Markus' intro

- Previous/future webinars
    - Nellie Liang   Evaluating early Fed programs
    - Daron Acemoglu   On the benefits of targeted policies
    - Paul Krugman   The audacity of hope

- Speakers

The 3 crises

- **Health crisis**
    - Health　　　　　　　contagion
    - Gaining time
- **Economy crisis**
    - Supply (chains), demand (hoarding)
    - Lockdown
- **Financial crisis**
    - Liquidity, solvency　　　contagion

Shut-down

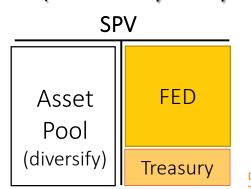|	2008	2020
Pre-crisis	Build-up of imbalances - Run-up of credit - Thinly capitalized (shadow) banks	Well balanced - US gov. debt expansion - Corporate debt
Trigger	Re-evaluation: real estate - Regional correlation	Corporate cash flow crash
Amplification	HH & banks' balance sheets	Corporate sectors balance sheets
Fin- sector	Shadow banks (part of banks)	FinTechs for mortgages Banks still for SMEs
Structured finance	CDOs	CLOs
Policy objective	Stimulus	Survival
Speed	Fast	Extremely fast

Central Bank: Lending vs. Buying

- Liquidity programs: lend against collateral
  - Downside risk: only if haircut was not large enough
    No upside risk
  1. Funding liquidity provision
  2. Market liquidity provision: improve secondary markets functioning
     - funding to existing market makers
     - *"Market maker of last resort"*   (Buiter & Sibert 2007)

- Credit program: buy risky asset
  - Should government sector take on credit risk?   ("I Theory" ➡ yes)
  - Upside and downside risk (diversify)
  - Which part of government?
    1. Central bank
    2. Development banks (co-invests in loans)
    3. Fiscal authority – take on junior/equity tranch

SPV

| Asset Pool (diversify) | FED |
| | Treasury |

The I Theory of Money

Brunnermeier-Sannikov (2018)

- ■ Risk free rate

- ■ Spreads
  - ■ Term spread   Yield curve management
  - ■ Credit spread   Corporate Bonds

contain

"The I Theory of Money"

- ■ Expected loss +
- ■ Risk premium = price of risk * (exogenous risk + endogenous risk)

amplifications, spirals, run, ..
non-linearities

- ■ Government steps in as intermediary, redistributes risk and creates money ➡ reduces deflationary pressures

I Theory: Which assets to buy?

PRINCETON UNIVERSITY

- Consumption demand management vs. Risk perspective
- Bottleneck approach
  - Financial sector   repair transmission channel
  - Household sector
  - Corporate sector
- Asset Purchase Programs/QE
  - Which assets? Gov. bond, mortgages vs. corporate bonds
  - Sequencing
  - Interaction with DMO (at Treasuries)
- Buy via auction or like FX intervention
  - Make most use to stabilize prices given limited ammunition ($4 tr.)
- Negative Interest rate: ZLB vs. Reversal Interest Rate

Inverse policy prescription
with Arvind Krishnamurthy

- Dos-and-don'ts are reversed

- Usual recession:
    - Stimulus focused
        - interest rates to stimulate spending and investment
- COVID recession:
    - Survival focused

Inverse policy prescription

- Chapter 11 is good solution for large firms, but

- SME need a pause

- Usual recession:
  Avoid evergreening is a problem b/c it crowds out credit to new firms/start-ups (Japan …)

- COVID recession:
  Promote evergreening
  offer banks cheap central bank refinancing
  for rolled-over loans   (special program x% below policy rate)
  - stabilize existing businesses

Poll 01:

1. Did the Fed benefit from its crisis experience in 2007-09
   1. Yes
   2. No

2. Paradox of Prudence (I Theory)
   1. Assuming risk and redistributing it across all nominal claim holders can reduce overall risk
   2. Risk is a zero sum game (whack a mole game)

3. Should Fed take on (credit) risk and distributed among many nominal claim holders?
   1. Yes
   2. No, it risk its independence

