

MACROECONOMIC RISK SCOR-PSE CHAIR NEWSLETTER N°8

The third annual lecture of the Macroeconomic Risk, SCOR-PSE Chair was held online on June 7, 2021, with **Luigi Zingales** (The University of Chicago Booth School of Business) as special guest speaker. Furthermore, the Chair organized its **fourth annual conference** both at PSE and online on September 17, 2021, entitled: "Back to which normal? Challenges and opportunities for the global economy after the pandemic"

This newsletter includes an interview of Luigi Zingales and a brief description of the research papers discussed at the conference. [+](#)



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CHAIR

Macroeconomic Risk

Can Democracy Survive a Concentrated Economy ?

AN INTERVIEW WITH LUIGI ZINGALES

On June 7, 2021, **Luigi Zingales** (The University of Chicago Booth School of Business) gave an online lecture on the theme of concentrated economy. Following this lecture, we had the opportunity to interview him about his research.

IN YOUR LECTURE, YOU STRESSED THE RISKS RESULTING FROM RISING MONOPOLY POWER. DO YOU THINK WE HAVE ENTERED A NEW GILDED AGE, WHERE MONOPOLIES ARE ONCE AGAIN FREE TO ACCUMULATE WEALTH AND POWER WITHOUT LIMITS?

Technology plays a big role in industry structure, but this role can be accentuated or attenuated by the political system. The Gilded Age was prompted by the enormous economies of scale and scope modern manufacturing can deliver. To exploit these economies of scale, however, the rubber barons defrauded investors, cheated consumers, and bribed public officials. It took two President Roosevelts to rebalance the system. I think **the network externalities and the economies of scale and scope in data collection have created the economic basis for a second Gilded Age.** Now it is up to the democratic system to decide how to respond.

THE MODERN ECONOMIC LITERATURE USUALLY FOCUSES ON THE NEGATIVE ECONOMIC ASPECTS OF MONOPOLIES. INSTEAD, IN YOUR TALK, YOU REVIVE AN OLD TRADITION OF ECONOMIC THINKERS CRITICIZING MONOPOLIES FOR THEIR POLITICAL EFFECTS. CAN YOU TELL US MORE ABOUT THE FOREFATHERS OF THIS INTELLECTUAL TRADITION? IN YOUR OPINION, WHY HAS THIS LINE OF RESEARCH BEEN MARGINALIZED IN THE ACADEMIC DEBATE?

The idea that **monopoly is inimical to democracy** is already present in the speeches of John Sherman, the very father of the first antitrust law. Yet, the closest forefathers of this intellectual tradition are Henry Simons at Chicago and the Ordoliberals in Freiburg. This tradition has shaped the U.S. policy in occupied Germany and Japan. Since the 1970s it has been marginalized because it does not lead so easily to mathematical formalization. It also did not fit very well the concerns of the time. When U.S. car giants were eaten alive by foreign competition, it was hard to argue that they were too powerful.



NOTE

The video replay of Luigi Zingales' lecture is available online. [+](#)

YOU DEMONSTRATE THAT THE CAUSALITY BETWEEN RISING MONOPOLY POWER AND AUTHORITARIAN REGIMES RUNS BOTH WAYS. IN THE LANGUAGE OF ECONOMISTS, THERE ARE BOTH A "DEMAND" AND "SUPPLY" FOR AUTOCRACY IN A MONOPOLY ECONOMY. LET US FOCUS ON THE DEMAND SIDE FIRST. WHAT MAY EXPLAIN WHY MONOPOLISTS FAVOR AUTHORITARIAN REGIMES OVER DEMOCRACIES?

