

Monetary policy: economics, politics, markets

If you followed macroeconomic news at all the last few years, you will certainly be familiar with the names and faces of several central bankers: Christine Lagarde of the ECB, Jerome Powell of the Fed, and maybe even Kazuo Ueda, the governor of the Bank of Japan. Their press conferences are widely watched, and their words interpreted by a host of commentators and analysts.

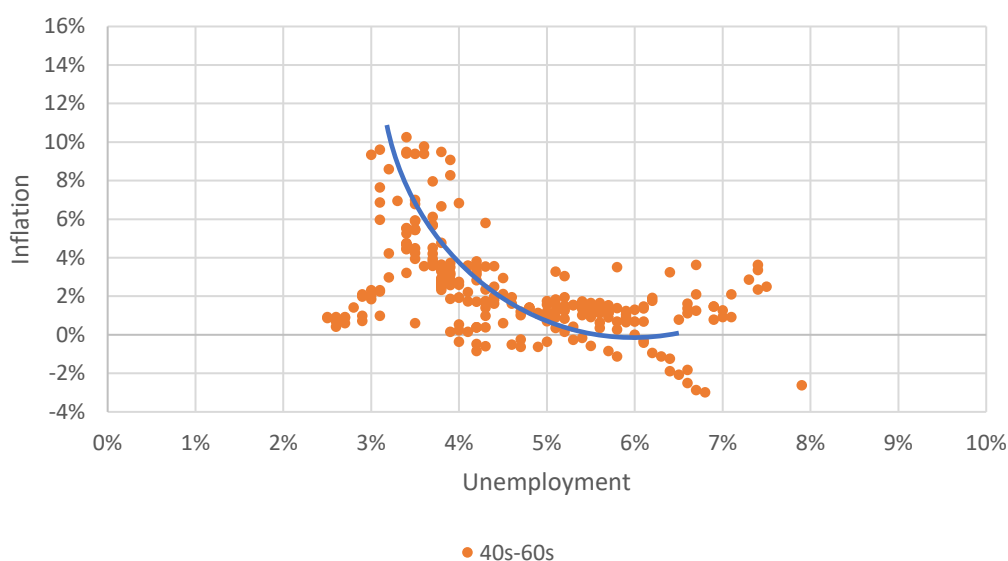
Even on the face of it, this is a surprising state of affairs. In our capitalist, market-based, economy, how did we get to a situation where government bureaucrats, whose job is the seemingly mundane task of “maintaining price stability” have such prominence?

It was not always so. As so often, to understand today’s situation we have to go back and look at the way history shaped our understanding of the economy, and what it has meant for the institutions of the 2020s.

For a long time, money was based on gold or other precious metals, of which money was made or for which it could be exchanged. Even in the decades after World War II, the Bretton Woods system fixed prices between gold, the US dollar, and other Western currencies. This was finally abandoned in the early 1970s. No longer was every dollar backed with gold. Rather, Western countries now issue fiat money, paper not backed by anything but its status as legal tender. This has liberated central banks to decide for themselves how much money to supply to the economy. At the time there was an understanding that money was not neutral: changing the amount of money circulating in an economy had effects on both inflation and economic growth.

The wisdom of the day was characterized by the so-called Phillips curve, which showed a trade-off between inflation and the rate of unemployment, the latter an indicator for how close the economy was operating to its maximum capacity. Lower unemployment – that is, less slack in the economy – was associated with higher inflation and vice versa. Indeed, if you look at the data from the 1940s to the 1960s, there seemed to be a reasonably tight relationship between the two.

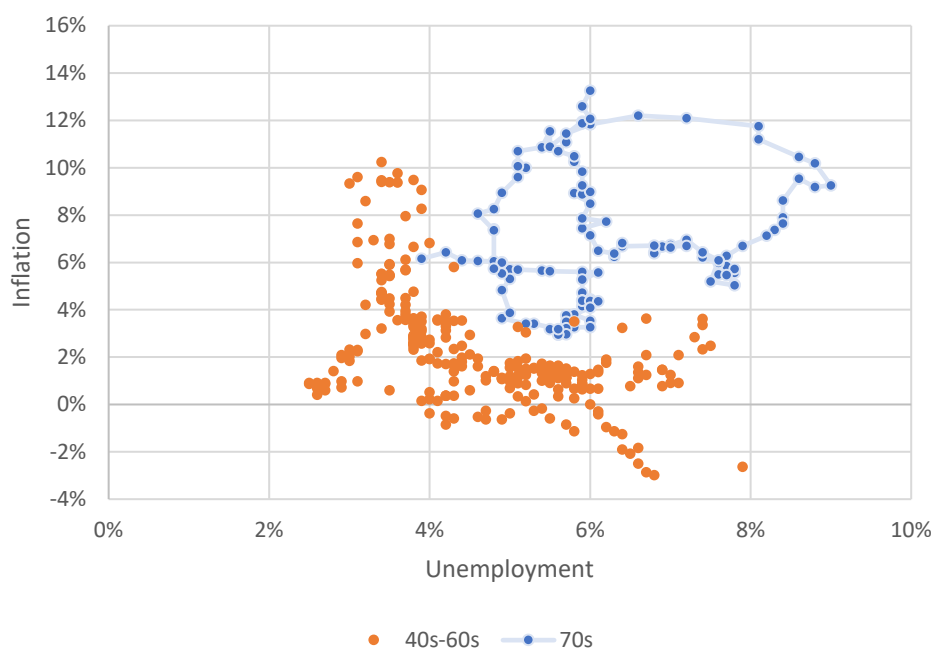
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The Phillips curve, using monthly data for the US 1948-1969. Source: BLS, Macrobond

