Inflation Expectation and Consumption: Evidence from CHFS Data

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***Abstract*—Engineering high inflation expectations has been proposed by economists and policymakers to stimulate consumption and GDP, especially when the nominal interest rate is approximately zero. This paper takes a close look at how individuals' inflation expectation affects their readiness to spend. Households' expectations about future economics affect their current consumption and there exists heterogeneous effect because of credit constraints. Using the cross-sectional data from China Household Finance Survey, we find that if households do not have credit constraints, those with positive inflation expectations spend 1437 RMB every year than those who expect the price level will stay the same or decrease. The effect of inflation expectations on consumption is insignificant for households with credit constraints. In addition, we further subdivide consumption into luxuries and necessities.**

***Index Terms*—Consumption, credit constraints, inflation expectations, micro data.**

I. Introduction

Whether households act on their inflation expectation has important policy implications, especially in recent decades of zero interest rate. There are multiple economic models that make the sign of this relationship vague, and the existing empirical evidence about the impact of inflation expectations on consumption is mixed in different contexts. To examine policies engineering high inflation expectations in attempt to stimulate economy, it is fundamental to look at micro-level evidence about whether households increase their consumption if they expect high inflation in the future.

II. Literature Review

There is a growing literature examining the relation between households' inflation expectations and willingness to spend. However, the micro-level evidence is mixed.

Ref. [1] analyzes the relation between inflation and spending attitudes using New York Fed/RAND-American Life Panel, and find no evidence supporting the hypothesis that consumers increase their spending on large home appliances and electronics in response to their increased inflation expectations. For the reason that consumers do not expect the inflation will also be reflected in their income. Using the microdata from the Michigan Survey of Consumers, [2] finds that even outside the zero lower bound, higher inflation expectations have small impact on the readiness to spend on durable goods, and significantly negative during the recent zero lower bound period. 1% rise in expected inflation reduces the likelihood of households being positive about spending by about 0.5%. Meanwhile, based on Consumer Opinion Survey from Polish Central Statistical Office [3] documents a weak negative association between inflation expectations and major purchases. Yet results from these papers just provide a potential reference for our research: changes in expected prices and purchase intentions for general goods and services do not necessarily correspond to changes for durables and large goods.

On the flip side, [4] employs German microdata and documented an 8% increase in the willingness to spend for households with positive inflation expectations. The German government announced in 2005 that a 3% increase in the value-added tax would be effective in 2007, which naturally increased household's inflation expectations in 2006. Their study finds that this exogenous increase in inflation expectations had a large positive impact on consumers' willingness to spend on durable goods. Similarly, [5] provides substantial evidence that consumers with high inflation expectations will spend more in current period and less in long terms. Higher expected change in inflation is associated with an increase in the probability that a given consumer will make major purchases. In addition, their conclusions are consistent with the macroeconomic theory: the promotion effect is greater when the lower limit of the nominal interest rate is binding.

I will use the micro-level survey data from China to examine the relationship between inflation expectations and readiness to spend in a different setting, where inflation is heating up fast and interest rate is declining. Moreover, I will add to this literature by looking into the heterogenous effect of inflation expectations on consumption.

This paper also speaks to another literature about the mechanisms through which inflation expectations affect consumption. The standard model that higher inflation expectations can increase consumption depends on two equations: Fisher equation (higher inflation expectations decrease real interest rate) and the Euler equation (lower interest rates reduce savings and increase current consumption).

According to Fisher equation, increased inflation is expected to boost current consumption or aggregate demand by reducing consumers' incentive to save for the future. On the other hand, the substitution effect argues that rising real interest rates makes future consumption cheaper than current consumption, thereby curbs current consumption.

However, there may exist some other economic channels making the sign of this effect ambiguous. For instance, [6] shows that inflation expectations depress consumption as it is an implicit tax on paper money. [7] proposes that high inflation expectation leads to high uncertainty, reducing the consumption demand because of precautionary savings. Also,

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there is a wealth redistribution effect [8]: moderate inflation redistributes wealth from lenders to borrowers, specifically, from bondholders to households with fixed-rate mortgages debt. To shed light on these potential channels, it's useful to look at families with and without credit constraint. Households with credit constraint may be incapable of acting on their increased inflation expectations. If we find in the data that effect of inflation expectations on consumption is larger for households without credit constraint, this will support the hypotheses that households tend to smooth consumptions over time and support the standard model with Fisher equation and Euler equation.

