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***“Central Bank Balance Sheets:
Misconceptions and Realities”***

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Good morning. It is a pleasure to be in Hong Kong for the Credit Suisse Asian Investment Conference.

My colleagues and I spend a fair amount of time talking to members of the public about the economic analysis that goes into monetary policymaking. We spend somewhat less time talking about the tools we will use to attain our economic goals. And to date we have spent relatively little time speaking in detail about one of those tools, the Federal Reserve's balance sheet – that is, the assets the U.S. central bank is holding and liabilities and capital used to finance those assets.¹ It is an admittedly complicated topic, but one that needs more explanation. The balance sheet needs to be better understood – beyond just its total size, and beyond just the assets on it. I say this given its likely importance in the future, should there eventually be an economic downturn; and given the suggestion in some quarters that balance sheet policies are behind recent market volatility (a suggestion I disagree with).

Technically speaking, the Federal Reserve's balance sheet, like that of any enterprise, reflects a point-in-time financial snapshot. The balance sheet is always evolving, and as a result the Federal Reserve publishes it each week.² I would point out that last week the Fed released additional information regarding its plans and principles for balance sheet normalization.³

Throughout my remarks today, I will be highlighting the importance of the balance sheet as a tool that will likely need to be used by central banks around the world, given the low interest rate environments in many developed countries. I will touch on some of the misconceptions that have emerged around the topic, look in some detail at the actual composition of the Fed's balance sheet, discuss the Fed's balance sheet normalization approach, disprove some mistaken assumptions about the balance sheet and recent financial market turbulence, and comment on the

role of the balance sheet going forward – providing my own view of the role balance sheet policies and actions could play in the future.

Misconceptions about the Federal Reserve Balance Sheet

The balance sheet policies of the U.S. central bank have received rather significant attention over the past two quarters. That attention stands in contrast to the somewhat surprising lack of market reaction in September 2017 to the announcement of a very gradual runoff of Federal Reserve assets.⁴

Even more surprising to me was the association – made by some market analysts at the end of 2018 – that the increased market volatility, falling long-term interest rates, and declining global stock market prices in the fourth quarter could be attributed to Federal Reserve balance sheet actions. In actuality, the runoff in balance sheet assets continued at a little faster pace in the first two months of this year than in the fourth quarter of last year, yet markets have risen and volatility has declined – which certainly does not square with the earlier commentary. This episode highlights the reason for concern that some misconceptions have emerged about the effects of Federal Reserve balance sheet actions – and what such actions can, and cannot, achieve.

I have talked to a variety of market observers who argue that the Fed's balance sheet should return to levels similar to those that existed prior to the financial crisis of 2008-2009. The argument for such a policy is based more on misconception than fact, since it does not recognize that factors unrelated to monetary policy also impact the growth of the Federal Reserve's balance sheet, as I will demonstrate in a moment. Furthermore, I think it is a mistake to focus primarily

on the size of the balance sheet, with much less attention placed on the quantity of bank reserves and the duration of the assets being held. In my view, these latter aspects are much more important than overall size, from a policy perspective.

It is important to dispel misconceptions surrounding central bank balance sheets if for no other reason than this: It is quite likely that central bank balance sheets will be integral to the conduct of monetary policy in the future, in the U.S. and many other countries. When a recession eventually occurs, central banks would normally decrease short-term interest rates. But with interest rates already low in most developed countries, central banks would likely reach the effective lower bound quite quickly. In fact, in Japan and Europe it is theoretically possible that rates might not rise much above the effective lower bound before a hypothetical next recession occurs. As in the Great Recession that followed the financial crisis, this could force central bankers to use asset purchases to create more accommodative financial conditions and stimulate their economies, which would necessarily entail an expansion of their balance sheets.⁵

If balance sheet policies are to become a more regular feature of monetary policy actions around the world, my view is that it is important that central bankers are clear with the public about why they would pursue such policies, what effects they will have, and what complications might arise as a consequence of using such policies.

