

FEDERAL RESERVE BANK OF KANSAS CITY

# ECONOMIC REVIEW



*Third Quarter 2016*

*Volume 101, Number 3*

Measuring the Stance of Monetary Policy  
on and off the Zero Lower Bound

Consumer Spending in China: The Past  
and the Future

Access to Electronic Payments Systems  
by Unbanked Consumers

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## *Measuring the Stance of Monetary Policy on and off the Zero Lower Bound*

*By Taeyoung Doh and Jason Choi*

In December 2008, the Federal Open Market Committee (FOMC) lowered its target range for the federal funds rate to 0–25 basis points, effectively hitting the zero lower bound. The economy recovered slowly from the depth of the recession, and the FOMC did not lift the federal funds rate target from its lower bound until December 2015.

The prolonged period at the zero lower bound raises the question of how to measure the overall stance of monetary policy when constraints prevent the FOMC from using its traditional policy tool—the target federal funds rate. Taeyoung Doh and Jason Choi propose a new “shadow short-term interest rate” that reflects both government and private-sector borrowing conditions. Their measure of the new shadow rate closely tracks the effective federal funds rate during the period before the zero lower bound. Furthermore, they find inflation and unemployment respond to the shadow rate much as they did to the effective federal funds rate before the zero lower bound period.

## *Consumer Spending in China: The Past and the Future*

*By Jun Nie and Andrew Palmer*

After declining for nearly half a century, the share of consumer spending in China’s GDP has recently increased. The rising consumption share has alleviated some concerns about slowing growth in China: economists and policymakers widely agree that the share of consumer spending must increase for China to continue its economic development. Whether this trend is sustainable, however, is unclear.

Jun Nie and Andrew Palmer examine the key factors driving the recent uptick in consumer spending to evaluate whether China can truly become a consumption-driven economy. They find Chinese consumption growth will likely remain strong, at around 9 percent, over the next few years due to relatively stable income growth and an expected decline in the household saving rate. But in the long run, strong household income growth—which will depend heavily on China’s current supply-side reforms to improve technology and investment—will be necessary for China to transition to a consumption-driven economy.

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*Access to Electronic Payments Systems  
by Unbanked Consumers*  
*By Fumiko Hayashi*

In 2013, nearly 17 million U.S. adults did not have a checking or savings account. Some of these consumers may choose not to have a bank account due to personal preferences. Others, however, may be influenced by factors they cannot control, such as minimum requirements to open accounts and high fees. For these consumers, access to more affordable electronic payment products may enhance their economic well-being by reducing the cost associated with payments and broadening their options of where to make purchases.

Fumiko Hayashi examines the main reasons consumers do not have traditional bank accounts and identifies features of electronic payment products that might attract those consumers. She finds that consumers are primarily deterred from opening bank accounts due to their low or unstable income and banks' high fees. She also finds that some electronic payment products—in particular, general purpose reloadable prepaid cards—may be able to address these issues and thereby attract unbanked consumers.

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# Measuring the Stance of Monetary Policy on and off the Zero Lower Bound

*By Taeyoung Doh and Jason Choi*

In December 2008, the Federal Open Market Committee (FOMC) lowered its target range for the federal funds rate to 0–25 basis points, effectively hitting the zero lower bound (ZLB). At this point, policymakers were constrained from lowering the target federal funds rate further. As a result, the FOMC turned to alternative tools, such as large-scale purchases of long-term Treasury bonds and mortgage-backed securities and forward guidance about future policy actions, to provide necessary stimulus to the economy. The economy recovered slowly from the depth of the recession, and the FOMC lifted the federal funds rate target to 25–50 basis points in December 2015.

The prolonged period at the zero lower bound raises the question of how to measure the overall stance of monetary policy when constraints prevent the FOMC from using its traditional policy tool. A proper measure of the monetary policy stance can help policymakers identify the degree to which monetary policy was constrained by the ZLB and the extent to which alternative monetary policy tools were effective.

A natural way to calibrate the stance of monetary policy during the ZLB period is to look for proxy variables correlated with the federal funds rate that were not constrained by the ZLB. Longer-term interest rates such as the 10-year Treasury bond yield are good candidates. Since current and expected future short-term interest rates systematically

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influence the current level of long-term interest rates, we can construct a “shadow short-term interest rate”—in other words, the rate that observed long-term interest rates would imply if the short-term interest rate could go below the ZLB. Several estimates of the shadow short-term interest rate are based on this idea. Lombardi and Zhu; Krippner; and Wu and Xia use long-term government bond yields in their estimates of the shadow short-term interest rate.

In this article, we propose a new shadow rate that reflects both government and private-sector borrowing conditions. We separate common factors affecting all interest rates from idiosyncratic factors affecting only individual interest rates and construct the shadow short-term interest rate implied by these common factors. Fluctuations in our measure are qualitatively similar to the existing shadow rate measures. Quantitatively, however, our measure is much less negative during the ZLB period than other measures that do not separate out idiosyncratic factors in explaining the variations in observed interest rates.

Our measure of the shadow rate closely tracks the effective federal funds rate during the period before the ZLB. Not only are both interest rates highly correlated during the period before the ZLB, but their effects on macroeconomic variables are also comparable. Our analysis shows that the responses of inflation and unemployment to the shadow rate since the onset of the ZLB are qualitatively similar to those obtained during the period before the ZLB using the effective federal funds rate. Quantitatively, the response of inflation is similar, but the response of the unemployment rate is stronger after the ZLB.

Our shadow rate measure suggests that policy was tighter in the ZLB period up to September 2012 than the policy prescription from a policy rule estimated during the pre-ZLB period. After September 2012, when the third round of asset purchases (QE3) began, our shadow rate indicates that policy was easier than the policy prescription.

## **I. Measuring the Stance of Monetary Policy during the ZLB Period**

The federal funds rate has been the primary tool of monetary policy since the early 1980s. As such, researchers typically use the effective federal funds rate to identify the stance of policy and estimate how policy-makers change the stance of policy in response to economic conditions (Bernanke and Mihov).

When the ZLB became a binding constraint in 2008, the effective federal funds rate ceased to respond to macroeconomic variables, making it impossible to identify the stance of policy through the funds rate alone. Longer-term interest rates, however, were not constrained by the ZLB. In fact, they responded to macroeconomic news in a manner consistent with their responses prior to the ZLB (Swanson and Williams). This suggests long-term interest rates may provide a way to consistently measure the stance of monetary policy on and off the ZLB.

Wu and Xia, for example, compute such a measure by backing out a potentially negative shadow federal funds rate from various long-term Treasury bond yields. Long-term Treasury bond yields are tightly linked to expectations of future short-term interest rates through a no-arbitrage relationship. For example, if long-term interest rates are higher than the risk-adjusted, expected short-term interest rates averaged over the time to maturity, investors can gain riskless profit by buying long-term bonds and selling short-term bonds.<sup>1</sup> The no-arbitrage assumption is that investors engage in this activity on an ongoing basis so that there is no opportunity to profit from such trades for any sustainable period of time.

However, imposing no-arbitrage restrictions on bond yields of different maturities might be restrictive, especially during the financial crisis. In such a period, investors' heightened risk aversion may hamper their ability to eliminate arbitrage opportunities through trading. In addition, by considering information from only Treasury bond yields, the Wu-Xia measure ignores private borrowing conditions that might have been influenced by unconventional monetary policies. The main goal of purchasing mortgage-backed securities, for example, was to directly ease private-sector financing conditions. Evaluating the efficacy of these unconventional monetary policies requires a shadow rate that incorporates private-sector financing conditions as well as government financing conditions.

As such, we construct a new measure of the shadow rate that includes information from various interest rates representing both government and private-sector financing conditions (details of how we construct our measure are available in the Appendix). We use common statistical factors moving various interest rates to construct a measure of the shadow rate. In this analysis, the variation in each interest rate can

be decomposed into the variation correlated with common factors and the idiosyncratic variation uncorrelated with common factors. Since we do not impose no-arbitrage restrictions, we do not directly link long-term interest rates to expectations of future short-term interest rates (as Wu and Xia do).

Table 1 lists the 12 interest rate variables we use to extract these factors: eight level variables and four spread variables. The eight level variables represent borrowing conditions for both the government and the private sector. The four spread variables represent the additional compensation that investors demand to hold assets with longer-term maturities or with credit risks.

Interest rates have trended down since the early 1980s, while interest rate spreads have been volatile. Chart 1 shows various interest rates trending down and closely following each other. Chart 2 shows that interest rate spreads are more volatile, show less co-movement, and spike during recessionary periods. Beyond the common variations in the two groups of variables, individual variables exhibit some idiosyncratic month-to-month variations. For example, since September 2012, when forward guidance about the future path of the policy rate was extended beyond a two-year horizon, the two-year Treasury note yield has occasionally moved in the opposite direction of the 10-year Treasury note (Chart 3).<sup>2</sup>

Since our main goal is to isolate the stance of monetary policy that affects co-movements of different interest rates, it is important to isolate common factors from factors specific to each individual variable. Our statistical method is similar to that of Lombardi and Zhu, but excludes Federal Reserve balance sheet variables and instead uses private-sector borrowing conditions. Since the FOMC indicated asset purchases were intended to put downward pressure on interest rates, including those related to private-sector borrowing conditions, the effect of balance sheet variables can be equally well captured by broad financial market borrowing conditions (Board of Governors of the Federal Reserve System).<sup>3</sup>

We construct the new measure of the shadow rate in two steps. First, we extract three principal components that explain most of the time-variation in eight interest rates and four interest rate spreads capturing the term premium and credit risk premium. The extracted principal components are averages of the 12 variables weighted to

Table 1  
Data Description

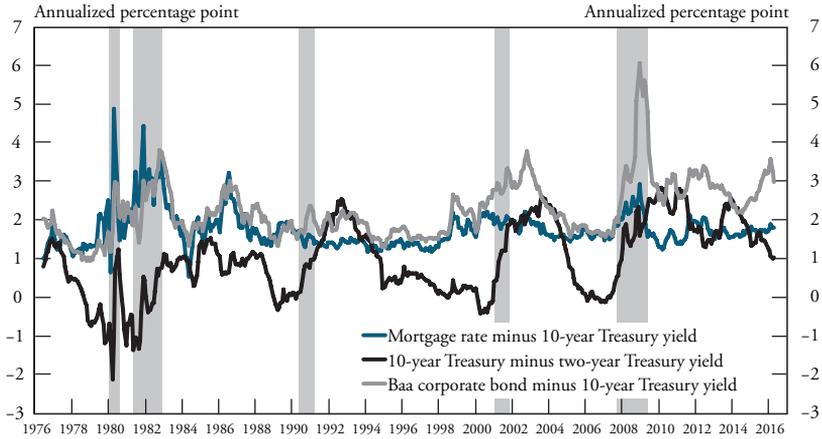
Variables	Description	Source
Level variables	Contract rates on commitments: conventional 30-year mortgages, Federal Home Loan Mortgage Corporation (percent)	Federal Reserve Board
	Two-year Treasury note yield at constant maturity (percent, annualized)	Federal Reserve Board
	Five-year Treasury note yield at constant maturity (percent, annualized)	Federal Reserve Board
	Seven-year Treasury note yield at constant maturity (percent, annualized)	Federal Reserve Board
	10-year Treasury note yield at constant maturity (percent, annualized)	Federal Reserve Board
	Bond buyer index: state/local bonds, 20-year, general obligation (percent, annualized)	Federal Reserve Board
	Moody's seasoned Aaa corporate bond yield (percent, annualized)	Federal Reserve Board
	Moody's seasoned Baa corporate bond yield (percent, annualized)	Federal Reserve Board
Spread variables	Mortgage rates and 10-year Treasury spread	Authors' calculations
	Two-year and 10-year Treasury spread	Authors' calculations
	Aaa corporate bond yield and 10-year Treasury spread	Authors' calculations
	Baa corporate bond yield and 10-year Treasury spread	Authors' calculations

Chart 1  
Interest Rate Level Variables



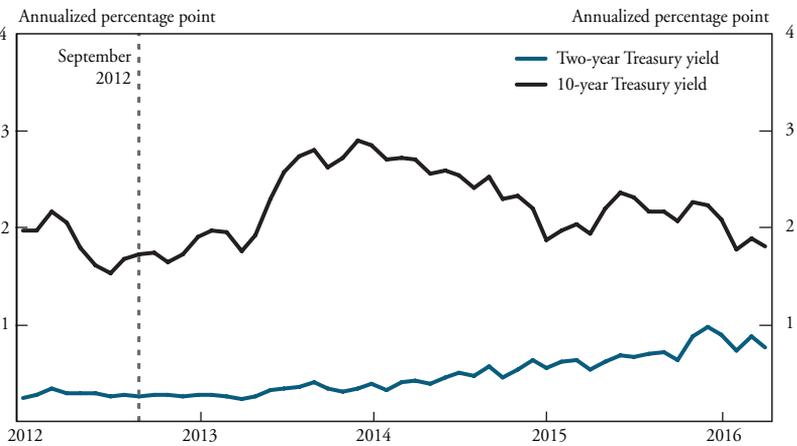
Notes: Gray bars denote NBER-defined recessions.  
Source: Federal Reserve Board.

Chart 2  
Interest Rate Spread Variables



Notes: Gray bars denote NBER-defined recessions.  
Source: Federal Reserve Board.

Chart 3  
Movements in Two-Year and 10-Year Treasury Yields



Sources: Federal Reserve Board and authors' calculations.

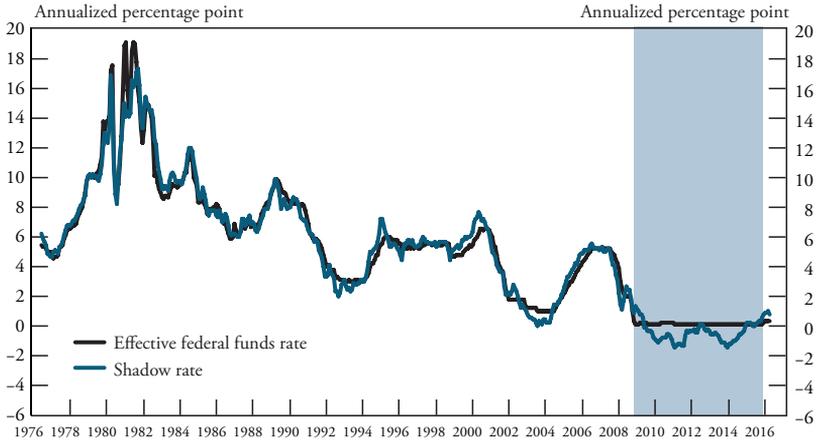
explain co-movements of different variables. Next, we regress the effective federal funds rate on a constant term and the three principal components over the pre-ZLB period. The resulting linear combination of the three factors is the shadow rate.

To be relevant as a measure of the monetary policy stance, a shadow rate must be highly correlated with the effective federal funds rate during the pre-ZLB period. Chart 4 shows that this is indeed the case for our shadow rate (black line), which closely tracks the effective federal funds rate (blue line) until 2008. The coefficient of correlation between the effective federal funds rate and our measure of the shadow rate is 0.95. Moreover, the variation in the shadow rate explains 91 percent of the variation in the effective federal funds rate for the pre-ZLB period. Similarly, Wu and Xia find that their shadow rate measure is highly correlated with the effective federal funds rate during the pre-ZLB period. Furthermore, both our measure and the Wu-Xia measure decline into negative territory for about 30 months after hitting the ZLB.

