

The Redistributive Consequences of Monetary Policy

BY MAKOTO NAKAJIMA

The Federal Reserve conducts monetary policy in order to achieve maximum employment, stable prices, and moderate long-term interest rates. Monetary policy currently implemented by the Federal Reserve and other major central banks is not intended to benefit one segment of the population at the expense of another by redistributing income and wealth. Any decisions regarding redistribution are considered to be the province of fiscal policy, which is determined by elected policymakers. However, it is probably impossible to avoid the redistributive consequences of monetary policy-making. As this article will explore, households differ in many dimensions — including their assets and debt, income sources, and vulnerability to unemployment — and monetary policy affects all these factors differently.

Even if one accepts the idea that monetary policy is not immune to redistributive effects, one could argue that the redistributive consequences are probably negligible if booms and recessions are mild enough that monetary policy does not need to cause large effects to ameliorate the fluctuations of the economy or keep inflation stable. The period between the mid-1980s and mid-2000s, called the Great Moderation, was such a period. During those years, the Federal Reserve conducted conventional monetary policy by making relatively small adjustments in the short-term policy target interest rate, known as the federal funds rate. However, in response to the Great Recession, the Federal Reserve moved aggressively by not only cutting the federal funds rate to essentially zero but also by implementing various unconventional measures such as communicating the expected timing and degree of future changes in the federal funds rate and purchasing large amounts of U.S. Treasury securities and mortgage-backed securities. When a central bank conducts such aggressive monetary policy, redistributive consequences might be more important.

It might be also true that the gain to society's well-being from stabilizing the overall economy is greater than the loss coming from associated redistributive effects, in which case we could safely focus on the overall effects and ignore the redistributive effects. Former Fed Chairman Ben Bernanke argued along these lines in January 2012 in response to the argument that the Fed was hurting savers by keeping the policy rate low:

In the case of savers, you know, we think about all these issues, and we certainly recognize that the low interest rates that we've been using to try to stimulate investment and expansion of the economy also imposes a cost on savers who have a lower return. ... I guess the response I would make is that the savers in our economy are dependent on a healthy economy in order to get adequate return. ... So I think what we need to do, as is often the case when the economy gets into a very weak situation, then low interest rates are needed to help restore the economy to something closer to full employment and to increase growth and that, in return, will lead ultimately to higher returns across all assets for savers and investors.¹

One could also argue that, in the long run, the redistributive consequences of monetary policy might average out. In other words, if the same type of households that tend to gain from monetary policy during economic expansions also tend to lose from monetary policy during recessions, then over time the average effect could be a wash. However, there is a good chance that the redistributive effects do not average out because business cycles are known to be

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asymmetric — expansions tend to be long and moderate, while recessions tend to be short and sharp. Since World War II, U.S. expansions have averaged almost six years and recessions less than a year.²

More research is needed to determine with great confidence whether the redistributive effects of monetary policy are significant enough that policymakers should explicitly consider their effects. Fortunately, there is a growing body of research on the issue. In this article, I start by investigating various channels through which monetary policy has redistributive consequences.³ Then I go on to discuss the effects of unconventional monetary policy measures.⁴

THE INFLATION CHANNEL

Surprise inflation’s effects on assets and debt. Monetary policy is expected to affect the level of overall prices as well as the rate at which that level is rising — in other words, inflation. But inflation does not always behave as intended. When monetary policy causes unexpected changes in inflation, some people might gain or lose from the surprise, because, for example, they hold different kinds of assets or debt — such as housing, stocks, bonds, and fixed- or adjustable-rate mortgages — based on how much inflation they expect in coming years.

