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Abstract

Major western central banks, such as the Fed and the ECB, reacted very mildly or not at all to the return of inflation since the second half of 2020. The huge balance sheets accumulated by those central banks over the global financial crisis and the pandemic are still at elevated levels and the recent correlation between inflation and the real exante policy rate is negative rather than positive violating Taylor's principle. The paper argues that at least part of those findings are due to the emergence of recession avoidance (RA) preferences at those central banks in the aftermath of the two crises. In the face of uncertainty such preferences assign higher importance to downward shocks to the output gap than to upward shocks to the inflation gap relatively to preferences that are symmetric in both gaps. The fact that prior to the global financial crisis and the pandemic the Fed and the ECB reacted in line with the prescription of Taylor's principle yields additional support for this conclusion. The paper discusses the extent to which this asymmetry in central bank preference is likely to persist in light of the longer run changes in monetary institutions and policies triggered by the two crises. Chinese monetary policy over the two crises was expansionary albeit to a lesser extent than those of the Fed and the ECB. RA preferences emerged in Japanese monetary policy long before, and intensified with, the outbreak of the last two crises. By contrast in countries with permanently loose monetary policies such as Argentina the main concern of the CB over the two crises remained inflation as was the case long before they occurred.

JEL Classification: E5, E4, E3, F3

Keywords: Recession avoidance, inflation, policy rates in aftermath of pandemic and global financial crisis

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Alex Cukierman[1]

May 25 2022

ABSTRACT

Major western central banks, such as the Fed and the ECB, reacted very mildly or not at all to the return of inflation since the second half of 2020. The huge balance sheets accumulated by those central banks over the global financial crisis and the pandemic are still at elevated levels and the recent correlation between inflation and the real exante policy rate is negative rather than positive violating Taylor's principle. The paper argues that at least part of those findings are due to the emergence of recession avoidance (RA) preferences at those central banks in the aftermath of the two crises. In the face of uncertainty such preferences assign higher importance to downward shocks to the output gap than to upward shocks to the inflation gap relatively to preferences that are symmetric in both gaps. The fact that prior to the global financial crisis and the pandemic the Fed and the ECB reacted in line with the prescription of Taylor's principle yields additional support for this conclusion. The paper discusses the extent to which this asymmetry in central bank preference is likely to persist in light of the longer run changes in monetary institutions and policies triggered by the two crises.

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1. Introduction

The global financial crisis (GFC) and the Covid-19 pandemic crisis (PC) led to substantial modifications in the application of monetary policy instruments and in the institutional position of the central bank (CB) within the public sector. Large scale asset purchases, negative interest rates and forward guidance became routine policy instruments, application of inflation targeting was flexibilized, many CBs were made responsible for systemic financial stability and the level of cooperation between the CB and the fiscal authority rose to levels that were largely taboo prior to the GFC. In light of those two crises focus shifted from inflation to recession and financial crisis prevention and deflationary rather than inflationary risks rose to the forefront of major central banks preoccupations.

However, supply disruptions caused by the PC, and more recently by the war in Ukraine, along with a sustained period of extremely low interest rates led to reemergence of inflation starting in the second half of 2020. This trend gathered momentum over 2021/22. By April 2022 the inflation reached about 8% in the US and in the Euro Area (EA), about 9% in the United Kingdom (UK) and around 4% in Japan. In spite of such large and sustained deviations from the 2% inflation target (IT), policy rates in those economies remained at very low, and even negative levels in the EA and Japan. By contrast, prior to the GFC the Fed and the European Central Bank (ECB) reacted sooner and more vigorously to smaller upward deviations from the IT.

Starting from this observation the paper hypothesizes that, following the deflationary trends experienced during the GFC and the PC the objective function of some major CBs became more sensitive to recessionary and financial stability risks relatively to inflationary risks in comparison to the pre- GFC era. More precisely. provided the reaction function of the CB prior to the GFC was symmetric in the output and inflation gaps, it became asymmetric in their aftermath – giving higher weight to downward shocks to the output gap than to upward shocks to the IT. Following Cukierman and Muscatelli (2008) I refer to this as recession avoidance preferences.[2] More detailed analysis reveals that the recent correlation between inflation and the US real exante federal funds rate is negative contrary to Taylor's principle. This is consistent with the view that

[2] They report such an asymmetry at the Fed under Burns/Miller and at the Bank of England prior to the introduction of IT.

this kind of asymmetry currently prevails at the Fed. Furthermore, in view of the changes that occurred in the institutional position of the Fed and its policy instruments during the two crises, part of this asymmetry is likely to persist. To a somewhat lesser extent those conclusions also apply to the ECB. This phenomenon has been present in Japan already prior to, and intensified, with the outbreak of the GFC. Like its western counterparts Chinese monetary policy expanded over the two crises but to a lesser extent and its policy rate invariably remained bounded away from the ZLB. In countries with permanently loose monetary policies such as Argentina the main concern of the CB over the two crises remained inflation as was the case long before their realization.

The paper's organization follows: As a benchmark section 2 describes the norms of desirable central bank conduct and position prior to the global financial crisis and the pandemic. Section 3 briefly describes changes in the application and type of monetary policy instruments triggered by the crises with particular focus on the implications of quantitative easing for the balance sheets of CBs. The evolution of policy rates over and after the two crises at the Fed, the ECB, the People Bank of China, the Bank of Japan, the CB of Korea, and the Banco Central de la Republica Argentina are documented and discussed in section 4. Evidence on the emergence of inflation avoidance preferences at the Fed and the ECB, and on their persistence is presented in section 5. This is followed by concluding remarks.

2. Norms of desirable central bank policies and position prior to the global financial crisis and the pandemic

The common view about the division of labour between fiscal and monetary policies prior to the GFC and the PC was that stabilization of the cycle should be left mainly to monetary policy implemented by a politically independent CB. Due to its longer decision-making lag and political nature, the role of fiscal policy (FP) in short run stabilization policy should be limited to the operation of automatic stabilizers.

During the two decades preceding these two crises the following consensus on monetary policy and institutions emerged: The main objective of monetary policy is to maintain price stability in the medium and long terms. This objective is operationalized in terms of an inflation target (usually 2 percent). As long as inflation does not deviate too much and/or too long from

the target, monetary policy can and should be used to reduce the output (or growth) gap.[3] The conduct of monetary policy should be delegated to an independent CB with full authority to set policy interest rates and to conduct open market operations mainly in safe government bonds. The interest rate is the main instrument of monetary policy and open market operations should be devised so as to support decisions about this instrument. Direct lending to government and interference with the instruments of monetary policy is prohibited. It bears repeating that since it can react more swiftly than fiscal authorities to changing circumstances most of the burden of short stabilization of the inflation and output gaps was expected to be borne by the independent CB.

In parallel, the New-Keynesian framework provided a micro-founded sticky prices conceptual framework that recognized explicitly the central role of forward looking expectations for the conduct of monetary policy within an IT framework.[4] In this micro-founded version of IT, an independent CB picks the short-term interest rate (taking the structure of the economy and of inflationary expectations as given), so as to minimize a weighted linear combination of the social costs of the inflation and output growth gaps. Here the first gap is the deviation of inflation from the IT and the second gap is the deviation of actual growth from its desired level.

This elaborate New-Keynesian framework, known as "Taylor's rule" was first suggested without micro-foundations by Taylor (1993) as a practical policy recommendation. It implies that, when either of the two gaps increases the CB should raise the exante real rate. Although the CB controls directly only the nominal rate it aims at attaining a real rate that minimizes a linear combination of the deviations of inflation from its target and of real growth from desired growth. Along with the definition of the exante real rate the rule implies that, when inflation is expected to increase, the nominal rate should be increased by more than the increase in expected inflation.