In those days, quantitative economic modelling using state-of-the-art computers was becoming popular. Economists saw the economy as a kind of giant machine, for which they were just learning the settings. To economists and to politicians, the Phillips curve looked like an exploitable aspect of the economy, where a little extra inflation could be used to cause unemployment to come down. At the time, in most countries, central banks were a part of the ministry of finance and could be instructed to increase the money supply at politically important moments – and they were. When politicians needed the economy to perform a little better, the supply of money was increased. The reverse, constraining supply to reduce inflation, was less popular, as it would drive up unemployment.

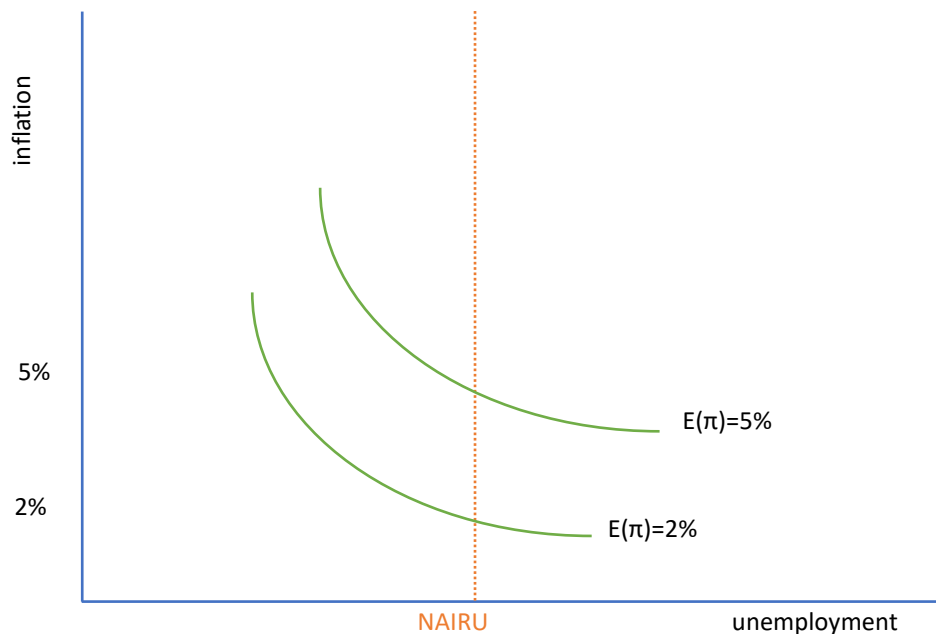
This attempt at macroeconomic management failed spectacularly in the 1970s, as we can see when we plot the same graph as above, but with an additional decade of data:



No more Phillips curve. Monthly data for the US 1948-1979. Source: BLS, Macrobond

The 1970s saw a combination of high unemployment and high inflation (or “stagflation”) that would have been impossible if the Phillips curve of the earlier decades had held. This was the worst of all outcomes: people reliably dislike inflation *and* unemployment, so much that the sum of the two is often called the Misery index.

