Why Has the US COVID-19 Crisis Been So Severe? The Employer-Sponsored Health Insurance Channel

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Greetings

- Thank you for the opportunity for the presentation.
- Today we discuss the question "Why is the COVID-19 Crisis in the US so severe? What needs to be done?"
- The organization of the talk is:
  - Introduction
  - Health Insurance Coverage Before the COVID-19 Crisis
  - Health Insurance Coverage in 2020
  - Effect of Health Insurance Coverage on the COVID-19 Crisis
  - Counterfactual Policy Analysis with the ACA Repeal or the Full Medicaid Expansion
Section 1. Introduction and Summary

- Research Question: Why Is The US COVID-19 Crisis So Severe?
- Previous Explanations
- Lessons from the Financial Crisis: Identifying the Systemic Risk
- Crucial Novelty of the Paper: Health Insurance Coverage and COVID-19
- Main Results
The US COVID-19 Crisis

- The US has a disproportionately large share of cases and deaths compared with other countries:
  - The US population is only 4.3% of the world population.
  - But the US has 19.2% of the world’s cases and 15.2% of the world’s deaths as of December 31, 2021.

- Why is it that the US COVID-19 crisis has been so severe?
Previous Explanations

- Delay in the Mask Mandate
- Lack of Large-Scale Testing
Explanation 1: Delay in Mask Mandate

- Chernozhukov, Kasahara, and Schrimpf (2021) use the data till June 2020 and estimate that the mask mandate early in the pandemic could have reduced cases and deaths in Spring 2020 (also see Kazumori (2020)).

- But this theory does not explain surges after the mask mandate was implemented.
The data until June 2020 show that an increase in mask coverage was associated with the decline in COVID-19 cases then.
But the data till December 2020 suggest that the mask mandate may not be the whole story.
Explanation 2: Lack of Large-Scale Testing

- Large-scale testing would have avoided the crisis (Taipale, Romer, and Linnarsson (2020)).
- But lack of large-scale testing alone would not explain the disproportional severity of the US Crisis compared with other countries.
Lessons from the Financial Crisis: Need to Identify the Systemic Risk

- Then one needs to identify systemic vulnerabilities in the current US health system for such a severe crisis.
Example: Systemic Risk in the 2008-09 Financial Crisis

- Bernanke, Geithner, and Paulson (2020) identify that excessive leverage of the financial institutions created systemic vulnerabilities for the financial system:

“This buildup of leverage, especially runnable debt, helped to make the financial system vulnerable to an unexpected shock. (...) Both the borrowers and regulators underestimated the run risk of short-term liabilities. (...) The gaps and weakness of the regulatory system certainly contributed to the vulnerability of the financial system in the run-up to the crisis.”
Leverage Amplification Mechanism in the 2008-2009 Financial Crisis (Adrian and Shin (2008))

Asset Price Decline

Asset Sales

Deleveraging

Weaker Balance Sheet
Crucial Novelty of the Paper

- This paper is the first paper that studies the unique severity of the US COVID-19 crisis via its unique health insurance system:
  - Significant number of uninsured population (28.9 million in 2019).
  - Employer-sponsored insurance system (ESI hereafter) where majority of people are insured.
  - High health care costs.
The ESI Amplification Mechanism

- An increase in COVID-19 cases and deaths will lead to lockdowns.
- Such lockdowns will lead to significant increases in unemployment.
- When people lose jobs, these people risk losing health insurance.
- These uninsured people become vulnerable to COVID-19 because they no longer afford to pay for the expensive health care.
- Such increases in cases and deaths will trigger further lockdowns.
The ESI Amplification Mechanism in the 2020-2021 US COVID-19 Crisis
Example 1: Essential Workers

- Essential workers have an uninsured rate of 13% compared to 8% of nonessential workers (Johnson (2020)).
- Essential workers spend time in close proximity to others thus can become superspreaders (Lewis (2021)).
Example 2: Concerns for Medical Costs
(Farmer (2020))

When Darius Settles died from COVID-19 on the Fourth of July, his family and the city of Nashville, Tenn., were shocked. Even the mayor noted the passing of a 30-year-old without any underlying conditions — one of the city’s youngest fatalities at that point.

(...) His wife, who works for Tennessee State University, says he was worried about costs as he went back to the hospital a second time; she tried to reassure him. "He said, 'I bet this hospital bill is going to be high.' And I said, 'Babe, it’s going to be OK.' And we left it alone, just like that," she says.