Not only are monopolies economically inefficient, they also tend to concentrate a disproportionate amount of surplus in the hands of the few. In a true democracy (where every person matters equally), the pressure towards eliminating the monopolies and redistributing the surplus becomes irresistible. This pressure exists even when redistributing shrinks the size of the pie (i.e., it is inefficient). When it increases the size of the pie (as in the case of the elimination of monopolies), however, such a pressure becomes irresistible. Knowing this, **monopolists favor authoritarian regimes, which can withstand that pressure better and**

protect their monopoly rents. This is what happened with the large German cartels in the 1930s. The big industrialists were not ideologically Nazis, they supported Nazism because they saw it as the best way to protect their market power.

THE INTERACTION BETWEEN MONOPOLY POWER AND AUTOCRACY HAS ALSO A "SUPPLY" SIDE. WHY IS THE RISE OF AUTOCRATS FACILITATED IN A CONCENTRATED ECONOMY? ARE THERE HISTORICAL OR RECENT EXAMPLES OF SUCH PHENOMENON?

The road to autocracy is paved with small power grabs. Each one individually seems small, but together these power grabs can transform the most thriving democracy into the most brutal dictatorship. The only possible block road to this transformation is some form of popular revolt, which does not necessarily take people to the street, but that engenders civil disobedience. Thus, **the chances of success of an aspiring autocrat will be higher, the more stealthy his power grabs are.**

"By concentrating a lot of power in a few hands, monopolies make it easier for an autocrat to grab power without using force."





By concentrating a lot of power in a few hands, monopolies make it easier for an autocrat to grab power without using force. Consider the case of Turkey’s President Erdogan. By privately threatening to exclude Facebook from Turkey, Erdogan succeeded in censoring dissent. If the market for social media were competitive, he would never have been able to do so without formally passing a law, with the political costs this would have entailed.

YOU COMPARE MONOPOLIES TO A “LOADED GUN”, POINTED AT DEMOCRACY. WHAT CAN WE DO TO LIMIT THE POLITICAL INFLUENCE OF MONOPOLIES? SHOULD THE STATE INTERVENE?

The narrow interpretation of the antitrust mandate has left governments and judges around the world unequipped to deal with the problem of limiting the political power of monopolies. We do not want to go back to an era when President Nixon was using the antitrust power to target his political enemies. Thus, **we need intellectual guidance on how antitrust should tackle the political influence of business without leaving room for arbitrariness and capriciousness.** Much of the effort of the Stigler Center at the University of Chicago is aimed at developing such intellectual guidance. Without it, it is difficult for any state to intervene.

YOU QUOTE HENRY SIMONS, AN INFLUENTIAL EARLY 20TH CENTURY AMERICAN ECONOMIST: “THE GREAT ENEMY OF DEMOCRACY IS



MONOPOLY IN ALL FORMS (...), IE, THE ORGANIZATION AND CONCENTRATION OF POWER WITHIN FUNCTIONAL CLASSES”. THIS SUGGESTS THAT IN THE “FIRST-BEST” SOCIETY, BOTH ECONOMIC MONOPOLIES AND “SOCIAL MONOPOLIES”, THAT IS, ORGANIZATIONS OR SOCIAL CLASSES, SHOULD BE ELIMINATED. DO YOU SHARE THESE VIEWS?

I do believe what Lord Acton said, that power tends to corrupt and absolute power corrupts absolutely. This is not only true on the side of the industrialists, but on the side of the unions as well. For example, in the United States the police union is very strong and in most states has obtained extraordinary legal protections, which are shielding even the most rogue cops. In the state sector, where there is no competition, unions have too much power. In the private sector exposed to competition, however, unions are not a problem. In fact, they are a necessary protection for workers.

IN CAPITALIST ECONOMIES, PRIVATE FIRMS SEEK AT MAXIMIZING THEIR PROFITS AND – ULTIMATELY – AT BECOMING MONOPOLIES ON THEIR MARKET. THAT IS, CAPITALISM NATURALLY TENDS TO GIVE RISE TO MONOPOLIES, WHICH, AS YOU STRESS IN YOUR PRESENTATION, IS A DANGER FOR DEMOCRATIC REGIMES, DO YOU THINK THERE IS A TENSION BETWEEN CAPITALISM AND DEMOCRACY?