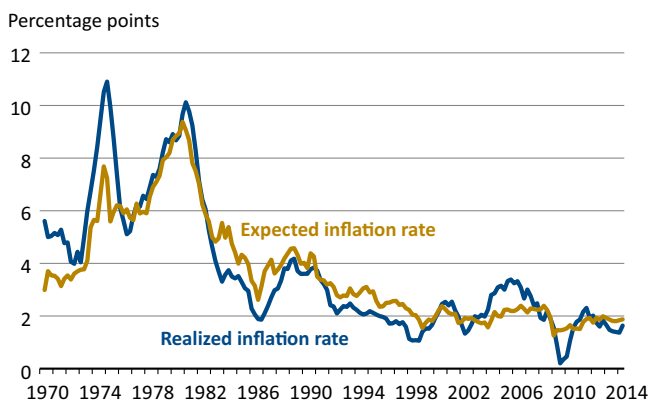
Expected inflation — as measured by surveys — and actual inflation generally move together, but the differences between the two indicate that people do not forecast inflation perfectly. The figure compares expected inflation and realized inflation. Not only is actual inflation not forecast

perfectly all the time, the difference between expected and actual inflation sometimes persists for a long time. For example, in the early 1970s, when the U.S. economy experienced an episode of high and volatile inflation, even professional forecasters significantly underestimated actual inflation. They also overestimated inflation after the rate declined sharply in the mid-1980s. When individuals make financial decisions based on inflation expectations that turn out to be incorrect, the discrepancy between expected and realized inflation could cause a redistribution of wealth. The effect of wealth redistribution could be stronger if such discrepancies persist.

How does surprise inflation cause redistribution? In order to answer this question, let’s think about how different kinds of assets are affected differently by inflation. In particular, it is useful to distinguish between *nominal* and *real* assets. Nominal assets are those whose payoff is a fixed dollar amount that is not adjusted for changes in the general level of prices. Think about a bond whose face value is \$100 and that pays its holders \$5. The rate of return on such an asset whose payoff does not change with the rate of inflation is called a nominal return. In this example, the nominal return of the bond is 5 percent. However, ultimately, what people care about when investing in assets is how many more goods and services they can buy with the return they earn. This is where inflation enters into the calculation. Let’s say the inflation rate is 2 percent per year. This means that, on average, goods and services become 2 percent more expensive after a year. In other words, money loses 2 percent of its value every year. After taking inflation into account, the effective return on a bond with a 5 percent nominal return is 3 percent, because things have become 2 percent more expensive. The return after taking inflation into account is called the real return. In this case, the real return of the bond is 3 percent. So one can see that when the inflation rate goes up unexpectedly, the value of a nominal asset declines, because the real return that the holder receives declines. If the inflation rate increases from 1 percent to 2 percent, the real return of the 5 percent nominal asset declines from 4 percent to 3 percent, and the price of the nominal asset declines, reflecting the loss of value.

Real assets are those whose value is not affected by inflation, although, of course, many real assets are not perfectly immune to inflation for various reasons. One example is housing. When inflation occurs and prices of goods and services go up, the value of housing goes up as well. Moreover, the benefits that the house gives you in terms of shelter are not affected by inflation. If you rent the house, the rent

Surprise Inflation Sometimes Persists



Sources: Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia; U.S. Bureau of Economic Analysis.

Note: Expected inflation is based on one-year-ahead median GDP deflator inflation expectations in the SPF. Realized inflation is the BEA’s implicit GDP deflator measure.

may naturally go up by 2 percent as well. In this sense, the value of housing is immune to changes in inflation.⁵ Another example is stocks. When surprise inflation occurs, and if firms' future profits perfectly incorporate the effects of that inflation, stock prices go up to keep up with inflation.⁶

Debt can also be classified as nominal and real. The most familiar example of nominal debt is the fixed-rate home mortgage. If you have a 30-year mortgage with a fixed interest rate of 5 percent, the real rate (after taking inflation into account) declines if the inflation rate rises unexpectedly, reducing the real value of debt. Notice that the mortgage holder benefits from the unexpected rise in inflation and subsequent decline in the value of the mortgage debt, while the holder of a nominal asset such as a bond suffers from surprise inflation.

Moreover, the size of the effect from surprise inflation depends crucially on both the maturity of the nominal asset or debt and on how long the surprise inflation lasts. An investor who holds a bond that matures after one year is affected by surprise inflation for only a year, even if the surprise inflation lasts more than a year. This is because the return of the bond is fixed for only a year. However, if surprise inflation lasts for 10 years, an investor who holds a bond that matures in 10 years is affected for those 10 years. Yet, if surprise inflation lasts only a year, the real return for the holder of a bond that matures in 10 years is affected for only that one year. Therefore, the value of a bond that matures in 10 years is affected more strongly than that of a bond that matures after a year if the surprise inflation is persistent. Similarly, an adjustable-rate mortgage is considered real debt because the interest rate can adjust frequently along with changes in expected inflation.⁷

The portfolio composition channel. When monetary policy causes surprise inflation, some households gain and some lose, because, as we have seen, unexpected inflation changes the value of nominal assets and debt, and households hold different amounts and types of assets and debt. Thus, unexpected inflation transfers wealth from households with nominal assets to those with nominal debt. This channel can be called the *portfolio composition channel*.