However, our estimates of the shadow rate differ noticeably from those of Wu and Xia during the ZLB period. For the most part, these differences can be explained by our relaxed no-arbitrage restriction. For example, Chart 5 shows that our shadow rate estimates start to sharply increase in August 2011 and stay at a relatively elevated level until August 2012 when the FOMC signaled an additional round of asset purchases; the Wu and Xia shadow rate, on the other hand, changes little over the same period.<sup>4</sup> The reason for this difference is the substantial decline in long-term Treasury yields due to safe haven demand in the midst of fiscal uncertainty and the Eurozone crisis. While the Wu-Xia measure interprets the huge drop in the long-term Treasury bond yield mostly by the corresponding decline in the common risk factor affecting the entire yield curve, our model suggests that some of these variations were specific to long-term maturity bonds and not driven by common risk factors. The finding is consistent with our earlier discussion on the idiosyncratic variation of the two-year Treasury yield for this period. In addition, our shadow rate measure begins to increase in December 2013, when then-Federal Reserve Chairman Ben Bernanke announced the tapering of asset purchases, while the Wu and Xia measure does not begin to increase until August 2014 when expectations of the first rate hike drove up near-term Treasury note yields.<sup>5</sup>

Chart 4

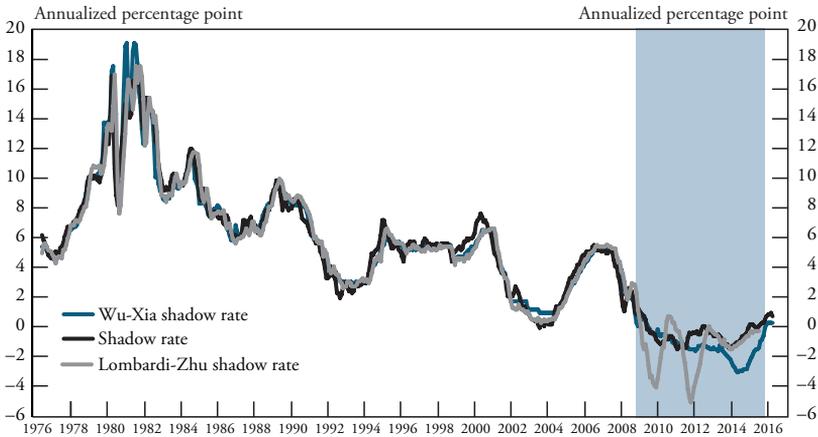
### Shadow Rate Compared with the Effective Federal Funds Rate



Note: Blue bar denotes zero lower bound period.  
Sources: Federal Reserve Board and authors' calculations.

Chart 5

### Comparison of Different Shadow Rate Estimates



Note: Blue bar denotes zero lower bound period.  
Sources: FRB Atlanta, Lombardi and Zhu, and authors' calculations.

Our findings suggest that imposing tight no-arbitrage restrictions on the entire Treasury yield curve may overstate the degree of policy accommodation during the ZLB period. In particular, policymakers must be careful in distinguishing declines in Treasury bond yields due to the movement in the common risk factor from those due to the maturity-specific risk factor.

## II. Responses of Inflation and Unemployment to Monetary Policy Shocks during the ZLB Period

For us to consider our shadow rate a consistent measure of the stance of monetary policy on and off the ZLB, an unanticipated decline in the shadow rate must have the same effects on macroeconomic variables during the ZLB period as a similar decline in the effective federal funds rate does during the pre-ZLB period.

To examine whether the shadow rate preserves the systematic relationship between macroeconomic variables and the stance of monetary policy during the ZLB period, we estimate a statistical model describing the dynamic relationships of these variables using data from both before and after the onset of the ZLB. More specifically, we regress inflation (measured by core PCE inflation), the unemployment rate, and our measure of the shadow rate on a constant term and lagged values of inflation, the unemployment rate, and the shadow rate. Table 2 shows the estimated coefficients of the vector autoregression (VAR) model do not vary much over the two subsample periods, suggesting the systematic relationship between macroeconomic variables and the stance of monetary policy has not changed dramatically since the ZLB. This finding is in line with Stock and Watson, who argue the Great Recession might have resulted from the same set of shocks that buffeted the economy in the past, albeit at a larger magnitude. This finding is also in line with Bundick, who shows the monetary policy rule perceived by private-sector forecasters during the ZLB period was similar to the rule they perceived during the pre-ZLB period.

While some unconventional monetary policies were expected after the onset of the ZLB, certain components of these policies were unexpected. How, then, can we isolate the macroeconomic effect of unanticipated monetary policy actions? Our estimated VAR allows us to quantify the effect of an unanticipated monetary policy shock on

Table 2

## Vector Autoregressions in the Pre- and Post-ZLB Sample Periods

	Pre-ZLB			Post-ZLB		
	Inflation	Unemployment rate	Shadow rate	Inflation	Unemployment rate	Shadow rate
Inflation (-1)	1.1837*** (-0.0931)	0.0922 (-0.0818)	-0.1243 (-0.2977)	0.7265*** (-0.1334)	-0.2393 (-0.1984)	0.3034 (-0.1845)
Inflation (-2)	-0.1329 (-0.1006)	-0.0953 (-0.0884)	0.4382 (-0.3216)			
Unemployment rate (-1)	-0.2162** (-0.0999)	1.6600*** (-0.0877)	-1.2635*** (-0.3192)	-0.0078 (-0.0251)	1.0880*** (-0.0374)	-0.1129*** (-0.0348)
Unemployment rate (-2)	0.1407 (-0.0920)	-0.7069*** (-0.0807)	1.0756*** (-0.2939)			
Shadow rate (-1)	-0.0516 (-0.0319)	0.0495* (-0.0280)	0.9006*** (-0.1019)	-0.0948 (-0.0610)	0.4920*** (-0.0908)	0.7250*** (-0.0844)
Shadow rate (-2)	0.0295 (-0.0309)	-0.0301 (-0.0272)	-0.0430 (-0.0989)			
Constant	0.3870*** (-0.1209)	0.1805* (-0.1061)	0.8700** (-0.3863)	0.4236 (-0.2905)	-0.1948 (-0.4321)	0.3081 (-0.4017)
R <sup>2</sup>	0.9874	0.9764	0.9513	0.5635	0.9730	0.8342

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

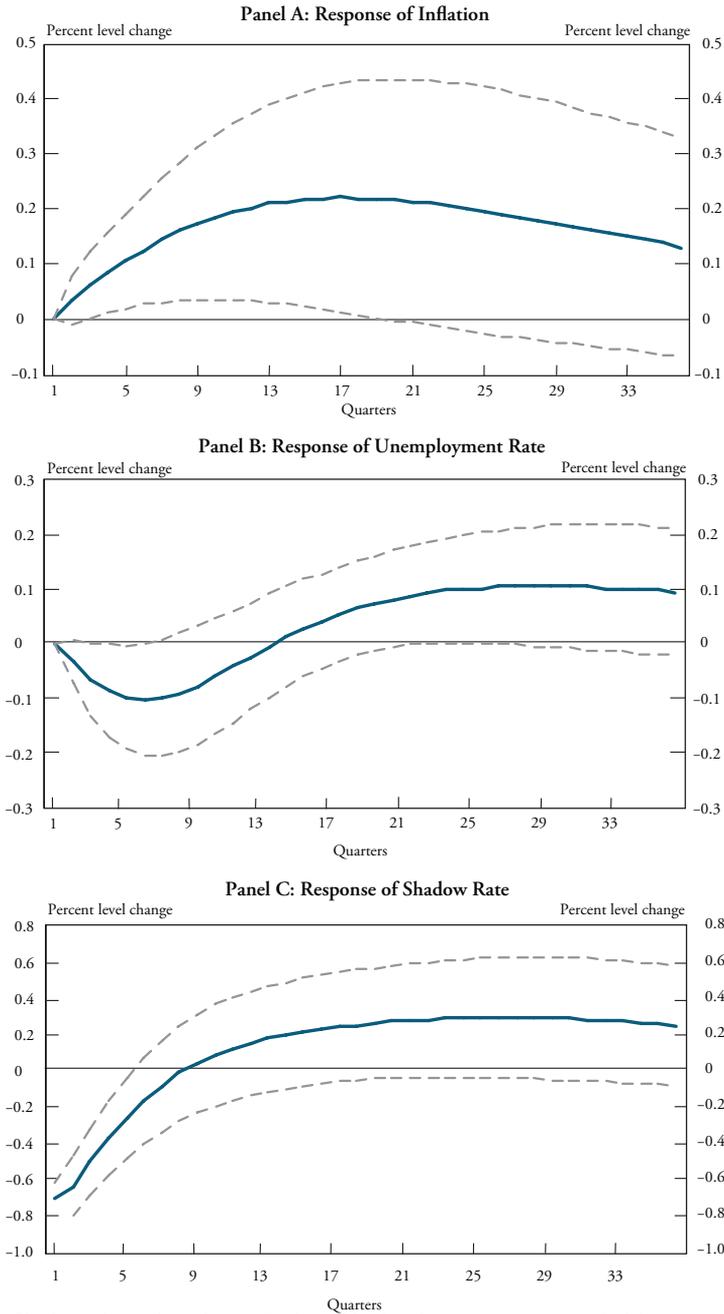
Note: Standard errors are in parentheses.

inflation and the unemployment rate with some additional assumptions. Residuals in observed variables that the VAR cannot predict are unanticipated shocks; however, because they are correlated with each other, they do not have economic interpretations by themselves. We thus impose restrictions on the contemporaneous responses of inflation and the unemployment rate to a monetary policy shock to identify them from the VAR residuals. We implement this restriction by ordering the variable for the shadow rate last in the VAR. Under this ordering, we can decompose VAR residuals in the equation for the shadow rate into monetary policy shocks and non-monetary policy shocks.

Charts 6 and 7 show that the dynamic responses of inflation and unemployment to a monetary policy shock since the ZLB period are generally similar to those during the pre-ZLB period. In addition, Chart 8 shows that the responses of macroeconomic variables to a monetary policy shock during the pre-ZLB period are essentially the same whether or not we use our shadow rate measure or the effective federal funds rate to identify the shock. A contractionary monetary policy shock decreases

Chart 6

Impulse Response to a Shock to the Shadow Rate: Pre-ZLB Sample

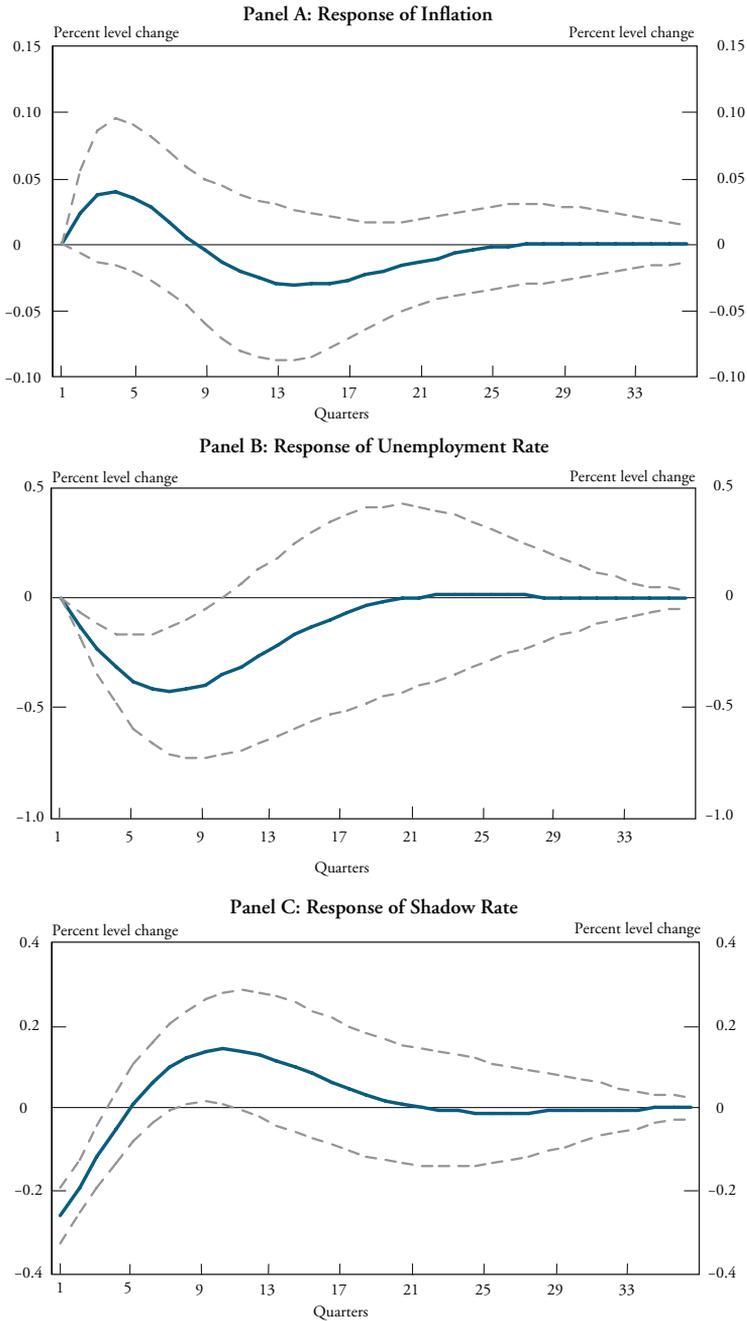


Notes: Blue line indicates the evolution of each variable when there is a one-time 1 standard deviation increase in the shadow rate. The dashed lines indicate  $\pm 2$  standard error bands around the responses.

Source: authors' calculations.

Chart 7

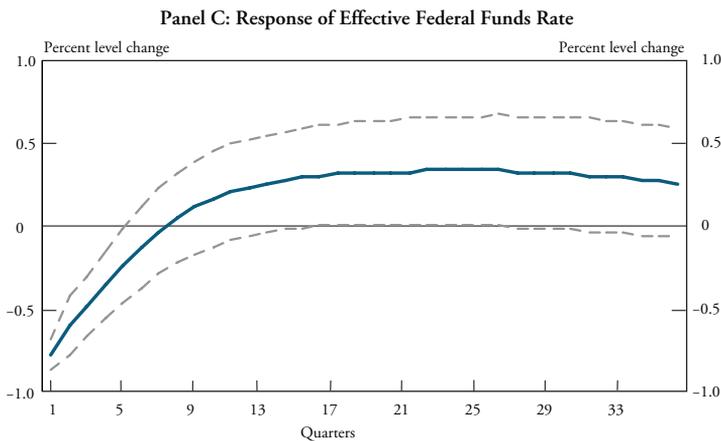
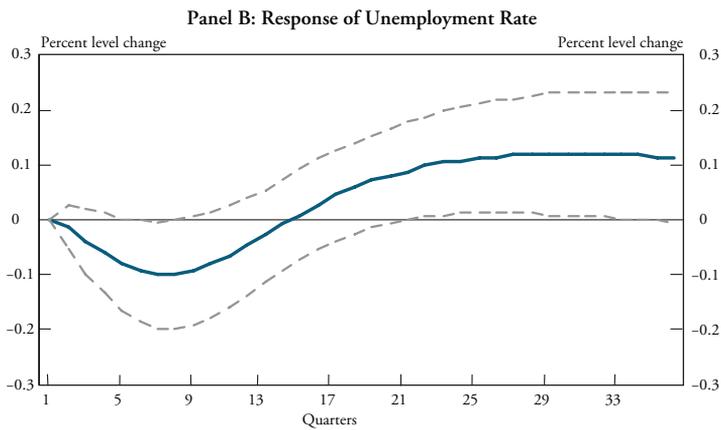
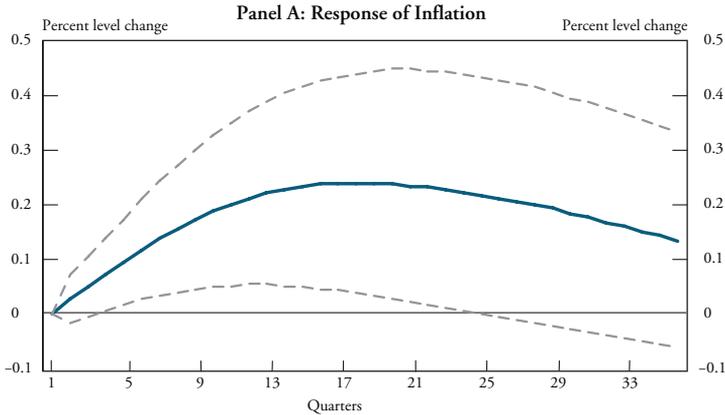
Impulse Response to a Shock to the Shadow Rate: Post-ZLB Sample



Notes: Blue line indicates the evolution of each variable when there is a one-time 1 standard deviation increase in the shadow rate. The dashed lines indicate  $\pm 2$  standard error bands around the responses.  
 Source: Authors' calculations.