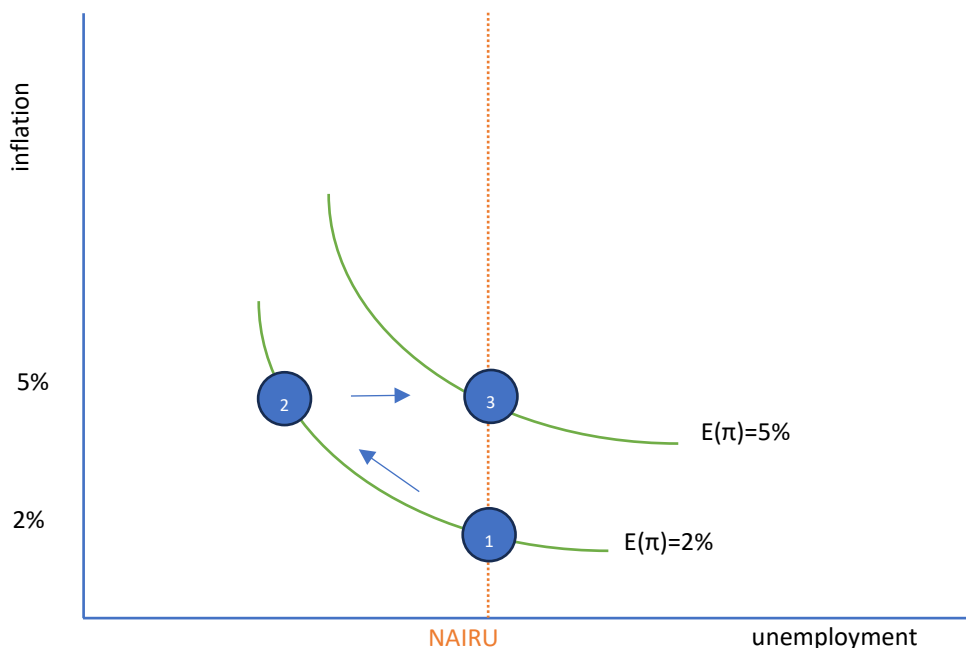
As it turned out, the trade-off that the Phillips curve seemed to offer was an illusion. The reason is that there is a crucial difference between the economy and a machine: the economy consists of people who are forward-looking and who can be fooled only so often. If inflation is higher than expected several years in a row, people will adjust their expectations. After much deliberation in the economists’ community, the relation between inflation and unemployment was reformulated as the “expectations-augmented Phillips curve”. Not quite as succinct, but certainly more accurate.



The expectations-augmented Phillips curve(s). In the short run, the solid, green, curves describe the economy. In the long run, with stable inflation expectations, you are on the dotted, orange, line.

As you can see in the figure, there is still a relation between inflation and unemployment. But now, many such relations are possible: the green lines in the figure are some possibilities. Which relation we actually get depends on what people (in their roles as employers, employees, investors, consumers etc.) think the inflation rate will be in the long run, their inflation expectations. The higher they expect inflation to be, the higher the Phillips curve lies in the figure. The two curves that are drawn show instances where expected inflation is 2%, and 5%.

An important insight of this new theory is that you cannot keep unemployment below its “natural level” for a long time using only monetary policy – as was possible in the world of the old Phillips curve. Each economy has a *non-accelerating inflation rate of unemployment* or NAIRU, to which it will converge in the long run if you keep the growth in money supply stable at some rate (and keep inflation from accelerating, as seems prudent). The adjustment comes from people’s expectations: the expected rate of inflation will move the green curve so that the actual rate of inflation lands you exactly on the NAIRU.



Let's look at an example. Using the same figure, imagine we start in an economy where expected inflation is 2% and unemployment is at its natural rate. In the diagram, we are at point 1. Then the money supply is unexpectedly increased; the economy responds, growth goes up and unemployment falls, and we move along the curve to point 2. Unemployment is low but inflation is 5%, much higher than expected. If the central bank keeps up this rate of money growth, inflation expectations will adjust to 5%. This shifts the curve, and we end up in point 3.

Point 3 is worse than point 1: for the same unemployment we get higher inflation. If we wanted to get back to point 1, you would have to restrict money supply; move along the curve to the right, increasing unemployment and possibly causing a recession. Inflation would be lower than expected; this causes inflation expectations to adjust downwards. When they have reached 2% we are back at point 1.

This highly theoretical model neatly explained what had happened in the 1970s: continued misuse of monetary policy had caused inflation expectations to go up, shifting the Phillips curve higher and causing high unemployment and high inflation. Even better, this insight was validated by the experience of the so-called Volcker deflation in the US in the late 1970s and early 80s. Volcker, the President of the Federal Reserve, increased interest rates (or rather: decreased the money supply, which resulted in interest rates of 20%). This initially caused massive unemployment and lowered inflation (moving down the Phillips curve). But after a while, as inflation declined and expectations for future inflation were reset to 2%, unemployment decreased back to the NAIRU. This was a costly operation – many families had to suffer through unemployment – but it taught policy makers an important lesson about the limits of monetary policy.