The amount and type of assets and debt that households tend to hold varies significantly, often along demographic lines. Since these different patterns determine how inflation transfers wealth from one type of household to another, let's focus on the diverse patterns among poor, middle-class, and rich households in different age groups. Table 1 summarizes the average net nominal position — which is the value of nominal assets minus the value of nominal debt

TABLE 1

Young Middle-Class Households Hold More Nominal Debt
Net nominal position as percent of net worth, by household type.

Age of head of household	≤35	36–45	46–55	56–65	66–75	≥75
By household income						
All income levels	-42.6	-10.1	2.3	15.2	19.4	30.6
Poor (bottom 20%)	-36.6	-33.8	-5.5	7.5	17.5	26.4
Middle class (middle 70%)	-114.0	-31.6	-4.8	14.0	25.2	38.1
Rich (top 10%)	-14.0	3.8	6.6	16.3	16.7	27.5

Source: 1989 Survey of Consumer Finances, in Doepke and Schneider (2006).

as a proportion of net worth — for each demographic group in 1989. For example, for households headed by persons age 35 or younger, a net nominal position of -42.6 means that, on average, those households held more nominal debt and that the average size of their net debt position was 42.6 percent of their average net worth. *Calculating Net Asset Positions* explains how Table 1 was constructed. We can easily see the following:

- Young households tend to borrow, mainly through mortgage loans, which are nominal debt. That is why their net nominal position is negative and large.
- Young middle-class households tend to hold the most nominal debt, since they typically hold the biggest mortgages. Poor households are more likely to rent, while rich households typically do not need to borrow as much as the middle class.
- Older households tend to hold nominal assets. After paying off their mortgage loans, they tend to diversify their portfolios by investing a portion of their wealth in nominal assets.

Why do different households hold different compositions of assets and debt? There are various reasons. First, whether a household owns or rents its home makes a substantial difference in its portfolio allocation, since housing is the single biggest item in the portfolios of the majority of households. In addition, the structure of the home mortgage market matters. In the U.S., long-term fixed-rate mortgages are more common than in many other countries, and the mortgage interest rate is subsidized through government-sponsored enterprises such as Fannie Mae and Freddie Mac. When a household purchases a house using a conventional fixed-rate mortgage, the household is naturally exposed to

Calculating Net Asset Positions

Net worth consists of housing, business interests, and financial assets and debt. According to the Survey of Consumer Finances, households headed by someone age 35 or younger had an average net worth of \$50,000 in 2010 dollars. The average value of their housing was \$37,000, which might seem low, but many households in this group do not own their homes. The average value of their business interests was \$13,000 and their financial assets averaged \$26,000, which included stocks (\$4,000) and other financial assets (\$22,000), for a total average value of assets of \$76,000. Their debt averaged \$26,000.

What portion of their components of wealth were nominal and therefore could be affected by inflation? Doepke and Schneider classify as nominal only a small proportion of this group's financial assets but most of their debt, since most of it was fixed-rate mortgage debt. Although the exact proportion that Doepke and Schneider calculated was based on a lot of detailed adjustments, for simplicity, we can consider 20 percent of nonstock financial assets as nominal (and therefore affected by inflation) and all debt as nominal. Under these simplified assumptions, their net nominal asset position was \$4,400 (20 percent of nonstock financial assets) minus \$26,000 (debt), which equals $-\$23,800$. This dollar amount is -43.2 percent of their average net worth (\$50,000), which is close to the corresponding number in Table 1 (-42.6 percent).

inflation risk — fluctuations of the future inflation rate.⁸

Second, as Andres Erosa and Gustavo Ventura observe from data, lower-income and lower-wealth households tend to use cash and checks for a larger fraction of their transactions. Naturally, these households tend to keep a larger fraction of their assets in cash and other short-term nominal assets such as checking accounts, which makes them vulnerable to inflation risk. Combined with the channels explored above, lower-income households that rent their homes (and thus have no mortgage) tend to be hurt by inflation, while lower-income households that own their homes, especially if they have a mortgage, tend to gain from inflation.

