INCOME SHOCKS AND CONSUMER SPENDING

Consumers spend half of the increased income associated with mortgage payment reductions

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Central banks and investors care about the marginal propensity to consume (MPC), or how much of an increase in disposable income is spent on goods and services. An increase in disposable income could come from multiple sources – government cash payments, tax rate reductions, and of course interest rate reductions. Recent evidence on MPC comes from a unique dataset of 50,000 bank customers in China.

The key result is that, in response to a change in interest rates that flowed directly to a change in disposable income, the marginal propensity to consume is estimated at 0.50 for interest rate increases and 0.38 for interest rate decreases. On average, homeowners with mortgages spent about 9 per cent more that non-mortgage homeowners in response to a series of interest rate cuts, and reduced their relative spending by about 5 per cent in response to a series of interest rate increases. The strongest response was amongst the 10 per cent of customers with the largest credit card debt. These customers increased spending by a relative 34 per cent, and their delinquencies fell by 1.6 per cent. The remaining unconstrained mortgage holders increased relative spending by about 7 per cent and had a 0.3 per cent reduction in delinquency. Customers increased their spending on discretionary items and on durable goods.

The response of central banks and governments to COVID-19 in early 2020 was consistent across the globe: cut interest rates and provide fiscal stimulus to keep workers employed, using the response to the global financial crisis as a precedent. In 2020 and 2021, consumers responded as central banks and governments hoped: they spent the money. In the U.S., retail sales were $463 billion in 2020 and $546 million in 2021, up 2.9 per cent and a staggering 21.4 per cent, respectively, from 2019. But this happened during a period of constrained supply of intermediate goods and reduced workforce participation. There are 2.6 million fewer people working in the U.S. today than if participation remained at the pre-pandemic level, given the population increase. Over 26 months from February 2020 to April 2022, average hourly earnings and the consumer price index both increased at an annual rate of 5.1 per cent. But inflation today is high (8.2 per cent for the 12 months ending April 2022) and is running well ahead of plausible future wage increases.

The weak link in the response of governments and central banks to economic shocks is that central banks are being asked to do too much with their ability to alter disposable income via their influence on interest rates. Central banks can't free up capacity at ports, or open factories in Asia, or increase the supply or oil, or alter the preferences of a former employee considering an alternative career (insert your preferred supply chain constraint here). Central banks also cannot determine who benefits most from low interest rates. And it appears that benefits flow disproportionately to existing homeowners and people with high borrowing capacity (at least enough wealth to put a down payment on a house or unit, and lock in a low interest rate mortgage).

Introduction

Central banks and investors care about the marginal propensity to consume (MPC), or how much of an increase in disposable income will be spent on goods and services. In this note, I summarize a recent publication in which researchers estimate MPC using a unique dataset of homeowners in China (summarized in Table 1). This is followed by a comment on central banks' response to COVID-19. I suggest that consumers responded exactly as central banks hoped, and that the current situation in which inflation is running ahead of reasonable wage growth expectations is the result of central banks being asked to do too much. Central banks cannot overcome real economic frictions (ports, factories, oil, employees) and cannot determine who benefits most from sustained low interest rates (existing homeowners and potential homeowners with borrowing capacity).

Table 1. Recent evidence

China	Mortgages are adjustable rate mortgages. Home loan rates under central bank control.
Dataset	~50,000 homeowners (16 per cent with mortgages). Credit card spending, balances and delinquencies. Sub-sample of individual loan terms.
Consumer response to a rate decrease	Home loan rates fell by about 2.3 per cent from January to June 2009 (announced September to December 2008). Relative credit card spending for mortgage holders increased by 8 per cent compared to homeowners without mortgages. Relative delinquencies fell by 0.4 per cent. For every 100 RMB increase in monthly disposable income, relative spending increased by 28 RMB. During the rate decrease period, the relative increase in spending for customers with the highest 10 per cent of credit card balances increased by 34 per cent. Relative increase in spending was 9 per cent on discretionary purchases versus 1 per cent on non-discretionary purchases. Relative increase in spending on non-durable goods was 7 per cent versus 1 per cent on durable goods. Marginal propensity to consume estimated at 0.50.
Consumer response to a rate increase	Home loan rates increased by about 1.8 per cent over 2011 and 2012. Relative credit card spending decreased by 5 per cent compared to homeowners without mortgages. Relative debt increased by 22 per cent. Marginal propensity to consume estimated at 0.38.