Chart 8

Impulse Response to a Shock to the Effective Federal Funds Rate: Pre-ZLB Sample



Notes: Blue line indicates the evolution of each variable when there is a one-time 1 standard deviation increase in the shadow rate. The dashed lines indicate  $\pm 2$  standard error bands around the responses.  
Sources: Authors' calculations.

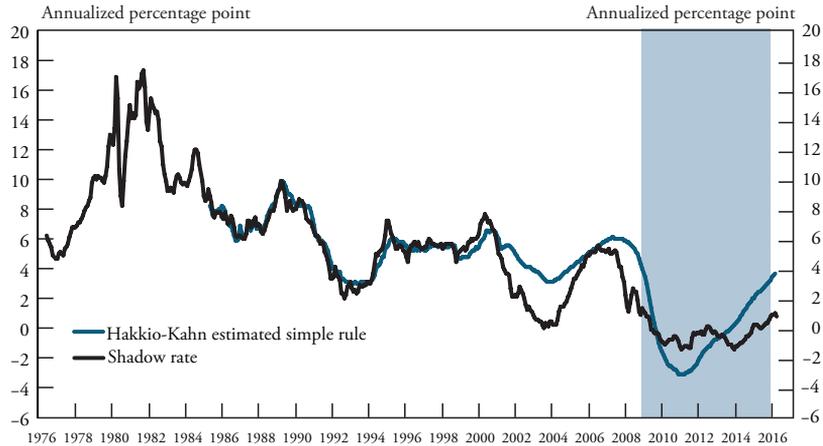
inflation but increases the unemployment rate over time. However, the timing and magnitude of the peak responses differ across the two periods. Inflation responds to the same amount of policy tightening more dramatically during the pre-ZLB period. The inflation response peaks 14 quarters after the shock, while the unemployment rate response peaks after six quarters. In contrast, after the onset of the ZLB, the responses of both inflation and the unemployment rate peak within six quarters of the shock. The inflation response is much more muted after the onset of the ZLB, while the unemployment rate response is amplified. However, uncertainty surrounding these responses increases after the onset of the ZLB due to a much shorter subsample period.<sup>6</sup>

Despite these differences, our VAR results suggest that an unexpected decline in our measure of the shadow rate might have provided stimulus to the economy after the onset of the ZLB. To evaluate whether the stimulus was sufficient to overcome the constraint on policy that the ZLB imposed, we compare our estimated shadow rate with the rate prescribed by a policy rule estimated from 1985 to 2001, a period of relatively favorable economic performance (Hakkio and Kahn). We plot our shadow rate measure alongside the policy prescription implied by Hakkio and Kahn, extending their analysis to a more recent period (Chart 9).

Comparing our shadow rate measure with the policy prescription from Hakkio and Kahn shows the stance of monetary policy was tighter than their policy rule prescribed from the end of QE1 (March 2010) to the beginning of QE3 (September 2012) and easier than their policy rule prescribed since then. This finding suggests that at the onset of the ZLB, policymakers were slow to recognize the depth of stimulus necessary to provide appropriate policy accommodation as prescribed by the estimated rule. Our results also show that policymakers might have compensated for this interest rate gap later by delaying liftoff and engaging in additional asset purchases. However, while this compensatory deviation might have offset the tighter-than-prescribed policy during the early period of the ZLB, the cumulative deviation was almost closed as of February 2016. This suggests compensating for past misses is no longer necessary—instead, a gradual return to more conventional monetary policy may be more appropriate.

Chart 9

## Shadow Rate Compared with the Estimated Simple Rule



Note: The Hakkio-Kahn measure estimates a simple Taylor rule from April 1985 to March 2001 and uses these coefficients to forecast the prescribed interest rule forward. Blue box denotes zero lower bound period.  
Sources: Hakkio and Kahn; authors' calculations.

### III. Conclusion

The period in which monetary policy was constrained by the ZLB poses a challenge for researchers and policymakers who wish to measure the stance of monetary policy in a comparable way to the pre-ZLB period. Gauging the current stance of monetary policy more precisely is important for setting an appropriate path of monetary policy in the future. This article proposes a shadow interest rate that can measure the policy stance seamlessly both on and off the zero lower bound using common statistical factors that explain government and private-sector borrowing conditions. The shadow rate measure we construct is comparable to the effective federal funds rate during the pre-ZLB period and distinct from the Wu-Xia shadow rate, which imposes no-arbitrage restrictions on the Treasury yield curve. Relaxing these no-arbitrage restrictions allows us to separate out movements in long-term interest rates due to common risk factors from those due to maturity-specific, idiosyncratic factors. Our statistical analysis shows that macroeconomic variables respond to our shadow rate after the onset of the ZLB in a similar manner to how they responded to the effective federal funds rate during the pre-ZLB period.

Finally, we compare the estimated shadow rate with the policy prescription from an estimated rule based on data from the pre-ZLB period. While the shadow rate is higher than the policy prescription during the ZLB period until the beginning of QE3, continued stimulus by forward guidance and asset purchases mostly offset the past misses as of February 2016. As a result, moving the federal funds rate target closer to the policy prescription—instead of trying to compensate for past misses in monetary stimulus—may be appropriate moving forward.

## Appendix

### Obtaining a Shadow Rate from a No-Arbitrage Term Structure Model

Under no-arbitrage restrictions, long-term government bond yields are equal to risk-adjusted averages of short-term interest rates. Suppose that while the observed short-term interest rate ( $r_t$ ) is constrained by the lower bound ( $\underline{r}$ ), the shadow rate ( $s_t$ ) is not constrained and driven by the same risk factors ( $X_t$ ) as in the pre-lower-bound period.

$$r_t = \max\{\underline{r}, s_t\}, \quad y_{\{n,t\}} = E_t^Q \left\{ \frac{\sum_{j=1}^n s_{t+j}}{n}, \underline{r} \right\}, \quad s_t = s(X_t; \theta), \quad X_{\{t+1\}} = f(X_t, \varepsilon_{\{t+1\}}; \theta)$$

where  $y_{\{n,t\}}$  stands for the government bond yield with the maturity of  $n$ -period and  $\theta$  describes the vector of parameters governing the evolution of the shadow rate and risk factors. When long-term bond yields are not constrained by the lower bound and  $s$  and  $f$  are linear with respect to arguments,  $y_{\{n,t\}}$  is also linear with respect to  $X_t$ . Once  $\theta$  is known, we can derive the shadow rate and the model-implied yield curve in the presence of the lower-bound constraint. Krippner calibrates  $\theta$  from other research to derive the yield curve for Japanese data while Wu and Xia estimate  $\theta$  using Treasury bond yields data and back out the shadow rate.

#### *Obtaining a shadow rate from a factor analysis of various interest rates*

The no-arbitrage term structure models explained above impose tight restrictions on the dynamics of risk factors and the cross-section of bond yields. While these restrictions are appealing from a theoretical viewpoint, in practice it is hard to precisely model risk factors that can explain not only government bond yields but also private-sector borrowing rates. As an alternative approach to constructing the shadow rate, we rely on a statistical analysis of various interest rates.

Suppose that  $Y_t$  represents a vector of demeaned government and private-sector borrowing rates. While the dimension of  $Y_t$  may be high, most of its variation can be explained by a low-dimensional vector of statistical factors ( $F_t$ ) as follows:

$$Y_t = \Lambda F_t + e_t,$$

where  $e_t$  stands for a vector of idiosyncratic components that are cross-sectionally independent. Since  $F_t$  is a purely statistical output, it does

not have any economic meaning comparable to the shadow rate in other studies. This article uses 12 variables for  $Y_t$  and extracts three principal components,  $F_t$ , out of it. We then regress the effective federal funds rate onto the constant and  $F_t$  using pre-ZLB period data (June 1976–November 2008) from the United States:

$$FFR_t = c_0 + c_1 F_t + u_t = s_t + u_t.$$

We use the estimated coefficients from this regression to obtain the measure of the shadow rate during the ZLB period. Lombardi and Zhu follow a similar factor analysis approach but use different datasets. They include short-term interest rates in during the pre-ZLB period but treat them as missing observations during the ZLB period. The authors back out missing values of short-term interest rates from the factor model by recovering the expected values conditional on the observed series. This method is conceptually similar to ours but more intensive to calculate.

## Endnotes

<sup>1</sup>In this case, investors can construct a self-financing bond portfolio with a positive payoff by shortselling short-term bonds in spot and forward markets and buying long-term bonds in spot markets.

<sup>2</sup>One explanation for their diverging paths is that the 10-year Treasury yield still reflected changing expectations of the future path of policy in response to economic news while the two-year Treasury yield became less responsive to economic news.

<sup>3</sup>“These actions [newly announced asset purchases], which together will increase the Committee’s holdings of longer-term securities by about \$85 billion each month through the end of the year, should put downward pressure on longer-term interest rates, support mortgage markets, and help to make broader financial market conditions more accommodative.”

<sup>4</sup>The Lombardi and Zhu shadow rate measure, which also does not impose no-arbitrage restrictions, shows a similar pattern to our measure, though the variation in their measure is somewhat larger.

<sup>5</sup>In addition to relaxing no-arbitrage restrictions, including private-sector borrowing conditions also makes some difference in the estimate of the shadow rate. If we obtain the shadow rate based on the pre-ZLB regression of the effective federal funds rate on the two-year and 10-year Treasury yields, this alternative shadow rate is lower than our original measure both in the beginning of the ZLB period and after liftoff. We interpret this difference as indicating that the transmission of monetary policy to private-sector borrowing conditions was attenuated in the midst of the financial crisis (late 2008–early 2009) but became stronger after late 2014 as the anticipation of a rate hike grew.

<sup>6</sup>Wu and Xia similarly find a much stronger response of the unemployment rate to a monetary policy shock during the ZLB period.

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# Consumer Spending in China: The Past and the Future

*By Jun Nie and Andrew Palmer*

**A**fter steadily declining for nearly half a century, the share of consumer spending in China's GDP has recently increased. Economists and policymakers widely agree that the share of consumer spending must increase for China to continue its economic development; sustaining growth primarily on exports and investment will become more difficult in the longer run. Moreover, if China successfully rebalances economic growth toward a greater share of consumption, the global economy may benefit. Stronger Chinese demand boosts exports from the rest of the world.

Although the recent rise in the consumption share has allayed some concerns about slowing growth in China, it has also spurred discussion over whether this trend is sustainable and whether China will truly become a consumption-driven economy. Judging the future of consumer spending in China requires understanding not only what drove the recent rise in the consumption share but also what drove its past multi-decade decline. In this article, we analyze the effects of several long-term trends—most notably, changes in demographics and urbanization—as well as recent developments—mainly the housing boom after 2000. The analysis shows the decline in the consumption share from 1970 to 2000 is largely explained by China's rapidly aging population (which reflects both increased longevity and a large decline in birth rates due

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to the one-child policy) and fast urbanization. After 2000, however, the consumption share declined by more than would be expected from the country's demographic and urbanization trends alone. This discrepancy is likely due to rapidly rising housing prices since the early 2000s, which increased households' saving rate and slowed consumption growth.

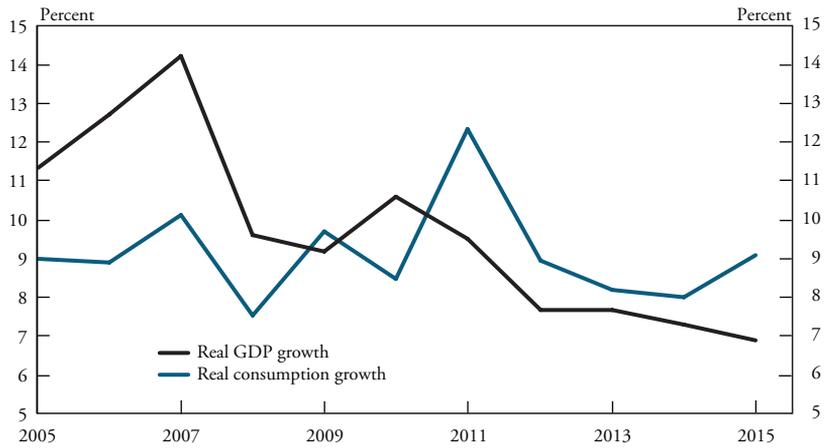
Based on the analysis of the key determinants of Chinese consumption growth, we forecast consumption growth and its share in GDP for the next five years. In a benchmark scenario of relatively stable income growth and a further modest decline in the household saving rate, consumption growth in China remains at around 9 percent per year over the next five years, causing the share of Chinese consumption in GDP to increase by about 5 percentage points to 44 percent by 2020. This scenario has two implications. First, it suggests that strong consumption growth is sustainable in the near future, allowing China to continue transitioning toward a consumption-driven economy. Second, it suggests that strength in near-term Chinese consumption growth will partly rely on a further decline in the household saving rate. As the household saving rate cannot decline indefinitely, consumption growth may need to rely more heavily on household income to be sustainable in the long run.

Section I documents trends in Chinese consumption. Section II analyzes the determinants of Chinese consumption. Section III provides forecasts of future Chinese consumption growth as well as its share in GDP.

## **I. Trends in Consumer Spending**

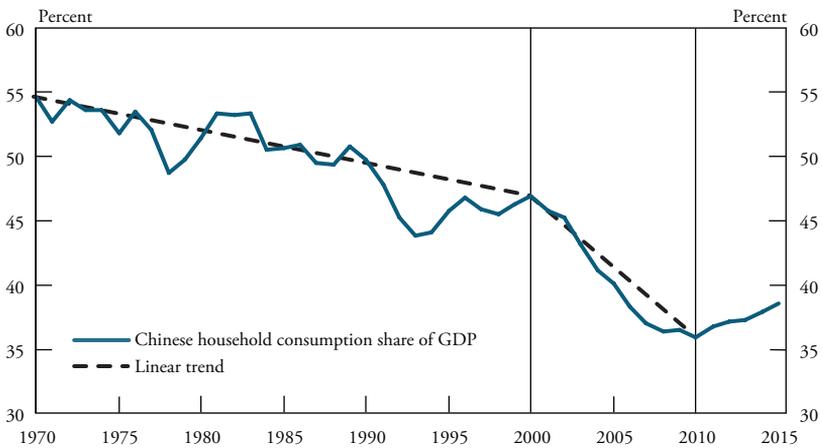
For the past decade, the trend of Chinese consumption growth is nearly flat despite a significant slowing of GDP growth in recent years. Chart 1 shows that real consumption growth fluctuated around an average of 9 percent annually, while real GDP growth slowed from more than 10 percent annually in 2005–07 to less than 7 percent in 2015. As consumer spending has outpaced GDP, the share of consumption in GDP has increased since 2010, reversing a nearly four decade decline (Chart 2).<sup>1</sup> Although slowing in other GDP components such as exports and investment may have mechanically increased the share of consumption in GDP, there is significant evidence that Chinese consumption is strong in its own right.

*Chart 1*  
**Chinese Real Consumption and Real GDP Growth**



Sources: China National Bureau of Statistics and Haver Analytics.

*Chart 2*  
**Consumption Share of Chinese GDP**



Sources: China National Bureau of Statistics and Haver Analytics.