Allow me to outline the key points that I will explore in more detail today. First, part of the expansion of the Federal Reserve's balance sheet occurs as a normal consequence of a growing economy with a growing need for currency, a factor not related to monetary policy action. A second factor that is unrelated to monetary policy is changes in the balances held at the Fed by the U.S. Treasury. The Treasury's General Account has grown significantly following

the financial crisis, in part because the Treasury shifted from using accounts at commercial banks to the Treasury General Account and decided to maintain larger balances.^{6,7} As a consequence of these factors, returning the balance sheet to a pre-crisis size may sound like the end result of normalizing policy, but in fact is neither desirable nor feasible. In addition, demand for reserves is much greater than pre-crisis, in part because financial institutions see the benefits of having a higher level of liquid assets.

Second, when scaled relative to GDP, the Federal Reserve's balance sheet is actually small compared to those of central banks in many other developed countries.

And third, as suggested by the previous discussion of currency and Treasury balances, it is important to focus on aspects of the central bank balance sheet that policymakers directly control, and that are closely related to policy decisions. I have in mind bank reserves, which can directly affect the ability to control short-term interest rates, and the duration of assets, which can also play a role in policymakers' ability to lower longer-term interest rates, as I will discuss in a moment.

As you likely know, the Federal Reserve has announced that it will continue using the same monetary policy framework that it has since the financial crisis, which maintains an ample supply of reserves to ensure that it can effectively maintain a "floor" type system for controlling short-term interest rates via administered rates.⁸ I will describe this in more detail in a moment. In particular, variability in some of the components of the Federal Reserve's balance sheet make it necessary to have ample reserves as a reasonable buffer if policymakers seek to avoid significant volatility in short-term interest rates.⁹

Finally, in my view, monetary policymakers should give more consideration to structuring the balance sheet to provide more leeway for policy measures to be taken when the next economic downturn occurs. This consideration primarily centers on building in the flexibility to exchange short-term for long-term Treasury securities so as to lower longer-term Treasury rates. I will now discuss all these points in more detail.

Examining the Federal Reserve’s Balance Sheet

As I mentioned at the outset, the Federal Reserve’s balance sheet, like that of any enterprise, reflects at a single point in time the assets it holds, and the liabilities and capital used to finance those assets.

Figure 1 shows how the assets and liabilities of the Fed have changed since before the Great Recession. The table provides a high-level overview of the largest categories of assets and liabilities of the Federal Reserve, for January 2004 and for February 2019. The assets are composed primarily of U.S. Treasury securities and mortgage-backed securities that have a government guarantee. All of these securities accrue interest.

These interest-generating assets are financed primarily by three categories of liabilities: Federal Reserve notes – U.S. currency – a category that does not pay interest; deposits held for the Treasury; and reserves held for thousands of depository institutions, which pay an overnight rate – or interest on reserves.¹⁰ I would note that the net income generated by the Fed’s balance sheet activity is turned over to the U.S. Treasury annually.¹¹

As Figure 1 illustrates, there have been significant changes to the assets and liabilities of the Federal Reserve over the past 15 years. In terms of assets, in 2004 the Federal Reserve held roughly one-third of its securities as short-term Treasury bills and held no mortgage-backed securities. By 2019, the Federal Reserve held essentially no Treasury bills and had dramatically increased its holdings of long-term securities such as Treasury bonds and mortgage-backed securities. This change in the composition of assets reflects a Fed policy choice that was necessitated by the fact that the short-term policy rate was already at its effective lower bound, even as the economy remained quite weak. Hoping to stimulate the economy, the Fed purchased long-term securities in order to reduce long-term interest rates (because debt security prices move inversely with their interest rates, higher prices spurred by purchases reduced rates).

In principle, the Federal Reserve can move to longer-term assets either by exchanging them for the central bank's holdings of short-term assets on the Fed balance sheet (a reallocation of the portfolio, accomplished by selling short-term assets and purchasing longer-term assets) or by simply purchasing longer-term securities – that is, crediting the banks that the Fed purchases them from with new reserves. In practice, the Fed did some of both. In the end, the overall amount of assets the central bank held became much larger, growing from less than \$1 trillion to approximately \$4.5 trillion, in large part due to these policy-related purchases of long-term securities.