Third, higher-income households might be more likely to adjust their portfolios to avoid inflation risk, either because they are more knowledgeable or they are more willing and able to pay the costs necessary to pay off debt or buy or sell stocks or bonds. In either case, they end up more protected against changes in expected inflation.

How significant are the portfolio composition effects? An influ-

ential study by Matthias Doepke and Martin Schneider calculates the impact of a surprise increase of 5 percentage points in the inflation rate. They consider a hypothetical case in which the Federal Reserve unexpectedly announces that the inflation rate will be 5 percentage points higher than initially expected for the next 10 years and find significant redistributive consequences across different types of households. Although inflation is unlikely to rise that much in the near future, it was not unreasonable to think about such high inflation in the 1970s (see the figure on page 10).⁹ Moreover, the experiment enables us to evaluate the significance of the portfolio composition effect in general.

Table 2 summarizes the effects on different households. Doepke and Schneider study two hypothetical cases. In the first (labeled *quicker reaction*), households are assumed to be able to react to surprise inflation when their assets and debt mature. In other words, households are no longer affected by surprise inflation after that point. This is the conservative and probably more realistic case. In the other case (labeled *slower reaction*), households cannot react to surprise inflation for 10 years. This case is less conservative and gives the maximum theoretical effects from surprise inflation.

In the quicker-reaction experiment, young middle-class households are big winners from surprise inflation. They gain the equivalent of 18.9 percent of their wealth. Poorer young households do not gain as much because they tend to be renters rather than homeowners, and thus they do not have much debt. Richer young households do not gain as much either, because they are less leveraged with home mortgage debt. The losers are older households, especially rich ones. They lose the equivalent of 4.7 percent of their wealth. Poor older house-

TABLE 2

Surprise Inflation Redistributes Wealth to Young Middle-Class Households

Percentage gain or loss from unexpected 5 percentage point increase in inflation for 10 years.

Age of head of household	≤35	36–45	46–55	56–65	66–75	≥75
Quicker reaction:						
Poor (bottom 20%)	0.2	4.0	0.6	-0.5	-1.3	-1.0
Middle class (middle 70%)	18.9	5.8	1.4	-1.4	-2.7	-2.6
Rich (top 10%)	2.1	-0.9	-1.6	-2.4	-2.9	-4.7
Slower reaction:						
Poor (bottom 20%)	14.4	13.3	2.2	-2.9	-6.9	-10.4
Middle class (middle 70%)	44.9	12.4	1.9	-5.5	-9.9	-15.0
Rich (top 10%)	5.5	-1.5	-2.6	-6.4	-6.6	-10.8

Source: Doepke and Schneider (2006).

holds do not suffer as much as rich ones, since the poor tend to hold more of their assets in cash rather than bonds.

In the slower-reaction experiment, the results are stronger by construction. The results are supposed to provide the upper bound of the effects of surprise inflation. In this experiment, for example, middle-class households headed by persons age 35 or younger gain the equivalent of 45 percent of their net worth from surprise inflation, while rich households headed by persons age 75 and older lose the equivalent of 11 percent of their wealth.

Although central banks around the world do not explicitly consider redistributive effects through the portfolio composition channel when setting policy, central banks are involved in maintaining data on diverse portfolio composition across different households. For instance, the Riksbank, the central bank of Sweden, collects and analyzes data on household debt.¹⁰ The Federal Reserve, in cooperation with the Treasury Department, publishes the triennial Survey of Consumer Finances, which covers U.S. household balance sheets, types of income, and demographic characteristics.¹¹

Global implications. Surprise inflation generates redistribution not only across different households but also across countries. Doepke and Schneider analyze the redistribution among them, too. As we have seen, redistribution through the portfolio allocation channel occurs because different entities hold different compositions of assets and debt. So let's start by asking how governments are affected by their portfolio compositions. The U.S. government holds a large balance of nominal debt because it has been issuing Treasury bonds and bills to finance its fiscal deficit. Much of its debt is held by foreign countries. Therefore, relative to the U.S., foreign countries own nominal assets.