Examining the components of Chinese household consumption can help explain its overall strength. Consumption of services and high-end products—not basic necessities—have mainly driven consumption growth. Chart 3 shows that real spending on transportation and communication increased sevenfold over the last two decades compared with a threefold increase in overall household spending. Transportation and communication is a broad category that encompasses many high-end goods and services that have recently become available to middle-class Chinese households, such as smartphones, laptops, and air travel. Travel services in particular appear to be growing quickly: the number of Chinese outbound travelers has been growing at a double-digit pace for many years, and 2015 marked the fourth consecutive year of China as the world’s top tourism source market (Jing, Feiyue, and Yiyi).

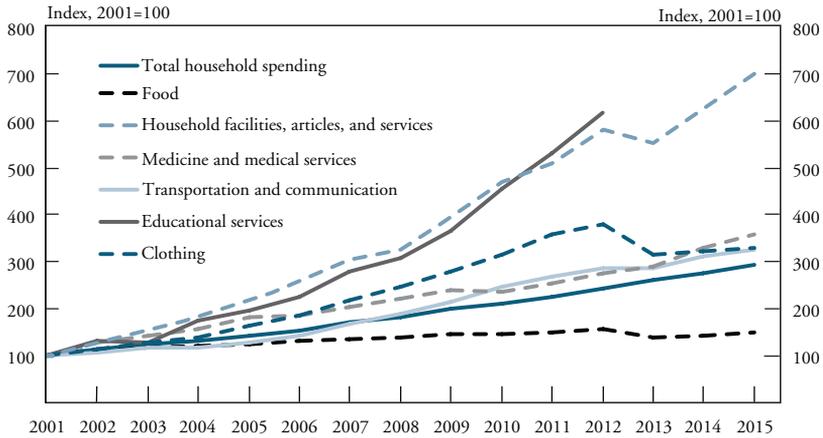
The black line in Chart 3 shows that another component of consumption, educational services, is also growing rapidly. Chinese families now are spending more resources on their child’s education both inside and outside the classroom. In addition to paying tuition both domestically and at foreign colleges and universities, Chinese families are increasingly paying for tutoring and other educational supplements for their children.<sup>2</sup> These trends are consistent with the rising number of Chinese students studying abroad since 2000. The share of Chinese students among foreign students in the United States has risen from about 11 percent during the 2005–06 school year to about 31 percent during the 2014–15 school year.<sup>3</sup>

Demographic factors could influence Chinese consumer spending, as young people account for a particularly large share of consumer spending in fast-growing services such as travel and education. Chart 4 shows that in the 40 years from 1970 to 2010, the ratio of young to working-age people (the “young dependency ratio”) was declining in China, while the ratio of old to working-age people (the “old dependency ratio”) was gradually rising. The declining share of young people suggests lower growth in consumer spending, as the strongest consumption categories—educational services and transportation and communication—are largely supported by young people. But the aging population may support consumption by spending more on health care.

The mass migration of Chinese households from rural to urban areas may also have influenced Chinese aggregate consumption growth.

Chart 3

Real Average Household Expenditures in China

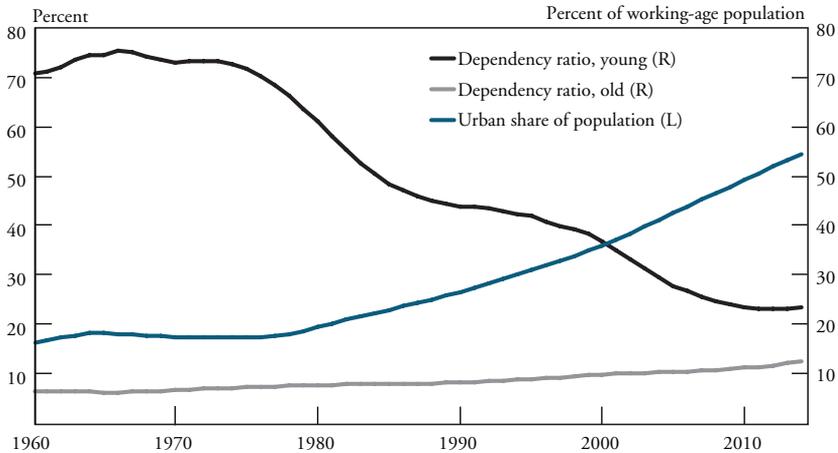


Note: All series are deflated by Chinese CPI.

Sources: China National Bureau of Statistics and Haver Analytics.

Chart 4

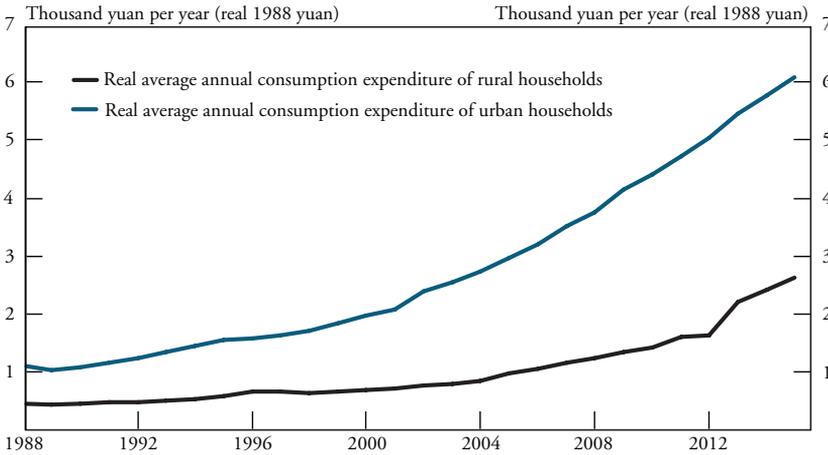
Chinese Urbanization Rate and Dependency Ratios



Sources: World Bank and Haver Analytics.

Chart 5

### Real Consumption Expenditure of Urban and Rural Chinese Households



Source: Wind Information.

Over the past five decades, the share of China's population living in urban areas has more than tripled, rising from 18 percent in 1960 to 56 percent in 2015 (Chart 4). Urban workers typically earn more and therefore spend more than rural households. Chart 5 shows that Chinese household spending by both urban and rural households increased sixfold from 1988 to 2015. However, urban households spent more than twice as much as rural households over that period, measured at constant prices. Rural households increased their real per capita consumer spending from about ¥476 (\$130) in 1988 to about ¥2,630 (\$710) in 2015 (measured by the price level in 1988), while urban households increased theirs from about ¥1,100 (\$300) to about ¥6,100 (\$1,650) during the same period. Thus, the increase in the urban share of the population has also boosted overall consumption growth.

## II. Key Forces Driving Consumption Trends

To account for both the long decline in the consumption share of GDP and its recent rise, we explore the effects of two sets of factors on consumption trends in China. The first set of factors are demographic and urbanization trends. Changes in the demographic and urban composition of Chinese households may be important in explaining the

long-term decline in China's consumption share in GDP. However, these trends alone cannot fully capture the changes in the consumption share in recent years, including the accelerated decline after 2000 and the subsequent increase after 2010. A second set of factors—specifically, the housing boom after 2000 and new family structures due to the one-child policy—may better explain the developments in this later period.

### *Demographic and urbanization trends*

To gauge the effects of demographic and urbanization trends on the share of consumption in GDP, we analyze a broad set of countries that are close to China economically or geographically. Since demographic and urbanization trends are typically persistent and slow moving, the lack of variation makes it difficult to capture their effects on consumption based on observations in a single country.

Our analysis is based on a panel regression using a sample of 24 countries including most Asian countries and large developing countries. The data are from the World Bank's World Development Indicators and cover the period from 1960 to 2014. Table 1 outlines the countries we use along with the selection criteria and sample periods for each. The dependent variable in our regression is the consumption share in GDP. To capture the average effect of demographic variables on emerging and Asian countries' consumption shares, we use the young and old dependency ratios as independent variables. Separating the young dependency ratio from the old dependency ratio is important, since the two ratios have shown completely different trends in China. In addition, we include the share of the population living in urban areas as an independent variable to measure the level of urbanization. To eliminate differences across countries that our analysis does not control for, we include country-fixed effects in the estimation.<sup>4</sup>

We derive two main findings from this regression analysis. First, we find an increase in either dependency ratio is associated with an increase in the consumption share in GDP. This finding reflects that old and young people may not earn income but do consume goods and services. In particular, we find a 1 percentage point increase in the old dependency ratio is associated with a rise in the consumption share of 0.31 percentage point, while an equivalent increase in the young dependency ratio is associated with an increase of 0.12 percentage point

Table 1

## Summary Information for the Cross-Country Regression Analysis

Country	Region/category	Dates of sample
Afghanistan	South Asia	2002–14
Bangladesh	South Asia/EAGLE	1960–70, 1973–2014
Brazil	EAGLE	1960–2014
Cambodia	Southeast Asia	1960–70, 1993–2014
China	East Asia/EAGLE	1960–2014
Egypt	EAGLE	1965–2014
India	South Asia/EAGLE	1960–2014
Indonesia	Southeast Asia/EAGLE	1960–2014
Iran	South Asia/EAGLE	1960–2014
Japan	East Asia	1970–2014
Korea	East Asia	1960–2014
Laos	Southeast Asia	1984–88, 2000–14
Malaysia	Southeast Asia/EAGLE	1960–2014
Mexico	EAGLE	1960–2014
Mongolia	East Asia	1981–2014
Nepal	South Asia	1975–2014
Nigeria	EAGLE	1981–2014
Pakistan	South Asia/EAGLE	1967–2014
Philippines	Southeast Asia/EAGLE	1960–2014
Russia	EAGLE	1989–2014
Sri Lanka	South Asia	1965–2010
Thailand	Southeast Asia	1960–2014
Turkey	EAGLE	1960–2014
Vietnam	Southeast Asia/EAGLE	1990–2014

Notes: We include countries geographically close to China based on the UN standard as well as large developing economies. Emerging and growth-leading economies (EAGLEs) are a grouping of key emerging markets developed by the Banco Bilbao Vizcaya Argentaria (BBVA). More precisely, they are emerging economies expected to contribute to world growth more than the average of the G-6 countries (G-7 excluding the United States) over the next 10 years. We use the UN geo-scheme of regions of Asia and include all countries in regions in or adjacent to China; specifically, East Asia, Central Asia, South Asia, and Southeast Asia. We exclude countries in Central Asia since all are former Soviet satellite states which experienced large and atypical economic shocks following liberalization after the fall of the USSR. We also exclude countries with a population under 2 million. In addition, we include data on large emerging economies categorized as EAGLEs by BBVA Research in 2016.

Sources: BBVA Research and World Bank.

(Table 2). The results are robust to an alternative specification in which we use one-year lags to avoid the possibility of the consumption share and demographic and urbanization variables in the same year moving together due to uncontrolled factors.

*Table 2*  
**Cross-Country Regression on Consumption Share of GDP**

Variables	Benchmark	One-year lag
Dependency ratio, old <sub>t</sub>	0.305*** (0.0899)	
Dependency ratio, young <sub>t</sub>	0.119*** (0.0235)	
Urban share of population <sub>t</sub>	-0.257*** (0.0368)	
Dependency ratio, old <sub>t-1</sub>		0.298*** (0.0940)
Dependency ratio, young <sub>t-1</sub>		0.123*** (0.0237)
Urban share of population <sub>t-1</sub>		-0.244*** (0.0370)
Constant	67.72*** (2.919)	66.72*** (2.959)
Observations	1,073	1,046
R <sup>2</sup>	0.289	0.282
Number of countries	24	24

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

Notes: Standard errors are in parentheses. We estimate the model using a panel regression with country-fixed effects. All data come from the World Development Indicators from the World Bank.

Sources: BBVA Research, United Nations, World Bank, Haver Analytics, and authors' calculations.

Second, we find an increase in urbanization tends to reduce the consumption share in GDP. This result requires more explanation, since one might expect urbanization to be associated with an increase in total consumption and thus an increase in the consumption share in GDP. Urban households in the countries in our sample (including China) spend more and have higher incomes on average than their rural counterparts. However, they also contribute more to total output, or GDP. Therefore, the negative coefficient from our sample suggests that when people in developing countries move from rural areas to urban areas—usually for better employment prospects—they contribute more to production than to consumption. To put this in a statistical perspective, based on our analysis, a 1 percentage point increase in the urban share of a country's population tends to reduce its consumption share in GDP by 0.26 percentage point on average.<sup>5</sup>

The regression results in Table 2, together with the observed demographic and urbanization trends in China, can explain the decline in the consumption share from 1970 to 2000 well. Using the relationships estimated from the regression, the changes in young and old dependency ratios, and the share of the urban population in China over this period, the model predicts an 8.1 percentage point decline in the consumption share, explaining nearly the entire 8.3 percentage point decline observed in the data. The increase in urbanization contributes 4.7 percentage points to the decline in the consumption share. Likewise, the large decline in the young dependency ratio contributes 4.3 percentage points to the decline, though this contribution is partially offset by a positive contribution of 0.9 percentage point from an increase in the old dependency ratio.

However, the regression model fails to capture the large decline in the consumption share in GDP from 2001 to 2010. Indeed, the model can explain only 4.1 percentage points of the decline in the consumption share, less than half of the observed decline of 9.8 percentage points. This remaining decline in the consumption share can be largely attributed to the increase in the household savings rate after 2000, likely driven by the Chinese housing boom.

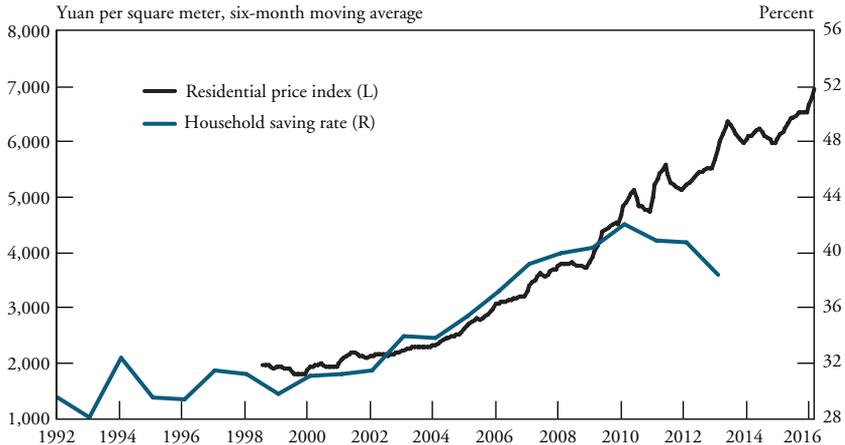
### *Changes in the household saving rate*

The larger-than-expected decline in the Chinese consumption share from 2001 to 2010 corresponds to a rapid increase in the household saving rate over the same period. Before 2000, the Chinese household saving rate was high but relatively stable at around 30 percent (Chart 6). This high saving rate was a product of both underdeveloped financial markets and the lack of a social safety net (Hung and Qian; Prasad). However, since 2000, the saving rate has increased dramatically, reaching a peak of 42 percent in 2010. As Chamon and Prasad show, the increase in the saving rate from 2001 to 2010 is broad-based across age groups. Moreover, a large increase in the household saving rate may imply slower growth in consumption and thus contributed to the rapid decline in the consumption share that began in 2000.