Luigi Zingales’ research interests span from corporate governance to financial development, from political economy to the economic effects of culture. He co-developed the Financial Trust Index, which is designed to monitor the level of trust that Americans have toward their financial system. In addition to holding his position at Chicago Booth, Zingales is currently a faculty research fellow for the National Bureau of Economic Research, a research fellow for the Center for Economic Policy Research, and a fellow of the European Governance Institute. He is also the director of the Stigler Center for the Study of the Economy and the State. Zingales also serves on the board of ProMarket and is the co-host of the podcast *Capitalism’n’t*. In 2014 he was the President of the American Finance Association.

In many markets, freedom of entry insures that profit maximization does not lead to monopolies. **The most serious threat to competition does not come from the desire of firms to maximize profits by outcompeting their rivals, but from their desire to maximize profits by subverting the rules of the game.** For example, Facebook succeeded in gaining its dominant position in the social media market by making it illegal for other firms to access the content account holders post on the platform, even with the account holder’s consent. **The only defense against this distortion is to have a political system responsive to the interest of the people at large,** rather than to a small group of producers. Thus, **capitalism needs democracy. The tension between capitalism and democracy is not a bug: it is a feature.** As I wrote in my book “A Capitalism for the People”, without democracy capitalism becomes a monopolistic plutocracy. Without capitalism, democracy does not prosper economically. The best system emerges from balancing this tension.

RECENTLY, SOCIAL MEDIA HAVE BANNED RIGHT-WING EXTREMISTS FROM THEIR PLATFORMS. YOU WARN THAT THIS LIMITATION OF THEIR FREEDOM OF SPEECH SETS A DANGEROUS PRECEDENT FOR MODERN DEMOCRACIES. YET, THE SEIZURE OF POWER BY ANTI-DEMOCRATIC MOVEMENTS

“The tension between capitalism and democracy is not a bug: it is a feature.”

MAY ALSO ULTIMATELY ENDANGER FREEDOM OF SPEECH. TO WHICH EXTENT DO YOU THINK WE MAY FACE A TRADE-OFF BETWEEN TODAY’S AND TOMORROW’S FREEDOM OF SPEECH? For 75 years Western democracies have

prospered not by limiting the freedom of speech, but by delivering to their citizens a system that works for them. I grew up in Italy where any Fascist propaganda was and still is a crime. In spite of that, a crypto fascist party has always existed. When the country was growing and his citizens were happy, this party was getting only a small fraction of the votes. If this very party is now poised to win the next election is not because of excessive freedom of speech, but because Italian democracy is failing its citizens.

A Model of Post-2008 Monetary Policy

Behzad Diba and Olivier Loisel, A Model of Post-2008 Monetary Policy, Working Paper, March 2021. This paper was presented by Olivier Loisel (CREST, ENSAE) and discussed by Julien Matheron (Banque de France).

After the Great Recession, the central bank's interest rate hit the zero lower bound (ZLB hereafter), forcing central banks to abandon conventional monetary policy and embrace instead non-conventional measures, labeled "Quantitative Easing" (QE hereafter). Yet, **the effects of QE on inflation and bonds are hard to rationalize for standard monetary policy theories.** One stylized fact appears as particularly challenging. During the ZLB episode, the inflation was neither very low, nor very volatile, nor very large. By contrast, the New Keynesian model implies large deflation and inflation volatility during the ZLB while the Monetarist model predicts large inflation after the QE. Does it mean, following Cochrane (2018), that the "core of monetary policy doctrines is wrong"?

In this paper, the authors show how a simple extension of the standard monetary policy model can rationalize the dynamics of inflation around the ZLB. In particular, **they introduce a monetarist element, i.e. bank reserves, into an otherwise standard New Keynesian model.** To generate a demand for reserves, the authors assume that banks need reserves to originate commercial loans. In turn, the demand for loans stems from the assumption that firms need to finance in advance a fraction of their wage bill. Crucially, **the monetarist part of the model allows them to account for the fact there were no significant deflation and low inflation volatility at the ZLB.** The reason is that, unlike in New Keynesian models, the effect of future shocks on current inflation is not increasing as they become more distant in time.