Monetary policy and the marginal propensity to consume

With inflation of 8.3 per cent in the United States (U.S.)[1] and 8.1 per cent in Europe,[2] central bankers and investors face the challenging task of understanding consumer behavior. Central banks have a blunt instrument to keep inflation within tolerable levels – monetary policy – which in the U.S. means buying and selling short-term government securities to shift the target cash rate and have this flow in an indirect way to mortgage rates on home loans. Central banks also buy and sell long-dated government securities and mortgage-backed securities to influence yields at the long end of the yield curve. On June 1, 2022 the U.S. Federal Reserve held $5.8 trillion of Treasury Securities and $2.7 billion of mortgage-backed securities amongst total assets of $8.9 trillion.[3] U.S. Federal reserve assets were $4.2 billion, and $0.9 billion, respectively, on February 26, 2020, and on September 3, 2008.[4]

Understanding MPC is crucial for setting monetary policy and portfolio analysis. For instance, higher MPC means higher earnings for consumer discretionary stocks in response to an increase in disposable income. An increase in disposable income could come from multiple sources – government cash payments in response to a negative economic shock, tax rate reductions, and of course interest rate reductions.

China setting and a detailed bank customer dataset

A recent paper using data from China provides insights into consumer behavior.[5] The China setting is useful because in China all mortgages are adjustable rate mortgages (ARMs) so a change in interest rates flows directly to a change in disposable income of mortgage holders. In the U.S., most mortgages are fixed-rate mortgages, which means that interest rate changes only indirectly flow through to changes in disposable income of mortgage holders. If interest rates fall, households with fixed rate mortgages only experience an increase in disposable income if they refinance. If interest rates rise, there will be reduced demand for new mortgages, but fixed rate mortgage holders will have unchanged disposable income. In addition, in China the relationship between mortgage rates and long-term benchmark rates is under government control. Mortgage finance comes from two sources: the Housing Provident Fund (HPF) and commercial banks. Loans from the HPF are generally not large enough to cover house purchases (the researchers estimate market shares of 82.5 per cent for commercial loans and 17.5 per cent for HPF loans).[6] The HPF loan rate is set by the PBC and the commercial loan rate is set as a multiplier of the long-term benchmark rate. So, the researchers have good information about home loan interest rates, and how benchmark interest rate changes flow to home interest rate changes.

The researchers also have access to a comprehensive dataset of customer information for an individual bank. Data includes information on credit card statements, demographic information, whether customers were homeowners with or without mortgages, and mortgage terms for a sub-set of borrowers who initiated their mortgage with the bank. This dataset allowed the researchers to estimate how an increase in disposable income associated with interest rate changes flowed through to consumption: How much did customers spend and what did they spend it on?

Evidence from the global financial crisis

Home loan rates fell by 2.30 per cent in late 2008

In 2008 the People's Bank of China (PBC) announced five interest rate cuts, starting on September 15, 2008, and ending on December 22, 2008. The long-term benchmark interest rate was cut from 7.83 per cent to 5.94 per cent, a reduction of 1.89 per cent. The new interest rates did not come into effect until January 1, 2009. This was associated with a reduction in the multiplier used to convert the long-term benchmark rate to a home loan rate. The multiplier decreased from 0.85 to 0.70, so the commercial loan rate decreased from 6.66 per cent (0.85 × 7.83 per cent) to 4.16 per cent (0.70 × 5.94 per cent), a decline of 2.50 per cent. The HPF rate fell from 5.22 per cent to 3.87 per cent, a fall of 1.35 per cent. Given the researchers' estimated 82.5 per cent market share for commercial loans, the average home loan interest rate fell from 6.40 per cent to 4.10 per cent, a fall of 2.30 per cent.