While much of this growth was initially a result of intentional monetary policy actions and the operation of lending facilities set up to provide liquidity during the financial crisis, there were also secular trends unrelated to Fed policy that caused the balance sheet to grow. These trends primarily affected the composition of Federal Reserve liabilities.

What liabilities financed the growing assets on the Fed's balance sheet? Before the crisis, the largest category of Fed liabilities was currency holdings. Currency is held by domestic individuals who use it as a medium of exchange, but is also held abroad. In some countries the U.S. dollar is the *de facto* domestic currency, whereas in other countries the U.S. dollar is often used as a store of value, hedging against the possibility of exchange rate depreciation of the local currency.

The Federal Reserve passively issues currency through banks in response to domestic and international demand for currency from bank customers. And when individuals hold U.S. currency, they are in effect providing an interest-free loan to the federal government.¹²

As **Figure 2** shows, as of 2019, currency holdings were more than twice the size of the Fed's *entire* balance sheet in 2004. It is important to note that this particular driver of currency liabilities is *not* a monetary policy action by the Fed. Since 2004, currency has grown from under \$700 billion to \$1.66 trillion. The change in currency holdings alone highlights that the Fed's balance sheet will not be able to shrink to earlier levels.

Of course, Figure 2 also shows that in 2004, just under 90 percent of the Federal Reserve's balance sheet was financed by currency. And now that percentage is just over 40 percent.

Among the non-currency liabilities on the Fed's balance sheet, "Other Liabilities" and the "U.S. Treasury General Account" are, like currency growth, not primarily driven by monetary policy actions. The balance sheet would have needed to grow to accommodate these changes as well. In short, those who argue for returning to a balance sheet closer to the former \$1 trillion

level from before the financial crisis are ignoring the non-monetary policy reasons that the balance sheet has expanded.

Even if one picks a much shorter horizon, significant changes in the composition of the Federal Reserve's liabilities are evident, as shown in **Figure 3**. From September 2017 to February 2019, Federal Reserve policymakers have very gradually reduced the overall balance sheet by letting some of the securities that are maturing roll off. However, this relatively small reduction on the asset side of the balance sheet has been accompanied by increases in both currency and the U.S. Treasury General Account on the liabilities side. The result has been an even larger shrinkage of reserves – a Fed liability – than would have occurred due to the rolling off alone.

Figure 4 shows the overall size of the balance sheet compared to the amount of excess reserves of depository institutions – the reserves in excess of the minimums required to meet reserve requirements.¹³ During the period when Federal Reserve policymakers were reinvesting maturing securities and holding the balance sheet's overall size relatively constant, excess reserves were declining because the other liabilities mentioned earlier were rising, absorbing reserves out of the banking system. With an enormous surplus of reserves already in the banking system, the Fed chose not to offset these reserve declines. As total assets have declined, and other liabilities have continued to grow, excess reserves are declining more rapidly than the overall balance sheet.

Figure 5 shows central banks' balance sheets relative to GDP in major industrialized countries. Examining the central bank's balance sheet assets as a share of GDP shows that the Federal Reserve's balance sheet, relative to the size of its economy, is smaller than that of these

other major developed countries. This is despite the fact that as a reserve currency, international demand for U.S. currency will be considerably larger than is the case for other currencies.

Another reason the Federal Reserve's balance sheet is smaller as a share of GDP than other developed countries' balance sheets stems from the aggressive and proactive easing by the Fed during the financial crisis, which restored U.S. growth faster than otherwise.¹⁴ I would assert that partly as a result of that aggressive action, the Fed was able to move sooner to unwind its emergency monetary policies and the United States is further along in the balance sheet normalization process relative to many peers.