The large jump in the household saving rate from 2000 to 2010 is largely related to development in China's housing market during this period. Before 1998, most Chinese families lived in government-provided houses; after economic reforms in 1998 removed this benefit,

Chart 6

## Chinese Household Saving Rate and Home Price Index



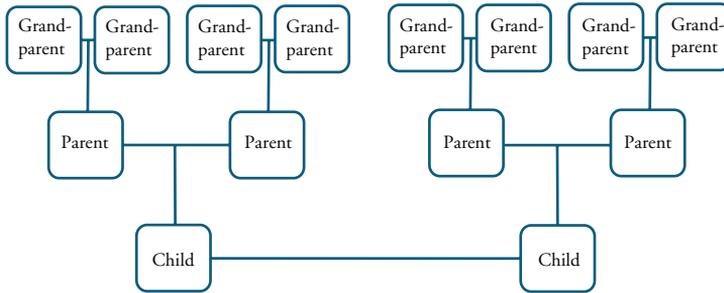
Sources: Economy Research Institute, China National Bureau of Statistics, and Haver Analytics.

however, most Chinese families needed to buy their own homes. This change triggered rapid growth in the Chinese real estate sector, causing home prices to rise tremendously. Furthermore, as house prices started to increase quickly, housing became a popular investment for wealthy Chinese households, raising demand even further and exacerbating house price increases. Indeed, from 2000 to 2010, house prices in China increased by about 161 percent (Chart 6). In addition to rapidly increasing prices, Chinese homebuyers faced large required down payments—typically 30–40 percent, but in some major cities as high as 50 percent. As a result, middle-class Chinese households were forced to save a disproportionately large share of their earnings to purchase a home (Fang and others). The saving didn't end with the purchase of a home—the subsequent mortgage payments constituted additional saving as they increased the homeowners' housing equity. As Rosenzweig and Zhang argue, this housing market dynamic helps explain the rising saving rate associated with rising housing prices from 1998 to 2010.<sup>6</sup>

As the scramble to buy homes after the 1998 reform faded, so, too, did the desire to save for homes. Moreover, young people currently do not need to save as aggressively as the previous generation for home purchases because their parents and grandparents often help them buy

Figure 1

## Chinese Family Structure under the One-Child Policy



Note: With the one-child policy, four parents and eight grandparents help young couples pay for a home.

a home. Due to the one-child policy, which was introduced in 1979, a typical young couple in China are the sole descendants of four parents and eight grandparents (Figure 1). In China, it is common for parents and grandparents to help their children by paying the high down payment or even paying for the entire house (Luo). Small family sizes under the one-child policy allow families to focus their resources rather than spreading them among multiple children or extended family members.

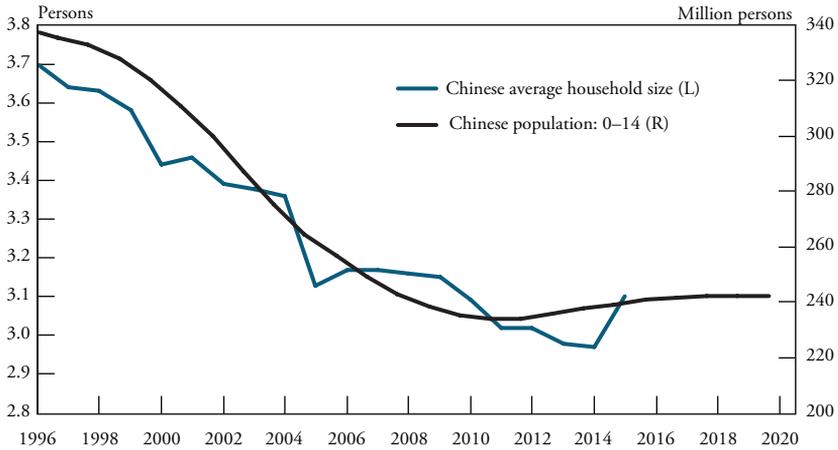
Large financial contributions from older generations are feasible for two additional reasons. First, after aggressively saving for several decades, many parents and grandparents are wealthy enough to afford this gift to the younger generation. Second, many households own multiple homes. Based on the 2014 China Household Finance Survey, one out of five urban households owns a second home, meaning that on average, a young couple's parents and grandparents have one extra home between them in addition to their primary residences. Overall, less pressure for young Chinese couples to save helps explain why the Chinese saving rate has started to decline since 2010.

### *Implications for the future of consumption*

Going forward, China's older dependency ratio is expected to continue to rise; China's young dependency ratio, however, is expected to reverse its previous trend. The young dependency ratio appears to have bottomed out and may in fact increase due to the removal of the one-child policy. In 2013, the Chinese government began to relax the one-child policy, and in 2015, the government began allowing all families

Chart 7

## Chinese Young Population and Household Size



Sources: China National Bureau of Statistics, United Nations, and Haver Analytics.

to have two children. Just as the introduction of the one-child policy slowed Chinese population growth, the removal of this policy is expected to significantly increase population growth. The black line in Chart 7 shows the number of children age 14 or younger has increased gradually since 2010, reversing a sharp decline, and is expected to continue to increase in the near future, according to the United Nations' forecasts. The blue line in Chart 7 shows an early indicator of this expected trend, as the average size of Chinese households has already started to increase. Overall, the rising trend in the number of young people, combined with our finding that a higher young dependency ratio boosts the consumption share in GDP, supports a further increase in China's consumption share.

However, our regression results also suggest the ongoing urbanization of the Chinese population may reduce the consumption share in GDP. Although the growing urban population supports consumption growth, it contributes more to production than to consumption. The share of the Chinese population living in urban areas has nearly tripled since 1980 and surpassed 50 percent for the first time in history around 2010. As the ongoing urbanization process is unlikely to stop in the near term, it may continue to restrain the share of consumption in GDP.

In addition, we expect the recent decline in the household saving rate to continue due to both lower saving among young people and an expected baby boom. According to Choukhmane, Coeurdacier, and Jin, the average saving rate for one-child households in China is about 9 percentage points higher than that of households with twins in the period of 2002–09.<sup>7</sup> The difference seems to largely reflect the difference in educational expenditures for one child compared with two. The 2009 Chinese Urban Household Survey shows a one-child household in China spends an average of 10.6 percent of its total income on education, whereas a household with twins spends 17.3 percent.<sup>8</sup> Thus, the expected increase in the population share of young people will likely lead to lower savings and more consumption in China in the near future.

### III. Chinese Consumption Outlook and Macro Implications

Identifying the determinants of Chinese consumption allows us to better forecast its outlook and understand its implications for China's transition toward a consumption-driven economy. We predict consumption growth will remain strong and may increase further over the next few years. However, whether China can truly become a consumption-driven economy depends on whether businesses can adjust production accordingly to meet the rising demand, thus triggering a demand-driven cycle supporting economic growth.

Our forecast for consumption growth is based on projections of two factors—household disposable income and household savings. We make direct assumptions about these two factors based on their historical relationships with changes in GDP growth and their recent trends. Based on the projected paths of household income and the saving rate we then calculate the implied growth path for consumption. One limitation of this approach, however, is the availability of data on the saving rate. Our measure of the household saving rate only extends to 1992, so we are unable to establish an explicit and statistically significant relationship between the saving rate and our demographic and urbanization variables. To address this limitation, we use the cross-country regression results in the previous section to estimate how much expected future demographic and urbanization trends are likely to contribute to future changes in the consumption share in GDP.

### *Household income*

Our projection of total disposable income growth is based on a forecast for real GDP and the relationship between disposable income growth and GDP growth. In our benchmark case, we assume GDP growth follows the most recent IMF forecast and gradually declines from 6.5 percent in 2016 to 6.0 percent in 2020. In addition, we assume disposable income growth slows less than GDP growth as it has in recent years. The regression results in column 1 of Table 3 show that a 1 percentage point increase in real GDP growth was associated with a 0.28 percentage point increase in real household disposable income growth over the 1982–2014 sample period for which data are available. After controlling for long-term trends, the effect increases to 0.44 percentage point (Table 3, column 2).

The relatively stable disposable income growth in China largely reflects its stable employment growth. State-owned enterprises account for about 30 percent of total urban employment in China, and due to political pressure, they seldom lay off workers (Szamosszegi and Kyle). As a result, employment has risen at a stable pace: more than 10 million jobs have been added to the economy each year over the last 10 years, including the years of the financial crisis. Indeed, the Chinese government has included stable employment growth as a mandate in its economic plan. Such stable employment growth strongly supports stable disposable income growth. We therefore use the coefficient of 0.44 to project the path of disposable income growth given our forecast of real GDP growth.<sup>9</sup>

We also include an alternative scenario—a “hard landing” path reflecting China’s potential failure to stabilize growth through reforms and policy stimulus. In the hard landing path, GDP growth slows 0.5 percentage point each year from 6.5 percent in 2016 to 4.5 percent in 2020. This scenario represents the view of a significant number of forecasters such as The Conference Board (Hoffman and Polk). Including this alternative scenario helps us understand how consumption might respond to a further slowing of the economy.

### *Saving rate*

Our saving rate projection is based on its recent trend and the factors we highlighted in the previous section, all of which point to an

Table 3

### Regression of China's Real Urban Disposable Income Growth on Real GDP Growth and Demographics

Variables	Real disposable income growth	Real disposable income growth
Real GDP growth	0.283 (0.269)	0.443* (0.237)
Dependency ratio, old		0.932 (2.089)
Dependency ratio, young		-0.801** (0.317)
Urban share of population		-0.644 (0.471)
Constant	7.887*** (2.763)	48.59** (20.82)
Observations	34	33
R <sup>2</sup>	0.033	0.389

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

Note: Standard errors are in parentheses.

Sources: China National Bureau of Statistics, Haver Analytics, and authors' calculations.

expected decline. The household saving rate declined by 3.6 percentage points from 2010 to 2013 (2014 and 2015 data were not available at the time of our analysis). In addition, a more recent survey from the Chinese central bank suggests the percent of Chinese households preferring to increase their savings and investments peaked around 2010—consistent with the timing of the peak of the saving rate—and has since declined, though at a slower pace than the saving rate (Chart 8). Consistent with the recent declines in the saving rate and the survey measure, our benchmark scenario assumes a 1 percentage point decline in the household saving rate each year from 2016 to 2020.

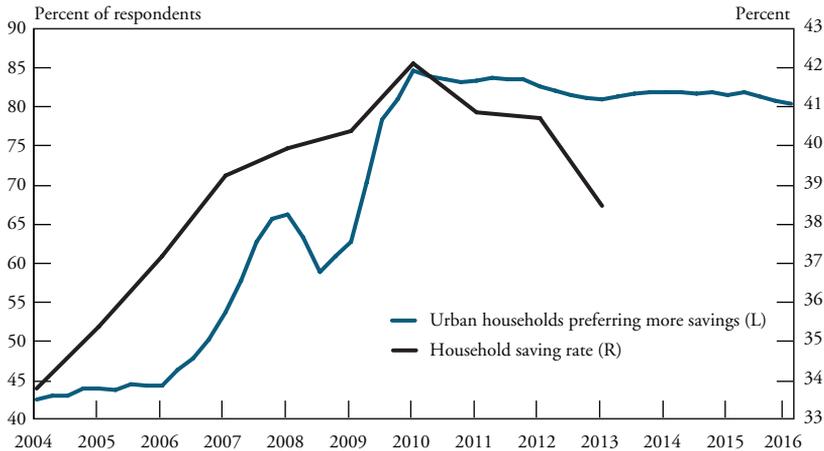
As with disposable income, we also include an alternative scenario for the saving rate. Our alternative scenario assumes savings will decline at an even faster pace: specifically, 2 percentage points each year. This faster-decline scenario represents an improved social safety net, which is on Chinese government's reform agenda and could help Chinese households reduce their precautionary savings.

#### *Chinese consumption forecasts*

We use these projections of the household saving rate and disposable income growth to forecast consumption growth and the consumption share of GDP from 2016 to 2020. Table 4 shows the forecasts for real

Chart 8

## Household Saving Rate and Willingness to Save



Note: Households “preferring more savings” also includes those respondents preferring more investment.  
Sources: China National Bureau of Statistics, People’s Bank of China, and Haver Analytics.

household consumption growth and the consumption share of GDP for the two GDP growth scenarios using the benchmark saving rate forecast. Panel A shows that under the flat GDP growth assumption, real consumption growth remains stable at around 9 percent through 2020. The consumption share of GDP, however, increases 5.4 percentage points over this period from 38.6 percent in 2015 to 44 percent in 2020.<sup>10</sup> Panel B shows that under the alternative view of Chinese growth, real consumption growth is slightly slower than under the flat GDP growth assumption but is a higher consumption share of GDP, rising 6.5 percentage points from 38.6 percent in 2015 to 45.1 percent in 2020. The larger increase in the consumption share despite slower consumption growth suggests more dramatic deceleration in sectors such as exports and investment: as the shares of other sectors in GDP decrease, the relative share of consumption increases. The relatively small difference in consumption growth in these two scenarios highlights the relatively small effects of slowing GDP growth on Chinese consumption if income growth remains stable and the saving rate follows its declining trend.

While a decline in the saving rate of 1 percentage point per year seems a reasonable path for China, Table 5 shows results from an alternative scenario in which the saving rate declines by 2 percentage points each year. This 2 percentage point decline is closer to what a simple statistical model

Table 4

## Consumption Forecast: Benchmark Model

## Panel A: Small decline in GDP growth

Forecast variables	Percent					
	2015	2016	2017	2018	2019	2020
Real GDP growth	6.9	6.5	6.2	6.0	6.0	6.0
Saving rate	37.0	36.0	35.0	34.0	33.0	32.0
Real household consumption growth	9.1	8.9	9.0	9.0	9.0	9.0
Consumption share of GDP	38.6	39.5	40.5	41.6	42.8	44.0

## Panel B: Larger decline in GDP growth

Forecast variables	Percent					
	2015	2016	2017	2018	2019	2020
Real GDP growth	6.9	6.5	6.0	5.5	5.0	4.5
Saving rate	37.0	36.0	35.0	34.0	33.0	32.0
Real household consumption growth	9.1	8.9	8.9	8.9	8.8	8.8
Consumption share of GDP	38.6	39.5	40.5	41.8	43.3	45.1

Note: Table shows results from a benchmark model with a 1 percentage point annual saving rate decline.  
Sources: China National Bureau of Statistics, IMF, Haver Analytics, and authors' calculations.

Table 5

## Consumption Forecast: Alternate Model

## Panel A: Small decline in GDP growth

Forecast variables	Percent					
	2015	2016	2017	2018	2019	2020
Real GDP growth	6.9	6.5	6.2	6.0	6.0	6.0
Saving rate	37.0	35.0	33.0	31.0	29.0	27.0
Real household consumption growth	9.1	10.6	10.6	10.5	10.5	10.4
Consumption share of GDP	38.6	40.1	41.7	43.5	45.4	47.3

## Panel B: Larger decline in GDP growth

Forecast variables	Percent					
	2015	2016	2017	2018	2019	2020
Real GDP growth	6.9	6.5	6.0	5.5	5.0	4.5
Saving rate	37.0	35.0	33.0	31.0	29.0	27.0
Real household consumption growth	9.1	10.7	10.5	10.4	10.3	10.2
Consumption share of GDP	38.6	40.1	41.8	43.7	45.9	48.4

Note: Table shows results from an alternate model with a 2 percentage point annual saving rate decline.  
Sources: China National Bureau of Statistics, IMF, Haver Analytics, and authors' calculations.

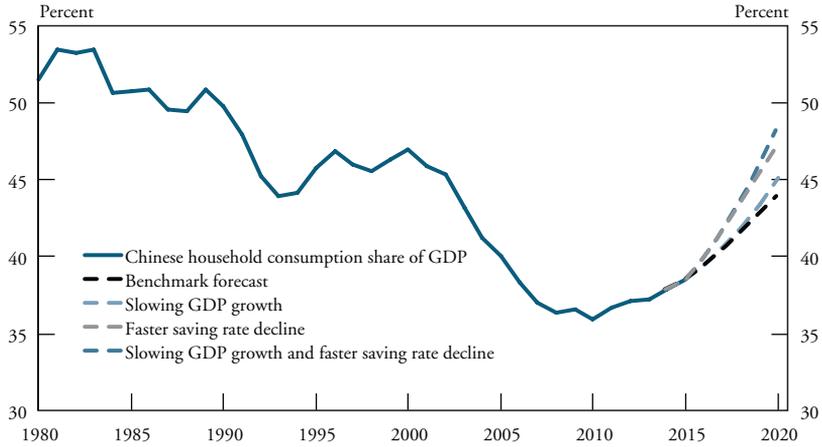
predicts.<sup>11</sup> In the alternative scenario, consumption growth rises to over 10 percent under both GDP growth assumptions and generates a consumption share in GDP of almost 50 percent under the pessimistic GDP growth assumption. To better compare the results across the four scenarios in Table 4 and Table 5, Chart 9 shows the consumption share of GDP in these scenarios and compares them with its history. Similarly, Chart 10 compares consumption growth in these four scenarios with its history. Overall, consumption growth remains strong and the share of household consumption in GDP continues to increase across all four scenarios. One cautionary note is that these scenarios assume relatively stable income growth as has occurred in the last few decades. However, given the ongoing reforms in China to restructure its supply side, it is possible that employment and income growth will be more volatile. If income growth is significantly weaker than we project here, both consumption growth and the consumption share could be significantly lower. This represents one downside risk to our forecast.

