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Transmission of Monetary Policy

Remarks by

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Thank you, Juan Pablo. I am delighted to be speaking at the University of Minnesota because, in many ways, this visit feels like a homecoming for me.[1] I was born right here in Minneapolis, before I moved to Colombia as a young child. My parents told me so many wonderful stories about this area and the university. My father studied for his Ph.D. here at the economics department. He studied under accomplished economists, including Anne Krueger, Leo Hurwicz, John Buttrick, and Ed Foster, the latter of whom is still here as an emeritus professor. The University of Minnesota has made many contributions to the field of economics and has historically had a close relationship with the Federal Reserve Bank of Minneapolis. So you really are part of the Fed's extended family, and it is an honor to speak with you.

Today, I would like to speak with you about the transmission of the Fed's monetary policy. I will discuss how monetary policy is transmitted through the economy, then touch on how I monitor its transmission, and, lastly, talk about two elements related to transmission that I evaluate when making monetary policy decisions. Those elements are the long and variable lags of monetary policy and whether its transmission is asymmetric and has changed over time. But before I delve into my primary topic, I would like to start by offering my views on the economic outlook.

Economic Outlook

The U.S. economy has grown at a solid pace, with real gross domestic product (GDP) expanding 2.5 percent last year. Activity indicators in the first few months of this year show healthy numbers. Last week, the March retail sales release showed resilient consumption, with positive revisions for January and February numbers. However,

[1] The views expressed here are my own and are not necessarily those of my colleagues on the Federal Reserve Board or the Federal Open Market Committee.

measures of household sentiment, such as surveys from the University of Michigan, Conference Board, and Morning Consult, have shown signs of softness, albeit to varying degrees. Many survey respondents report that their views reflect trade policy concerns, though, as we have seen, the exact contours of those policies are still taking shape. Thus, GDP growth for the first quarter, which will be reported next week, may show some moderation relative to what we saw in 2024, although this moderation may be offset by increased purchases front-loading the implementation of tariffs. Financial markets have experienced increased volatility in recent weeks. If financial conditions were to tighten persistently, that could weigh on growth in the future.

The labor market remains solid, but the pace of hiring has eased during this year. In the first quarter, U.S. employers added 152,000 jobs per month, on average, compared with a monthly pace of 168,000, on average, last year. The unemployment rate edged up last month to 4.2 percent, but it is still low and has remained near its current level since last summer. Moreover, initial jobless claims have remained stable at low levels. Those numbers are consistent with other measures indicating that the labor market is broadly in balance.

With respect to inflation, progress has slowed since last summer, and inflation remains above the 2 percent goal. Based on the consumer price index (CPI) and producer price index (PPI) data, the 12-month change in the personal consumption expenditures (PCE) price index was estimated to have been 2.3 percent last month and 2.6 percent for the core categories, which exclude food and energy.

I pay careful attention to two subcategories of inflation: first, core goods—which are goods outside of volatile food and energy products—and, second, nonhousing

market-based services, which are based on transactions and not imputed prices, such as car maintenance and haircuts. Goods inflation was negative in most of 2024—as was the norm for several years before the pandemic—but it increased to 0.4 percent in January and February. In March, the CPI and PPI releases pointed to goods inflation decreasing to a still-positive 0.1 percent, which is better news. By contrast, nonhousing market services inflation stayed elevated through March, at an estimated 3.4 percent. That category often provides a good signal of inflationary pressures across all services. As we look ahead, while the long-run level of tariffs is still to be determined, tariffs have moved significantly higher this year. That will likely put upward pressure on prices. For instance, both survey- and market-based measures of near-term inflation expectations have moved up. Longer-term inflation expectations—those beyond the next few years—largely remain well anchored and consistent with our 2 percent inflation goal, and I hope they continue in that way.

I am closely monitoring incoming data and the cumulative effects on both sides of our mandate from policies in four distinct areas: trade, immigration, fiscal policy, and regulation. I am also monitoring any risks to the outlook, especially upside risks on inflation or downside risks to employment. Still, I think our monetary policy is well positioned for changes in the macroeconomic environment. Thus, I will support maintaining the current policy rate for as long as these upside risks to inflation continue, while economic activity and employment remain stable. I remain committed to achieving both of our dual-mandate goals of maximum employment and stable prices.

