDV} = PS - \kappa + \frac{\eta^{RDV} CF(1-\sigma)}{\delta^Z} - K^{RDV} - \frac{CF(1-\sigma)}{\delta^Z}$$

  - *If $NPV_1<0$, forbear and hope for the best at t=2*
  - *If $NPV_1>0$, determine whether to wait to redevelop or not*

Redevelopment Option

- ***Payoffs to waiting to redevelop***

$$NPV_2^U = (\eta^{RDV} - 1)CF(1+\sigma)(1-\sigma)\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDV}$$
$$NPV_2^D = (\eta^{RDV} - 1)CF(1-\sigma)^2\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDV}$$

  - ***Notice if wait, anticipate avoiding capital charge cost at t=2***
  - ***Implies waiting (if optimal) results in forbearance (as opposed to foreclosure, which is more costly), with the costs of forbearance already accounted for in NPV_1***
  - ***Given $NPV_1>0$, but waiting is optimal, lender has latent value that increases loan MV above loan BV***

- ***Option value to waiting:***

$$NPV_2^{RDV} = \frac{1}{2}Max\{0, NPV_2^D\} + \frac{1}{2}NPV_2^U$$

- ***Finally, if $NPV_1 > NPV_2$, optimal to foreclose at t=1 and sell asset at*** $\frac{\eta^{RDV}CF(1-\sigma)}{\delta^Z} - K^{RDV}$

Redeployment Option

- ***Here the alternative is starkly different from redevelopment***

- ***Now, the alternative use has experienced a positive COVID shock and remains at the stated rate of obsolescence, δ***

- ***Will again examine the case in which payment default occurs at t=1***

- ***Post-redeployed asset value is*** $\frac{\eta^{RDP}CF(1+\sigma)}{\delta}$***, as compared to the post-redeveloped asset value of*** $\frac{\eta^{RDV}CF(1-\sigma)}{\delta^{Z}}$

- ***Would generally expect*** $\eta^{RDP} > \eta^{RDV}$***, but not assured***

Redeployment Option

$$NPV_1^{RDP} = PS - \kappa + \frac{\eta^{RDP}CF(1+\sigma)}{\delta} - K^{RDP} - \frac{CF(1-\sigma)}{\delta^Z}$$

- ***If $NPV_1 < 0$, forbear and hope for the best at t=2***
- ***Valuing the option to wait given that $NPV_1 > 0$ is complicated by the fact that there are four possible outcomes at t=2, depending on state outcomes to the alternative use versus the current use***
  - ***Outcomes are: U-D, U-U, D-D, D-U (with the alternative use realization stated first and the current use realization stated second)***

Redeployment Option

$$NPV_2^{U-D} = \eta^{RDP} CF(1+\sigma)^2\left(\frac{1-\delta}{\delta}\right) - CF(1-\sigma)^2\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDP}$$

$$NPV_2^{U-U} = \eta^{RDP} CF(1+\sigma)^2\left(\frac{1-\delta}{\delta}\right) - CF(1+\sigma)(1-\sigma)\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDP}$$

$$NPV_2^{D-D} = \eta^{RDP} CF(1+\sigma)(1-\sigma)\left(\frac{1-\delta}{\delta}\right) - CF(1-\sigma)^2\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDP}$$

$$NPV_2^{D-U} = \eta^{RDP} CF(1+\sigma)(1-\sigma)\left(\frac{1-\delta}{\delta}\right) - CF(1+\sigma)(1-\sigma)\left(\frac{1-\delta^Z}{\delta^Z}\right) - K^{RDP}$$

$$NPV_2^{U-D} > NPV_2^{U-U} > NPV_2^{D-D} > NPV_2^{D-U}$$

Redeployment Option

- ***To calculate NPV_2, the expected value of waiting, need to know correlation structure between alternative v. current use. Let the correlation coefficient equal ρ***
- ***It can be shown that probability of U-U and D-D is $\frac{1+\rho}{4}$ and that the probability of U-D and D-U is $\frac{1-\rho}{4}$***
- ***With this,***

$$NPV_2^{RDP} =$$

$$\frac{1+\rho}{4}[Max\{0, NPV_2^{D-D}\} + NPV_2^{U-U}] + \frac{1-\rho}{4}[Max\{0, NPV_2^{D-U}\} + NPV_2^{U-D}]$$

Redeployment Option

- *If $NPV_1 > 0$ and $NPV_2 > NPV_1$, wait*
  - *Implies forbearance, but where there is latent loan value*

- *If $NPV_1 > NPV_2$, foreclose and sell for immediate redeployment*
  - *Sales price is* $\frac{\eta^{RDP} CF(1+\sigma)}{\delta} - K^{RDP}$

- *Some of the comparative statics are contrary to standard predictions*
  - *Increases in K^{RDP}, κ, δ^Z cause further delay (not surprising)*
  - *Increase in ρ favors immediate redeployment (perhaps surprising at first, since intuition is that lower ρ results in better diversification to decrease incentive to wait)*
  - *Increase in σ when ρ is in a "normal range" of say [0,1] favors immediate redeployment (this is also surprising relative to conventional wisdom)*
    - *Happens because larger ρ puts less weight on D-U term, which moves negatively with increases in σ. D-D term moves positively, but weakly so*