End of MARKUS' INTRODUCTORY REMARKS

Now   Please ask questions in Q&A box

Webinar: An Evaluation of the Fed-Treasury Credit Programs

Jointly Organized with the Society for Financial Studies

WITH JEREMY STEIN
HARVARD UNIVERSITY

Monday, May 11, 12:30 PM ET
Pre-Registration Required

BENDHEIM CENTER FOR FINANCE   SFS

An Evaluation of the Fed-Treasury Credit Programs

(based on joint work with Sam Hanson, Adi Sunderam, and Eric Zwick)

Princeton Bendheim Center for Finance Webinar on Covid-19

Jeremy Stein

Harvard University

May 11, 2020

Why Support Businesses in the First Place?

- COVID-19 shock is a massive shock
  → Inward shifts in both aggregate supply and demand
  → Large loss of output, staggering unemployment

- Overarching goals of economic policy:
  - Smooth consumption
  - Allocate losses fairly and efficiently
  - Contain forces that can amplify the initial economic shock

- Broad consensus that there should be a large expansion of social insurance programs for households
  - Unemployment insurance
  - SBA Paycheck Protection Program: $659 billion
    - Up to $10 million loan, converts to cash grant if 75% spent on payroll

- Rationale for providing direct support to firms (capital) is somewhat less obvious and policy design more controversial

Classic Lender-of-Last Resort Logic

- Bagehot's rule: lend freely to solvent firms, against good collateral, at a penalty rate.
  - I.e., lend to firms that are illiquid but fundamentally solvent.

- Underlying theory of the case: think of Diamond-Dybvig (1983)
  - Lending by central bank eliminates the bad run equilibrium. In good no-run equilibrium, everybody is solvent, can pay back their loans.

- In hindsight (and with a good bit of luck) this LOLR approach is a decent superficial characterization of 2008-09.
  - TARP funds were almost entirely repaid, Fed didn't lose a nickel.
  - Looks ex post to have been in significant part a liquidity crisis.
  - Not to downplay importance of solvency-driven interventions, e.g. stress tests.

Mnuchin as Bagehot?

Steven Mnuchin Says U.S. Aims to Get Back Its Money From Fed Programs

Treasury secretary says some investments may be profitable while others lose money

Treasury Secretary Steven Mnuchin listened during a briefing on the Paycheck Protection Program at the White House Tuesday.
PHOTO: AL DRAGO/CNP/ZUMA PRESS

By *Kate Davidson* and *Richard Rubin*
Updated April 29, 2020 5:42 pm ET

WASHINGTON—Treasury Secretary Steven Mnuchin said he expects the government to recover funds it is committing to backstop the Federal Reserve's emergency lending programs, as it has in past crises.

Congress last month appropriated $454 billion to absorb possible losses on the Fed programs, which will provide trillions of dollars in loans to businesses and municipalities. The money from the Treasury serves as a buffer to protect the Fed against losses.

This Is Not 2008-09!

- Magnitude of the fundamental shock is much larger: this is not primarily a liquidity event for most firms.

- Uncertainty about firm solvency is first order:
  - We do not know how long the public health emergency will last.
  - We do not know what the post-COVID world will look like (e.g., how much business travel there will be 3 years from now).

- And economic interpretation of solvency is less clear-cut
  - Normally, near-zero revenues for 12 months and inability to service debt are strong signals that a business is not economically viable.
  - Less obviously the case here.
  - Is a dental practice that has minimal revenues over the next year non-viable? What should become of the assets?

High-Level Policy Goals: Micro and Macro

- Micro-efficiency: prevent destruction of socially valuable business capital: both physical and organizational.
    - Goal is *not* to shield debt/equity investors from losses
    - But technology for allocating losses—the bankruptcy system—is imperfect and risks excessive destruction of productive capital
    - And bankruptcy system becomes less efficient when capacity is strained (Iverson, 2018)
    - Even if many firms need to ultimately be restructured, benefits to "flattening the curve"

- Macro: contain amplification mechanisms
    - Financial accelerators: firm, household and bank balance sheets
    - Fire sales in credit markets: implications for credit spreads on new loans
    - Aggregate demand externalities and Keynesian multipliers
    - Congestion externalities in bankruptcies courts

Core Design Principles

- Preserve optionality: "Venture Capitalist of Last Resort"

    - In environment of high uncertainty, control government's exposure not with ex ante credit standards, but with staged-financing approach

    - Provide enough aid for firms to stay alive for a few months, then reassess as more is learned.