Four factors we highlighted—rising shares of the young and old population, urbanization, a large accumulation of household wealth, and less savings drain from purchasing homes—have already begun to influence Chinese consumption and saving. A factor that could reduce households' desire to save in the future is improvements in the social safety net. China currently has a weak social welfare infrastructure which has caused households to save more for themselves. As Baker and Orsmond point out, if the Chinese government stepped up its efforts to improve the economy's social security system and created more robust health care programs, households would face less pressure to save for out-of-pocket retirement and medical expenses. This could cause the Chinese household saving rate to fall at a faster pace from its current high level (around 35 percent), further lifting consumption growth in the near term. Enacting social welfare reform would make our alternative scenario (a 2 percentage point annual decline in the saving rate) more likely.

### *Contribution of demographic and urbanization factors*

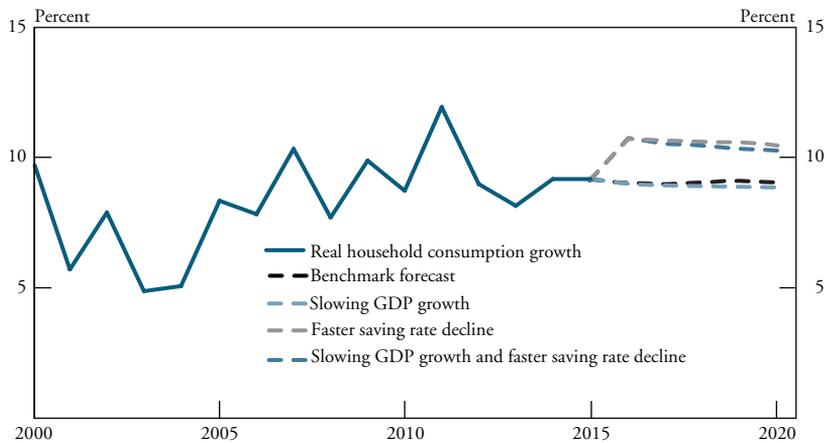
In addition to providing a basis for forecasts, our cross-country regression results can help us quantify the contributions of projected demographic changes and urbanization to China's future consumption

*Chart 9*  
**Consumption Share of GDP: Data and Forecasts**



Sources: China National Bureau of Statistics, IMF, Haver Analytics, and author's calculations.

*Chart 10*  
**Consumption Growth: Data and Forecasts**



Sources: China National Bureau of Statistics, IMF, Haver Analytics, and author's calculations.

share in GDP. Population projections from the United Nations suggest the young and old dependency ratios will increase by an average of 0.13 and 0.81 percentage point per year, respectively, over the next five years. The long-term trend in the urban share of the population in China, which has increased steadily by an average of 1 percent per year from 1980 to 2015, suggests the urban share will continue to increase by 1 percentage point per year for the next five years.

Based on these projections, the model predicts the consumption share in GDP will not change much in the next five years, as the positive contribution of demographic changes is mostly offset by the negative contribution of further urbanization. This represents a large break from historical trends: over the last 40 years, the negative contribution of urbanization and the declining young dependency ratio consistently outweighed the positive contribution of an aging population, leading to a yearly average decline in the consumption share of 0.3 percentage point per year. The minimal contribution of these factors in the future suggests our benchmark forecast—a 1 percentage point rise in the consumption share in GDP per year through 2020—relies more on an expected decline in the saving rate and relatively stable income growth than demographic and urbanization trends.

### *Implications for China's transition to a consumption-driven economy*

Our forecast of continued strong growth in both China's consumption and consumption share in GDP does not necessarily imply that China's economy will become consumption-driven. A consumption-driven economy requires not only strong consumer demand but also increased production and higher incomes to support it. Our analysis suggests that consumption growth in the next five years will rely on the combination of a declining saving rate and relatively stable income growth. Maintaining consumption growth over the longer run, however, will require a further pick up in income growth, since the saving rate cannot fall indefinitely.

Generating higher income growth will require China to restructure its supply side so that production can meet rising household demand. A successful transition to a consumption-driven economy would allow industries to increase the domestic production of goods and services that consumers will increasingly demand; this increased production will, in

turn, generate additional jobs and support income growth. But if the increase in demand is met with an increase in foreign imports rather than domestic production, domestic employment and household income may not benefit, and consumption growth will eventually slow. Moving toward a true consumption-driven economy will require China to meet rising demand with domestic, not foreign, goods and services.

#### **IV. Conclusions**

After declining for nearly half a century, consumer spending as a share of GDP in China began to increase around 2010. We examine the key factors driving this change and predict their long-term trends. Based on this analysis, we find that Chinese consumption growth will likely remain strong over the next few years due to relatively stable income growth and an expected decline in the household saving rate. The declining saving rate in China reflects both a changing demographic structure—an expected increase in the young dependency ratio after multiple decades of decline—and a changing consumption pattern of young people, who face less pressure to save thanks to financial support from their parents and grandparents.

In the long run, transitioning to a consumption-driven economy may require some policy changes. Specifically, China may need to implement successful supply-side reforms—which are on the government’s agenda but haven’t yet been significantly pushed forward—to enable domestic production to meet rising domestic demand. Although the Chinese household saving rate is declining from a very high level, the downward trend cannot last forever. A truly consumption-driven economy must rely on strong household income growth, which is ultimately driven by improved technology and investment.

## Endnotes

<sup>1</sup>In general, total Chinese consumer spending consists of spending by households and spending by the government. As we focus on the Chinese consumer sector, throughout the paper, “the share of consumption in GDP” refers to the share of household consumption in GDP.

<sup>2</sup>For more details on Chinese households’ spending on extracurricular activities and educational supplements, see Nielsen.

<sup>3</sup>For more details about Chinese students studying at U.S. colleges and universities, see Institute of International Education.

<sup>4</sup>To mitigate concerns about non-stationary variables and spurious regressions, we conduct cointegration tests on each country. The results show all series are cointegrated and thus our regression results are valid.

<sup>5</sup>We also include a quadratic term of urbanization in the regression to capture possible non-linear effects of urbanization on the consumption share. But the overall effect of urbanization on the consumption share remains negative.

<sup>6</sup>Wang and Wen argue fast-rising house prices and living costs cannot explain the high level of the Chinese household saving rate. However, their definition of the household saving rate does not include housing investment. That is, an increase in housing investment does not influence the household saving rate in their calculation. So it is not surprising they find relatively small effects of rising housing prices on their constructed household saving rate.

<sup>7</sup>Using twins helps reduce heterogeneity caused by age differences.

<sup>8</sup>For more on the effects of two children in Chinese households, see Jin.

<sup>9</sup>Alternatively, we could include projections on dependency ratios and the urban share of the population in projecting disposable income growth. This approach delivers similar results because the positive influence of the old dependency ratio on disposable income growth is offset by negative influences from the young dependency ratio and the urban share of the population.

<sup>10</sup>Li and Xu argue that the Chinese consumption share in GDP is underestimated in the data. So we encourage readers to pay more attention to the predicted increase, 5.4 percentage points, than absolute levels.

<sup>11</sup>We model the saving rate as an autoregressive process with four lags, as indicated by the commonly used Akaike information criterion. The estimated model generates a projection of the saving rate within the range of our two scenarios.

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# Access to Electronic Payments Systems by Unbanked Consumers

*By Fumiko Hayashi*

In 2013, nearly 8 percent of U.S. households, or about 17 million U.S. adults, did not have a checking or savings account (Burhouse and others). Many of these consumers—who are considered “unbanked”—rely heavily on cash to meet their transaction needs. Some consumers may choose not to have a bank account solely due to personal preferences such as for privacy. Others, however, may be influenced by factors they cannot control, such as minimum requirements to open accounts and high fees. If the latter is the case, access to more affordable electronic payment products could enhance unbanked consumers’ economic well-being by reducing the cost and time associated with payments and broadening their options of where to make purchases.

Increasing unbanked consumers’ access to and use of electronic payment products are high priorities among policymakers around the world (Committee on Payments and Market Infrastructures and World Bank Group). Payment services are, in their own right, an important part of the overall package of financial services, but they also serve as an entry point to other financial services such as savings, investments, loans, and insurance. The Federal Reserve’s mission in payments is to foster the integrity, efficiency, and accessibility of U.S. payments and settlement systems to support financial stability and economic growth. Promoting electronic payments systems with broad public access is key to achieving accessibility as well as efficiency.

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In this article, I examine the main reasons some consumers do not have a traditional bank account and identify features of electronic payment products that might attract those consumers. I find that while a small fraction of unbanked consumers prefer to use cash for privacy reasons, the majority of consumers are unbanked for other reasons, such as limited credit or banking history, low and unstable income, high fees, negative perceptions of banks, and account attributes like complexity and slow speed of funds availability. Some electronic payment products have the potential to attract unbanked consumers by addressing the issues they have with traditional checking accounts. Among such products, general purpose reloadable (GPR) prepaid cards may be able to address the issues more effectively than alternative checking accounts offered by depository institutions or transaction accounts offered by nondepository institutions.

Section I reviews previous research on the reasons why some consumers do not use banks and assesses the importance of these reasons. Section II describes electronic payment products available to unbanked consumers, discusses advantages and disadvantages of those products relative to traditional checking accounts and cash, and considers which products unbanked consumers are most likely to adopt. Section III concludes with a discussion of policy implications.

## **I. Reasons Consumers Do Not Have Bank Accounts**

Consumers may not have a bank account for a variety of reasons. Some reasons are solely related to factors that providers control, such as credit and banking history requirements to open a bank account. Other reasons are solely related to consumers' preferences, such as the desire for privacy. And still other reasons are related to factors consumers can control and factors outside their control: for example, consumers may choose not to use a bank account if the high cost of using a bank account—due to both their low, unstable income and banks' high fees—exceeds the benefits. While individual unbanked consumers may have several reasons for not having a bank account, some reasons may be more important than others. Understanding these reasons—as well as which reasons are greater barriers to entry than others—is useful not only for payment service providers as they develop electronic payment products that attract

unbanked consumers, but also for policymakers as they consider policies that encourage the use of electronic payments systems.

To identify the various reasons why consumers do not have bank accounts, I use two studies based on interviews with different subsets of consumers. The Federal Reserve Bank of Kansas City interviewed unbanked and underbanked individuals with low and moderate incomes to understand why they distrust banks or why they choose other institutions to meet their financial service needs.<sup>1</sup> Likewise, Romich, Gordon, and Waitthaka interviewed prepaid card users who previously had a bank account to examine why those individuals exited from the banking system.

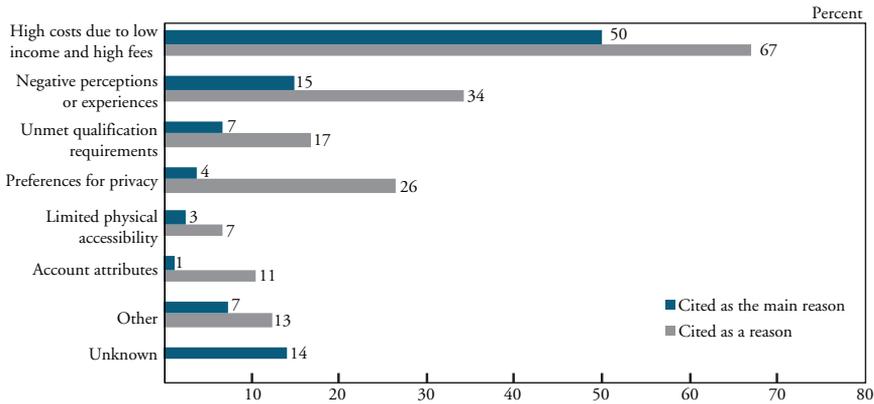
However, these interview studies do not indicate the relative importance unbanked consumers place on these reasons. To isolate the main reasons from all possible reasons, I use two recent surveys of unbanked consumers. I primarily use a Federal Deposit Insurance Corporation (FDIC) survey, which asks unbanked households to select all reasons why they do not have a bank account and then select one main reason from the list provided in the survey, including “other.” The FDIC list encompasses almost all reasons identified in the aforementioned interview studies. As a supplement, I also use a survey conducted by the Board of Governors of the Federal Reserve System. Similar to the FDIC survey, the Board of Governors survey asks unbanked consumers to select main reasons from a predetermined list; however, the Board of Governors list has two drawbacks. First, it does not include one potentially important reason—privacy. Second, it includes the reason “do not need or want a bank account,” which encompasses various reasons related to consumers’ preferences and may mask the fundamental reasons unbanked consumers do not need or want a bank account.

Distinguishing between common reasons consumers do not have a bank account and the “main reasons” they select is important: a given reason may be common among consumers without being an especially significant barrier to entering the banking system. For example, 26 percent of households in the FDIC survey cited privacy as among the reasons they do not have a bank account; however, only 4 percent of households cited it as the main reason (Chart 1).

The reason consumers most often selected as the “main reason” they do not use banks is the high cost of maintaining an account due

Chart 1

## Reasons Households Do Not Have Bank Accounts



Source: Author's calculations based on 2013 FDIC survey.

to their low, unstable income and banks' high fees. Some bank accounts have a minimum deposit requirement to open the account, typically ranging from \$25 to \$100 (Bretton Woods). In addition, many banks offer conditionally free checking accounts: banks waive or reduce monthly account fees if a consumer meets a minimum balance, a minimum monthly deposit, or both (Hayashi, Hanson, and Maniff). However, consumers with low and unstable income may not meet those criteria and thus may incur a monthly fee. Their unstable income, and to some extent their limited financial literacy, may also trigger fees such as overdraft fees and non-sufficient-funds (NSF) fees, which are assessed when account holders' balances are not sufficient to cover their transactions. Many consumers perceive the level of these fees—the median fee is \$30 per overdraft or NSF incident—to be too high.<sup>2</sup> In the FDIC survey, about 50 percent of unbanked households cited main reasons related to low income that does not meet minimum balance requirements (37 percent) or high fees (13 percent) (Chart 1).

The second main reason relates to consumers' negative perceptions or experiences with banks. In the two interview studies, unbanked interviewees often stated their past experiences with banks had been negative. Some consumers felt that banks cleared checks and other transactions in a way that intentionally created a greater number of overdraft or NSF charges. These unexpected fees caused

some consumers to close their bank accounts and distrust banks. Other unbanked consumers felt they would not be welcomed at banks or treated with respect. And some consumers, especially immigrants, felt they could not easily communicate with bank staff due to language barriers. About 15 percent of households in the FDIC survey cited negative perceptions or experiences with banks as the main reason they do not use banks.

The third main reason is that consumers do not meet banks' qualification requirements. Unmet qualification requirements include no credit score or credit scores too low to open bank accounts, lack of proper identification or Social Security number, involuntary account closures by banks, and applications denied by banks due to past financial mistakes.<sup>3</sup> Consumers who do not meet the criteria set out by depository institutions cannot have a bank account, even if they want one. Thus, they have been involuntarily excluded from the banking system. Seven percent of households in the FDIC survey cited banks' qualification requirements as the main reason they do not have a bank account.

The fourth main reason, privacy, relates solely to consumers' preferences. Consumers for whom privacy is critical may choose not to have a bank account and instead exclusively rely on cash. Some of these consumers may simply prefer the anonymity of cash (Kahn, McAndrews, and Roberds). Others may want to avoid paying taxes or hide their income from debt collectors. Consumers who do not have a bank account for these reasons have voluntarily excluded themselves from the banking system. In the FDIC survey, 4 percent of households cited privacy as the main reason they do not use banks.

