# Monetary Easing, Investment and Financial Instability

Viral Acharya[1] Guillaume Plantin[2]

[1]New York University

[2]Sciences Po

# Introduction

- Unprecedented monetary easing in all major currencies post 2008
- "search for yield" among institutional investors has contributed to a sharp price increase in risky asset classes
- e.g., high-yield corporate bonds, emerging-market debt and equities

# Disappointing impact on investment

- Investment has not returned yet to its pre-recession trends in advanced economies...
- ...despite a large wedge between historically low interest rates and historically high returns on capital...
- ...that have been largely paid out to shareholders, notably in the form share buybacks (see, e.g., Furman 2015, 2016)

# These facts amplified following the 2007-8 crisis...

...but pre-dated it

- Gutierrez and Philippon (2016) trace back to the early 2000s:
  - decline in U.S. private fixed investment despite a high Tobin's q
  - increase in firms' share buybacks
- Taylor (2011, 2012) traces the start of a "Great Deviation" around the same time
  - monetary policy became relatively more accommodative
  - prudential regulation looser
  - contributed to the build-up of financial fragility leading to the 2008 crisis
- Contentious though (see, e.g., Bernanke, 2010)

# This paper...

...offers a model in which stimulating productive investment with an accommodative monetary policy comes at the cost of excessive financial risk taking.

# (Very broad) intuition

- Consider the elementary situation in which an agent can borrow or lend at the risk-free rate in order both to smooth consumption and to invest in a storage technology with decreasing returns to scale
- As the risk-free rate becomes small, the agent borrows large amounts in order both to invest large quantities, and to borrow against his future profits for early consumption (leveraged share buyback)
- If a borrowing constraint binds at some point, then the agent will allocate his borrowing capacity between investment and share buybacks up to the point at which the returns are equal, both above the risk-free rate
- Endogenous lower bound below which leveraged share buybacks crowd out investment and create socially undesirable financial fragility

# Model

# Setup

- Discrete time OLG model
- 2 types of private agents:
  - Workers
  - Entrepreneurs
- Public sector

# Setup

- 2 desirable goods:
  - A perishable consumption good that serves as numéraire
  - A capital or durable good. One unit of capital good produced at date $t$ generates one unit of the consumption good at date $t+1$
- Bond market. There is a competitive market for one-period risk-free bonds denominated in the numéraire good

# Workers

- Unit mass born at each date and live for two dates
- Supply one unit of labor when young
- Consume when old. Risk neutral
- Each worker owns a technology that transforms $I$ units of labor into $g(I)$ contemporaneous units of the consumption good

# Entrepreneurs

- Unit mass born at each date and live for two dates
- Risk neutral over consumption at each date. No discounting
- Each entrepreneur born at date $t$ is endowed with a technology that transforms $I$ units of labor at date $t$ into $f(I)$ contemporaneous units of the capital good

# Public sector

The public sector

- Does not consume and maximizes the total utility of the private sector, discounting that of future generations with a factor arbitrarily close to 1
- Monetary policy. The public sector announces at each date an interest rate at which it is willing to absorb any net demand for bonds
- Fiscal policy. The public sector can tax workers as it sees fit, and can, in particular, apply lump-sum taxes. It cannot tax nor regulate entrepreneurs

# Steady-state

- We study steady-states in which the public sector announces a constant interest rate $r$. Denote $w$ the market wage, and $l$ the quantity of labor that workers supply to entrepreneurs
- Entrepreneurs then borrow $wl$ to pay wages. If $r < 1$, they borrow the additional amount $(f(l) - rwl)/r$ against their next-date profit $f(l) - rwl$
- Workers invest in bonds both their labor income $w$ and their profit $g(1 - l) - w(1 - l)$
- Firms maximize profits

$$g'(1 - l) = w,$$
$$f'(l) = rw$$

# Steady-state

The consumption of a given cohort is then:

$$\underbrace{\left[1+\mathbf{1}_{\{r<1\}}\left(\frac{1}{r}-1\right)\right](f(l)-rwl)}_{\text{Entrepreneurs' income}}+\underbrace{rwl+rg(1-l)}_{\text{Old workers' pre-tax income}}$$

$$+\underbrace{(1-r)\left[g(1-l)-\mathbf{1}_{\{r<1\}}\left(\frac{f(l)}{r}-wl\right)\right]}_{\text{Rebate to old workers}}$$

$$=f(l)+g(1-l)$$

# Steady-state

$$f(l) + g(1 - l)$$

Maximized by setting the interest rate at $r^* = 1$. In this case, the market wage $w^*$ solves

$$w^* = g'(1 - l^*) = f'(l^*) = r^* w^*$$

# Remarks

1. Shortage of funds. Does the public sector always has the sufficient tax capacity to accommodate bond trading by private agents? Yes, if $r \geq 1$. Not necessarily when $r$ is sufficiently small, because young entrepreneurs' borrowing might exceed the income that young workers and the public sector (via taxation of old workers) can lend

2. Irrelevance of leveraged share buybacks. Borrowing against their future profit $(f(I) - rwI)/r$ by young entrepreneurs when $r < 1$ in order to consume admits a straightforward interpretation as a leveraged share buyback. If they do not create borrowing constraints, they are immaterial (purely redistributive)

# Monetary easing

- Suppose now that the date-0 cohort of workers have a less productive technology than that of the others
- Transforms $x$ units of labor into $\rho g(x)$ contemporaneous units of the consumption good, where $\rho \in (0, 1)$

# Monetary easing - Flexible wage

- With a flexible wage, the interest rate $r^* = 1$ is still optimal at all dates
- The date-0 wage decreases to $w_0 < w^*$ such that

$$w_0 = \rho g'(1 - l_0) = f'(l_0)$$

# Monetary easing - Rigid wage

- **(Downward rigid wage)** The wage cannot be smaller than $w^*$ at any date
- The public sector can make up for the absence of appropriate price signals in the date-0 labor market by setting the date-0 policy rate at

$$r_0 = \frac{w_0}{w^*}$$

- Entrepreneurs invest up to the optimal level $I_0$ since

$$f'(I_0) = r_0 w^* = w_0.$$

- Each worker accommodates by applying in his own firm the residual quantity of labor that the other firms are not willing to absorb at the prevailing market wage $w^*$

# What if supply cannot meet demand?

If $r_0$ goes below a threshold, excess corporate demand for funds, investment snaps back to its non stimulated level

- Entrepreneurs are rationed
- They split their funds into productive investment and consumption
- The constrained marginal return on investment is equal to 1, above the interest rate

## A peek into the general model

# General model with liquidity risk

- Entrepreneurs are long-lived, capital good takes time to build, and entrepreneurs may not have acces to markets at all dates. Both investment and share buybacks thus involve taking on rollover risk — Carry trades
- Good news: If the interest rate is not too low entrepreneurs are reulctant to enter into leveraged share buybacks
- Bad news: When they do so with a lower rate, socially inefficient maturity transformation
- Optimal emergency lending can address this, but still a wedge between the return on investment and the interest rate

# Summary

- Monetary easing comes at the cost of excessive financial instability...
- ...in a world in which the public sector cannot perfectly regulate maturity transformation (shadow banking...)
- Endogenous lower bound, possibly larger than zero