    - <u>Must be willing to lose money:</u> there are few dead-safe loans to be made. Need to pay to preserve option value.

- Make aid widely available

    - Do not impose excessively stringent ex ante credit standards

    - Bagehot "solvency and good collateral" criteria not appropriate here

- Provide aid with less senior claims (i.e., more like preferred plus warrants than senior debt)

    - Preserves firm balance sheets and reduces future cashflow problems

    - Mitigate debt overhang that would otherwise slow recovery

Existing Programs: Overview

- <u>Corporate Credit Facilities:</u> $750 billion
  - Investment grade firms (+ recent fallen angels)
  - Few other restrictions

- <u>Main Street Facilities</u>: $600 billion
  - Firms up to 15,000 employees or up to $5b in annual revenues
  - Many restrictions: leverage, bank risk retention, executive compensation, distributions to shareholders

- Facilities akin to special purpose banks: Fed lends, equity investment from Treasury funds appropriated in CARES Act

Existing Programs: Public Firm Coverage

Program Eligibility % of Total	N	Employment	Sales	EBITDA
Included: PMCCF	12.0%	57.9%	65.4%	69.6%
Included: Main Street	33.0%	15.8%	15.3%	16.2%
Included: SBA PPP	24.5%	0.3%	1.0%	0.9%
Excluded: Large, high-yield (or unrated)	4.7%	19.2%	13.0%	10.7%
Excluded: Mid-sized, levered, high-yield	25.8%	6.7%	5.2%	2.6%
Excluded: Investment grade with no debt	0.0%	0.1%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

- Existing programs miss 26% of employment at public firms
  - 19% of sales and 14% of profits
- Significant employment at
  - Large, high-yield firms (too big to qualify for Main Street)
  - Mid-sized, high-yield (too levered to qualify for Main Street)

Existing Programs: Private Firm Coverage

Program Eligibility	N	Payroll	Sales	EBITDA
% of Total				
Included: Main Street	2.4%	42.6%	45.9%	42.9%
Excluded: Big retail	0.6%	6.1%	13.6%	7.7%
Excluded: Too small	97.0%	51.2%	40.5%	49.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Average debt per firm in the Too Small bucket: **$81,212**

- Fed programs also miss vast majority of private firms
  - Too small, not very profitable
  - Some of these firms are potentially covered by PPP.

Why the Gaps?

- Overall program design suggests aversion to taking credit risk
  - Bagehot dictum at work?

- No junk-rated firms allowed in Primary Market Corporate Credit Facility (PMCCF)
  - Leaves a large chunk of public-company employment uncovered.
  - Suggested tweak: admit BB and B-rated firms. But take warrants to improve government's expected return, align incentives.
  - Also: caps on exec comp, shareholder distributions to better screen.
  - And more tightly control *quantity* that they can initially borrow.

- Leverage limits in Main Street programs.

Main Street Programs in More Detail

Main Street Lending Program Loan Options	New Loans	Priority Loans	Expanded Loans
Term	4 years	4 years	4 years
Minimum Loan Size	$500,000	$500,000	$10,000,000
Maximum Loan Size*	The lesser of $25M or an amount that, when added to outstanding and undrawn available debt, does not exceed 4.0x adjusted 2019 EBITDA	The lesser of $25M or an amount that, when added to outstanding and undrawn available debt, does not exceed 6.0x adjusted 2019 EBITDA	The lesser of $200M, 35% of existing outstanding and undrawn available debt, or an amount that, when added to outstanding and undrawn available debt, does not exceed 6.0x adjusted 2019 EBITDA
Risk Retention	5%	15%	5%
Payment (year one deferred for all)	Years 2-4: 33.33% each year	Years 2-4: 15%, 15%, 70%	Years 2-4: 15%, 15%, 70%
Rate	LIBOR + 3%	LIBOR + 3%	LIBOR + 3%