Under these circumstances, what are the redistributive consequences of surprise inflation? As one might expect, the U.S. government, like households with home mortgages, gains from the decline in the value of its debt when the inflation rate goes up unexpectedly. On the other hand, foreign countries suffer from the loss in value of the U.S. bonds they own. Doepke and Schneider estimate how much the U.S. government and foreign countries gain or lose.¹² Assuming the quicker reaction to surprise inflation of 5 percentage points for 10 years, the U.S. government gains as much as 5.2 percent of U.S. GDP, while foreign countries lose as much as 3.2 percent of U.S. GDP. Under the slower reaction scenario — which is an extreme case — the U.S. government gains 13.0 percent of its GDP, while the rest of the world loses 5.2 percent.

In sum, surprise inflation transfers wealth from older

and richer American households to younger middle-class households and from foreign countries to the U.S. government. Of course, gains for the U.S. government are ultimately gains for the American people. But how different groups of American households benefit from those gains varies as well, depending on how the gains are used.¹³

Redistribution through expected inflation. So far I have focused on the effects of unexpected inflation, but expected inflation also causes redistribution, as different households own different amounts of cash. People often find it convenient to hold cash to use for transactions, even though cash doesn't earn any interest and its value is constantly eroded by inflation. Since inflation works as a tax on holding cash, this channel is known as the *inflation tax channel*.

Table 3 shows the percentage of expenditures paid by cash, debit, and credit card for different income groups. Since lower-income households tend to conduct a larger fraction of transactions with cash, and thus tend to hold a larger fraction of their assets in cash, they tend to lose more from inflation, even expected inflation. Erosa and Ventura use a theoretical model to evaluate the redistributive effects of expected inflation through the inflation tax channel and find that, indeed, inflation burdens lower-income households disproportionately.

INCOME CHANNELS

As I discussed at the beginning, monetary policy is intended to affect not only prices but also real economic activity. The Federal Reserve's mandate includes promoting maximum employment.¹⁴ When the Federal Reserve is trying to stimulate employment, different groups of people

TABLE 3
Low-Income Households Rely on Inflation-Sensitive Cash

Household income	Percent of expenditures paid for with:			
	Cash	Debit cards	Credit cards	Other
Less than \$25,000	55%	31%	5%	9%
25,000–49,999	29	51	15	5
50,000–74,999	22	49	24	5
75,000–99,999	16	46	35	3
100,000–124,999	16	43	37	4
125,000–199,000	14	40	37	9
200,000 and above	10	15	66	9

Source: Bennett, Conover, O'Brien, and Advincula; Federal Reserve Bank of San Francisco (2014).

might be affected differently by the same monetary policy. Let's explore potential redistribution channels that occur when monetary policy is intended to either stimulate or cool down the U.S. economy.

The wage heterogeneity channel. When monetary policy affects the labor income or wages of different groups of the population differently through its diverse effects on employment, this channel is called the *wage heterogeneity channel*.

The risk of unemployment is distributed unequally across different groups of people, resulting in redistribution through the effect of monetary policy on unemployment risk. Michael Elsby, Bart Hobjin, and Aysegul Sahin document two facts related to this channel. First, the unemployment rate is higher on average among the young and those with less education. For example, the average unemployment rate between 1982 and 2010 was 12.6 percent for people age 16 to 24, while the average unemployment rate was 3.6 percent for people age 55 and older. Among people of all ages with less than a high school diploma, unemployment averaged 8.8 percent, while for those with at least a college degree it averaged 2.6 percent. The second fact is that unemployment fluctuates more for groups whose average unemployment rate is high. In other words, in a recession, the unemployment rate goes up more for those groups whose average unemployment rate is already higher than it is for the overall labor force. Between 2007 and 2009 — the Great Recession years — the overall unemployment rate went up from 4.6 percent to 9.3 percent, a 4.7 percentage point increase. However, for people with less than a high school diploma, the unemployment rate went up by 7.4 percentage points, while for those with at least a college degree the rate went up by only 2.6 percentage points. During the same period, the unemployment rate for people age 16 to 24 went up by 7.0 percentage points, while for those age 55 and older the rate went up by only 3.5 percentage points.