Indeed, this is not just a charming historical anecdote. It contains all you need to understand the situation that the Fed and the ECB find themselves in today. Three things stand out:

1. According to the updated theory, in the long run, the instrument of monetary policy can only achieve one goal: low inflation, or price stability. In the short run, you can still surprise people and use the (augmented) Phillips curve to create a temporary boom. While this may be tempting, the long-run costs of having to reset expectations will be high. In the 1980s and 90s, many countries decided that it was better to keep this instrument out of the hands of politicians, who might not be able to resist the temptation to use it. They followed the lead of New Zealand, which had made its central bank independent and technocratic, allowing it to focus on price stability only. Presently, the ECB is the clearest example of such a mandate given to an **independent central bank**. The Fed is also independent, but has a dual mandate, which also includes both stable prices and maximum sustainable employment.
2. The updated model also explains central bankers' strange obsession with **inflation expectations**. At almost every press conference, they hammer on about the fact that these are "firmly anchored". In the backs of their minds, they have the augmented Phillips curve diagram, where expectations play a crucial role. To understand monetary policy today, it is important to realize that all the current central bankers were educated on a version of this diagram. Inflation expectations are not just theory, they are measured in three different ways: through surveys of citizens, experts and by looking at the prices of inflation swaps. Though any expectation will be subjective to a degree, those of experts and traders are presumably informed by state-of-the-art models for price dynamics.
3. While the experiences in the 1970s and the 1980s provide a great parable and have led to the standard framework for monetary policy, the **world has changed** considerably since then. The two most important changes are the enormous growth of financial markets, in which traditional banks play an ever-smaller role. Rather, the equity and bond market, and large institutional investors, today are at the forefront of financing firms and governments. And second, the globalization of the last 30 years ushered in a period in which the main macroeconomic problems had very little to do with the trade-off between unemployment and inflation.

5

To start with the last item, the accession of China to the World Trade Organization in 2001 made possible an unprecedented supply of cheap, manufactured, goods to the Western world. Arguably, the impact on labor supply was even bigger than the addition of workers from the former Eastern bloc after the fall of the Berlin wall a decade earlier. This had big effects on the industrial base in Europe and the US, large parts of which moved to low-wage countries. For consumer prices, however, it was a golden era. The average rate of inflation in The Netherlands between 2010 and 2020 was only 1.6%, and in the euro area it was even lower: 1.3%, far from the (then) official target of (close but below) 2%.

At the same time, there were other pressures on the ECB which demanded its immediate attention. The European sovereign debt crisis of 2011-12 saw interest rates on euro sovereign debt diverge massively, with Italy and Spain paying more than 7% on 10y bonds while Germany paid less than 2%. Reasoning that the integrity of the euro area and its policy transmission mechanism were at stake, the ECB intervened by introducing several new instruments, including an asset purchase program (in

an effort to increase the supply of money when interest rates could go no lower) and making it extra attractive for commercial banks to extend loans (for the same reason).

These actions highlight the other thing that had changed since the 1970s. Financial markets had become much larger and more interconnected, and it was no longer true – if it ever was – that the main effect of monetary policy was the change in economic activity, summarized as unemployment on the axis of the Phillips diagram. In central bankers' logic, banks and financial markets are part of the *transmission mechanism* of monetary policy, a set of pipes through which the intended stimulus reaches the real economy. Because central bankers are squarely focused on consumer price stability, what happens in these financial markets is supposed to be only of secondary importance to them. But having to safeguard the transmission mechanism brought the financial markets in direct focus.

These changes in the economy taught central banks two further important lessons in the first two decades of this century. The first is that in this new globalized and financialized world, the traction their policies have with inflation is not always strong, or even predictable. While it was [already known](#)¹ that monetary policy operates with *long and variable lags*, the 2010s proved that in some cases, lifting inflation from levels that are too low is near impossible for central bankers, even with extraordinary measures.¹ The second lesson was that while central banks may have less power over inflation than thought, their power over financial markets is very strong. In the wake of the financial crisis of 2008, the Fed succeeded in keeping the financial sector functioning despite large shocks to assets and liabilities; similarly, the ECB managed to keep the euro area bond market together in 2012 and after. Central banks' ability to put a floor under any price using unlimited buying commitments was stronger than any other force in financial markets. But the transmission of financial market outcomes to consumer prices in the real economy seemed smaller than in the past.

6

One problem with the enhanced toolkit of the ECB is that it threatens to undo the separation between price stability and economic policy that was the reason for introducing independent central banks. Even though the ECB is adamant that it only cares about its objectives (and has won court cases about this question), the control over sovereign interest rates that it exercises makes it loom large in political discussions about government budgets. This can undermine the technocratic nature of central banks.