(...) Darius Settles knew he was in bad shape. But he didn’t attempt to make a third trip to the hospital. Instead of 911, he called his father, pastor David Settles, and asked his father to come pray for him.

(...) He sat by his son’s side. Darius’ wife made some peppermint tea, and when they put it to his lips, Darius didn’t sip. They thought he had fallen asleep. But he was unconscious.
Example 3: Gallup Survey (Witters (2020b))

- Over half (58%) of non-White adults versus 32% of White adults report that they are either “extremely concerned” or “concerned” about being able to pay for the cost of care if they are diagnosed with COVID-19.
- 24% of adults reported that the household has been unable to pay for medicine or drugs that a doctor had prescribed because the household didn’t have enough money to pay for them in June 2020.
2020 Data Quality Issues

- There have been difficulties in data collection in 2020.
  - The standard ACS 1-year data product would not be released for 2020 because the data do not meet the statistical quality standards (Cook and Daily (2021)).

- We conduct our analysis with the national-level data and the state-level data.

- The contribution of the paper is to conduct the first study of the effect of health insurance coverage on the US COVID-19 crisis.

- It would be a topic of ongoing research to develop a methodology to deal with the 2020 data.
Main Result: Health Insurance Coverage in 2020

- The uninsured rates increased in the summer of 2020 after the lockdown.
  - COBRA and Medicaid did not fully offset the loss of coverage from ESI.
- The uninsured rates then decreased in the fall 2020 following reopening of businesses.
- The uninsured rates started to increase again in the winter as distressed employers were not able to provide health insurance to employees.
- The loss of coverage was concentrated on vulnerable population:
  - Working age
  - Hispanic
  - Low educational attainment
  - Low income
Main Result: The Effect of Uninsured Rate on COVID-19 Cases

- We consider the data before the vaccine EUA to focus on the effect of uninsured rate.
- To be consistent with the previous research, we consider policy variables used in Chernozhukov, Kasahara, and Schrimpf (2021).
- We consider 16 specifications using national and state-level data and various combinations of explanatory variables.
- We find a statistically significant effect of uninsured rates on COVID-19 daily cases for all 16 models with the p-value <0.01.
An Example: Fits of the Models

- The models fit the data well ($R^2$ 0.796 and 0.888).
Main Result: Counterfactual Policy Analysis

- Repealing ACA
- Full Medicaid Expansion
Counterfactual 1: Repealing ACA

- Since the ACA became the law in 2010, House Republicans passed repeal bills more than 50 times between 2010 and 2016 (Berenson (2017)).
- Recently, in *California v. Texas*, the Supreme Court ruled to leave the entire ACA intact.
- What could have happened if ACA had been repealed?
The Effect of Repealing ACA

- The ACA Repeal could have increased the cases by 3.42 times when the national data was used and 3.76 times when the state-level data was used.
- The result is consistent with the intuition that a country cannot contain the pandemic when people cannot afford medical care.
- The US COVID-19 crisis could have been catastrophic without ACA.
Counterfactual 2: Full Medicaid Expansion

- The ACA expands Medicaid coverage for most low-income adults to 138% of the federal poverty level (FPL).
- As of December 2020, 36 states and the District of Columbia had expanded Medicaid eligibility, whereas the remaining 14 states had not.
- What would have happened if Medicaid had been expanded to all these states before the crisis?
The Effect of Full Medicaid Expansion

- The full Medicaid expansion could have reduced the per-capita COVID-19 cases from 538% of the world average to 190% when the national data was used and to 150% when the state-level data was used.

- The result is consistent with the intuition that having health insurance coverages comparable with other countries could have mitigated the US COVID-19 cases to the level comparable to other countries.
Takeaway of the Paper

- In the 2008-2009 financial crisis, excessive leverages of financial institutions created a systemic risk to the financial system.

- In the 2020-2021 COVID-19 crisis, uninsured population and ESI create a systemic risk to the health system.

- After the 2008-2009 financial crisis, the US adopted long-term responses for the financial system such as Dodd-Frank, BASEL III, OFR, and FSOC.

