“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

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

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

![Graph showing Nonresidential Structure Share of Capital Stock](image)

![Pie chart showing asset proportions](image)
Bank v. CMBS Delinquency Rates

CMBS
Delinquency Rate (30+ Days & REO)

Banks & Thrifts
Delinquency Rate (90+ Days)
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

<table>
<thead>
<tr>
<th>Sources of</th>
<th>Parcels in 2020 (#,000)</th>
<th>Gross Outflow (%)</th>
<th>Gross Inflow (%)</th>
<th>Redevelopment (%)</th>
<th>New Development (%)</th>
<th>Net Inflow (%)</th>
<th>Avg. Value of Unchanged ($,000)</th>
<th>Avg. Value of Outflows ($,000)</th>
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<tr>
<td>Major Commercial Property Types</td>
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<td>22</td>
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# Determinants of CRE Redeployment

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<th>Income Producing Commercial</th>
<th>Residential</th>
<th>Land</th>
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<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
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<tr>
<td>Age of Building</td>
<td>0.0822***</td>
<td>0.0845***</td>
<td>0.0835***</td>
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<tr>
<td></td>
<td>(0.00475)</td>
<td>(0.00478)</td>
<td>(0.00482)</td>
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<tr>
<td>Population Density (Normalized)</td>
<td>1.276***</td>
<td>1.519***</td>
<td>1.513***</td>
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<tr>
<td></td>
<td>(0.153)</td>
<td>(0.159)</td>
<td>(0.159)</td>
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<tr>
<td>Mortgaged Property</td>
<td>-0.731**</td>
<td>-0.718**</td>
<td>-0.687**</td>
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<tr>
<td></td>
<td>(0.311)</td>
<td>(0.311)</td>
<td>(0.312)</td>
</tr>
<tr>
<td></td>
<td>(0.374)</td>
<td>(0.374)</td>
<td>(0.374)</td>
</tr>
<tr>
<td>ln(Value Per Square Foot of Lot Size)</td>
<td>-0.748***</td>
<td>-0.704***</td>
<td>-0.703***</td>
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<tr>
<td></td>
<td>(0.141)</td>
<td>(0.142)</td>
<td>(0.142)</td>
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<tr>
<td>Land Share of Assessed Value</td>
<td>1.476*</td>
<td>1.477*</td>
<td>0.148**</td>
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<tr>
<td></td>
<td>(0.833)</td>
<td>(0.833)</td>
<td>(0.0590)</td>
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<tr>
<td>Foreclosure Sale</td>
<td>0.144</td>
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<td>0.301***</td>
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<td></td>
<td>(0.961)</td>
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<td>(0.0681)</td>
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<tr>
<th></th>
<th>N</th>
<th>R2</th>
<th>State FE</th>
<th>Initial Prop Type FE</th>
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<tr>
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<td>0.07</td>
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<td>0.03</td>
<td>Y</td>
<td>Y</td>
<td>10.03</td>
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<td>Y</td>
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</tr>
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<td></td>
<td>93,006</td>
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<td>Y</td>
<td>Y</td>
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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

Time $t=1$

- $CF(1+\sigma)$
  - $CF(1+\sigma)(1-\sigma)$
    - $CF(1-\sigma)$
      - $CF(1-\sigma)^2$

Time $t=2$

- $CF(1+\sigma)^2$
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

\[
\begin{align*}
  t=1 & & t=2 \\
  \text{CF}(1+\sigma)^2 & & \\
  \text{CF}(1+\sigma) & & \\
  \text{CF}(1+\sigma)(1-\sigma) & & \\
  \text{CF}(1-\sigma) & & \\
  \text{CF}(1-\sigma)^2 & & 
\end{align*}
\]
Model

Figure 2

Evolution of Asset Values Over Time

\[ \text{CF}(1+\sigma)/\delta \]

\[ \text{CF}(1+\sigma)(1+\delta)/\delta \]

\[ \text{CF}(1+\sigma)(1-\sigma)/\delta \]

\[ \text{CF}(1-\sigma)(1+\delta)/\delta \]

\[ \text{CF}(1-\sigma)^2/\delta \]
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: \( \delta \leq \frac{CF(1+\sigma)(1-\sigma)}{L} \) \( (\text{LTV constraint}) \)
  • LPC2: \( \delta \leq CF(1+\sigma) \) \( (\text{DCR constraint}) \)
• Interest rate and loan amount endogenously determined based on anticipated state outcomes and anticipated equilibrium responses
• Everything boils down to analyzing the effects of \( \sigma \) and \( \delta \)
**Model**

Panel A: Regime 1
\[ \delta \geq \sigma/4 \]

Panel B: Regime 2
\[ \sigma(1 - \sigma)/(4 + 2\sigma) \leq \delta < \sigma/4 \]

Panel C: Regime 3
\[ \delta < \sigma(1 - \sigma)/(4 + 2\sigma) \]

\( t=1 \) \hspace{1cm} \( t=2 \) \hspace{1cm} \( t=1 \) \hspace{1cm} \( t=2 \) \hspace{1cm} \( t=1 \) \hspace{1cm} \( t=2 \)

\[ CF(1+\sigma)^2 \]
\[ CF(1+\sigma) \]
\[ CF(1+\sigma)(1-\sigma) \]
\[ CF(1-\sigma) \]
\[ CF(1-\sigma)^2 \]

LPC1 Binding – Term Default

LPC1 Binding – CF Default

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 $\delta$ to $\delta^z$
  • 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:**

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

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

• 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 $\rho$

• 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,

$$NPV_2^{RDP} =$$

$$\frac{1+\rho}{4} \left[ \text{Max}\{0, NPV_2^{D-D}\} + NPV_2^{U-U} \right] + \frac{1-\rho}{4} \left[ \text{Max}\{0, NPV_2^{D-U}\} + NPV_2^{U-D} \right]$$
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 \( K_{RDP}, \kappa, \delta^Z \) cause further delay (not surprising)
  • Increase in \( \rho \) favors immediate redeployment (perhaps surprising at first, since intuition is that lower \( \rho \) results in better diversification to decrease incentive to wait)
  • Increase in \( \sigma \) when \( \rho \) is in a “normal range” of say [0,1] favors immediate redeployment (this is also surprising relative to conventional wisdom)
    • Happens because larger \( \rho \) puts less weight on D-U term, which moves negatively with increases in \( \sigma \). D-D term moves positively, but weakly so