The fifth main reason concerns the physical accessibility of banks, such as locations and hours. If banks do not have branches where unbanked consumers reside or work, the indirect costs to these consumers—such as transportation costs or the time spent accessing the closest branch—may be too high. Few or inconveniently located branches can also raise direct costs: ATM fees, for example, can add up significantly if consumers use ATMs not owned by their banks. In these cases, consumers are likely to be assessed two separate fees: a so-called “foreign” fee by their bank and a surcharge by the ATM owner.<sup>4</sup> Due to these indirect and direct costs, unbanked consumers often consider retailers more convenient to use than banks for basic transaction services such

as cashing checks and buying money orders. Their billers, such as landlords, often accept money orders but not checks, ACH, or credit and debit cards. Furthermore, retailers are typically open more hours than banks and allow their customers to complete other tasks concurrently such as paying bills and shopping at the store. In the FDIC survey, 3 percent of households cited limited physical accessibility of banks as the main reason they do not have a bank account.

The sixth and final main reason relates to attributes of bank accounts and associated payment services that do not meet the needs of certain groups of unbanked consumers. Consumers with limited financial literacy, for example, may find opening or managing a bank account complex and the fees confusing. Consumers who wish to access their funds immediately or make payments that reach the recipients as quickly as possible may find checks and other payment services banks offer too slow. To meet their need for faster payments, these consumers often turn to retailers or payment service providers outside the banking system, such as check cashers and money transmitters. In addition, some unbanked consumers perceive bank accounts as unsafe relative to cash even though consumer protection laws limit consumer liability for unauthorized transactions. Other unbanked consumers prefer cash because it offers greater control, enabling them to easily manage and immediately access to their money. In the FDIC survey, only 1 percent of households cited account attributes as the main reason they do not use banks.

However, the importance of account attributes in consumers' banking decisions may be understated in the FDIC survey. The FDIC survey includes only one reason related to account attributes—"banks do not offer needed products or services." In contrast, the Board of Governors survey allows unbanked consumers to cite one of three reasons related to account attributes as the main reason. Those reasons include "would not use an account enough" (cited by 8 percent of the survey respondents), "cannot manage or balance an account" (2 percent), and "needed products or services are not offered" (1 percent). As the FDIC survey does not include the first two reasons in its list of options, consumers who would have selected them may have selected "other" instead.

The survey results suggest providers at least partially control the main reasons consumers report they do not use the banking system. This may imply that consumers who rely solely on cash to meet their transaction needs do so not out of a preference for cash but because they lack bank accounts. Unlike most banked consumers, who access electronic payment products such as debit cards and ACH through their bank accounts, unbanked consumers cannot access many electronic payment products. However, more recently, electronic payment products have become increasingly available through accounts other than traditional bank accounts. Thus, unbanked consumers may be able to adopt those electronic payment products if such products address the issues unbanked consumers have with traditional bank accounts.

## **II. Which Electronic Payment Products Would Attract Unbanked Consumers?**

Both depository institutions and nondepository institutions offer electronic payment products that may attract unbanked consumers. Both types of institutions offer general purpose reloadable (GPR) prepaid card accounts which enable consumers to use GPR prepaid cards. Some depository institutions offer alternative checking accounts that provide debit cards and access to ACH to meet the needs of otherwise unbanked consumers. In addition, some nondepository institutions offer transaction accounts associated with mobile or online payment products.

I assess whether GPR prepaid cards, alternative checking accounts, or transaction accounts are best equipped to address the reasons some consumers do not use the banking system by examining the advantages and disadvantage of each type of account relative to traditional checking accounts. Unbanked consumers may be more likely to adopt electronic payment products if they are associated with accounts that meet their needs.

### *GPR prepaid card accounts*

Currently, GPR prepaid cards, which are directly tied to GPR prepaid card accounts, may be the most prominent electronic payment product for unbanked consumers. GPR prepaid cards can be used as a substitute for a checking account. Before cardholders use a GPR prepaid card for purchases, cash withdrawals or bill payments, they must

load funds on to the card. They can load and reload funds through electronic funds transfers, direct deposits, or at a retailer that participates in a reload network.

*Current state.* In the past several years, unbanked consumers have increasingly turned to GPR prepaid cards to meet their transaction needs. According to Burhouse and others, the share of unbanked households that had ever used a GPR prepaid card increased from 18 percent in 2011 to 27 percent in 2013. More than 22 percent of unbanked households reported they used these cards in the 12 months prior to the survey, and nearly 58 percent of these households reloaded funds on their cards at least once.

GPR prepaid cards serve three functions. First, they can be used like debit cards. Cardholders can make purchases at any brick-and-mortar or online merchant that accepts the brand(s) on their card (such as Visa or MasterCard), and they can withdraw cash at ATMs or at retailers using the cash-back function.<sup>5</sup> Second, GPR prepaid cards can be used to send and receive ACH payments. In addition to a 16-digit card number, GPR prepaid cards typically have a separate 10–14 digit account number that consumers can use to receive direct deposits or pay bills through ACH. Third, some GPR prepaid cards can be used for person-to-person transfers. Consumers have traditionally relied on checks and money transmitter services to send funds to and receive funds from other consumers.

Both depository institutions and nondepository institutions offer GPR prepaid cards. Hayashi, Hanson, and Maniff identify 24 major providers—10 banks and 14 nondepository institutions. The nondepository institution providers typically act as a program manager—in other words, while a depository institution may issue the cards, the nondepository institution runs the card program on the issuer's behalf. Some nondepository institutions, such as NetSpend, also maintain the cardholder database, approve or decline transactions, and provide customer services. American Express, a nondepository institution, which issues its GPR prepaid cards by itself and runs its own card programs, is a notable exception.<sup>6</sup>

*Advantages and disadvantages.* GPR prepaid cards have clear advantages over traditional checking accounts in addressing qualification requirements, negative perceptions and experiences with banks, and

physical accessibility. GPR cards have some advantages over traditional checking accounts in addressing high costs due to consumers' low, unstable income and bank accounts' high fees and issues related to account attributes. And GPR cards have neither an advantage nor a disadvantage over traditional checking accounts in addressing privacy concerns.

GPR prepaid cards can mitigate some qualification requirements to open an account. For example, GPR card providers do not typically check prospective customers' credit and banking histories; as a result, unbanked consumers with credit or past banking problems can more easily access GPR cards than traditional bank accounts. However, some obstacles remain: as with bank accounts, prospective GPR cardholders must provide proper identification in compliance with anti-money laundering regulatory requirements.

GPR prepaid cards can also benefit unbanked consumers with negative perceptions of banks. GPR cards have a clear advantage over traditional checking accounts for these consumers, as they are available at nondepository institutions as well as banks. Although banks do issue many nondepository institutions' GPR cards, cardholders do not interact directly with the issuing bank. Instead, the nondepository institution interacts with consumers as a program manager. Moreover, some GPR cards are co-branded with a retailer, check casher, or money transmitter with which unbanked consumers are familiar, helping increase consumer trust in those cards.<sup>7</sup>

GPR prepaid cards also have a clear advantage for unbanked consumers who consider retailers more convenient than banks for their transaction needs. Many GPR cards offered by nondepository institutions can be obtained at a retail store and registered and activated online. At retail stores, consumers can also reload funds on the card using cash, in addition to making purchases and obtaining cash with the card.

Furthermore, GPR prepaid cards have a slight advantage in addressing high costs due to unbanked consumers' low, unstable income and bank accounts' high fees. GPR prepaid cards typically do not have minimum balance requirements to open the account or to waive or reduce monthly account fees. In addition, fees for overdraft transactions on GPR cards are much less than for checking accounts (Hayashi, Hanson, and Maniff). Consumers can also avoid unexpected overdraft and NSF fees entirely by choosing a GPR card that does not offer overdraft capa-

bility. However, excluding overdraft or NSF transaction fees, GPR cards could be more costly than traditional checking accounts. Cardholders who do not receive periodic direct deposits may incur a monthly fee or per-purchase fee. Cardholders may also incur some fees unique to GPR cards: some providers charge balance inquiry fees, and some retailers charge reload fees when cardholders reload their card with cash.

GPR prepaid cards also have a slight advantage in expanding or addressing bank account attributes that do not meet the needs of certain unbanked consumers. Many providers of GPR cards offer tools such as online access, mobile applications (“apps”), and text alerts so their cardholders can easily monitor and manage the balance of their card anytime anywhere. Although large banks offer similar tools to their customers, smaller banks lag their larger counterparts especially in mobile banking service offerings.<sup>8</sup> Other account attributes, such as safety and the speed of funds availability, are similar for both GPR cards and traditional checking accounts. Like traditional checking accounts, a majority of GPR cards are FDIC-insured, meaning funds on the cards will be returned to the cardholder if the card issuer fails. Also like debit cards, most GPR providers limit consumer liability for unauthorized transactions.<sup>9</sup> Speed of funds availability is also similar for both GPR cards and traditional accounts, since GPR cards use either debit card networks or ACH to process transactions. Some GPR cards do, however, have faster person-to-person transfers between cardholders who use the same GPR card product. Since both the sender and recipient of the funds are on the same provider’s account book, transfers between cardholders can be immediate.

Finally, GPR prepaid cards have no advantage over traditional bank accounts in addressing consumer privacy concerns. Like traditional bank accounts, GPR card providers require prospective cardholders to present identification which is then linked to the card number. Accordingly, the card is traceable to an individual consumer. As a result, a creditor could garnish the balance on the GPR card. Moreover, the traceable nature of the card means payments made with GPR cards are not anonymous, just like debit card and ACH payments.

### *Alternative checking accounts*

Alternative checking accounts offer another option for previously unbanked consumers to access electronic payment products such

as debit cards and ACH. Banks and credit unions offer alternative checking accounts to consumers who are not qualified for, or cannot afford, traditional checking accounts. These accounts include second-chance checking accounts and checking accounts accompanied by low-fee, short-term, small-dollar loans.<sup>10</sup>

*Current state.* Unbanked consumers by definition do not have any bank account, including an alternative checking account. However, some unbanked consumers may consider opening a bank account in the future, and alternative checking accounts may be easier for them to open than traditional checking accounts. According to Burhouse and others, 14 percent of unbanked households reported they were very likely to open a bank account in the 12 months following the survey; 22 percent reported they were somewhat likely to open a bank account in the 12 months following the survey.

At least a few hundred banks and credit unions offer second-chance checking accounts for consumers with credit and banking history problems.<sup>11</sup> Some of these accounts also carry lower fees than traditional checking accounts. Depository institutions, especially credit unions, are also increasingly offering short-term, small-dollar loans to consumers with little or no credit history. According to the National Credit Union Administration, the number of credit unions offering such loans increased more than five times from 2010 to 2013 (Peters). These loans carry a lower interest rate than alternative short-term loans such as payday and car-title loans.<sup>12</sup> However, to be eligible for such loans at a credit union, consumers need to open an account with the credit union. Many credit unions that offer low-fee, short-term, small-dollar loans also offer checking accounts that carry relatively lower fees than traditional checking accounts.

*Advantages and disadvantages.* Alternative checking accounts have a clear advantage over traditional checking accounts in mitigating qualification requirements for consumers to open an account and some advantages in addressing high costs due to both consumers' low, unstable income and high fees of traditional checking accounts; negative perceptions and experiences with banks; and account attributes. As with GPR prepaid cards, alternative checking accounts have no advantage over traditional bank accounts in addressing consumer privacy concerns. In addition, alternative checking accounts

have a disadvantage relative to traditional checking accounts in addressing issues related to physical accessibility.

Alternative checking accounts have a clear advantage in addressing qualification requirements to open an account. Since alternative checking accounts are aimed at consumers with poor credit or banking histories, such consumers can more easily access these accounts than traditional checking accounts. However, consumers without proper identification are still unable to open these alternative accounts, as banks are required to obtain proper identification from their prospective customers.

Alternative checking accounts have some advantage over traditional checking accounts in addressing high costs due to consumers' low, unstable income and high fees of traditional checking accounts. Some depository institutions offer second-chance checking accounts with lower fees than traditional checking accounts or without overdraft capability, preventing account holders from making accidental overdrafts and incurring high fees. Checking accounts accompanied with low-fee, short-term, small-dollar loans may also reduce the cost for consumers as the loans can eliminate, or at least reduce, overdraft incidents. Other depository institutions, however, set almost identical fees for both second-chance checking accounts and traditional checking accounts.

Alternative checking accounts also have some advantage in addressing consumers' negative perceptions or experiences with banks. Some depository institutions that offer alternative checking accounts are certified as Community Development Financial Institutions (CDFIs) by the CDFI Fund, a branch of the U.S. Treasury Department, and obtain funding from the CDFI Fund. Since CDFI certification is granted for depository institutions with a mission of serving low- and moderate-income people and communities, the targeted consumers may perceive alternative checking accounts offered by CDFIs more positively than those offered by other depository institutions.

In addition, alternative checking accounts have some advantage in addressing consumers' concerns about account attributes. Alternative checking accounts may be easier for consumers with limited financial literacy to manage than traditional checking accounts, be-

cause some depository institutions—especially CDFIs—provide a range of financial education for these account holders. Non-CDFIs may still offer tips to alternative checking account holders on how to manage the account or require them to take a financial literacy or money management class.

However, as with GPR prepaid cards, alternative accounts have no advantage over traditional accounts in addressing consumer privacy concerns. Similar to traditional checking accounts, alternative accounts are traceable to an individual consumer. Electronic payment products available through alternative checking accounts—debit cards and ACH—are the same as those available through traditional checking accounts, and payments made with those products are not anonymous. As a result, like traditional checking accounts, alternative checking accounts cannot address privacy concerns.

Furthermore, alternative checking accounts may actually have a disadvantage relative to traditional checking accounts in addressing concerns about physical accessibility. Since not all depository institutions offer alternative checking accounts, finding and visiting a branch of an institution that offers alternative checking accounts may be more burdensome for consumers.

### *Transaction accounts*

Besides GPR prepaid cards and alternative checking accounts, transaction accounts may also address unbanked consumers' needs. Nondepository institutions offer transaction accounts which can be funded with cash and do not need to be linked with a bank account or payment card account. These transaction accounts are typically either mobile accounts or online accounts.

*Current state.* Outside the United States, especially in emerging and developing countries, mobile accounts—generally referred to as “mobile money”—have been playing a key role in promoting financial inclusion. Mobile accounts in these countries are usually pre-funded: consumers use cash to fund accounts held at their mobile carrier. Almost 90 percent of transactions made with mobile money are purchases of mobile phone airtime and money transfers to another individual (Groupe Spéciale Mobile Association).

In the United States, mobile wallets linked with mobile carrier billing are emerging—in other words, payments made with the mobile wallet are added to the consumer’s mobile phone bill. Until recently, the purchases consumers could add to their mobile carrier bill were limited to digital goods like mobile apps and games. More recently, however, LevelUp, a mobile wallet mainly used for purchases at merchants such as fast food restaurants, has added carrier billing as an option for its users (Hernandez).

PayPal is the major provider of online accounts in the United States. PayPal accounts can be used to make purchases online, transfer money to and from another individual, and make purchases at a brick-and-mortar store through a mobile app. Although account holders typically load funds onto the account by linking it to their bank accounts or payment card accounts, they can also load the account with cash.<sup>13</sup>

*Advantages and disadvantages.* Transaction accounts offered by non-depository institutions have clear advantages over traditional checking accounts in addressing issues related to qualification requirements to open an account; high costs due to low, unstable income and high fees; negative perceptions and experiences with banks; and physical accessibility. Transaction accounts have no advantage over traditional checking accounts in addressing privacy issues. And transaction accounts have a disadvantage relative to traditional checking accounts in addressing issues related to account attributes.