3. Changes in central banks' instruments and policy conduct triggered by the global financial crisis and the pandemic

[3] Although most CBs were sensitive to financial stability considerations this objective did not take center stage until the arrival of the GFC.
[4] Woodford (2003) and Gali (2008) are prominent examples.

The GFC led to a much heavier reliance on unconventional (at the time) monetary policy instruments, the most important of which are quantitative easing (also labeled as large-scale asset purchases by the Fed), forward guidance and mainly, in some smaller open economies, to forex interventions.

Quantitative easing: Buying or selling assets by the central bank is a normal byproduct of conventional interest-rate policy even during normal times, since maintenance of the policy rate at the level desired by the central bank has to be supported by injection or removal of liquidity through the buying or selling of assets. There are several factors that distinguish asset purchases during the crisis from their normal-times counterparts. Most importantly, the bulk of such purchases were done once the policy rate reached the zero lower bound (ZLB). The heavier reliance on QE in major developed economies like the US was triggered by CBs in such countries to circumvent the ZLB. In some countries such as Switzerland and the Euro area it led to the emergence of negative policy rates effectively pushing the rate bound below zero. The lower this effective lower bound (ELB) the more difficult it is to maintain it due to the larger return difference between cash and short term obligations.

Relatedly the range of assets purchased by CBs expanded dramatically. Rather than limiting itself to government debt CBs, such as the Fed, bought mortgage-backed securities and other types of commercial debt. During the immediate aftermath of Lehman's fall, the Fed also bought banking stocks in an attempt to strengthen the capital position of the banking system. In reaction to the panic that engulfed financial markets in the immediate aftermath of Lehman's collapse, QE was used mainly to inject liquidity into the capital market. After two-three years the main objective became the revival of economic activity and reduction of unemployment. Although it engaged in some limited asset purchases already in 2008–2009, the ECB started to engage in large-scale asset purchases only at the beginning of 2015. Prior to that, the bulk of its liquidity injections operations were done through limited-term advances to the banking system.[5]

QE in the US and limited term advances in the Euro area (EA) led to some hitherto unseen massive expansions in the balance sheets of the Fed and of (the highly conservative) ECB as well as in banking reserves. The rates of growth of those two balance sheets started to accelerate during 2007 reaching temporary plateaus; the Fed over 2014 and the ECB during 2012. Over

[5] Further details appear in Cukierman (2014).

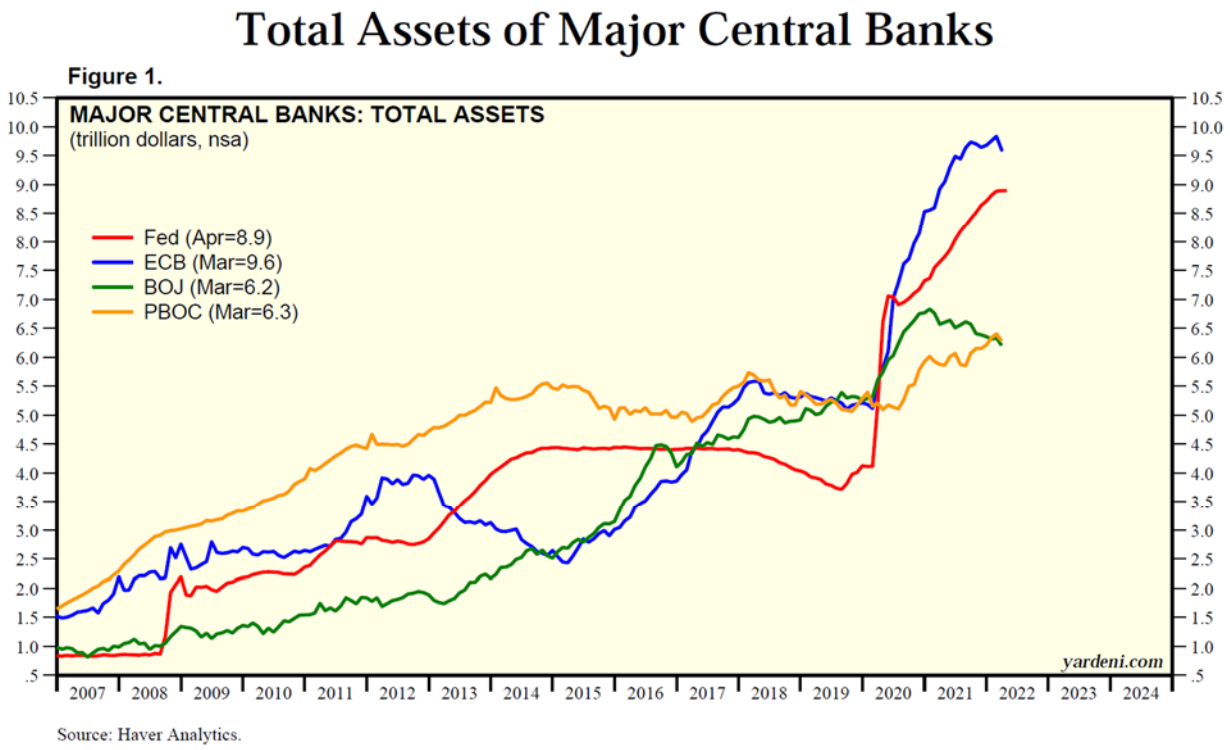
those respective periods the Fed's balance sheet (BS) had expanded 5.6 times and that of the ECB by a factor of 2.7. Figure 1 shows the evolution of the BSs of those two CB along with those of the People Bank of China (PBOC) and the Bank of Japan (BOJ) between 2007 and 2022. The figure reveals that the balance sheet of the PBOC between 2007 and 2014 is qualitatively similar to that of the Fed but with a smaller expansion factor of 3.2.[6]

Figure 1 shows that after reaching their respective plateaus and till the outbreak of the Covid-19 which was that of the ECB. But in 2015 when, under Draghi, the ECB started to use QE on a grand scale the rate of growth of its BS increased substantially reaching a second higher plateau over 2018/19. Tapering was quickly discarded with the outbreak of the PC and the BSs of all three CBs resumed upward trends. The BS expansions of the Fed and of the ECB, which doubled over 2020/1, were particularly dramatic, In addition to preventing financial instability a main objective of this renewed reliance on QE was to help finance the large fiscal deficits created in response to the pandemic (Cukierman (2021).[7]

The Bank of Japan (BOJ) had been using QE on a substantial scale long before the GFC. This trend intensified with the collapse of Lehman Brothers in September 2008. Since then the BOJ followed an almost continuous expansionary path reaching a peak during 2021. Between September 2008 and this peak the BOJ BS had increased by more than 6.5 times

[6] Part of asset expansion within the PBOC was due to reserve accumulations designed to slow down appreciation of the Yuan.

[7] In view of the large deficits some economists such as Gali (2020) even advocated the use of seignorage. In the UK the Bank of England (BOI) and the treasury reached an agreement that allows seignorage financing for a limited period of time.