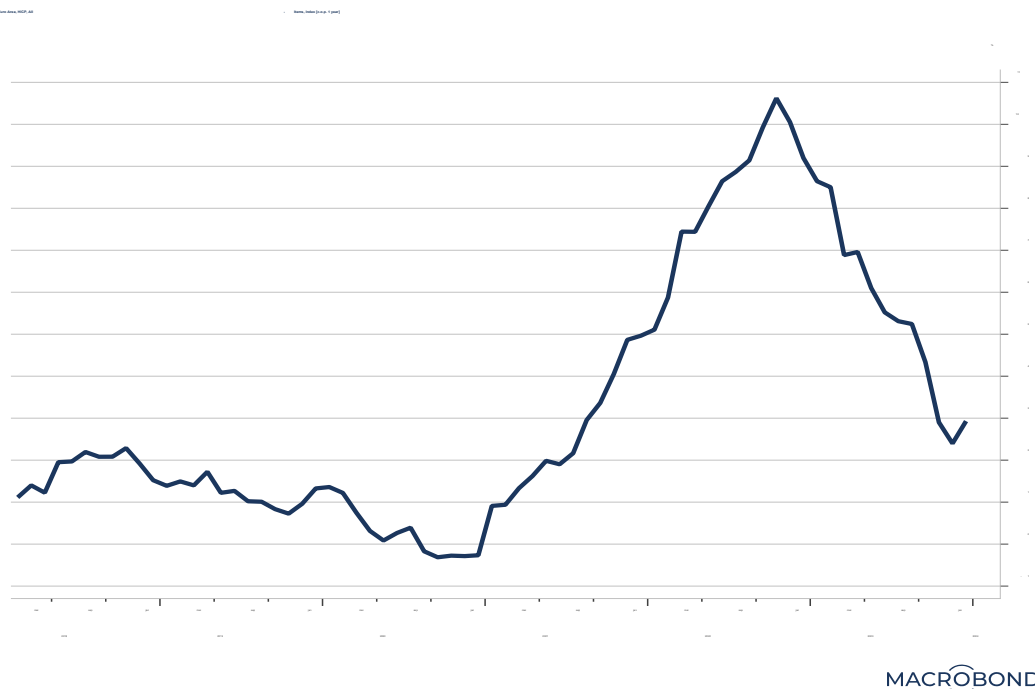
Current monetary policy

We can now take a look at the situation that the ECB and the Fed find themselves in at the beginning of 2024. Since the Covid crisis of 2020, Western economies have been buffeted by a number of very large shocks. Coming out of the lockdowns, the ECB was supporting the economy at full power, with its policy interest rate negative and a bond-buying program that added tens of billions to the money supply each month. An understandable policy stance, given that euro area inflation was negative, that is, prices were declining, at the end of 2020.

But soon after, inflation took off for a number of reasons: the lockdowns had made it harder to consume services, so people started spending on goods. International supply chains could not handle the extra demand, especially given the Chinese zero-covid policy that meant that the main supplier was operating less efficiently. In early 2022, an energy crisis made things worse after Russia invaded

¹ This paragraph contains links to external content, which is not part of the curriculum.

Ukraine and was sanctioned, leading to a natural gas shortage in Europe. In October of that year, euro area inflation peaked at over 10 percent.



Euro HICP year-on-year inflation. The Harmonized Index of Consumer Prices (HICP) is a price measure that can be consistently applied in all euro-area countries. Usually it differs slightly from countries' own price indices, such as the Dutch CPI.

7

Throughout 2021 and in the first months of 2022, the Fed and the ECB declined to move the policy rates in response to the inflation shock (even though they did reduce their bond-buying programs) for two reasons:

1. It seemed that the increase in inflation had come about through supply shocks, which are usually one-off changes in prices. With inflation being measured over a 12-month period, we can expect these changes to drop out of inflation after a year. The effects of monetary tightening, which constrains demand, usually take longer to materialize. Thus, central banks do not generally respond to one-off (or “transitory”) shocks, especially if they are likely to reverse as seemed the case with the Chinese supply problem.
2. Remember that the ECB had just spent close to a decade trying to get inflation to go higher. There was much concern that the inflation expectations of European citizens would be drifting below the 2% target. A bout of inflation, assuming it would be short-lived, could be just what the doctor ordered.

The theory of the transitory shock was abandoned by the Fed in March of 2022. At that point, it had been a year since PCE² inflation had breached 2%, and it showed no signs of coming down, reading 6.5% in February of 2022. Worryingly, wages also seemed to be going up, with the Atlanta Fed wage growth tracker – which corrects for composition effects – at close to 6%. Higher wages, if they are

² There are different measures of consumer price inflation; PCE (personal consumption expenditures) is the measure that the Fed prefers.

not offset by higher productivity, have the potential to start a wage-price spiral; they are an indication that inflation expectations have started to increase. Indeed, in March of 2022 the 5y5y-inflation swap³ had started trading at 2.7%, far above the Fed target.