Overview of Monetary Policy Transmission

Now turning to the primary topic of my speech, I will first discuss how monetary policy is transmitted through the economy. In this section, I will give some examples from the recent past as a tool for explaining my arguments, but I am not intending to comment further on the latest developments in the economy.

Understanding the transmission of monetary policy starts with understanding how the Federal Reserve uses its policy tools. The Federal Open Market Committee (FOMC) adjusts the target range for the federal funds rate, or the rate that banks pay for overnight borrowing. Setting the federal funds rate is the primary means by which the Fed adjusts the stance of monetary policy, among its range of monetary policy tools. In addition to the FOMC directly adjusting the federal funds rate, Fed policymakers' communications about the future path of monetary policy may also result in changes to longer-term interest rates because households' and businesses' expectations about future policy affect the level of interest rates.

Adjustments to the federal funds rate affect a multitude of financial conditions faced by consumers and businesses. For example, changes to the federal funds rate filter through to the interest rates lenders charge for loans to businesses and households as well as to what financial institutions pay in interest on deposits. The current and expected future path of the federal funds rate also affects asset prices, as it changes the relative attractiveness of different investments, such as stocks and real estate. Fluctuations in both interest rates and asset prices affect a household's wealth and a corporation's

balance sheet, which can, in turn, affect the terms under which they can borrow.[2] I have discussed some of the most common ways in which policy is transmitted. There are, of course, other important channels, such as exchange rates and international spillovers, that I will not discuss today. Research suggests that the channels of transmission are extensive and ever evolving.[3]

Consumers and businesses make decisions based on financial conditions.[4] For illustrative purposes, let's consider a period when FOMC policymakers view it as appropriate to ease the restrictiveness of monetary policy by reducing the target range for the federal funds rate over time. The resulting lower interest rates on consumer loans elicit greater spending on goods and services, particularly on durable goods that are often financed. Lower mortgage rates can encourage renters to buy a home by reducing the monthly payment borrowers face and can encourage existing homeowners to refinance their mortgages to free up cash for other purchases. Lower interest rates can make holding equities more attractive, which raises stock prices and adds to wealth. Higher wealth tends to spur more spending, as households tend to consume at least a portion of their increased wealth. Investment projects that businesses previously believed would be marginally unprofitable become attractive because of reduced financing costs,

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[2] Such broader changes in credit conditions are called the "credit channel" of monetary policy, discussed in Ben S. Bernanke and Mark Gertler (1995), "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives*, vol. 9 (Autumn), pp. 27–48.

[3] For evidence on how U.S. monetary policy affects exchange rates, see Martin Eichenbaum and Charles L. Evans (1995), "Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates," *Quarterly Journal of Economics*, vol. 110 (November), pp. 975–1009. Additionally, U.S. monetary policy also affects global financial conditions, as analyzed by Silvia Miranda-Agrippino and Hélène Rey (2020), "U.S. Monetary Policy and the Global Financial Cycle," *Review of Economic Studies*, vol. 87 (November), pp. 2754–76.

[4] For evidence that financial conditions are a crucial part of the transmission of monetary policy, see Mark Gertler and Peter Karadi (2015), "Monetary Policy Surprises, Credit Costs, and Economic Activity," *American Economic Journal: Macroeconomics*, vol. 7 (January), pp. 44–76.

particularly if businesses expect their sales to rise. Expecting a better macroeconomic environment and lower delinquency rates down the road, banks may loosen their lending standards on approving loans for households and businesses. All these decisions support aggregate demand and may put upward pressure on inflation.

Of course, there are periods when policymakers see it as appropriate to increase the level of restraint placed on the economy by raising the federal funds rate over time. That may occur when policymakers are seeking to lower inflation. Then, the monetary policy effects I just described would be reversed, putting downward pressure on aggregate demand and inflation.

Developments in Monetary Policy and Financial Conditions

Let me now discuss how I view the transmission and the stance of monetary policy during the past few quarters. To be clear, I will not discuss the developments in financial markets over the past few weeks.