- The US would need similar long-term responses for the health system.
### Comparison of the Financial System and the Health System

<table>
<thead>
<tr>
<th></th>
<th>Financial System</th>
<th>Health System</th>
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<tbody>
<tr>
<td><strong>Systemic Risk</strong></td>
<td>Excessive leverage</td>
<td>Uninsured, ESI</td>
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<td><strong>Externality</strong></td>
<td>Fire-sales spillover</td>
<td>Spreading to others</td>
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<td><strong>Crisis</strong></td>
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<td>2020-21</td>
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<td><strong>Short-term Response</strong></td>
<td>Asset purchases</td>
<td>Vaccine, ARP</td>
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<tr>
<td><strong>Long-term Response</strong></td>
<td>Dodd-Frank</td>
<td>?</td>
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</table>
Section 2. Previous Literature

- This study is related to previous literature on
  - Significance of health insurance coverage for health outcome
  - Impact of ACA on health insurance and health outcome
  - Social determinants of health for COVID-19
Significance of Health Insurance Coverage for Health

- The previous literature identifies several channels that health insurance coverage affects health outcomes such as
  - Medical service utilization (Card, Dobkin, and Maestas (2008) and Finkelstein, Taubman, Wright et al. (2012))
  - Emergency use (Doyle (2005), Hadley (2007), and Taubman, Allen, Wright, et al. (2014))
  - Follow-up care (Asplin, Rhodes, Levy, et al. (2005))
  - Prescription medication (Baicker, Allen, Wright, et al. (2017))
  - Preventive care (Bailey, O’Malley, Gold, et al. (2015))
  - Charges (Dusetzina, Basch, and Keating (2015))
  - Access to primary care (Smith, Akira, Hudson, et al. (2017)).

- This paper studies how the health insurance coverage (or the lack thereof) affects the COVID-19 cases.
Impact of ACA on Health Insurance and Health Outcome

- The Affordable Care Act delivers a significant impact on health insurance coverage and health outcome through various channels:
  - Impact on health insurance coverage (Collins, Robertson, Garber, et al. (2012), and Agarwal and Sommers (2020))
  - Financial impact on hospitals (Dobson, DaVanzo, Haught, et al. (2017))
- This study complements these studies by studying the impact of health insurance coverage on the COVID-19 cases.
Social Determinant of Health in the COVID-19 Crisis

- There have been significant interests in the social determinant of health during this pandemic such as Rodriguez, Solomon, de Lemos, et al. (2020), CMS (2021b), and Polyakova, Udalova, Kocks, et al. (2021).

- This paper complements their analysis by considering health insurance coverage as another social determinant of COVID-19.
Section 3. Health Insurance Coverage Before the COVID-19 Crisis

- The US Health Insurance System
- The Impact of ACA on Health Insurance Coverage
- Health Insurance Disparities Before the Crisis
The US Health Insurance System

- The U.S. health insurance system is a mix of public and private insurers and health care providers:
  - Employer-sponsored health insurance is a plan provided through an employer (179 million, 55.4% in 2019).
  - Direct purchase is coverage purchased from an insurance company or through a federal or state marketplace (42 million, 13.1%).
  - Medicare is for adults 65 and older and people with disabilities (58 million, 18.1%).
  - Medicaid finances the delivery of primary and acute medical services, as well as long-term services, to a low-income population (64 million, 17.2%).
  - Significant number of uninsured (30 million, 9.2%).
The Impact of ACA on Health Insurance Coverage

- The ACA is a comprehensive health care reform law enacted in March 2010.
  - Individual Mandate: Almost all people were required to have health insurance coverage.
  - Employer Mandate: Large and medium-size employers must offer a health insurance.
  - Medicaid Expansion: Expanded eligibility to low-income adults, eliminating categorical restrictions on coverage in states.
  - Health Insurance Marketplaces: Individuals and small employers can purchase non-group insurance.
Health Insurance Coverage Changes from 2008
Health Insurance Disparities Before the Crisis

- **Age**: Disproportionately in the age group of 19-54.
- **Ethnicity**: Disproportionately Hispanic or African American.
- **Education**: The majority have education of high school graduates or less.
- **Work Experiences**: The majority are part-time workers or do not have jobs.
- **Total Household Income**: Almost half of the population has a household income of less than $50K.
Age of Uninsured Population

![Age of Uninsured Population in 2019](image-url)
Ethnicity of Uninsured Population
Education of the Uninsured Population

![Graph showing education levels of uninsured population in 2019](image-url)
Household Income of the Uninsured Population
Section 4. Health Insurance Coverage in 2020

- Surge in Unemployment in Spring 2020 and Its Impact
- The COVID-19 Crisis Reinforced the Health Insurance Disparities
- FFCRA and CARES Act
Surge in Unemployment in Spring 2020

- On March 13, 2020, President Trump proclaimed that the COVID-19 outbreak constitutes a national emergency.
- Starting in March, states started to adopt stay-at-home orders.
- The unemployment rate in April 2020 increased by 10.3 percentage points to 14.7 percent, the highest rate and the most significant over-the-month increase since 1949.
What Happens When a Worker Loses ESI