Overall, these facts suggest that the balance sheet should not be expected to decline to anything close to the pre-crisis size, in my view. Growth in non-monetary policy related liabilities, like currency, make it quite likely that the absolute size of the Fed's balance sheet will continue to grow.

However, the size of the balance sheet — more specifically, the size of reserve balances in the banking system — is also closely related to how the central bank chooses to conduct monetary policy, and how we want monetary policy to react in the next recession. I will now explore these aspects of the balance sheet with you.

Balance Sheet Normalization

Following its January meeting, the Federal Open Market Committee (FOMC), the U.S. monetary policy decision-making body, issued a short statement regarding monetary policy implementation and balance sheet normalization.¹⁵ The Committee said:

The Committee intends to continue to implement monetary policy in a regime in which an ample supply of reserves ensures that control over the level of the federal funds rate and other short-term interest rates is exercised primarily through the setting of the Federal Reserve's administered rates, and in which active management of the supply of reserves is not required.

Two aspects of the announcement are particularly notable as we consider the future size of the Fed's balance sheet.

First, the FOMC indicated that the Federal Reserve would continue to operate in an environment of an “ample” supply of reserves, which implies a floor-type system of interest rate control, consistent with the operating framework used since the fall of 2008. Prior to the financial crisis, the Federal Reserve operated in a “scarcity of reserves” monetary policy framework. That meant simply that there were enough reserves in the banking system to satisfy short-term borrowing and lending needs, but not more. As a consequence, to maintain the targeted level for short-term interest rates, the Fed regularly conducted open-market operations by adjusting the supply of reserves (and thus the federal funds interest rate), given its estimate of reserves demand.

But once short-term rates had hit zero and the Federal Reserve's asset purchases had dramatically expanded the supply of excess reserves, it could no longer set short-term rates by making small adjustments to the supply of reserves. There were just too many reserves to do that. So the Federal Reserve moved to a “floor system” where we rely on a key administered interest rate that we can set regardless of reserve levels: the rate the Fed pays on excess reserves. In theory, this rate will establish a floor below which market rates will not fall (since banking institutions would generally not lend out short-term money at a rate less than the rate the Fed pays risk-free on banks' excess reserves). The announcement that the Fed is continuing with the

floor system implies that we intend to maintain an ample supply of reserves at depository institutions.

A second implication of the announcement was that within the context of an ample supply of reserves, intervention to add or reduce reserves to offset other liability movements is not necessary (thus the phrase, “active management of the supply of reserves is not required.”) In this operating model, excess reserves need to be ample enough that surprise movements in other liabilities on the Fed’s balance sheet do not need to be offset through open market operations.

Figure 6 shows the major liability categories over the past 15 years. While currency demand has increased quite smoothly overall, liabilities like the U.S. Treasury General Account and Other Liabilities have shown significant fluctuations. To avoid regular interventions to reduce short-term interest rate volatility, reserves need to be large enough that large, temporary declines or surges in liabilities do not cause short-term rates to spike or plummet. With ample reserves, fluctuations in other liabilities do not need to be offset.

The Balance Sheet and Recent Financial Market Turbulence

Some market analysts attribute turbulence in financial markets during the fourth quarter of 2018 to the Federal Reserve’s continuing reduction of the size of its balance sheet. In my view, however, concerns about the international economy, potential trade disputes, and a U.S. government shutdown are much more plausible explanations for the financial market turbulence. For one thing, the Fed’s reduction is still quite gradual. And equity markets experienced a

substantial recovery in the first two months of 2019, even while the runoff of the balance sheet was slightly faster than in the fourth quarter.

Figure 7 shows the monthly change in the Federal Reserve System assets. By design, the runoff was intended to be quite gradual. The runoffs during the third and fourth quarters of 2018 were similar, with an average monthly decline of 0.9 percent in both periods. A similar decline occurred in January 2019, with a more rapid decline following in February 2019. Despite the roughly similar magnitude of runoff, the stock market rose over the third quarter while falling in the fourth quarter of last year and recovering again since the beginning of this year. So there seems to be little correlation between equity market movements and the relatively small and steady decline in the balance sheet.