In the second half of last year, I gained greater confidence that inflation was on a sustainable path toward the FOMC's 2 percent objective. I also wanted to preserve the strength I saw in the labor market. As a result, I supported the FOMC's decision to decrease the target range for the federal funds rate by a total of 1 percentage point during the meetings from September through December. However, even before the Committee began to ease policy, some financial conditions started to ease. This easing can be seen in the Financial Conditions Impulse on Growth index.[5] That index, developed by Federal Reserve Board staff, showed easier financial conditions from March 2024. And through

[5] See Andrea Ajello, Michele Cavallo, Giovanni Favara, William B. Peterman, John Schindler, and Nitish R. Sinha (2023), "A New Index to Measure U.S. Financial Conditions" FEDS Notes (Washington: Board of Governors of the Federal Reserve System, June 30), https://doi.org/10.17016/2380-7172.3281.

January, the demand for loans by households and businesses picked up.[6] In the early months of the year, financial conditions, however, remained somewhat restrictive, as borrowing costs continued to be elevated and bank credit moderately tight. Through March, interest rates on short-term small business loans had only edged down since their post-pandemic peak.[7] Banks stopped tightening lending standards after nine consecutive quarters, but they left standards unchanged in January.[8] These financial conditions helped to moderate aggregate demand and aid in moving inflation sustainably toward our 2 percent target.

Details of Monetary Policy Transmission

Monitoring the financial conditions I just described is one important way I evaluate how well the Fed's monetary policy is being transmitted to the rest of the economy. But it is not the only way. I also consider two other elements that play important roles in the transmission of our monetary policy.

Timing Matters

The first element to evaluate is the timing with which monetary policy affects the macroeconomy. The contemporary economics literature uses a variety of statistical models to estimate the effects of what are called monetary policy "shocks." Those are movements in the policy rate that are not explained by estimates of how monetary policy systematically responds to incoming economic and financial data and are not anticipated

[6] See Board of Governors of the Federal Reserve System (2025), "The January 2025 Senior Loan Officer Opinion Survey on Bank Lending Practices," https://www.federalreserve.gov/data/sloos/sloos-202501.htm.
[7] See survey data from the National Federation of Independent Business, available at William C. Dunkelberg and Holly Wade (2025), "Small Business Economic Trends," March, https://www.nfib.com/wp-content/uploads/2025/04/NFIB-SBET-Report-March-2025.pdf.
[8] See Board of Governors, "The January 2025 Senior Loan Officer Opinion Survey" (note 6).

by the public.[9] Focusing on the estimated effects of these shocks helps isolate the consequences solely coming from monetary policy actions and communications. One lesson that emerges from this research is that, broadly speaking, it turns out that Milton Friedman's "long and variable lags" concept still holds.[10] A selection of key studies on the topic estimates that it takes about one to two years for the maximum effects of policy to be observed in economic activity and inflation.[11] These long lags in monetary policy affecting the economy point to why it is important for policymakers to anticipate economic conditions as best as possible and try to be proactive about understanding the effects of different shocks to the economy, so they can act quickly when needed.

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[9] For a literature review on the different ways of identifying monetary policy shocks, see V.A. Ramey (2016), "Macroeconomic Shocks and Their Propagation," in John B. Taylor and Harald Uhlig, eds., *Handbook of Macroeconomics*, vol. 2 (Amsterdam: North-Holland), pp. 71–162.

[10] See Edward Nelson (2020), *Milton Friedman and Economic Debate in the United States,* 1932–1972, vol. 1 (Chicago: University of Chicago Press), p. 141.