Consumer response to a rate reduction

The researchers analyzed a sample of 7,896 homeowners with mortgages and 41,664 homeowners without mortgages, excluding customers under the age of 18 and over the age of 65. The typical customer is 36 years old, married (87 per cent), has one child (average dependents = 0.60) and spends 2,886 RMB ($433) per month on their credit card. 1.7 per cent of customers are more than 60 days past due on their credit card.[7]

The researchers estimate that, during September 2008 to December 2008 (when rate reductions were announced but not implemented), homeowners with mortgages increased their credit card spending by 8.0 per cent relative to homeowners without mortgages. During January to June 2009 (when rate reductions were in effect), the estimated relative credit card spending increase is 8.7 per cent. The delinquency rate also dropped by a relative 0.4 per cent for homeowners with mortgages during January to June 2009.[8]

The researchers also conducted analysis exclusively on the sub-sample of mortgage-holders who originated mortgage loans from the bank providing the sample. The researchers estimated each borrowers' change in disposable income with reference to the borrowers' loan origination date, maturity date and principal. The researchers estimated that, for every 100 RMB increase in monthly disposable income, credit card spending increased by 29 RMB from September to December 2008 (prior to the rate increase taking effect) and by 28 RMB from January to June 2009 (subsequent to the rate increase taking effect).[9]

Customer response to a rate increase

From October 2010 to July 2011, the central bank announced five interest rate increases which culminated in the long-term benchmark interest rate increasing to 7.05 per cent. From January 2012, the multiplier used to set commercial loan rates reverted to 0.85.[10] These changes meant that the commercial mortgage rate reverted back to 5.99 per cent (recall that prior to September 15, 2008 the commercial mortgage rate was 6.66 per cent, and it fell to 4.16 per cent by December 22, 2008 with these changes taking effect on January 1, 2009).[11] In a regression that now incorporates periods of interest rate increases as well as decreases, the researchers found that relative spending by mortgage holders decreased by 5.3 per cent in 2012 (not statistically significant), compared to the baseline estimate from January to August 2008; and the increase in spending over the interest rate increase period of January to June 2009 is 10.6 per cent.[12] The relative increase in debt for mortgage holders was an estimated 22.2 per cent in 2012. In contrast, during the interest rate reduction period of January to June 2009 the relative decrease in debt was 3.4 per cent.

Marginal propensity to consume

The researchers estimate the MPC associated with an interest rate cut is 0.50, six months after the announcement of an interest rate cut; and 0.38 six months after the announcement of an interest rate increase.[13] These MPC estimates are based upon the relative increased and decreased spending of mortgage holders versus outright homeowners during the periods of interest rate increases and decreases. To place the MPC estimates in context, the researchers estimate that when interest rates fell, the average monthly increase in disposable income in China was 5.71 billion RMB ($0.857 billion) in 2009. The MPC estimates of 0.50 and 0.38 correspond to an annual increase in GDP of 0.10 per cent and 0.08 per cent, respectively.[14]

Cash-constrained consumers were most sensitive to a change in disposable income

The researchers split the sample into constrained and unconstrained customers, with constrained customers defined as those with credit card debt in the top 10 per cent of the sample. Constrained customers with mortgages increased their spending by a relative 33.8 per cent when interest rates were reduced, compared to just 10.3 per cent (not statistically significant) when interest rate reductions were announced but had not yet taken effect. In contrast, the relative increase in spending by unconstrained mortgage holders was 7.9 per cent during the announcement period, but just 5.9 per cent during the period of interest rate reductions. Credit card delinquencies fell by a relative 1.6 per cent during the interest rate reduction period for constrained mortgage holders, but by just 0.3 per cent for unconstrained mortgage holders.[15]

Discretionary, non-durable goods spending was most sensitive to changes in disposable income

The researchers performed their analysis on sub-samples of discretionary versus non-discretionary spending (18.5 per cent of spending, defined as spending on "local conveyance and taxi," "supermarkets," "food and beverage stores," "utilities," "fuel," and "government"). The researchers found that mortgage holders had relative increased spending of 8.6 per cent on discretionary purchases during the interest rate reduction period (the figure is 5.4 per cent during the announcement period, not statistically significant). Relative spending on non-discretionary goods only increased by 1.2 per cent during the interest rate reduction period (not statistically significant) and by 2.6 per cent during the announcement period (not statistically significant).