Looking at another financial indicator – the behavior of term premia – also argues against the idea that the reduction in the Fed’s balance sheet spurred market turbulence. Conceptually, quantitative easing should work through the term premium, or the return needed to induce investors to hold long-term securities instead of short-term securities. Term premia from 2004 to early 2019 are shown in **Figure 8**. As the Fed purchases *long*-term securities, it raises the price and lowers the rate on those securities, thus reducing the term premium. This also encourages investors to “bid up” the price and lower the interest rates on other high-duration securities, so that the Fed’s purchases of government-guaranteed securities have beneficial spillover effects to a wide array of other asset prices.

With quantitative *tightening*, one would expect over time that Treasury yields and term premia would move higher. In contrast, last December the 10-year U.S. Treasury rate fell and the term premium remained quite low – not the reaction one would expect if the very gradual

reduction in the balance sheet were responsible for substantial tightening, which caused asset prices to fall.

The Balance Sheet Going Forward

Both the composition and size of the central bank's balance sheet can influence financial conditions, and thus the path of the economy. As I discussed earlier, holding the balance sheet's size constant would still reduce the amount of excess reserves, as liabilities – such as currency – grow over time. While the point at which the balance sheet no longer is being reduced is clearly important, another significant issue going forward will be determining the point at which the Federal Reserve should once again begin purchasing securities to offset the decline in reserves (and the size of its balance sheet) that would otherwise occur as currency and other liabilities grow.

Another key issue will be the composition of the balance sheet and the duration of the assets on it. **Figure 9** shows that the Fed has been very gradually reducing the duration of U.S. Treasury securities holdings on its balance sheet. Even so, the duration is far higher than it was prior to the financial crisis. One reason for this rise in duration is shown in **Figure 10**. The Fed currently holds virtually no U.S. Treasury bills, which had been more than one-third of the Fed's securities holdings prior to the financial crisis.

In my view, one benefit of having both short- and long-maturity Treasuries on the Fed balance sheet is that it provides a way to stimulate the economy through quantitative easing without increasing the size of the balance sheet, should that be necessary. As suggested earlier, policymakers could lower longer-term interest rates by selling Treasury bills and buying long-

term Treasuries, leaving the size of the balance sheet constant. But to do so, the Fed needs to have some Treasury bills on the balance sheet. Thus, increasing the share of U.S. Treasury bills and more quickly lowering the duration of securities held as assets may be an important goal as part of the normalization process. This would give the Federal Reserve the flexibility to take the policy step of lengthening the maturity of its balance sheet assets the next time a significant economic downturn occurs.

Concluding Observations

Active use of the central bank's balance sheet is a relatively new tool for monetary policy. As an emerging part of the monetary policy toolkit, altering the size and composition of the central bank's balance sheet does not yet have a long history of careful analysis of its effects. In fact, most central banks still see moving short-term interest rates as the primary tool to influence the economy. However, I think it is important to understand how balance sheet changes can and do impact the economy.

In summary, it is unrealistic to expect the Federal Reserve's balance sheet to return to the size it was before the financial crisis, for several reasons that I have described today. First, the demand for some of the Fed's liabilities – for instance currency – continues to grow, which given the binding characteristics of a balance sheet implies the purchase of additional assets over time.^{16,17} A second reason is that operating frameworks affect the desired size and composition of the balance sheet. At the January 2019 FOMC meeting, the Committee announced plans to continue running a floor system with an abundance of reserves. A “scarcity of reserves” framework like the Fed operated with before the financial crisis would have a smaller pool of

reserves and a smaller balance sheet than a floor system with an abundance of reserves. Third, some of the liability categories have become more variable, and if policymakers want to avoid regular interventions in the financial market, it requires that there be enough excess reserves that these fluctuations in liability categories do not create additional volatility in short-term rates.