Reproduced from Yardeni Research Inc. (2022)

Negative interest rates: During the GFC and its aftermath negative inflation rates along with economic activity below potential induced a number of central banks to experiment with negative policy rates. Sweden, Denmark, and Switzerland set their deposit rates at negative levels to preserve competitiveness and to induce banks to lend. During the first quarter of 2015, the ECB adopted a negative deposit rate mainly in order to stimulate banks' lending. A similar policy was enacted in early 2016 by the Bank of Japan. Negative rates on banking reserves mean that banks have to pay for keeping deposits at the central bank. It appears at first blush that those developments imply that the ZLB is not as binding as was believed in the past. A more sensible interpretation is that the bound may be reduced somewhat below zero but that as long as the returns on cash is zero, it is not possible to reduce the policy rate substantially below zero. This requires adjustments in the standard IT system if the natural rate is expected to be substantially

below zero for an extended period of time as suggested by estimates due to Cúrdia (2015) and Cúrdia et al. (2015).[8]

Forward Guidance: Like QE and forex interventions, forward guidance is not a new monetary policy instrument. However, the ZLB constraint, along with widespread use of QE in the United States and more recently in the euro area, made it an effective complementary policy tool. Obviously, for this to be effective, preannouncements of future policy plans have to be subsequently delivered. This may be a problem if unexpected future developments call for deviations from previously announced policies.[9] Following experimentation with date-based statements about the target policy rate through 2012, the Fed started to handle this difficulty by using contingent forward guidance. In 2013, the Fed announced numerical thresholds for the rate of unemployment and inflation. In particular, it stated that the target policy rate will stay low as long as unemployment is above 6.5 percent and inflation remains at or below 2.5 percent. In his memoirs, Ben Bernanke (2015, 532) stresses that the figure for unemployment was a threshold rather than a trigger in the sense that the Federal Open Market Committee (FOMC) would not even consider lifting the policy rate as long as unemployment was above 6.5 percent.

In the face of mounting doubts about the viability of the EA, President Mario Draghi of the ECB uttered the following famous strong signal: "*Within our mandate the ECB will do whatever it takes to preserve the Euro. And believe me, it will be enough* ". (Draghi (2012).

4. A long run view of monetary policy rates with particular focus on the global financial crisis and the pandemic

The GFC and CP periods in developed economies were characterized by extended periods during which policy rates were at the effective lower bound (ELB).[10] This section presents an overview and a discussion of the evolution of policy rates in some developed and developing economies.

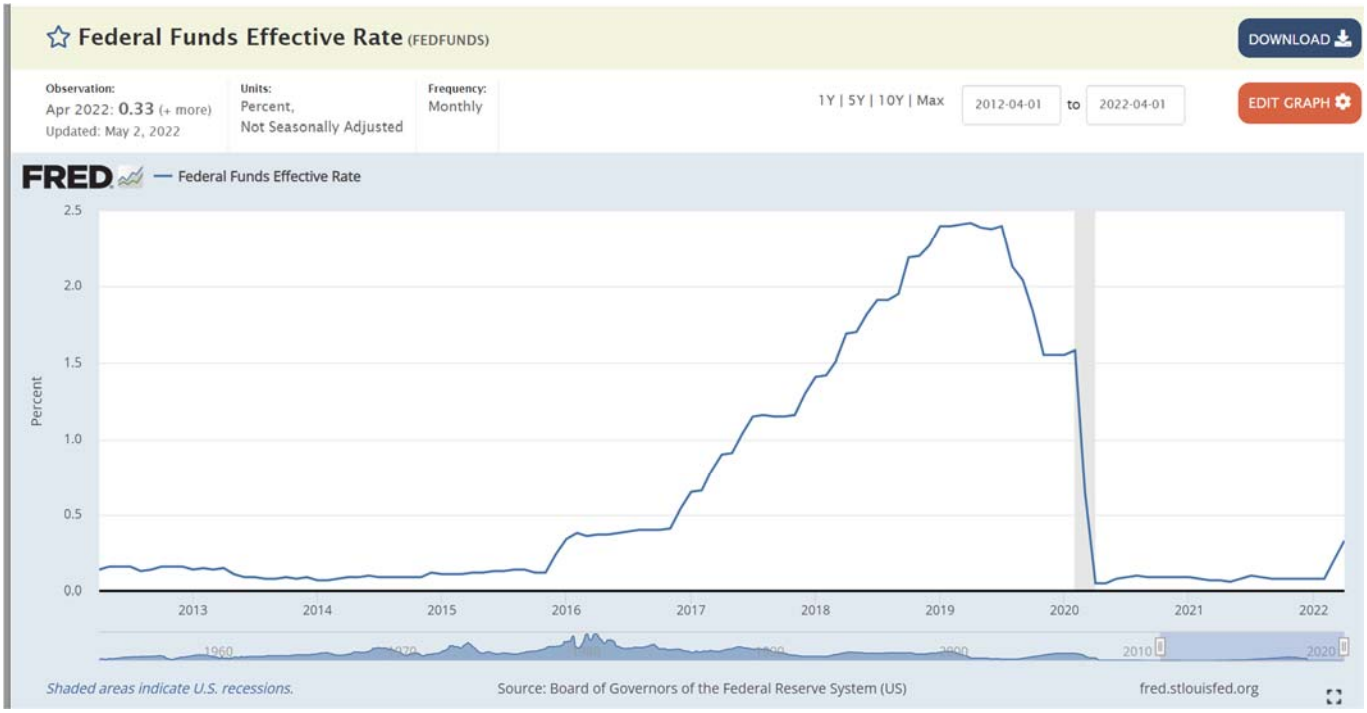
[8] Cukierman (2016) argues that those estimates are likely to be biased downward

[9] An extensive survey of recent literature on central bank communications appears in Moessner et al. (2016).

[10] Since the ELB concept may be negative it includes the ZLB as a particular case.

The US Federal Funds Rate (FFR): During the boom years prior to the GFC the Fed gradually raised the FFR to over 5% (Figure 2b). Following the collapse of Lehman Brothers in September 2008 the FFR dropped to the vicinity of the ZLB and remained there till the end of 2015. Figure

Figure 2a: US Federal Funds Rate 2012-2022



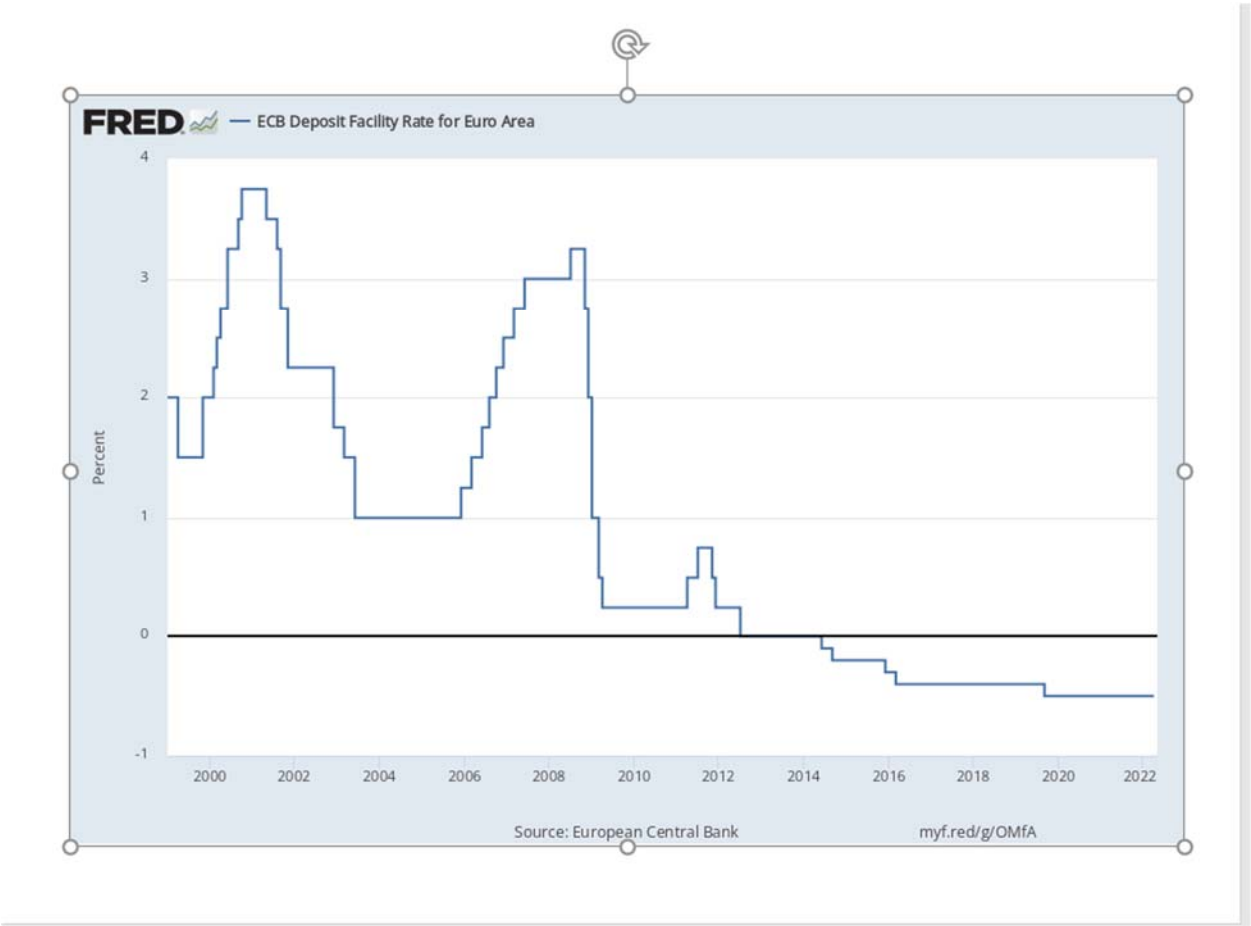
2a shows that, since 2016 as economic activity recovered, it resumed an upward gradual trend reaching a peak of 2.4% over 2019. Since summer 2019 a gradual negative trend appeared hitting the ZLB in April 2020. The Fed started to raise the FFR away from the ZLB only in March 22. By that time CPI inflation had been above 5% for about ten months.