If as a result of accommodative monetary policy unemployment were to fall more for those who are younger and have less education, the policy could be said to be redistributing income across diverse groups of people. Moreover, as I emphasize in my recent work with Nils Gornemann and Keith Kuester, individ-

uals with less income or education tend to hold less wealth and thus are less likely to have savings to supplement their income while they are unemployed. Under these circumstances, accommodative monetary policy that reduces their risk of unemployment might be even more effective in helping those individuals, especially when borrowing is difficult.

The income composition channel. A household's total income includes not only wages but also any financial income such as returns on stocks, bonds, real estate, or other assets that members of the household own. Because different households have different mixes of wages and financial income, and because monetary policy affects wages differently than it affects financial income, the overall effect of monetary policy will vary from one type of household to another. This channel of redistribution is called the *income composition channel*.

The income composition channel might be especially important in the U.S. because wealth, which is the source of financial income, is highly unequally distributed in the U.S.¹³ As Table 4 shows, 33.6 percent of the total wealth in the U.S. in 2007, including financial assets as well as housing, was held by the top 1 percent of all U.S. households, while the bottom 60 percent of households held only 5.4 percent of the total wealth. Similarly, households in the bottom 20 percent of the wealth distribution received 79 percent of their income from wages and 2 percent from financial assets such as capital and businesses. Households in the top 1 percent of the wealth distribution derived 66 percent of their income from assets and only 30 percent from wages.

Now, suppose the Federal Reserve raises interest rates unexpectedly. If higher real interest rates slow down economic activity, unemployment rises and wages decline. On the other hand, higher real interest rates imply that income

TABLE 4
Financial Assets Are a Main Income Source Only for the Wealthy

	Wealth quintiles					Top 1%
	1st	2nd	3rd	4th	5th	
Share of total wealth	-0.2 %	1.1%	4.5 %	11.2 %	83.4 %	33.6 %
Composition of income						
Labor income (from wages)	78.9	81.2	78.6	77.1	51.4	30.2
Financial income (from capital and business interests)	2.0	4.7	7.2	10.2	39.7	65.7
Transfer income (from government programs)	15.5	12	12.4	12.1	8.2	3.6

Source: 2007 Survey of Consumer Finances, in Diaz-Gimenez, Glover, and Rios-Rull (2011).

from some financial assets could increase. Since, as we have seen in Table 4, only a small proportion of households earn a large proportion of income from financial income, while most households derive their income mainly from wages, higher real interest rates induced by monetary policy imply that income is redistributed from less-wealthy households to wealthier ones. Similarly, if the Federal Reserve lowers interest rates, and if the economy responds to the accommodative monetary policy as expected, income might be redistributed from the wealthy to the less-wealthy.

However, remember that various effects are in play here. Accommodative monetary policy could have a positive effect on the stock market. In that case, wealthy households, which invest more of their wealth in stocks, would benefit. Yet, if accommodative monetary policy raises the expected future inflation rate, the value of nominal assets, which wealthy households tend to hold more of, declines. Whether and how much a wealthy household gains or loses from monetary policy depends on the relative strength of these different effects on the composition of its portfolio of assets and debt.

A study by Olivier Coibion, Yuriy Gorodnichenko, Lorenz Kueng, and John Silvia shows that, in the U.S., when there is a surprise increase in the interest rate that monetary policy affects, income and consumption inequality widen. Specifically, when the policy interest rate rises 1 percent per year, the income of the top 10 percent of income-earners rises by around 1 percent, while the income of the bottom 10 percent of income-earners either declines slightly or does not change. Consumption by the top 10 percent of households in terms of spending increases by as much as 2 percent, while spending by the bottom 10 percent of households declines by the same degree. These findings suggest that the redistributive consequences of monetary policy through the income composition channel are significant. My recent work with Gornemann and Kuester shows that when the standard model that macroeconomists use to analyze monetary policy is extended to include households with varying compositions of income, it can generate sizable redistributive effects through the income composition channel.