Main Street Design Concerns

- Bank risk retention: designed to ensure government is making loans on "commercial" terms—seen as positive-NPV by banks.
  - Given all the externalities at play, this is not the right social criterion.
  - Banks more likely to participate when new loan bails out an existing troubled position—allocative distortion.
  - And probably won't participate otherwise, even if loan is socially positive-NPV

- Accelerated repayment schedules
  - E.g. in new loan program, 1/3 of principal in each of years 2-4.
  - Likely to create cashflow problems for firms that borrow.
  - Somewhat more moderate in priority loan program, but at cost of giving lenders a more senior claim—thereby exacerbating debt overhang problems.

- Tight credit standards
  - Debt/EBITDA < 4.0x in new loan program.

Hardness of Debt Claims a Particular Worry

- Combination of fast repayment plus senior claims likely to put many Main Street borrowers in distress when economy is still fragile.

- Who will manage the workouts? Does Treasury delegate to a third party?
  - Given participation of banks, workouts may have to be on private-market terms; if so, reduced scope for socially-desirable recontracting ex post.
  - Senior bank lenders may be relatively liquidation-prone.

- A better option: finance with preferred claims
  - Interest payments can be deferred without forcing default.
  - More junior status lessens debt overhang, makes it easier to attract future rounds of financing.
  - Can add warrants to strengthen government's overall position, align incentives.
  - Again, venture-capital analogy is helpful: what is the right way to provide finance to firms in an environment of high uncertainty?
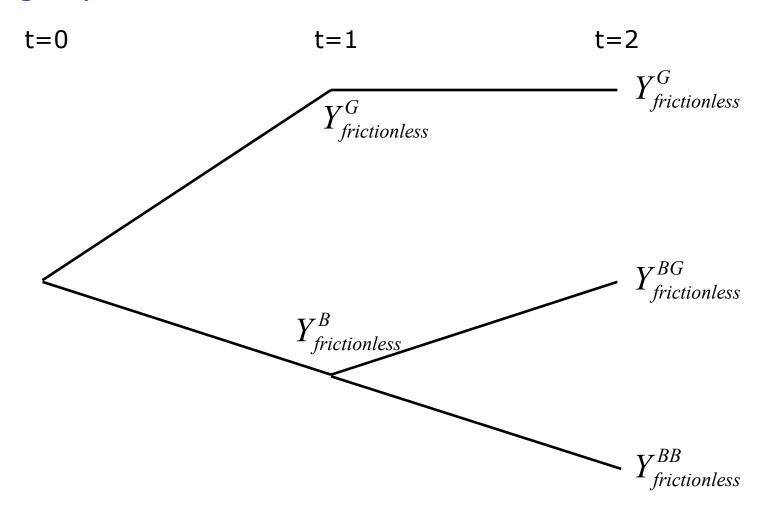
How To Think About Staged-Finance Aspect?

- Cap loan size: Protect taxpayers by limiting the amount firm can borrow, not by excluding bad firms.

- Easy to estimate recurring fixed obligations (rent, interest payments, lease payments) from 2019 tax return as

$$Obligations = Revenues - Cost \ of \ Goods - Wages$$
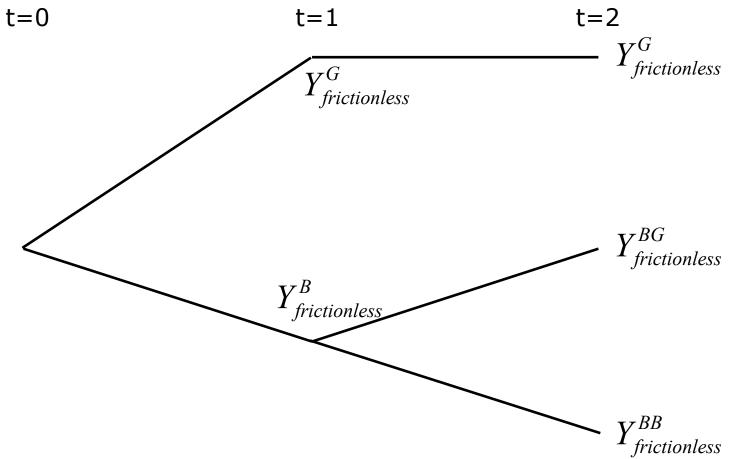$$- Depreciation - Profits$$

- Might allow firms to borrow up to ¼ of this amount each quarter.