Figure 2a: US Federal Funds Rate 2012-2022

European Central Bank (ECB) Deposit Facility Rate (DFR) for Euro Area: From inception and by institutional design the ECB had been rather conservative focusing mainly on inflation. Figure 3 suggests that, excluding a few years between 2003 and 2005, the relatively high DFR prior to the GFC is in line with this observation.[11] It also explains why the ECB did not reduce the DFR all the way to zero with the onset of the GFC reaching it only in 2013 under president Draghi who replaced the rather conservative Trichet in November 2011. But in the face of persistent deflation the institutional conservativeness mollified even further since 2015 when the DFR dipped into negative territory remaining there (under Laguarde) to this day. Interestingly, it appears that the need to deal with economic crises due to the GFC and the CP slanted the choice of presidents away from the strict conservativeness originally built into the ECB charter.[12]

[11] Note that, other things the same, the ECB DFR is lower than the Fed FFR since it is a deposit rate while the latter is a lending rate.
[12] A detailed account of ECB's monetary policy since its creation in 1998 till 2018 appears in Hartman and Smets (2018)

Figure 3: ECB Deposit Facility Rate



China Prime Lending Rate (PLR): The PLR is the rate major banks charge their most creditworthy customers. It is calculated as a weighted average rate quoted by major banks on loans; the weights are the shares of each bank in the volume of loans. Although it resonates as a market rate its current main determinant is the policy of the PBOC subject to approval by the State Council. During the early twenty first century the PLR completed a substantial drop from 12% to the 5-6 percent range, rising to almost 8% over the world expansionary period and dropping back to that range shortly after the Lehman event. After a temporary increase during 2012 it dropped again reaching a plateau of 4.35% in 2016. The PBOC maintains the 4.35% rate to this day. In comparison to the Fed and the ECB China's policy rate is uniformly higher. This is partly due to the fact that it is a somewhat longer lending rate than the policy rates of the Fed and the ECB. Like its Western counterparts the PBOC reduced its rate following the GFC panic and maintained it at the 4.35% historically low level over the PC. But unlike the Fed and the

ECB the PLR kept a healthy distance from the ZLB most likely because of China's much higher rate of growth.

Due to the authoritarian nature of the regimes the PBOC does not possess instrument independence of the type enjoyed by its Western counterparts. It basically is an executor of the State Council's policy. Over the years Chinese monetary policy gradually shifted from mainly intermediate quantitative targets to a hybrid system that combines both quantitative and interest rate targets. A detailed account appears in Jones and Bowman (2019).

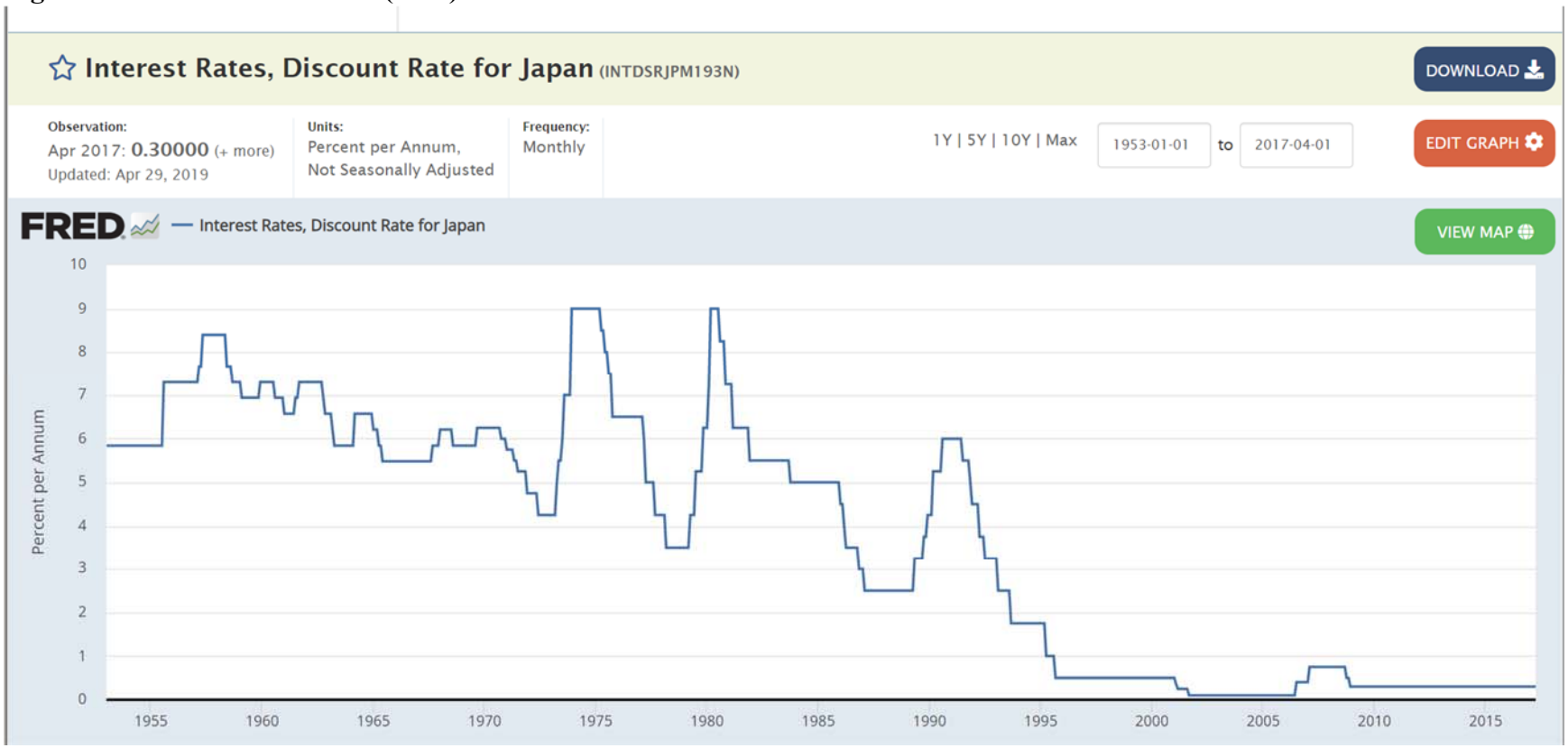
Figure 4: China Prime Lending Rate

https://tradingeconomics.com/china/lending-rate

BOJ Policy Rates: Figure 5a shows the BOJ Discount Rate (JDR) between 1955 and 2017. During the boom years preceding 1995 the lower bound on the JDR has been higher than 2.5% and was occasionally even raised to 9%. The rate gradually declined from about 6% in the early nineties to about half a percent in late 1995. It was reduced further to 0.3% in December 2008 staying at this level till March 2022.