The Fed started increasing its policy rate that month, and the ECB followed in July of 2022. In a little over a year, the Fed policy rate went up by 5¼ percentage points, and the ECB's deposit rate by 4½ percentage points.

Now think back to the augmented Phillips curve. The point of this monetary operation was to keep the curve from drifting up, by reducing the supply of money and by shifting *along* the curve to the right: this would decrease inflation and increase unemployment. The labor market was actually in pretty good shape in the wake of the covid crisis, unemployment stood at record low levels in both the euro area and the US. Economists observing this policy agreed that this would likely change in 2023: they predicted a sharp increase in unemployment and a recession in Europe and the US.

Though investors are generally not keen on inflation, the prospect of a tightening central bank is not great either. They can expect the prices of their investments to be affected in a number of ways:

1. As interest rates increase, the discounting of future cash flows makes them worth less today. This happens almost mechanically with (nominal) fixed income assets such as bonds. But the same phenomenon also affects equities, especially if the firm has a lot of its expected profits in the distant future. The increase of nominal rates thus leads to capital losses in markets through higher discount factors.
 - a. Inflation-linked bonds see a mix of two effects. The inflation-part of their payoff stream increases as inflation goes up unexpectedly, but the discounting of these streams suffers from the same effect. The discounting wins out if real interest rates go up, and in 2022, they did.
 - b. When rates increase, the duration effect on returns is negative. Investors can escape this effect by allocating to cash instead of bonds, which many did in 2023.
2. Higher rates (and a lower supply of money) are meant to slow down economic growth, and thereby reduce inflation. This is not a painless process: it works through cancelled projects, decreased inventories, pressure on the housing market and ultimately the firing of employees and the folding of companies. This means that both credit risk and the risk of lower-than-expected profits goes up when central banks tighten policy.
 - a. The effect on project planning and corporate profitability can take time, which is why monetary policy has long and variable lags. There is an exception, however, for companies that are directly exposed to duration risk in the financial markets. As we found out in March of 2023, this included a number of American regional banks.

³ By looking at the different rates on 5- and 10-year inflation swaps, a measure can be constructed that indicates expected inflation over a 5-year period that starts 5 years from now. This is the 5y5y inflation swap rate. It is an operational measure of what "long run inflation" the market is pricing.

Their Treasury portfolios caused enough losses that the value of the banks was wiped out.

3. A byproduct of the change in monetary policy was a sharp increase in price volatility. Through their purchase programs, central banks had for some time put a lid on volatility in the bond- and credit markets. Since 2022 the MOVE index⁴ of traded US bond volatility has roughly doubled from the decade before.

From the perspective of early 2024, it looks like the tightening of central banks was successful. Inflation rates have come down and seem to be converging on the target level of 2%. Inflation expectations are once again firmly anchored. But there has been a strange twist in the story: the expected recession, and the increase in unemployment that was predicted at the end of 2022, have failed to materialize. The American economy in particular has kept on growing, and the reduction in inflation has been achieved almost without economic hardship. People now talk of a “soft landing”, instead of an economic crash.

The news is not quite as good in Europe, where GDP growth has stalled, but also here we are not seeing the augmented Phillips curve in action. Unemployment in the euro area is at a record low, and bankruptcies are up, but not near recession levels.

Two important consequences: first, with the slowdown of the economy much smaller than anticipated, or in the American case, not happening, investors are less worried about risks to credit quality and profits. But more worryingly, a question now hovers over central bank policy: if the economy barely responded to the increase in rates, how much control do they actually have over what goes on in the real economy? Is the transmission mechanism broken, and were we just lucky this time? Or, more ominously, are we yet to see the effect of higher rates given that there are long and variable lags? In which case the medicine would arrive after the patient has already recovered.

9

Central bank digital currencies

When we talk about central banks increasing the supply of money, people usually employ the metaphor of the “printing press” that produces banknotes. In most peoples’ lives however, the use of physical money (notes and coins) has been declining for years. Instead, most people use their balances at commercial banks to pay for goods and services, employing the intra- and interbank payment system when they wish to make a purchase. The creation of credit is similarly in the hands of commercial banks, by modifying entries in their accounts. Controlling the money supply thus becomes a question of changing the interest rates that commercial banks receive or pay, or (in some cases) tweaking the reserve requirements.

You could see the decreasing use of cash as just another obsolete technology being replaced by something better, but central bankers worry that it deprives citizens of something important: the ability to hold reserves and conduct transactions without using commercial entities that may charge fees or set conditions. More speculatively, it is possible that commercial parties would someday offer

⁴ Traded volatility is a measure of the amount of volatility priced into derivatives linked to the asset. Thus, the MOVE index goes up if options linked to bonds price in a higher amount of (future) volatility.

their *own* currencies, crowding out conventional money and thus depriving central banks of their role. The (cancelled) introduction of Facebook’s “Libra” coin illustrates this possibility.