[11] See the following papers: Lawrence Christiano, Martin Eichenbaum, and Charles L. Evans (1999), "Monetary Policy Shocks: What Have We Learned and to What End?" in John B. Taylor and Michael Woodford, eds., *Handbook of Macroeconomics*, vol. 1 (Amsterdam: North-Holland), pp. 65–148; Christina D. Romer and David H. Romer (2004), "A New Measure of Monetary Shocks: Derivation and Implications," *American Economic Review*, vol. 94 (September), pp. 1055–84; Harald Uhlig (2005), "What Are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure," *Journal of Monetary Economics*, vol. 52 (March), pp. 381–419; Jean Boivin, Michael T. Kiley, and Frederic S. Mishkin (2010), "How Has the Monetary Transmission Mechanism Evolved over Time?" in Benjamin M. Friedman and Michael Woodford, eds., *Handbook of Monetary Economics,* vol. 3 (Amsterdam: North-Holland), pp. 369–422; Olivier Coibion (2012), "Are the Effects of Monetary Policy Shocks Big or Small?" *American Economic Journal: Macroeconomics*, vol. 4 (April), pp. 1–32; Gertler and Karadi, "Monetary Policy Surprises" (see note 4); Pooyan Amir Ahmadi and Harald Uhlig (2015), "Sign Restrictions in Bayesian FAVARs with an Application to Monetary Policy Shocks," NBER Working Papers Series 21738 (Cambridge, Mass.: National Bureau of Economic Research, November), https://www.nber.org/system/files/working_papers/w21738/w21738.pdf; Christiane Baumeister and James D. Hamilton (2018), "Inference in Structural Vector Autoregressions When the Identifying Assumptions Are Not Fully Believed: Re-evaluating the Role of Monetary Policy in Economic Fluctuations," *Journal of Monetary Economics*, vol. 100 (December), pp. 48–65; Marek Jarociński and Peter Karadi (2020), "Deconstructing Monetary Policy Surprises—The Role of Information Shocks," *American Economic Journal: Macroeconomics*, vol. 12 (April), pp. 1–43; Silvia Miranda-Agrippino and Giovanni Ricco (2021), "The Transmission of Monetary Policy Shocks," *American Economic Journal: Macroeconomics*, vol. 13 (July), pp. 74–107; and Michael D. Bauer and Eric T. Swanson (2023), "A Reassessment of Monetary Policy Surprises and High-Frequency Identification," in Martin Eichenbaum, Erik Hurst, and Jonathan A. Parker, eds., *NBER Macroeconomics Annual 2022*, vol. 37 (May), pp. 87–155.

Direction of Travel

The second element to consider when making decisions related to monetary policy is whether its transmission has been equally impactful during different points in time. For example, credible evidence indicates that contractionary monetary shocks may generally decrease economic activity more strongly than expansionary shocks increase it.[12] To understand these asymmetric effects, consider the following illustrative metaphor used by Marriner Eccles, who led the Fed back in the 1930s.

Imagine a string with monetary policy at one end and the economy at the other. Employing tight monetary policy when inflation is rising is like pulling on the string to keep the economy in check—it works fairly well. But attempting to stimulate the economy with loose policy during a downturn is like trying to push on the string to move the economy—a more difficult task.

There is evidence of this asymmetry in consumer spending on long-lasting durable goods, such as vehicles and appliances. While an easier monetary policy may lower interest rates and thus stimulate spending on durable goods in the near term, the effects of that policy may be smaller over time, as households may have already purchased durable goods.[13] If a family replaces their living room furniture when rates are low, they are unlikely to need a new set of furniture a few years later and thus would not

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[12] See, for instance, Silvana Tenreyro and Gregory Thwaites (2016), "Pushing on a String: US Monetary Policy Is Less Powerful in Recessions," *American Economic Journal: Macroeconomics*, vol. 8 (October), pp. 43–74; Joshua D. Angrist, Òscar Jordà, and Guido M. Kuersteiner (2018), "Semiparametric Estimates of Monetary Policy Effects: String Theory Revisited," *Journal of Business & Economic Statistics*, vol. 36 (July), pp. 371–87; and Regis Barnichon, Christian Matthes, and Tim Sablik (2017), "Are the Effects of Monetary Policy Asymmetric?" Federal Reserve Bank of Richmond, *Economic Brief*, vol. 3 (March), pp. 1–4, https://www.richmondfed.org/-/media/richmondfedorg/publications/research/economic_brief/2017/pdf/eb_17-03.pdf.

[13] See Alisdair McKay and Johannes F. Wieland (2021), "Lumpy Durable Consumption Demand and the Limited Ammunition of Monetary Policy," *Econometrica*, vol. 89 (November), pp. 2717–49.

consider how current rates would change their decisions. Thus, during an easing cycle, it is reasonable to suspect that the potency of monetary policy may be somewhat diminished.