REDISTRIBUTION FROM UNCONVENTIONAL POLICY

When the monetary policymaker has already lowered its target interest rate to virtually zero, it has no room to lower it further should the economy need additional accommodation. In order to deal with the situation, policymakers have employed unconventional measures, such as committing to a future interest rate (when such a commitment is

made publicly, it is known as *forward guidance*) or large-scale purchases of various assets such as long-term Treasuries or mortgage-backed securities (commonly referred to as *quantitative easing*).

Research focusing on the redistributive effects of unconventional monetary policy is virtually nonexistent, because policymakers started using forward guidance and quantitative easing only recently, as a response to the Great Recession and the economy's slow recovery since then. Yet, to the extent that these unconventional measures affect future inflation or real activity, redistributive consequences similar to those associated with conventional monetary policy are expected to occur. However, there are other consequences that are relevant only with quantitative easing. Let me discuss one example. When the Federal Reserve purchases mortgage-backed securities en masse, it does so with the intention of driving down mortgage interest rates, thus making it more affordable for people to purchase houses. This increase in demand for housing is expected to increase housing prices in general and therefore also benefit current homeowners by increasing the value of their homes. On the other hand, higher house prices hurt homebuyers, even while they benefit from lower mortgage rates. Generally speaking, by affecting mortgage interest rates, these unconventional monetary policy tools could generate redistribution from homebuyers to current homeowners. The general message is that when the market for a particular type of asset is affected by large-scale purchases of such assets, the policy could create winners and losers depending on who holds those types of assets.

CONCLUSION

It is important to be aware that, even if it is intended to affect all segments of the population equally, monetary policy is probably not going to be completely neutral. If the various redistributive effects that I have discussed in this article are small compared with the ways in which monetary policy affects all segments of the population equally, the redistributive consequences might be less of a concern. However, the answer to this question probably depends on the economic environment. More research is needed for weighting various redistributive effects against the nonredistributive effects that policymakers have traditionally focused on. ■

NOTES

- ¹ See the press conference transcript.
- ² Average durations as determined by the National Bureau of Economic Research's Business Cycle Dating Committee, www.nber.org/cycles/cyclesmain.html.
- ³ Monetary policy may also redistribute wealth and income geographically, although those dynamics are beyond the scope of this article. See the *Business Review* article by Gerald Carlino and Robert DeFina.
- ⁴ An important strand of the literature that I do not discuss here is about the optimal average level of inflation. An interested reader might consult the *Business Review* article by Daniel Sanches (2012) or the overview by Stephanie Schmitt-Grohe and Martin Uribe (2010).
- ⁵ In reality, house prices do not move in perfect unison with inflation, since inflation and house prices are affected by economic activities differently.
- ⁶ Again, in reality, the relationship is far from being perfectly in sync.
- ⁷ However, there is often a limit as to how much the interest rate of an adjustable-rate mortgage can change. This restriction makes adjustable-rate mortgages not perfectly immune from surprise inflation.
- ⁸ Notice that the effect here is asymmetric, because when the mortgage rate goes down together with the inflation rate, borrowers can refinance their mortgages and benefit from the lower rate, although refinancing is not cost-free.
- ⁹ The average longer-run outlook for inflation held by members of the Federal Open Market Committee, the monetary policy-setting committee of the Federal Reserve, is around 2 percent. See www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf.
- ¹⁰ See www.riksbank.se/en/Press-and-published/Notices/2014/Riksbank-continues-analysing-household-debt/.
- ¹¹ The survey is conducted by NORC (formerly the National Opinion Research Center) at the University of Chicago.
- ¹² The calculations assume that the entities hold the same mix of assets that they did in 1989.
- ¹³ Cesaire Meh, Jose-Victor Rios-Rull, and Yaz Terajima use Canadian data to analyze how households' gains and losses would differ depending on how the government allocated its gains through different fiscal policies.
- ¹⁴ As stated in the Federal Reserve Act, "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long-run growth of the monetary and credit aggregates commensurate with the economy's long-run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates." See www.federalreserve.gov/aboutthefed/section2a.htm.
- ¹⁵ Javier Diaz-Gimenez, Andy Glover, and Jose-Victor Rios-Rull tabulated the data from the 2007 Survey of Consumer Finances.

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