One idea to keep central banks relevant is CBDC or central bank digital currency. It would be a digital equivalent of cash, backed by the central bank rather than a commercial bank and used in much the same way as cash. It is thought that a digital form of money would overcome many of the drawbacks of physical money while retaining its essential qualities: anonymity, instant clearance, and zero credit risk. People could use it to buy goods and services or pay each other (retail CBDC), and financial institutions could use it to settle trades (wholesale CBDC or wCBDC). The digital form could also enhance this type of money, allowing instant transfers over large distances or across borders, at scale (such as with fiscal transfers) and subject to rules. CBDCs could play a role in financial inclusion (especially in emerging economies) and would be usable without the need for communication with a third party (“offline” use).

There are several problems however: non-physical money, possibly subject to technical constraints and meddling by authorities inherently faces questions about privacy and dependability. Getting citizens to accept and hold this form of currency will need to involve transparency around current and future abilities for authorities to track or cancel money and guarantees about dependability. The ECB has already ruled out that euro-CBDC would be *programmable*, where only specific goods or services could be bought, or money could only be spent at specific times or places. However, conditional payments that take place automatically when certain conditions are met might be possible.

Another problem occurs when CBDC are *too* attractive: in times of reduced trust in commercial banks, if people could rapidly pull their money from banks and put it in CBDCs. Then banks would be much more susceptible to runs, putting financial stability in danger. Many of the proposed schemes therefore have a maximum balance that citizens can hold in CBDC. In many cases, a role for intermediaries such as commercial banks in the distribution of CBDCs is foreseen.

The introduction of CBDC is at different stages in different jurisdictions.⁵ The [ECB](#) started a two-year investigation phase in November 2023, and similarly, the BoE is in a [design phase](#). Pilots have been run in Switzerland, where the settlement of a lending transaction was cleared using wCBDC in December 2023. In China, the e-RMB is already [up and running](#), with different wallet sizes varying inversely with the level of privacy. Though discussions about CBDC [have been held](#) in the US, the Fed has not made a decision on whether to pursue them.

The PBoC

Up to now we discussed monetary policy as though central banks are operating a closed economy and are in control of the supply of money. While this is a useful framework to talk about large economic blocs such as the US and the euro area, it is of course also true that we live in a world of international trade and finance, where in many cases capital and money can move around freely.

The exception to this, for a long time, was China. While the trade in goods between China and the rest of the world swelled in in the 1990s and after, for many years the People’s Bank of China (PBoC) kept running a closed capital account. This meant that there was no free convertibility between

⁵ This paragraph contains links to external content, which is not part of the curriculum.

Chinese money (RMB) and, for instance, euros and dollars. Chinese exporters could, of course, convert their dollars to RMB but only at the price fixed by the PBoC. The availability of RMB outside of China was limited. The advantage of this policy was that it insulated the Chinese economy from outside pressures. For instance, Chinese citizens could not invest their savings in foreign banks or financial instruments, which allowed Chinese banks to pay lower rates of interest and created a cheap source of funding for Chinese companies. Financial crises, such as the credit crisis in 2008, only affected Chinese citizens indirectly.

Chinese authorities have always maintained that the closed capital account was a temporary measure, and that Deng's motto "reform and opening up" would eventually also apply to the Chinese financial sector. And indeed, foreign investors have increasingly been allowed to invest in Chinese financial markets – first through licenses and since 2014 through "connects" between on-shore and off-shore markets. These stock- and bond- "connects" also allow Chinese parties to invest outside of the mainland. Further internationalization of the RMB was achieved in 2016 when the IMF included the RMB in the currencies that make up the its SDR basket, making it an official reserve currency. The Chinese authorities have encouraged RMB internationalization by developing RMB financial services, first in Hong Kong and later also on the mainland, and by encouraging the use of RMB for settling cross-border trade. The latter is made easier by the existence of the e-RMB.

While opening up the capital account exposes China to international financial shocks, there are a number of benefits. Firstly, in a world where most trade is conducted in US dollars, even trade between countries that does not involve the US depends on the availability of USD and uses the American financial system. That much of world trade is nonetheless conducted in USD shows that there is usually no shortage of dollars or USD credit, and that the US-centered financial system is generally trusted. However, the role of the USD does give the United States some power over trade in which it is not itself involved. For instance, entities that use the US financial system are expected to abide by US sanctions policy. Now that the US is increasingly critical of China, it makes sense that China wants an alternative system; however, that can only succeed if foreigners can and want to keep their reserves in RMB.