Transaction accounts can significantly mitigate qualification requirements to open an account. For unbanked consumers who have identification, credit, or banking history problems, transaction accounts offered by nondepository institutions are more accessible than traditional bank accounts. Some mobile carriers neither require prospective customers to show proper identification nor check credit history when the customers select a prepaid plan. Similarly, PayPal does not check credit history and does not require proper identification when a consumer opens an account.<sup>14</sup>

Transaction accounts also have a clear advantage over traditional accounts in addressing high costs due to banks’ high fees and consumers’ low, unstable income. In particular, cash-load, pre-funded transaction accounts cost much less than traditional checking accounts. These accounts have no minimum deposit requirement and no monthly fees.

Moreover, these accounts incur no overdraft fees because any transaction that exceeds the account balance will be declined (as long as the account is not linked to a bank account, payment card account, or post-payment mobile carrier bill).

Mobile accounts linked with mobile carrier billing also have a clear advantage over bank accounts in addressing consumers' negative perceptions of banks. About 70 percent of unbanked households had mobile phones in 2013, suggesting a majority of unbanked consumers already have a relationship with a mobile carrier (FDIC 2014). Whether providers such as PayPal are more trusted than banks is unclear; however, since PayPal's cash load is available at retailers or money transmitters with which unbanked consumers are familiar, those consumers might feel more comfortable dealing with PayPal than with banks.

Finally, transaction accounts have a clear advantage over traditional accounts in terms of physical accessibility. Transaction accounts, which can be accessed online, do not require consumers to visit a physical location except when they load funds with cash onto their accounts. When they do need to load cash onto their accounts, consumers have more convenient options to choose from: mobile wallet users can add funds to many mobile carriers' prepaid plans at retailers and the carriers' service locations, and PayPal account holders can load cash at retailers and certain money transmitters.

As with both GPR prepaid cards and alternative checking accounts, transaction accounts offer no privacy advantage over traditional checking accounts. Although transaction accounts have less stringent identification requirements, they do not necessarily offer more privacy. Payments made with PayPal accounts or mobile wallets linked to mobile carrier bills are not anonymous. Both mobile and online accounts are traceable to an individual consumer.

In addition, transaction accounts have attributes that are less attractive than bank accounts. The current limited use of mobile wallets linked to mobile carrier bills limits their functionality. Mobile wallets can, however, offer their users the ability to monitor and manage their account balance anytime anywhere. PayPal offers account features similar to GPR prepaid cards, such as real-time online account monitoring and immediate money transfer between PayPal account holders. However, while PayPal accounts are frequently

used for online transactions and person-to-person funds transfers, their use at brick-and-mortar merchants is still limited.

Arguably, a more critical disadvantage of these transaction accounts is safety. PayPal accounts, for example, are not FDIC-insured (Woodruff).<sup>15</sup> Thus, if PayPal fails, funds on PayPal accounts may not be returned to the account holders. With respect to unauthorized transactions, PayPal and mobile wallet providers voluntarily limit consumer liability. While PayPal provides similar consumer protections to those debit and GPR prepaid card issuers are required to provide, some mobile wallet providers may not clearly disclose whether they have dispute resolution or liability limiting policies (Federal Trade Commission).

### *Prospects for adoption*

Although each of the three account types has some advantages over traditional checking accounts, it is not clear which account and associated electronic payment product unbanked consumers would be most likely to adopt. To compare the three types of accounts, Table 1 summarizes the advantages and disadvantages of each account type in addressing the six main reasons consumers do not use bank accounts. The reasons are ordered from most to least cited as the main reason in the FDIC survey.

Transaction accounts have a clear advantage in addressing the number one reason in the FDIC survey: high costs due to consumers' low, unstable income and the high fees of traditional checking accounts. However, GPR prepaid cards and alternative checking accounts have at least some advantage over traditional checking accounts as well (Table 1). The costs consumers incur can vary significantly according to their behavior; however, any individual consumer with low, unstable income may find at least one of the three accounts less costly than traditional checking accounts. Therefore, the three types of accounts can collectively lower costs, positively influencing unbanked consumers' adoption of the three types as a whole.

Both GPR prepaid cards and transaction accounts have a clear advantage in addressing the second most cited main reason: negative perceptions and experiences with banks. However, alternative checking accounts also have some advantage, because unbanked consumers may trust providers of alternative checking accounts such as CDFIs more

*Table 1*  
**Advantages and Disadvantages of Alternative Accounts Relative to Traditional Checking Accounts**

Main reason ranking	Reason	GPR prepaid card accounts	Alternative checking accounts	Transaction accounts
1	High costs due to low income and high fees	+	+	++
2	Negative perceptions or experiences	++	+	++
3	Unmet qualification requirements	++	++	++
4	Preferences for privacy	~	~	~
5	Limited physical accessibility	++	—	++
6	Account attributes	+	+	—

++ : Clear advantages      ~ : Indifferent  
+ : Some advantages      — : Disadvantages

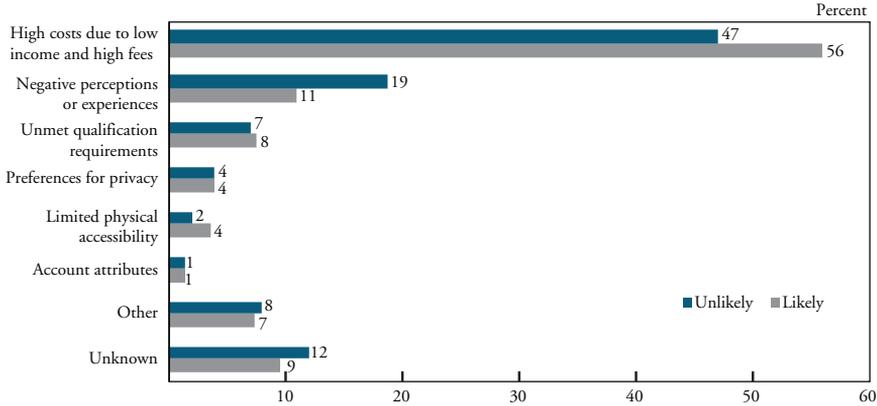
than other depository institutions. Trust is a key factor for unbanked consumers in determining whether to adopt an electronic payment product. According to the 2013 FDIC survey, 19 percent of unbanked households who said they were not too likely or not likely at all to open a bank account in the 12 months following the survey cited “distrust or dislike dealing with banks” as the main reason they do not have a bank account (Chart 2).

All three types of accounts have a clear advantage in addressing qualification requirements to meet to open an account (Table 1). All three types have less stringent requirements for consumers’ credit and banking histories than traditional checking accounts, which may increase the likelihood of consumers adopting these accounts and associated electronic payment products. Although transaction accounts have less strict identification requirements than the other two, this looser requirement may also sacrifice product safety. As a result, it is unclear whether transaction accounts will be more attractive to unbanked consumers than the other two types.

None of the accounts have an advantage over traditional checking accounts in addressing the fourth main reason: privacy. Thus, consumers who avoid bank accounts solely for privacy reasons are unlikely to adopt any of the three products. Such consumers, however, account for a relatively small share of unbanked consumers (4 percent).

Chart 2

### Main Reasons Households Do Not Have Bank Accounts: Likely versus Unlikely To Have a Future Account



Source: Author's calculations based on 2013 FDIC survey.

In addressing the fifth main reason, physical accessibility, GPR prepaid cards and transaction accounts have an advantage over traditional checking accounts, while alternative checking accounts have a disadvantage. As a result, this factor may positively affect adoption of GPR prepaid cards and transaction accounts but negatively affect adoption of alternative checking accounts.

Finally, GPR prepaid cards and alternative checking accounts have some advantages in addressing the sixth main reason: attributes of traditional checking accounts that do not meet unbanked consumers' needs. Transaction accounts, in contrast, have disadvantages relative to traditional accounts in terms of safety and functionality. All three types of accounts allow users to easily monitor and manage their accounts thanks to technologies like online access, mobile apps, and text alerts. Such abilities will likely encourage unbanked consumers to adopt an electronic payment product. According to the Board of Governors survey, about 67 percent of unbanked consumers of all ages have access to a mobile phone; access among unbanked consumers age 34 or younger reached 75 percent in 2015.<sup>16</sup> Among mobile phone users, unbanked consumers are more likely to make mobile payments than fully banked consumers (23 percent versus 17 percent). Furthermore, adoption of GPR prepaid cards is highly correlated with access to a mobile phone, especially a smart

phone (FDIC 2014). More than 40 percent of unbanked households with access to a smart phone have adopted GPR prepaid cards, while only 21 percent of unbanked households without access to a smartphone have adopted them. These statistics suggest that as more unbanked consumers gain access to a mobile phone or smartphone, adoption of mobile accounts or GPR prepaid cards will increase.

In contrast, all three account types have little or no advantage over traditional accounts in addressing another account attribute: speed. While some GPR prepaid cards and transaction accounts enable users to make immediate money transfers between users of the same product, none of the three accounts really meet the unbanked consumers' demand for speed, such as immediate access to their funds and payments that reach the recipients immediately.<sup>17</sup> This may prevent some unbanked consumers from adopting products available through these accounts over cash. However, immediate payments and funds availability may soon become available through these products as the United States implements faster payments capabilities (see Box). Whether a given product offers faster payments may significantly influence unbanked consumers' adoption of that product.

Transaction accounts have a disadvantage relative to traditional checking accounts as well as the other two types of accounts with respect to another account attribute: safety. Consumers concerned about the safety of their funds stored in an account may be less likely to adopt transaction accounts. Transaction account providers voluntarily protect consumers from unauthorized transactions, but some do not clearly disclose their liability limit policies to their customers.

In sum, GPR prepaid cards may be able to address issues unbanked consumers have with traditional checking accounts more effectively than alternative checking accounts or transaction accounts. GPR prepaid cards have advantages in addressing nearly all reasons consumers do not have bank accounts and do not have a clear disadvantage. Transaction accounts have clear advantages in addressing four of the six reasons but have disadvantages in account attributes such as safety and functionality. Alternative checking accounts have at least some advantages in addressing issues related to four reasons but have a disadvantage in physical accessibility.

**Box****Faster Payments in the United States**

Faster payments require providers to immediately confirm payment execution, notify the payer and payee, deduct the payment from the payer's account, and make funds available to the payee's account in near real time. Consumers with low, unstable income in particular may benefit from near-real-time funds availability, because it allows them to better control their cash flow and make and receive last-minute payments of all types. Faster funds availability also helps consumers reduce the costs of overdrafts or declined payments due to insufficient funds (Hayashi).

More than 20 countries have already developed or are developing faster payments systems to better meet the needs of their citizens and businesses. In the United States, the Federal Reserve has established and led a Faster Payments Task Force that consists of a diverse array of stakeholder members to identify and assess alternative approaches for implementing safe, ubiquitous, and faster payments capabilities. The Task Force will assess faster payments solution proposals from various providers using the effectiveness criteria it has identified and then publish the proposals, assessments, and strategic issues deemed important to the successful development of faster payments as a final report in 2017.

### III. Conclusion

About 8 percent of U.S. households do not have a checking or savings account and rely heavily on cash. Access to affordable electronic payment products could enhance many unbanked consumers' welfare. Electronic payment products reduce the cost and time associated with transactions and enable consumers to make purchases not only at brick-and-mortar merchants but also over the internet or a mobile phone. As retail payments have shifted from paper-based to electronic over the years, including unbanked consumers in the electronic payments system is key to fulfilling the Federal Reserve's mission of achieving accessibility and efficiency in payments.

I find that three types of accounts through which electronic payment products are available—GPR prepaid cards in particular, and, to a lesser extent, alternative checking accounts and transaction accounts—have the potential to attract unbanked consumers through their advantages over traditional bank accounts. These accounts and associated electronic payment products can address issues unbanked consumers have with traditional bank accounts such as credit and banking history problems; high costs due to consumers' low, unstable income and banks' high fees; negative perceptions of or experiences with banks; and the complexity and security of certain account features. However, all three account types could make improvements to facilitate further adoption. In particular, by offering faster payments as soon as is feasible, providers of electronic payment products associated with the three account types can meet unbanked consumers' demand for immediate access to their funds and payments that immediately reach the recipients.

These findings have some implications for policymakers. Although GPR prepaid cards appear to be more effective than the other two types of accounts in addressing issues unbanked consumers have with traditional checking accounts, no single electronic payment product can address all of these issues; instead, individual consumers can choose the product that aligns with their behavior as well as their reasons for being unbanked. Currently, both depository and nondepository institutions provide electronic payment products to meet the needs of unbanked consumers. Thus, policymakers may want to ensure a competitive

environment for these institutions to fairly and safely provide payment services to this segment of population.

As a first step, policymakers could review the regulatory framework for bank and nondepository institution payment service providers and improve the framework if needed. In addition, policymakers could explore ways to encourage the accessibility of faster payments not only through bank accounts but also through other alternatives such as GPR prepaid cards and transaction accounts.

## Endnotes

<sup>1</sup>Underbanked consumers are defined as consumers who have a bank account but also use alternative financial services outside the banking system such as check cashing, money remittances, payday loans, and auto title loans.

<sup>2</sup>The median overdraft and NSF fee varies by the size of financial institutions, ranging from \$25 among institutions with less than \$100 million in assets to \$35 among institutions with more than \$50 billion in assets (Moebs Services).

<sup>3</sup>Many U.S. banks use ChexSystems' data to screen a bank account applicant's banking history. ChexSystems tracks checking and savings account activities and reports information such as involuntary account closure, bounced checks and overdrafts, unpaid negative balances, and risky or dishonest behavior.

<sup>4</sup>The foreign fee typically ranges from 50 cents to \$3, and the median surcharge is about \$2.50.

<sup>5</sup>Using their card and personal identification number, cardholders can obtain cash at the checkout counter by adding their cash withdrawal amount to their purchase amount.

<sup>6</sup>The funds of American Express's GPR prepaid cards are held by Wells Fargo.

<sup>7</sup>Co-branded cards are designed with a retailer, check casher, or money transmitter's brand as the dominant brand on the card but also contain the GPR prepaid card provider's logo and the card network's logo.

<sup>8</sup>Banks and credit unions with larger assets are more likely to offer mobile banking services than those with smaller assets, according to a survey conducted in 2014 in five Federal Reserve Districts: Atlanta, Boston, Dallas, Minneapolis, and Richmond. The survey results are presented in Crowe, Tavilla, and McGuire.

<sup>9</sup>Although the Consumer Financial Protection Bureau has not finalized rules governing GPR prepaid cards, card networks such as Visa and MasterCard require GPR card providers using the network to limit consumer liability.

<sup>10</sup>Products and services financial institutions offer to unbanked and underbanked consumers are reported in Rengert and Rhine.

<sup>11</sup>About 300 banks and credit unions that offer second-chance checking accounts are listed at [www.nerdwallet.com/blog/checking/second-chance-checking/](http://www.nerdwallet.com/blog/checking/second-chance-checking/). Alternative credit scores (for example, the FICO Score XD) allow depository institutions to assess otherwise unscorable consumers ([www.fico.com/en/products/fico-score-xd#marketecture](http://www.fico.com/en/products/fico-score-xd#marketecture)).

<sup>12</sup>To get a payday loan, consumers are typically required to have a bank account in relatively good standing.

<sup>13</sup>Account holders can purchase a PayPal My Cash Card and load funds on the card at a retailer with cash. Then, the account holders apply those funds to their PayPal account through PayPal's website.

<sup>14</sup>PayPal may later request its account holders to provide their date of birth and the last four digits of their Social Security number to verify the account holders and allow them to add funds to their PayPal account.

<sup>15</sup>PayPal accounts had been FDIC-insured until 2012, when new oversight laws passed in California.

<sup>16</sup>Access to smartphones among unbanked consumers age 34 years or younger reached 61 percent in 2015.

<sup>17</sup>Unbanked and underbanked consumers' desires for faster funds availability, faster payment speed, and faster deposits are reported in Burhouse, Navarro, and Osaki.

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