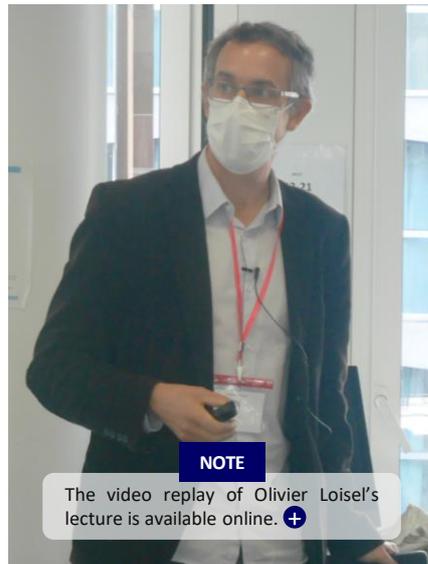
During the ZLB episode, inflation was neither very low, nor very volatile, nor very large.

The authors refer to this effect as "local determinacy under exogenous instruments". As a consequence, current inflation is not infinitely responsive to future distant policy shocks and inflation variations are limited in amplitude.

However, the monetarist part of the model also generates additional challenges of its own. The first challenge is that **monetarist theory counterfactually predicts that inflation should have skyrocketed after QE, because of the massive increase in the quantity of money.** Here, the authors show that their model is able to rationalize the moderate increase in inflation after QE, under two additional conditions. The first condition is that agents perceive the monetary expansion as temporary. The second condition is that the agents' money demand is close to satiation - but not fully satiated.

One additional challenge is **that interest rate on government bonds fell below the interest rate on reserves during the ZLB episode.** This would suggest that the

demand for money is fully satiated, hence implying that the tight link between money supply and prices, at the core of monetary theory, is not operational. The authors demonstrate that **introducing government bonds** in their model is able to account for this fact. The idea is as follows: on the one hand, non-bank financial agents buy governments bonds *en masse* since they provide liquidity services, hence pushing the T-bill interest rate down. On the other hand, banks have access to central bank's reserves and only hold of



the former, since the interest on reserves set exogenously by the central bank provides a better return.

Finally, the authors explore the implications of their model regarding the conduct of future monetary policy. Calibrating their model to the US economy in 2010, they **consider different scenarios for the normalization of monetary policy and study their effects on inflation dynamics.** They find that **monetary policy normalization has unambiguously deflationary effects.** In particular, this rules out neo-Fisherian effects, where the increase in the interest rate would imply an increase in inflation. They also compare a floor vs. a corridor system and find that a floor system always delivers "local determinacy". By contrast, the corridor system fails to deliver "local determinacy" if the interest rate on reserves does not react enough to current inflation. This result is useful to inform the current debate about the design of monetary policy.





A Model of Credit, Money, Interest and Prices

Saki Bigio and Yuliy Sannikov, A Model of Credit, Money, Interest, and Prices, NBER Working Paper No. 28540, March 2021. This paper was presented by Saki Bigio (UCLA, NBER) and discussed by Eric Mengus (HEC Paris).

Since the outbreak of the Great Recession, developed nations' central banks have implemented a series of non-conventional monetary measures, which are often referred to as "Quantitative Easing" (QE hereafter). **The goal of QE has been to circumvent the limitations of conventional monetary policy posed by the "zero lower bound" on the policy interest rate, and has resulted in a massive expansion of central banks' balance sheets.** However, **little is known about the theoretical foundations of QE policy and the mechanisms through which it impacts the real economy.** Indeed, standard models of monetary policy have an overly simplistic view of the central bank, where the central bank only controls a single policy instrument (e.g. the nominal interest rate or the quantity of money) and where balance sheet size is irrelevant. This paper attempts at filling this gap in the literature.