Unsurprisingly, a similar long run decreasing pattern appears also in the JDPR shown in Figure 5b. The JDRP hits the ZLB already in the mid-nineties and is negative since 2016.

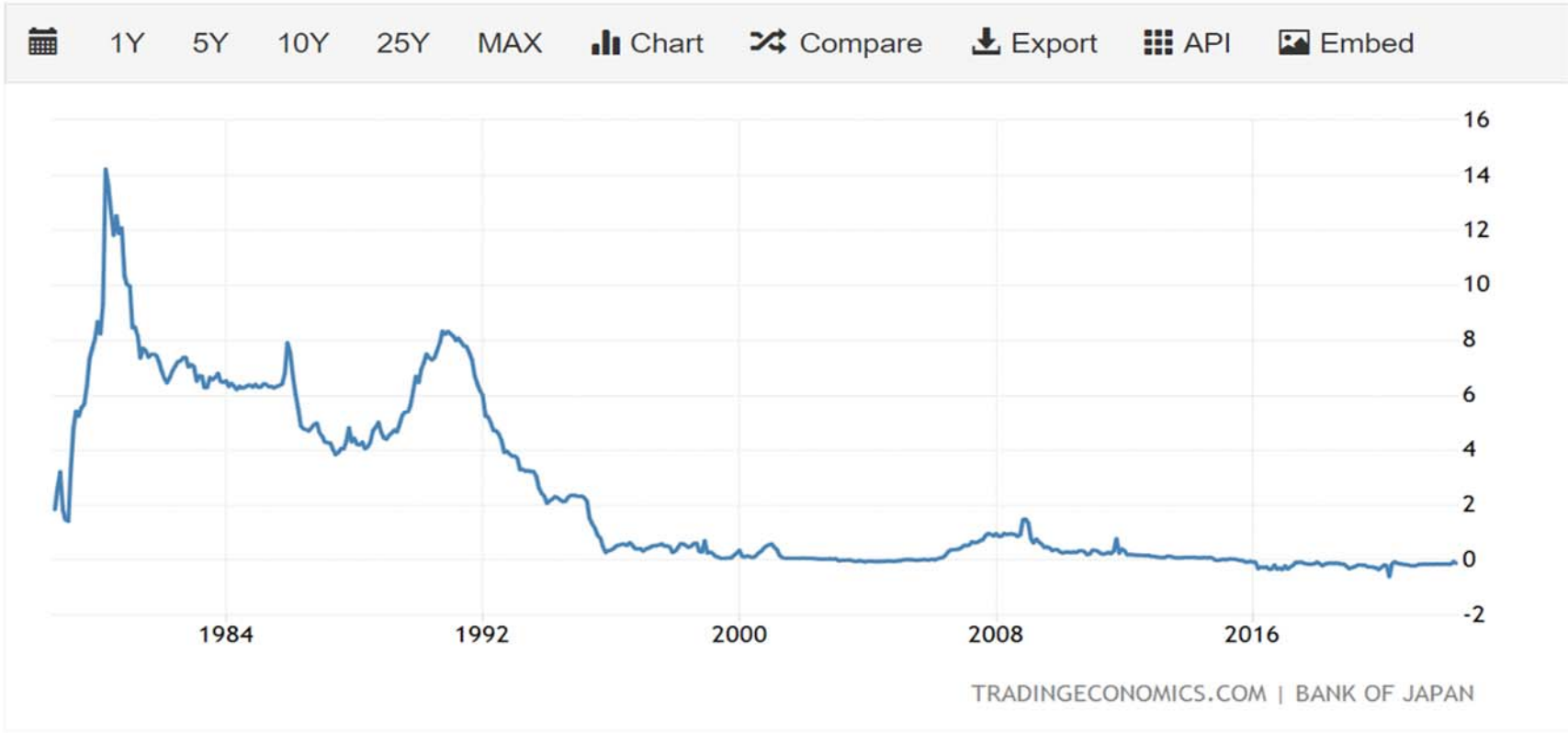
Figure 5a: BOJ Discount Rate (JDR)



https://fred.stlouisfed.org/graph/?id=INTDSRJPM193N

Between December 2008 and March 2022 the Basic Discount Rate and the Basic Loan Rate have been 0.3%.

Figure 5b: Japan Deposit Rate (JDPR)

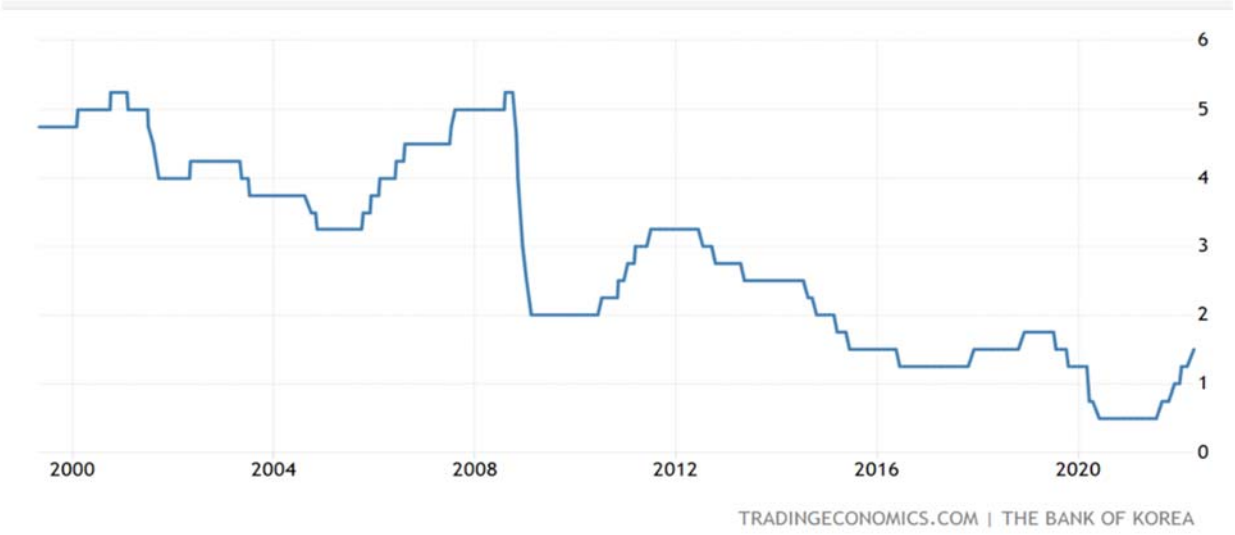


https://tradingeconomics.com/japan/deposit-interest-rate#:~:text=Deposit%20Interest%20Rate%20in%20Japan%20averaged%202.33%20percent%20from%201978,Deposit%20Interest%20Rate%20in%20Japan.

Since Jan 2016 JDPR has been negative.

Bank of Korea Policy Rate (BKPR): During the early twenty first century the BKPR was reduced gradually from around 5% to a bit over 3% for a short period in 2005, During the boom years preceding the GFC it was raised gradually back to the 5% range. Following Lehman's collapse, it was reduced precipitously to 2% but resumed an upward trend toward a temporary plateau above 3%. Since 2012 the SPKR developed a gradual downward trend dipping to about half a percent shortly after the outbreak of the PC. Finally, the Bank of Korea reversed this trend by raising the policy rate over 2021 to moderate developing inflation.