The researchers also showed that the relative increase in spending was confined to non-durable goods. During the interest rate reduction period, mortgage holders' relative increase in spending was 6.9 per cent on durable goods (the figure was 5.5 per cent during the announcement period, not statistically significant). In contrast, the relative increase in spending on durable goods was just 1.2 per cent during the interest rate reduction period (not statistically significant) and 1.0 per cent during the announcement period (not statistically significant).

Result summary

The key result from the paper is that, in response to a change in interest rates that flowed directly to a change in disposable income, the marginal propensity to consume is estimated at 0.50 for interest rate increases and 0.38 for interest rate decreases. On average, homeowners with mortgages spent about 9 per cent more that non-mortgage homeowners in response to a series of interest rate cuts, and reduced their relative spending by about 5 per cent in response to a series of interest rate increases. The strongest response was amongst the 10 per cent of customers with the largest credit card debt. These customers increased spending by a relative 34 per cent, and their delinquencies fell by 1.6 per cent (that is, customers in this cohort increased spending, or paid off debt, or both). The remaining unconstrained mortgage holders increased relative spending by about 7 per cent and had a 0.3 per cent reduction in delinquency. Customers increased their spending on discretionary items, with no material change in spending on non-discretionary items; and on durable goods, with no material change in spending on non-durable goods.

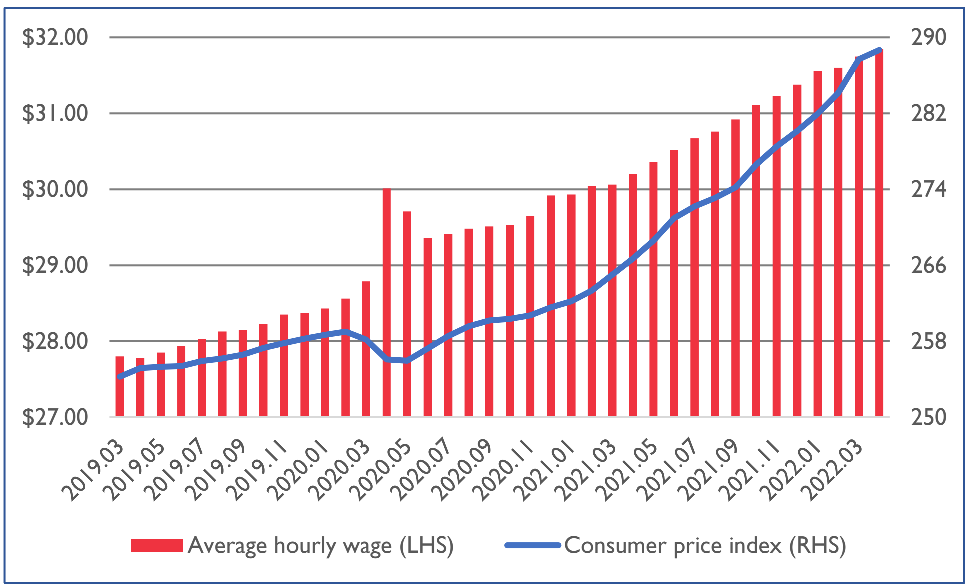
Comment: Central banks are being asked to do too much

The response of central banks and governments to COVID-19 in early 2020 was consistent across the globe: cut interest rates and provide fiscal stimulus to keep workers employed. The precedent for this response was the global financial crisis of late 2008, subsequent to which we observed a gradual increase in output and employment. There is broad agreement amongst central banks and governments that a lengthy period out of the workforce makes it harder for workers to re-enter the workforce.