In this paper, the authors model **the role of the size of the central bank's balance sheet in the implementation of monetary policy.** In their model, the central bank has two main policy instruments: **the quantity of reserves supplied by open market operations** (i.e. the central bank's balance sheet size) and **the interest rate on reserves.** Importantly, the model departs from the rest of the literature by explicitly modeling how monetary policy operates through a banking system. The authors show how the central bank's policy instruments determine, in equilibrium, the levels of loan and deposit rates charged by commercial banks to their customers. In particular, reserves supplied by the central bank ease **the settlement frictions on the interbank market:** the higher the supply of reserves, the easier it is for commercial banks to settle debts arising from deposits' movements across banks, and the lower the spread on the interbank market.

In the model, monetary policy can operate in **three different regimes.** The first regime is called the **"corridor system"**: the quantity of reserves is low, i.e. balance sheet size is small, and there is a positive spread between the loan and deposit interest rates. Monetary policy works both through the classic interest rate channel and the credit channel. The second regime is called the **"floor regime"**: the quantity of reserves is high, i.e. the balance sheet size is large, and the spread between loan and deposit interest rates is zero. **Further increasing reserves through market operations is ineffective** and only the interest channel remains operational. The third regime is called the **"liquidity trap"**: the quantity of reserves is high but the interest rate on reserves is negative, pushing banks to transform reserves into currency (liquidity trap). Commercial banks set the deposit interest rate to zero and **charge high loan interest rates in order to defend their profits margins,** with contractionary effects on the economy.

The authors then explore the normative implications of their set-up. In a fully-fledged heterogeneous agent New Keynesian model with incomplete markets and wage rigidity, they show that central banks should operate with a small balance sheet during booms and inflate their balance sheet during recessions. The trade-off behind this result is not trivial. On the one hand, larger reserves result in a lower credit spread, hence easing household access to debt and helping them insure against micro risks. On the other hand, larger reserves and lower credit spread reduce the power of monetary policy to fight negative aggregate shocks, since aggregate demand becomes less responsive to monetary policy. To sum up, **the central bank faces a trade-off between micro-insurance and macro-insurance.** As such, this model can articulate the notion that central banks "are pushing on a string" during recessions, and has key implications regarding the optimal conduct of QE policy by central banks.

Central banks should operate with a small balance sheet during booms and inflate their balance sheet during recessions.



Falling Interest Rates and Credit Misallocation: Lessons from General Equilibrium

Vladimir Asriyan, Luc Laeven, Alberto Martin, Alejandro Van der Ghote and Victoria Vanasco, Falling Interest Rates and Credit Misallocation: Lessons from General Equilibrium, Working Paper, May 2021. This paper was presented by Alberto Martin (CREi, UPF, Barcelona GSE) and discussed by Carolina Villegas Sanchez (ESADE).

For the last decades, advanced economies have experienced low levels of real interest rates. **According to common wisdom, a fall in the real interest rate should have a positive effect on the economy** through its expansionary effect on output. However, there have been increasing concerns that declining real interest rates **could also entail negative effects**. In particular, it could stimulate unproductive economic activity by making it easier for low-productivity firms to enter the market and grow. **Under which conditions do low interest rates foster unproductive activities? Can this effect be large enough to hamper aggregate economic growth?**

In this paper, Asriyan, Laeven, Martin, Van der Ghote and Vanasco build a theoretical framework to address these questions. Their model has two key ingredients. First, the economy is populated by **entrepreneurs with heterogeneous productivity levels**, i.e. some entrepreneurs have access to better technologies than others. Second, **entrepreneurs face financial friction**: the amount of capital they can borrow is constrained by their level of collateral. These assumptions are common to many recent macro-financial models.

The authors then **investigate the effect of a fall in the interest rate on the economy's output**. They show that the effect of interest rates decline can be decomposed in two components. First, a **partial equilibrium (PE) effect**: holding the price of capital constant, a decline in



interest rate induces higher demand for capital by both incumbent and entering

The decrease in real rates generates a reallocation of resources from high-productivity incumbents to low-productivity new entrants.