- *Dynamically adjust* program in as public health conditions change.
  - If situation deteriorates, gradually reduce the amount firms can borrow in subsequent tranches → needed wave of bankruptcies can take place in an orderly way.

In Sum

- This is not 2008-09, and we need a different approach to government financial support of firms. Classic LOLR does not address the problem at hand.

- Given enormous uncertainty, desirable program features include:
  - Wide access: not too stringent on ex ante credit quality
  - Staged financing: control exposure via quantity allocated, preserve optionality
  - Relatively junior claims and ability to defer interest.
  - Other mechanisms to align incentives and screen borrowers: warrants, caps on executive comp and shareholder distributions.

- Government as venture capitalist of last resort.
  - Have to be prepared to take significant losses if things go south.
  - Not LOLR policy, but rather a Fed-leverage-enhanced form of fiscal policy.

Slightly more formal sketch

t=0   t=1   t=2

$Y^G_{frictionless}$

$Y^G_{frictionless}$

$Y^{BG}_{frictionless}$
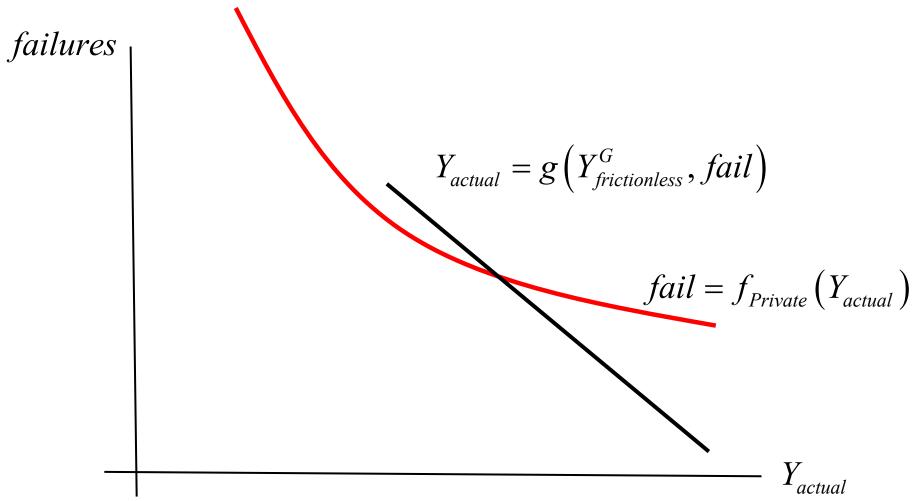
$Y^B_{frictionless}$

$Y^{BB}_{frictionless}$

- Frictionless fundamentals determined by health outcomes
  ◦ Could also imagine frictionless fundamentals affected by past decisions (i.e., liquidate or not), but ignore here for simplicity.