In 2020 and 2021, consumers responded as central banks and governments hoped: they spent the money. In the U.S., retail sales were $463 billion in 2020 and $546 million in 2021, up 2.9 per cent and a staggering 21.4 per cent, respectively, from 2019.[16] Consumers are also likely to have been buoyed by an increase in the value of their homes and stock portfolios, in large part influenced by the Federal Reserve's purchases of long-data government bonds and mortgage-backed securities. The Federal Reserve's balance sheet continued to expand until March 2022.[17] This occurred during a period of constrained supply of intermediate goods from overseas, and reduced workforce participation (the labor force 16 years and up was 164.6 billion in February 2020, and was 164.4 billion in May 2022, which represents participation rates of 63.4 per cent and 62.3 per cent, respectively).[18] There are 2.6 million fewer people working in the U.S. today than if participation remained at the pre-pandemic level, given the population increase.

This means that inflation today is high (8.2 per cent for the 12 months ending April 2022) and is running well ahead of plausible future wage increases. But over the course of the pandemic, average hourly wages and price changes have been approximately the same. In February 2020 the seasonally-adjusted average hourly wage of private sector employees was $28.56. By April 2021, this figure had increased by 11.5 per cent to $31.85, an annual increase of 5.1 per cent.[19] Average hourly wages increased instantaneously because wages were maintained but less hours were recorded. The corresponding change to the consumer price index is 11.4 per cent, also an annual increase of 5.1 per cent (a 1.1 per cent fall over two months following by annual increases of 4.2 per cent and 8.2 per cent; Figure 1).[20] The problem, of course, is that inflation could continue to run at rates well above wages increases.

Figure 1. Wages and consumer price index



The weak link in the response of governments and central banks to economic shocks is that central banks are being asked to do too much with their ability to alter disposable income via their influence on interest rates. The evidence from the two most recent crises, and from the research paper reviewed here, is that consumers will spend a large portion of any increase in disposable income, especially if they are cash-constrained; and that ongoing spending will help to maintain employment and wages without unmanageable inflation **provided businesses can operate as normal.** But central banks can't free up capacity at ports, or open factories in Asia, or increase the supply or oil, or alter the preferences of a former employee considering an alternative career (insert your preferred supply chain constraint here). Central banks also cannot determine who benefits most from low interest rates. And it appears that benefits flow disproportionately to existing homeowners and people with high borrowing capacity (at least enough wealth to put a down payment on a house or unit, and lock in a low interest rate mortgage).

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[5] Agarwal, Deng, Gu, He, Qian and Ren (2022).
[6] Agarwal, Deng, Gu, He, Qian and Ren (2022), p. 493.
[7] Agarwal, Deng, Gu, He, Qian and Ren (2022), Table I, p. 498.
[8] Agarwal, Deng, Gu, He, Qian and Ren (2022), Table II, p. 501.
[9] Agarwal, Deng, Gu, He, Qian and Ren (2022), Table IV, p. 507.
[10] Agarwal, Deng, Gu, He, Qian and Ren (2022), p. 506.
[11] The researchers do not report changes in the HPF rate and therefore do not report the estimates aggregate changes in mortgage holders' borrowing rate.
[12] Agarwal, Deng, Gu, He, Qian and Ren (2022), Table V, p. 509.
[13] Agarwal, Deng, Gu, He, Qian and Ren (2022), p. 510.
[14] The researchers make estimates of 0.14-0.19 per cent of GDP over a 21-month expansion window and an MPC range of 0.40-0.54. However, I consider it more intuitive to convert to an annualized increase in GDP, and also use the MPC estimates based only upon the single MPC estimates from the expansion and contract periods (rather than the multiple MPC estimates based upon different estimation windows reported by the researchers).
[15] Agarwal, Deng, Gu, He, Qian and Ren (2022), Table VI, p. 511.
[16] https://fred.stlouisfed.org/series/RSXFS#0 accessed on June 4, 2022.
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