The PE effect always has an expansionary effect on output. Second, a **general equilibrium (GE) effect**: as a result of higher demand for capital, the price of capital rises and hence the demand for capital by high productivity incumbent entrepreneurs falls. As such, the GE effect has contractionary effect on output. Consequently, the net effect of interest rate decline on output is ambiguous. Should the GE effect be large enough relative to the PE effect, the net effect may turn negative.

The authors then identify two conditions **under which interest rate declines have a contractionary effect** on output, i.e. under which the GE effect overturns the PE effect. First, **the elasticity of capital**

supply should be high to magnify the increase in the price of capital. Second, **financial constraints on borrowing** should be severe enough so that incumbent firms respond less to decreases in the interest rate and hence the PE effect is small.

Overall, the decrease in real rates **generates a reallocation of resources from high-productivity incumbents to low-productivity new entrants**. The authors demonstrate that this reallocation of resources is inefficient: new entrants do not internalize that the effect of their entry on the price of capital and hence on incumbents' production. **The assumptions of heterogeneity and financial frictions are key for this result to hold**: in a standard frictionless representative-agent model, a decrease in real interest rates is always expansionary.

Finally, the authors show that their main result is robust to a large number of extensions, such as adding a fraction of financially unconstrained firms; introducing decreasing returns at the entrepreneur level; and introducing wealth dynamics for entrepreneurs.



The Effect of Macroeconomic Uncertainty on Household Spending

Olivier Coibion, Dimitris Georgarakos, Yuriy Gorodnichenko, Geoff Kenny and Michael Weber, The Effect of Macroeconomic Uncertainty on Household Spending, NBER Working Paper No. 28625, March 2021. This paper was presented by Olivier Coibion (University of Texas at Austin) and discussed by Luigi Paciello (EIEF).

Following the seminal work by Bloom (2009), uncertainty has become a core topic in the policy debate. A recurring question has been, **how does households' uncertainty about future economic growth alter their current spending?** Empirical research has shown that measures of uncertainty do indeed spike during recession, hence suggesting that **shocks to uncertainty may be a driver of the business cycle**. However, this evidence is at best suggestive, as it is based on correlations. Clear causal relationship still has to be established as this paper attempts to demonstrate.

The main challenge to identifying clear causal relationships stems from the difficulty of **disentangling the effects coming from uncertainty itself from the effects coming from pessimism**. Indeed, both dimensions of the belief distribution about future economic growth matter, yet are very different. Uncertainty corresponds to the *dispersion* of the distribution of households' belief (the second moment of the distribution) while pessimism corresponds to the *average* of the distribution (the first moment). Because uncertainty and pessimism tend to rise together during recessions, separately identifying their effects on household spending is challenging.

To circumvent this difficulty, **the authors use a randomized controlled trial (RCT hereafter) design**. In a survey managed by the European Central Bank, they randomly split households in two groups: a control group and a treated group. Households in the treated group received one out of four "information treatments", which were **supposed to induce exogenous variations in either their level of pessimism or uncertainty**, i.e. the first and second moments of their belief distribution. For example, the first treatment informed them



about the average forecast about economic growth by professional forecasters (which was meant to affect the second moment). The authors then measured whether and, **if yes, by how much the information treatment did affect the average and dispersion of the households' belief distribution**. Later on, follow-up surveys measured households' spending and households' desire of investing in financial and real assets. Hence, this design allows them to rigorously follow the effects of change in uncertainty and/or pessimism on household's spending.

They find that the **information treatments were very successful in moving separately**

the first and second moments of the households' belief distribution, at the exception of the fourth treatment, which focused on the economic growth in the

Households' uncertainty has a statistically significant, large negative effect on their level of spending.

household's country rather than the whole eurozone area. Interestingly, the first information treatment, on the average growth forecast, ended up affecting both the first and second moments, and not only the first moment as expected. In contrast, the second treatment only affected the dispersion of beliefs, as expected. To sum up, **the different treatments did deliver different relative movements in beliefs**, which allowed the researchers to separately identify the effect of uncertainty and pessimism on households' spending.