Figure 6: Central Bank of South Korea Policy Rate



https://tradingeconomics.com/south-korea/interest-rate

Banco Central de la Republica Argentina (BCRA) Leliq rate (ALR) and Argentinian Inflation: The ALR is a short term reference rate set by the central bank. Its behavior vividly illustrates what happens when, due to weak central bank institutions, inflation and inflationary expectations are allowed to move into the double digit range.[13] Although the legal independence of the BCRA is non negligible political interference with monetary policy has been and is still quite common leading to violent inflationary outbursts and numerous series of stabilization

Figure 7a: 7 days Leliq Rate

[13] An additional example is Turkey.

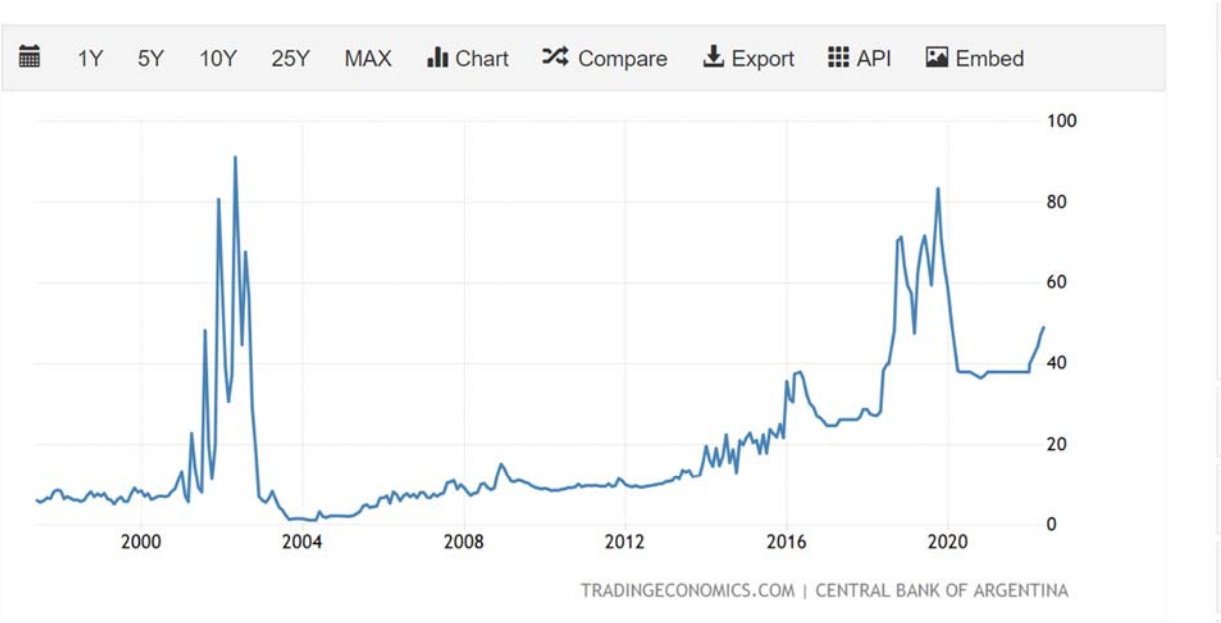


Figure 7b: Inflation in Argentina

plans that fail after a while. Comparison of Figures 7a and 7b shows the very close **positive** correlation between inflation and the ALR suggesting that causality runs from inflation to the policy rate. This stands in stark contrast to effective inflation targeting regimes in which the correlation between the policy rate is normally **negative**. Essentially, high inflation and

inflationary expectations force the CB to raise the policy rate in order to avoid extremely negative dips in the real rate.

Figures 7a and 7b show that following the demise of the convertibility plan and the ensuing inflation the ALR climbed to over 80% inducing an additional stabilization plan that reduced inflation and the ALR for a while in 2004. From that point and on both inflation and the ALR have been creeping upward. Following an inflationary outburst formal inflation targeting was adopted in 2016.[14] This temporarily reduced both variables only to be followed by another inflationary outburst to 60% in 2020. Uncharacteristically the BCRA reacted by raising the policy rate by even more to 80%. This reduced inflation only momentarily as the BCRA let the ALR lag behind inflation thereafter.

Discussion: The GFC and the PC forced CB such as the Fed and the ECB into deflation and the ELB. In stark contrast the lesson from countries with inflation in double digit inflation such as Argentina and Turkey is that the main problem is inflation rather than deflation in spite of those two crises. This leads to the suspicion that pre-crises good practice implementation of IT over those crises was too strict.

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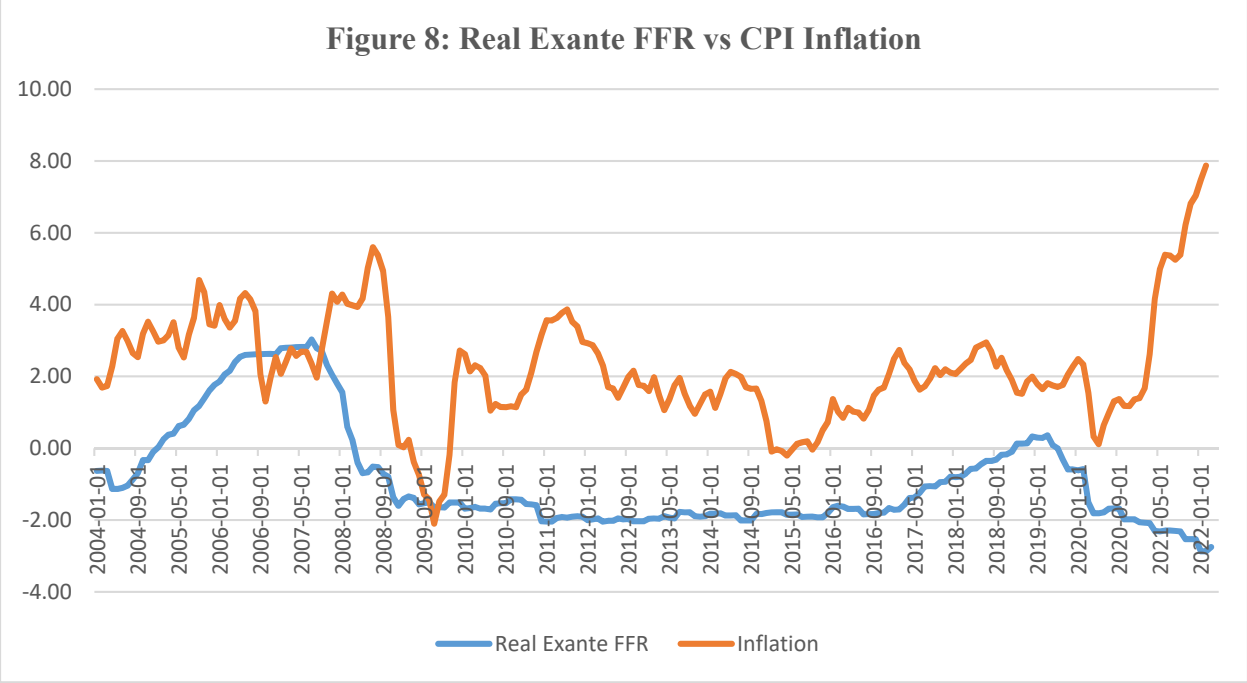
5. Emergence of deflation aversion in some major central banks: possible reasons and persistence

Background: Throughout the GFC and most of the PC inflation was dormant and policy rates were very low parking at the ELB in many developed economies. In particular, except for a time interval between 2016 and the beginning of the pandemic the US FFR was stuck at the ZLB between fall 2008 and spring 2022 (Figures 2a). The ECB deposit rate hit the ZLB in 2012 and since 2015 has been in negative territory up to this day (Figure 3). Those policies were initially enacted to prevent the collapse of the financial system and the ensuing recession characterized by deflationary rather inflationary pressures. In parallel, as discussed in section 3, both CBs engaged in large scale QE operations to counter the adverse effects of both crises and to facilitate the financing of large fiscal packages deployed during the GFC and the huge packages over the PC. As a consequence, when inflation started to pick up during the second half of 2021 the balance

[14] IMF Western Hemisphere Department (2016).

sheets of major Western CBs (Figure 1) and public debts were, and still are, at all times historical heights.