• When a worker loses ESI, there are ways that the worker could obtain insurance coverage:
  • Special enrollment in another group health plan (such as a spouse’s employer’s group health plan)
  • COBRA continuation coverage
  • Special Enrollment in individual market insurance coverage
  • Health coverage through Medicaid/CHIP

• But these safeguards did not completely offset the loss of coverage from ESI in 2020.
Health Insurance Coverage in 2020

- Uninsured rates increased in the summer and then in the winter as the distressed employers were no longer able to provide health insurance.
Who Got Uninsured in 2020?

- **Age**: Significant increase for the age group 35-44.
- **Ethnicity**: Significant increase for Hispanics.
- **Education**: Predominantly the population with less than high school educational attainment.
- **Work Experiences**: The majority are part-time workers or do not have jobs.
- **Total Household Income**: Uninsured rates of low-income groups have increased in the spring and summer of 2020. (The uninsured population has higher nonresponse rates.)
- **Thus the COVID-19 Crisis further reinforced the existing health insurance coverage disparities.**
Age of Uninsured Population in 2020
Ethnicity of Uninsured Population in 2020
Education of the Uninsured Population in 2020
Household Income of the Uninsured Population in 2020
FFCRA and CARES Act

- The Families First Coronavirus Response Act (FFCRA) requires employers to provide their employees with expanded family and medical leave for COVID-19.

- The Coronavirus Aid, Relief, and Economic Security (CARES) Act has the Provider Relief Fund for testing, treatment, and vaccination for uninsured individuals.
**Insufficiencies of FFCRA and CARES Act**

- The uninsured population average annual total household income is around $50K.
- The average cost of hospital care for COVID-19 ranges from $51,000 to $78,000 (Hackett (2020)).
- FFCRA eliminates cost-sharing in only a few situations (Chua and Conti (2020)).
- Providers are not required to participate in the CARES Act Provider Relief Fund program (Schwartz and Tolbert (2020)).
- Reimbursement till February 2021 is just 26,891 cases with a total of $1.89 billion (CDC (2021b)).
  - Only a fraction of more than 14 million cases by December 2020.
- Thus these safeguards are not sufficient and the uninsured population are vulnerable to COVID-19.
Section 5. Coverage and COVID-19

- Data
- Effect of Uninsured Rates on Daily New Cases Controlling Policy Variables and the Time Trend
- Controlling for the Unemployment Rates
The COVID-19 cases data are from the New York Times website. We consider the data before the vaccine EUA of December 11, 2020 to focus on the effect of health insurance coverage.

We obtain the uninsured rates data from the CDC Household Pulse Survey till the week of November 25-December 7.

We obtain the unemployment rate (seasonally-adjusted) from BLS.

The population data is from the 2019 National and State Population Estimates (NST-EST2019-0).

To be consistent, we consider policy variables used in Chernozhukov, Kasahara, and Schrimpf (2021) from the same data source (Raifman, Nocka, Kristen, et al. (2020)).
Descriptive Statistics of Policy Variables

- The descriptive statistics of policy variables used in this paper are consistent with Chernozhukov, Kasahara, and Schrimpf (2021) (Figure 9) that considered the data till June 2020.
## Correlation Among Policy Variables

- The correlation matrix is consistent with Chernozhukov, Kasahara, and Schrimpf (2021) (Table 2) who considered the data till June 2020.
- Correlations with the mask mandate are negative because the mask mandates were introduced as the economy reopened.

<table>
<thead>
<tr>
<th></th>
<th>Stay at Home</th>
<th>Business</th>
<th>Restaurant</th>
<th>Movie</th>
<th>Mask</th>
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<td>-0.69</td>
<td>-0.66</td>
<td>-0.43</td>
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</tr>
</tbody>
</table>
First Models

- We first consider the linear regression models ("Model 1-4") to estimate the effect of US uninsured rates on US daily cases using the equation:

\[
(\text{US Cases})_t = \alpha + \beta(\text{US Uninsured Rates})_t + \sum_{j \in \{\text{policies}\}} \gamma_j(\text{Policy Variable } j)_t + \delta t + \epsilon.
\]

- The coefficient of interest is \(\beta\), an estimate for the impact of US uninsured rates on US daily cases controlling for
  - Policy variables (masks, closures, and stay-at-home order)
  - Time trend
Results

- Uninsured rates have statistically significant effects on COVID-19 cases for all 4 models.