Another example of asymmetry can be seen in the transmission of monetary policy to private lending. Board staff research documented strong growth in the period between the Global Financial Crisis and the pandemic, fueled by structural factors, such as the attractiveness of the market to borrowers and investors due to its higher customization.[14] One implication of this strong growth during this past policy tightening is that monetary policy transmission to private credit markets appeared more muted relative to financing through public credit markets or bank commercial and industrial lending.

By contrast, other factors specific to the recent period likely decreased the potency of monetary policy during the tightening cycle but may increase it during the easing cycle. When the pandemic struck and social distancing was common, many households severely curtailed spending. In addition, a historic level of government transfers boosted household income. This combination led the personal savings rate to soar.[15] Recent work by Board staff suggests that these excess savings accumulated during the pandemic may have reduced the effects of tighter monetary policy over recent

[14] See Ahmet Degerli and Phillip J. Monin (2024), "Private Credit Growth and Monetary Policy Transmission," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, August 2), https://doi.org/10.17016/2380-7172.3565.

[15] See, for instance, Aditya Aladangady, David Cho, Laura Feiveson, and Eugenio Pinto (2022), "Excess Savings during the COVID-19 Pandemic," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, October 21), https://doi.org/10.17016/2380-7172.3223; and Francois de Soyres, Dylan Moore, and Julio L. Ortiz (2023), "Accumulated Savings during the Pandemic: An International Comparison with Historical Perspective," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, June 23), https://doi.org/10.17016/2380-7172.3326.

years.[16] If households are flush with excess cash, they are less likely to respond to elevated interest rates by curtailing demand. Instead, they may have funds to avoid financing or may feel they are able to afford higher monthly payments.

Now, some five years after the pandemic began, these excess savings are exhausted.[17] This creates an environment in which monetary policy could be having its average effects on the household sector, although we should consider that the financial health of borrowers with lower credit scores has deteriorated meaningfully in recent years and credit card and auto loan delinquencies are now above pre-pandemic levels. For these households, easing monetary policy may have larger effects.

I am closely monitoring all these possible changes in monetary policy transmission across the economy. Also, I am humbly aware that it is difficult for economists to judge the overall effect of monetary policy actions on the U.S. economy in real time.

Conclusion

To summarize, I see inflation still running above the 2 percent target while the labor market has remained stable. But the economy is facing heightened uncertainty, with upside risks to inflation and downside risks to employment. This month, we learned that the tariff increases are significantly larger than previously expected. As a result, the economic effects of tariffs and the associated uncertainty are also likely to be larger than anticipated. It is important for monetary policymakers to broadly examine all available

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[16] See Thiago R.T. Ferreira, Nils Gornemann, and Julio L. Ortiz (forthcoming), "Household Excess Savings and the Transmission of Monetary Policy," *International Journal of Central Banking*.

[17] See Hamza Abdelrahman and Luiz Edgard Oliveira (2024), "Pandemic Savings Are Gone: What's Next for U.S. Consumers?" *SF Fed Blog,* Federal Reserve Bank of San Francisco, May 3, https://www.frbsf.org/research-and-insights/blog/sf-fed-blog/2024/05/03/pandemic-savings-are-gone-whats-next-for-us-consumers.

information, including market-based measures, surveys, and anecdotal reports, to understand what is happening in the economy as early as possible because, as I discussed, it takes time for policy to have an impact. As the direction of the economy changes, it is critical to pay close attention to real-time data and to consider the lags and asymmetries of policy transmission to ensure we respond not only to the actual movements on both sides of the mandate, but also to the risks to the economic outlook.

As I observe the economy and consider the appropriate path of monetary policy, I am closely studying how the decisions the FOMC makes are transmitted through the economy. We have learned much about how those transmission channels work and how they may have changed in recent years, and there is much more to learn. I am confident some of that research will be done right here at the University of Minnesota. Overall, of course, when setting policy, I am guided by how best to achieve the dual-mandate goals of maximum employment and stable prices given to us by Congress because that results in the best outcomes for all Americans.

Thank you again for such a warm welcome back to the Twin Cities.