Evidence on emergence of a dominant recession avoidance at the Fed: Good practice IT as embedded in one form of the Taylor principle requires that in the face of rising inflation the CB should respond by increasing the exante real policy rate. In what follows I examine the extent to which this principle has been followed before and after the recent revival of inflation in the US. This is done in Figure 8 by plotting the evolution of the real exante FFR and of CPI inflation. The real exante FFR is calculated as the difference between the monthly FFR and the average one year ahead expected inflation from the Survey of Professional



Forecasters (SPF).[15] The Figure shows that after a temporary dip to 0.12% in May 2020 inflation climbs to over 4% in April 2021 reaching about 8% at the beginning of 2022. In stark contrast to

[15] Among the existing various data sets designed to capture inflationary expectations the SPF expectations are likely to be closest to those of the business community as well as those of policymakers at the FED. Those expectations are published at quarterly frequencies and are documented at:
https://www.philadelphiafed.org/surveys-and-data/real-time-data-research/survey-of-professional-forecasters

the Taylor principle the exante real FFR rate has been decreasing monotonically over the same period, rather than increasing. Essentially, in the face of rising one year ahead inflationary expectations, the Fed did not adjust its policy rate at all during 2021, and when it finally started to do that in 2022, the adjustment was smaller than the increase in inflationary expectations. This happened in spite of the fact that, after a deep but short recession in 2020, US employment and GDP growth recovered nicely over 2021.

This policy is consistent with the view that, in the aftermath of more than a decade dominated by low inflation, interest rates and negative output gaps, the Fed's objective function became asymmetric. In particular, in the face of uncertainty about the output gap, financial stability and inflation the Fed became more averse to negative shocks to the output gap and financial stability than to positive deviations of inflation from the inflation target. In the spirit of Cukierman and Muscatelli (2008) I refer to this asymmetry as "**dominant recession aversion**" preferences.[16] Through estimation of nonlinear Taylor rules within a New-Keynesian framework for the US and the UK they report that the dominant type of asymmetry in monetary policy (recession avoidance versus dominant inflation avoidance) often changes in line with the most acute recent macroeconomic problem. The pre GFC boom years are consistent with this finding. Figure 8 shows that as inflation increased from the 2% target in 2004 to over 4% during 2005/6 the exante real rate gradually increased in line with the Taylor principle. Thus, when the main problem had been inflation and excessive exuberance in financial markets monetary policy reacted in line with Taylor' principle.

A digression on interest on reserves (IR): Since the onset of the GFC the Fed has been paying interest on banks' reserves. Figure 9 shows that, as was the case with the FFR this rate was maintained in the vicinity of the ZLB throughout the GFC. It was then gradually raised, starting in 2016, reaching a brief plateau of almost 2.5% over 2019 and plunging back to the ZLB over the PC. It resumed a modest upward trend only during the first quarter of 2022. In summary, the

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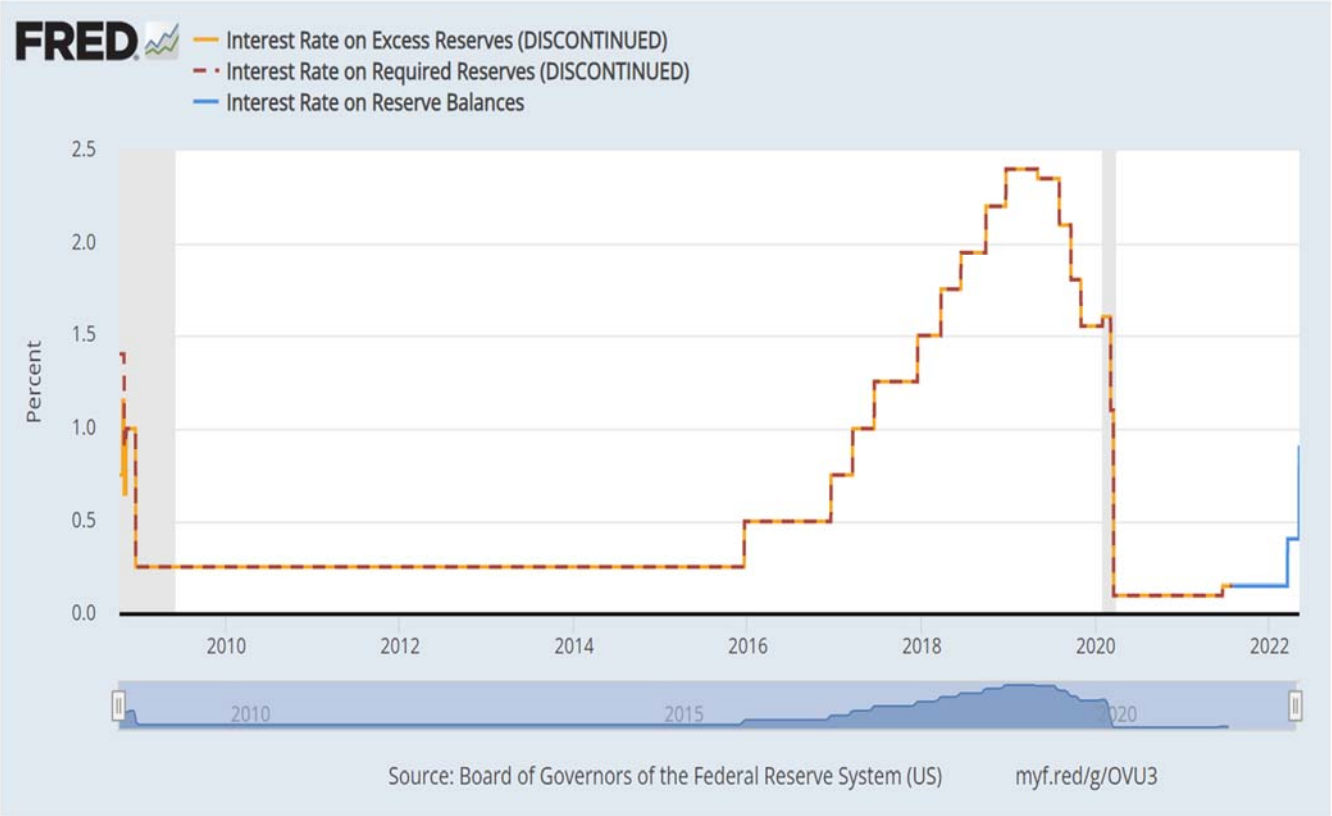
Monthly expectation in the figure within each quarter are approximated by the uniform quarterly observation. Although this abstracts from within quarters variations in expected inflation it is unlikely that this invalidates the main conclusion of this section since the variation across quarters is moderate.

[16] Estimation of nonlinear Taylor rules within a New-Keynesian framework for the US and the UK by Cukierman and Muscatelli (2008) supports the view that the dominant type of asymmetry in monetary policy (recession avoidance versus dominant inflation avoidance) often changes in line with the most acute recent macroeconomic problem.

qualitative behavior of the IR is similar to that of the FFR supporting the hypothesis that in the aftermath of the two crises the Fed has developed a dominant recession avoidance.