<table>
<thead>
<tr>
<th>US Daily Cases</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<tbody>
<tr>
<td>Uninsured (%)</td>
<td>23036.42***</td>
<td>46228.18***</td>
<td>46100.41***</td>
<td>44337.96***</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
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<tr>
<td>Mask Mandate (%)</td>
<td>-2343.82***</td>
<td>-1534.56***</td>
<td>-1518.06***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Closures (%)</td>
<td></td>
<td>787.54***</td>
<td>1479.37**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
<td>(0.02)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Stay at Home (%)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.23)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Time Trend</td>
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<td>F-statistics</td>
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<td>211</td>
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Controlling Unemployment Rates

- We now control for the unemployment rate ("Model 5-8"):

\[
(\text{US Cases})_t = \alpha + \beta (\text{US Uninsured Rates})_t + \gamma (\text{US Unemployment Rate})_t + \sum_{j \in \{\text{policies}\}} \delta_j (\text{Policy Variable } j)_t + \epsilon t + \varepsilon.
\]

- The coefficient of interest is $\beta$, an estimate for the impact of US uninsured rates on US daily cases controlling for
  - Unemployment rates
  - Policy variables (masks, closures, and stay-at-home order)
  - Time trend
## Results

- Uninsured rates have statistically significant effects for all models.

<table>
<thead>
<tr>
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<th>US Daily Cases</th>
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<tr>
<td></td>
<td>(5)</td>
<td>(6)</td>
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<tr>
<td>Uninsured (%)</td>
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<td>35467.98***</td>
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<td>Unemployment (%)</td>
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<td>54254.37***</td>
<td>54248.43***</td>
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<tr>
<td>Mask (%)</td>
<td>658.94**</td>
<td>659.28**</td>
<td>834.82***</td>
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<td>(0.02)</td>
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<td>Closures (%)</td>
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<td>Stay at Home (%)</td>
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<td>399</td>
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</table>
Fits of the Model

- The models fit the data well ($R^2$ 0.796 and 0.888).
Robustness Check with the State-Level Data

- The results are robust with the state-level data that also provide good fits.
Section 6. Counterfactual Policy Analysis

- Effect of the ACA Repeal
- Effect of the Full Medicaid Expansion
Counterfactual 1: Repealing ACA

- We follow Banthin, Simpson, and Blumberg (2020) who estimate that 21.1 million people would be uninsured from repealing ACA.
- The COVID-19 cases could have increased 3.42 times (confidence interval 2.59 to 4.25).
- The result is consistent with the intuition that a country cannot contain a pandemic when people cannot access the health care.
Effect of Repealing ACA

- The ACA repeal could have had catastrophic impacts.
Counterfactual 2: Full Medicaid Expansion

- We follow Buettgens (2021) who estimate the uninsured population would have decreased by 4.19 million for the age 19-65 with the full Medicaid expansion.
- Full Medicaid expansion could have reduced the per-capita COVID-19 cases from 538% of the world average to 190% with the national data to 150% with the state-level data.
- The result is consistent with the intuition that having health insurance coverages comparable with other countries could have mitigated the US COVID-19 cases to the level comparable to other countries.
Effect of the Full Medicaid Expansion

- Full Medicaid expansion could have mitigated the severity of the US COVID-19 crisis.
Section 7. Conclusion

- Summary
- Future work
Summary

- The COVID-19 crisis has caused disproportionately severe damages to the US compared with other countries.
- Understanding why the US COVID-19 crisis has been so severe is an essential question for the US health care system.
- The contribution is that this paper is the first to propose the idea that a significant number of uninsured and the employer-sponsored health insurance system could create a systemic risk to the US health system.
- We find that the uninsured rates have statistically significant effects on the COVID-19 cases after controlling unemployment rates, time trend, NPIs, and state heterogeneities.
- A counterfactual analysis finds that
  - Repealing ACA could have created a devastating impact.
  - Full Medicaid expansion could have significantly mitigated the severity of the US COVID-19 crisis.
Future Work

- This study shows the usefulness of the systemic approach to the health system.
- It would be significant to develop a methodology to be able to deal with the 2020 data.
- The analysis suggests the need to study coordinated responses of the public health and health insurance system.
- This analysis shows the need to further study the relevance of the lessons of the 2008-2009 financial crisis to the health system.
Takeaway of the Paper: Need for Systemic Responses to the US Health System

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<th>Financial System</th>
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Thank you!


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