The main result is that **households' uncertainty has a statistically significant, large negative effect on their level of spending**, both one month and four months after the treatment. As additional results, they also document that: 1) the decline in spending is **more pronounced for specific categories of goods: namely, the personal and recreational care goods**; 2) higher uncertainty **reduces** the likelihood that households buy **durable goods**; and 3) higher uncertainty induces a **reallocation of portfolio shares away from risky assets** (e.g. mutual funds or cryptocurrency). These results are key to understand the factors driving the decrease in aggregate demand during recessions.

NOTE

The video replay of Olivier Coibion's lecture is available online. [+](#)



Zero Lower Bound on Inflation Expectations

Yuriy Gorodnichenko and Dmitriy Sergeyev, Zero Lower Bound on Inflation Expectations, NBER Working Paper No. 29496, November 2021. This paper was presented by Dmitriy Sergeyev (Bocconi University) and discussed by Philippe Andrade (Boston FED).



The Great Depression of the 1930s has significantly changed the way policy makers envision the conduct of economic policy. The crisis was characterized by both a massive fall in economic activity and a protracted episode of deflation, which **left many subsequent generations of central bankers with an intense fear of deflation.**

More recently, these fears have been reinforced by the economic situation in Japan, which has been plagued by deflationary forces and stuck in a low economic growth regime for the past 30 years.

The central banks' fear of deflation episodes was also given **ample theoretical support by modern macroeconomic models.** In these models populated by forward-looking and optimizing agents, deflation episodes tend to have large economic costs. Indeed, the feedback loop between inflation and inflation expectations can result into out-of-control downward spirals. However, the modern macro models rely on the

questionable assumption of agents having full information rational expectations (FIRE). A growing literature yet shows significant divergence from the FIRE assumption. In this context, should we really worry about deflation?

In this paper, Gorodnichenko and Sergeyev first document that **households do not expect deflation, even when the economy has a high chance of going into deflation.** Using data from the Michigan survey of consumers and the Bank of Japan Opinion Survey, they compare the distributions of

inflation expectations to the distribution of realized inflation rates. They find that the distribution of inflation expectations is highly skewed and displays only very little mass below zero. By contrast, the distribution of realized inflation rates displays a significant mass below zero, especially in the Japanese case: households failed to predict these negative inflation rates. In other words, **consumers have a**

Households do not expect deflation, even when the economy has a high chance of going into deflation.

“zero lower bound” (ZLB) on their inflation expectations. In addition, they study the behavior of the distribution of inflation expectations over time, in both Greece and Japan, and find that **deflation expectations only react by a small extent to deflationary episodes.** The authors give some potential explanations for this phenomenon: *i)* the long history of positive inflation could have anchored inflation expectations well above zero, or *ii)* households dislike inflation and form their expectations according to the worst-possible scenario, hence overweighing high inflation outcomes.

Next, the authors **explore the implications of the “zero lower bound” on the inflation expectations for business cycle dynamics during deflationary episodes.** To do so, they add an exogenous constraint on inflation expectations (the ZLB) into an otherwise standard New Keynesian macroeconomic model. They model deflationary episodes as shocks to the real interest rate and compare the response of the economy with FIRE agents from that with agents with a ZLB on their inflation expectations. They find that **the effect of a deflationary shock is smaller in the model with a ZLB on inflation expectations.** Indeed, inflation expectations are stuck at zero and cannot adjust downwards, which effectively shuts down the traditional feedback effect on current deflation.

Finally, the authors also explore the model implications for monetary policy and show that forward guidance and negative interest rates become less powerful. In contrast, central bank communication can deepen the recession if it encourages the households to adjust their expectation downwards below the ZLB.

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