Figure 9: Interest Rate on Excess Reserves and on Reserves



How persistent is the Fed's current recession avoidance (RA)?: Several processes combined to produce policy behavior that is consistent with the Fed's timid reaction to inflation. One may simply be that what this paper identifies as RA is actually based on Fed policymakers' belief that recent inflation is transitory and does not necessitate contractionary monetary measures. Although this may be the case for some negative supply shocks caused by the CP in areas such as sea and air transportation, the real US recovery along with a persistent period of price increases in assets and real estate markets suggest that the recent acceleration of inflation is rather persistent. This is reinforced by persistent shortages in world supplies of food, energy and international trade due to the war in Ukraine and sanctions on Russia. Moreover, public speeches by Fed officials suggest that FOMC members believe that a substantial part of current inflation is

persistent supporting the view that the Fed's slow reaction to inflation acceleration is largely due to the emergence of RA. Actually the emergence of RA after 15 years of low economic activity and deflation over the GFC and the PC should not be too surprising. Those years have conditioned policymakers operating in an uncertain world to be particularly averse to negative output shocks and to unanticipated financial shocks that might recreate adverse states similar to those experienced over those two crises.

How likely is it that the Fed's RA will persist into the future? An immediate observation is that the more persistent the recent revival of inflation, the more likely it is that RA will recede into the past and that recessionary and inflationary risks will be treated symmetrically. But, beyond this consideration RA is likely to persist for several reasons due to long term institutional and policy changes that occurred over the GFC and the PC. The first is due to the fact that the GFC led to a far-reaching, process of regulatory reform aimed at identifying systemic risk early on and closing pre-crisis regulatory loopholes. The July 2010 Dodd-Frank Act charged the Fed with supervision and regulation of systemic risks and, in parallel, gave it more authority in comparison to the pre-crisis era.

By introducing legislation that explicitly makes the CB accountable for systemic financial stability this institutional change is likely to induce persistent hesitancy toward strict application of a symmetric Taylor rule. The huge public and private debt levels accumulated over the two crises reinforce the view that this change in the Fed's objective function is likely to persist for as long as total debts remain at elevated levels. Beyond fear of triggering a financial crisis and associated recession the Fed's slow reaction to rising inflation is also motivated by a desire to avoid excessive increases in public debt service. This is also likely to persist since reduction of public debts normally takes a long time.

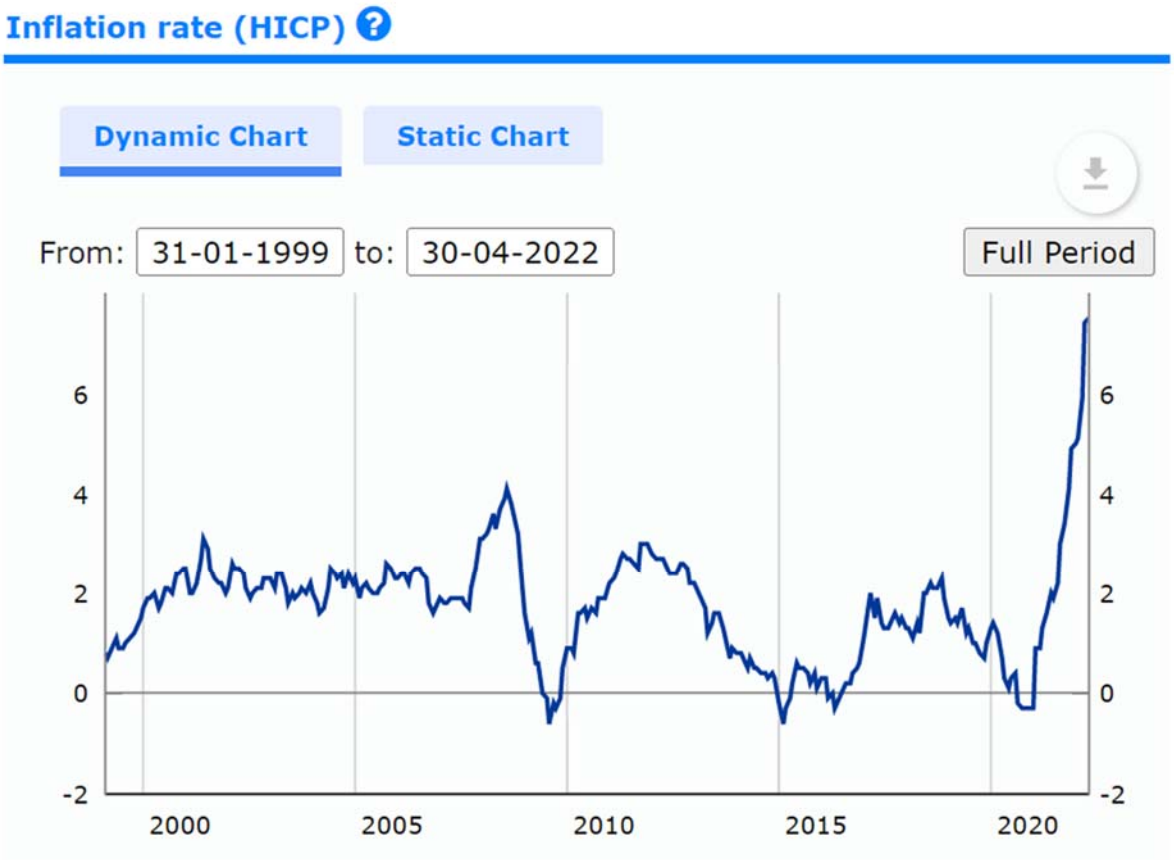
Is there evidence on emergence of a dominant recession avoidance at the ECB?:

Figure 10 shows the evolution of the Harmonized Index of Consumer Prices (HICP) in the Euro Area (EA) since the creation of the ECB till April 2022. The HICP reached three upward deviations of inflation from the 2% target during that period: The first (around 4%) in the pre-GFC period, a second (about 3%) during the GFC and a 7% peak in early 2022. The first inflationary bout was extinguished swiftly through determined tightening by the ECB. The second peak triggered a milder a contractionary reaction on the part of the ECB and the largest third peak no reaction at all (see Figure 3). Part of this inaction is due to evidence from the ECB

Survey of Professional Forecasters supporting the view that the recent acceleration of inflation is believed to be temporary (ECB Press Release (2022)).[17]

However, the fact that, in the face of a sustained acceleration of inflation from zero to 7% over the last year and a half the DFR remains at -0.5% since 2019, is consistent with the view that the two crises led to some degree of recession avoidance preferences also at the ECB. Furthermore, the creation, in 2014. of a European Banking Union which makes the ECB responsible for macro-systemic stability and the supervision of 129 significant banks within the European Union injects persistence into this preference change.[18]

Figure 10: Inflation in the Euro Area



[17] Medium and long term inflationary expectations are somewhat better anchored than in the US
[18] A fuller account of regulatory reforms at the Fed and the ECB appears in section 6.5 of Cukierman (2019).

6. Concluding remarks

The main messages of this paper are: 1. Major Western CBs, such as the Fed and the ECB, developed recession avoidance preferences over the GFC and the PC. Interestingly during the GFC Ball (2013) and others have proposed to raise the IT to 4% in order to deal with persistently negative output gaps.[19] 2. Due to structural reforms making those CBs responsible for systemic financial stability this phenomenon is likely to persist for some time. 3. In 1980 Volcker stabilized the stagflation of the seventies in the US by means of large and swift increases in the policy rate. Major Western CBs are unlikely to apply such cold turkey medicine again for at least two reasons: First, in view of much larger stocks of public and private debt, a precipitous increase in the policy rate carries larger risks of financial instability in comparison to Volcker's stabilization. Second, following the regulatory reforms triggered by the GFC those CBs now have legal responsibility for systemic stability.

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[19] Although this is not reported here explicitly there is evidence that a similar phenomenon is occurring at the Bank of England.

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