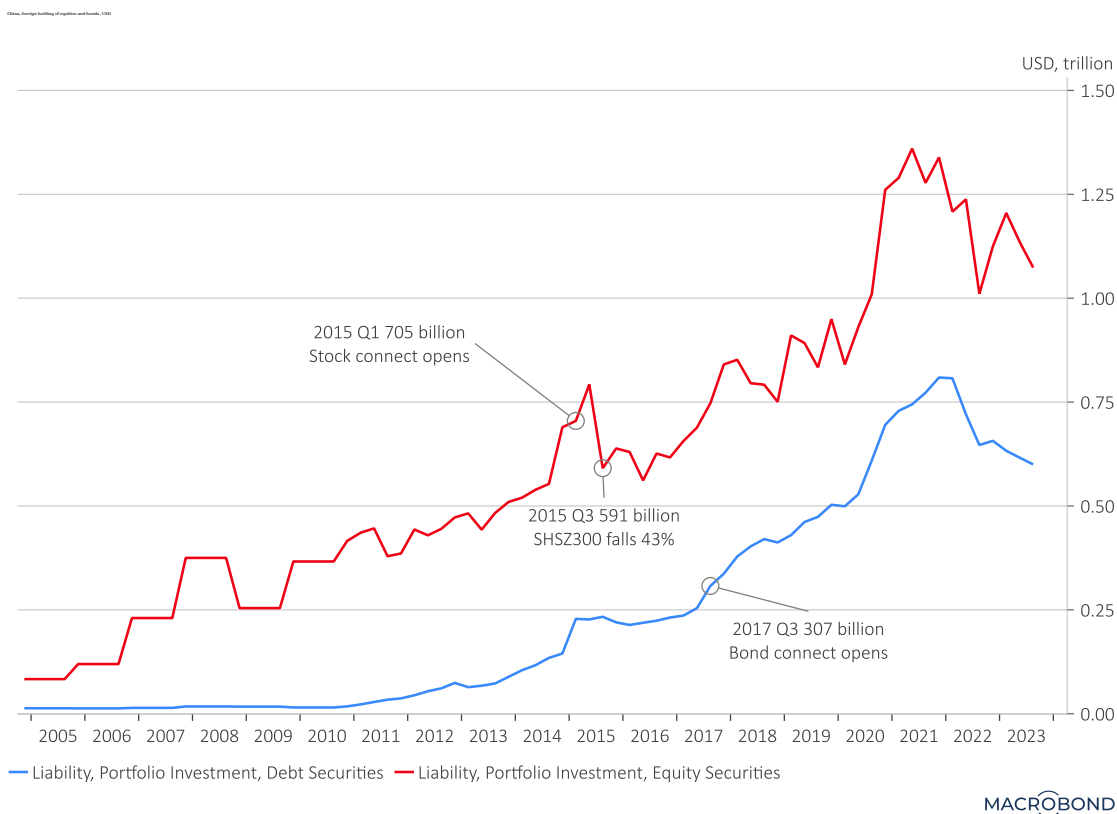
The other benefit is that China is a big importer of natural resources. Having to pay for its copper and oil in USD is not currently problematic, but again gives the US power over important Chinese inputs. Being able to pay for its oil in RMB would be much preferable to China, but it requires that the counterparty accept and hold the currency.

For many years, the development of RMB as an alternative to the USD proceeded at a snail's pace. Despite the reforms and the efforts of the PBoC, the share of RMB in official reserves or in trade transactions remained in the low single digits. Western investors did increasingly warm to Chinese financial markets, leading to a substantial inflow into Chinese equities and bonds. This was partly driven by low interest rates and high valuations in Western financial markets and the promise of fast economic growth in China.

Two developments have recently had an impact on this situation: American politicians have become more critical of China, which they consider a geopolitical rival; and the sanctions that followed the Russian invasion of Ukraine have highlighted the risks of holding assets in another country. Russians with money in the West, as well as the Russian state, have seen their balances frozen in the wake of the invasion.

Since then, trade between Russia and China (which has backed Russia internationally) has grown substantially and it can reasonably be assumed that most of it is conducted in RMB. Interest in keeping a portion of assets outside the Western financial system has increased in other countries as well. Thus, in some ways, the goal of RMB internationalization has come closer.

At the same time however, the interest of Western investors in holding RMB assets has declined, at a time when there is increased scrutiny over foreign investment, interest rates in the West have become positive once again and Chinese growth is slowing. We can see the total effect of these trends in the data: the amount of RMB portfolio assets (equities and bonds) held by foreigners has declined over the last 2 years.



Foreign holdings of Chinese portfolio investments. Source: SAFE, Macrobond

This state of affairs is by no means final. It is the official Chinese policy to keep opening their financial system to all foreign investors. And while trade policy between the US and China keeps shifting with the political winds, there remain strong financial and economic ties between China and the West.