Slightly more formal sketch

t=0   t=1   t=2

$Y^{G}_{frictionless}$

$Y^{G}_{frictionless}$

$Y^{BG}_{frictionless}$

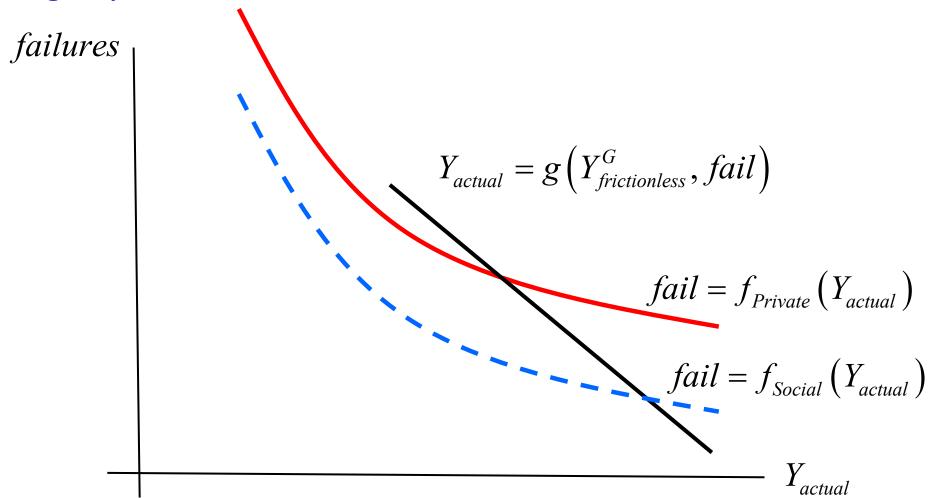$Y^{B}_{frictionless}$

$Y^{BB}_{frictionless}$

- Private market outcome: Fixed point in failures and actual output:

$$fail = f_{Private}\left(Y_{actual}\right)$$

$$Y_{actual} = g\left(Y_{frictionless}, fail\right)$$

Slightly more formal sketch

failures

$$Y_{actual} = g\left(Y^G_{frictionless}, fail\right)$$

$$fail = f_{Private}\left(Y_{actual}\right)$$
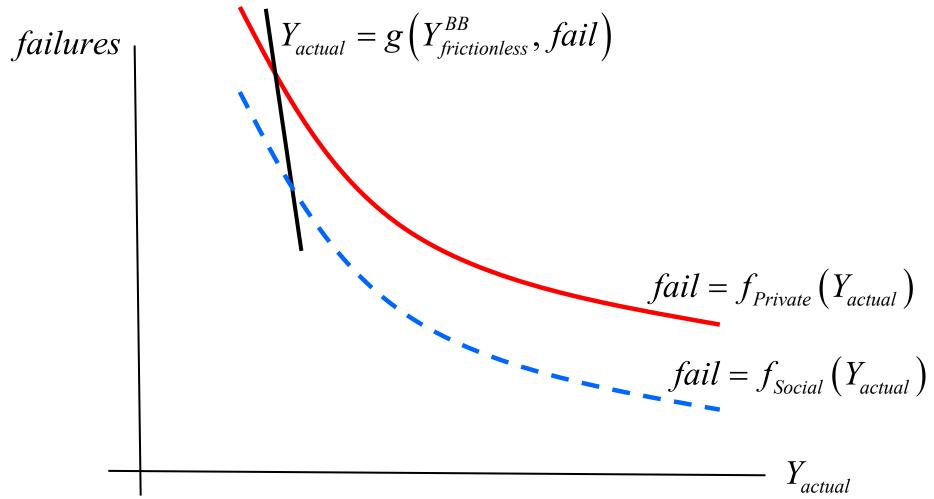
Y_{actual}

- Private market outcome without government intervention.

Slightly more formal sketch

failures

$$Y_{actual} = g\left(Y^{G}_{frictionless}, fail\right)$$

$$fail = f_{Private}\left(Y_{actual}\right)$$

$$fail = f_{Social}\left(Y_{actual}\right)$$

Y_{actual}

- Government intervention shifts failure curve down → big effect if fundamental resolves to good state (though govt may still have losses).
- Private actors take Y_{actual} as given when choosing *fail*; a benevolent government internalizes effect of *fail* on Y_{actual}

Slightly more formal sketch

failures

$$Y_{actual} = g\left(Y_{frictionless}^{BB}, fail\right)$$

$$fail = f_{Private}\left(Y_{actual}\right)$$

$$fail = f_{Social}\left(Y_{actual}\right)$$

Y_{actual}

- In contrast, not much effect if we have a bad health outcome.
- Funds to survive 2 periods + possibility of very negative outcome → Govt reluctant to commit → Keep firms alive for 1 period and reassess