As I mentioned today, some have suggested that the Fed's balance sheet is partly responsible for financial market volatility at the end of 2018, but I disagree. The Federal Reserve's balance sheet decline has been quite gradual, and proceeded along roughly the same path when stock prices have been rising as when stock prices have been falling. Furthermore, I noted that the term premium, the main mechanism by which the balance sheet impacts the economy, remains at quite low levels.

In conclusion, I will say that in a hypothetical next recession, it may be that many central banks have little room to reduce short-term rates. This will likely generate an increased need to utilize the balance sheet as a stimulative tool of monetary policy. Therefore, it is important for policymakers to continue to research how balance sheet operations influence the economy – and I dare say it is important for market observers, lawmakers, and the public to become more comfortable with the benefits of central banks using their balance sheet tools to pursue the public interest.

Thank you.

¹ See, for example, the discussion of balance sheets in *Corporate Finance* by Ross, Westerfield, and Jaffe.

² See https://www.federalreserve.gov/monetarypolicy/bst_fedsbalancesheet.htm.

³ See the March 20, 2019 statement *Balance Sheet Normalization Principles and Plans*: <https://www.federalreserve.gov/newsevents/pressreleases/monetary20190320c.htm>.

⁴ After the September 2017 FOMC meeting, it was announced that the program for gradually reducing the Federal Reserve’s securities holdings would begin in October 2017.

⁵ Specifically, such actions would likely entail an expansion of reserves, which, along with the normal and gradual increase in currency requirements, would significantly swell the size of central bank balance sheets.

⁶ See Chicago Fed Letter, No. 395, 2018, *The Structure of Federal Reserve Liabilities*, by Thomas Haasl, Sam Schulhofer-Wohl, and Anna Paulson: <https://www.chicagofed.org/publications/chicago-fed-letter/2018/395>.

⁷ This is done to cover payments in the event that the Treasury is unable to issue debt.

⁸ After the January 2019 FOMC meeting, it was announced that the operating regime would continue to be a floor system. See <https://www.federalreserve.gov/newsevents/pressreleases/monetary20190130c.htm>.

⁹ If the Fed shrinks available reserves too much, then fluctuations in reserves due to factors beyond our control—such as the Treasury’s deposits to and withdrawals from its Fed account—could lead to a scarcity or surplus of reserves that would in turn cause significant volatility in short-term interest rates. Knowing how large is an “ample” supply is something we are learning about; but as I have outlined, it is essential to keep an ample supply if we are to control short-term interest rates as we have in recent years.

¹⁰ Congress gave the Federal Reserve the authorization to pay interest on reserves, effective October of 2008. Paying interest on reserves is an important tool as the Fed works to raise rates – because banks can receive interest on reserves held overnight with the Federal Reserve, banks will not want to lend at a rate below what they can get from holding funds with the Fed.

¹¹ The net income generated by the Fed’s balance sheet activity is turned over to the U.S. Treasury as part of the central bank’s annual remittance of earnings net of expenses.

¹² When banks purchase currency from the Fed, they “pay” for it with reserves, and thus their reserve balances decrease. If the Fed wishes to offset this decline in reserves, the Fed can purchase government securities, which replaces the reserves in the banking system, maintaining the overall level of reserves even as currency increases. If it does not, reserve balances in the banking system will decline as currency use increases. Those Treasury securities are assets on the Fed’s balance sheet. The interest earned by the Federal Reserve on these securities is ultimately returned to the federal government.

¹³ It is important to note that there are other reasons for banks to hold reserves; for example, banks use reserves to meet their liquidity requirements of holding high quality liquid assets.

¹⁴ It is important to note the figure also shows that the other central banks have significantly expanded their balance sheets.

¹⁵ See the January 30, 2019 Statement Regarding Monetary Policy Implementation and Balance Sheet Normalization: <https://www.federalreserve.gov/newsevents/pressreleases/monetary20190130c.htm>

¹⁶ As I demonstrated, currency is now much larger than the Federal Reserve’s entire pre-crisis balance sheet.

¹⁷ If we intend to operate in an environment of ample reserves, policymakers will need to match increased currency demand with increased Treasury holdings.