Existing literature focused on the heterogeneous effect of inflation expectations on consumption in economic literacy and education. Respondents with higher income and economic literacy predict more accurately about future inflation situation and are more likely to be optimistic ([9]-[11]) Households' choices of consumption depend on their expectation to future economic situation. However, I will examine the heterogeneity through a different lens: liquidity constraint. This has important policy implications: if households cannot act on their inflation expectations due to liquidity constraint, the government could use the financial system to help.

I use the data from China Households Finance Survey (CHFS) conducted by Southwestern University of Finance and Economics in 2013. It covers 28,000 households in 262 counties and 1,048 village communities. The survey includes questions about households' basic demographics (age, income, assets etc.) and questions about their inflation expectations in the coming year. Moreover, the survey documents households' consumption plan in detail. To examine the effect of inflation expectations and consumption, I use both Ordinary Least Square Method (OLS) and Instrumental Variable (IV) and the sign of the results are robust to different specifications: higher inflation expectations lead to higher consumption when households don't have credit constrain. This relationship is particularly interesting in China as inflation is heating up fast in China in recent years.

This paper will be organized as follows. Section III will describe the survey and data. Section IV A will present the OLS results and section IV B shows the IV results. Finally, I conclude in Section V.

III. Data Description

The key variable I use are based on survey questions asking households' inflation expectation, records of consumption and credit constraints. My main interest lies in three questions:

Q1: How do you expect the price level in the coming year?

A. Increase a lot B. Somewhat Increase C. Same as this year D. Somewhat Decrease E. Decrease a lot

Q2: What was the average monthly amount your family spent last year, including food, utility, commodity, household services, transport, communication, entertainment, clothing, decoration, heating, durable goods, luxury goods, education, vehicles, travel and healthcare expenses.

Q3: Does your family have any credit cards or a housing reserves fund? If so, why?

We coded the "Credit constraint = 1" if the households applied for a credit card or a mortgage but got rejected or couldn't get access to such financial institutes.

The survey also included information about individual characteristics such as education, marital status, risk preference, and household income and wealth level.

TABLE I: Summary Statistics: Households with Different Inflation Expectations

Inflation Expectation	Increase	Same	Decrease
consumption	19310.584	14979.593	19678.218
	[20166.532]	[13697.196]	[21710.503]
N	4305	435	330
luxuries	2561.187	1418.669	2212.743
	[9293.082]	[3648.94]	[8507.888]
N	4433	444	342
necessities	16888.169	13769.345	17409.136
	[15081.345]	[12317.047]	[16070.834]
N	4343	440	331
income	43266.975	26050.708	48741.491
	[146508.53]	[53692.926]	[168843.489]
N	4484	450	344
asset	54743.592	30148.683	45337.982
	[201613.087]	[75749.33]	[98508.114]
N	4114	415	321
age	46.508	48.367	45.698
	[12.22]	[12.504]	[11.661]
N	4484	450	344
education	1.479	1.313	1.462
	[.667]	[.572]	[.611]
N	4445	447	338
Family size	3.657	3.758	3.642
	[1.493]	[1.475]	[1.417]
N	4484	450	344
In urban area	0.408	0.293	0.404
	[.491]	[.456]	[.491]
N	4484	450	344
Risk aversion	3.718	3.876	3.658
	[1.244]	[1.226]	[1.305]
N	4436	443	342

Table I includes basic summary statistics. On average, approximately 85% respondents expect that price level will increase in the coming year, 8.5% respondents expect that the price level will stay the same and 6.5% respondents expect deflation in the coming year. Table I describes households' consumptions, income level, and other characteristics by their inflation expectations. In general, households with positive or negative inflation expectations have higher levels of consumption, income and asset level as compared with those with a stable inflation expectation. The summary statistics for households above indicate some correlation between inflation expectations, readiness to spend, and wealth level. Therefore, it is essential to control for the observed heterogeneity as shown in the table above in the regression.

IV. Summary of Result

A. Ordinary Least Square Method (OLS)

For the baseline specification, I look at the effect on inflation expectations on annual consumption with OLS and examine the heterogeneous effect for households with and

without credit constraint by adding interaction terms. Table I: Summary Statistics: Households with Different Inflation Expectations.

TABLE II: OLS, EFFECTS OF INFLATION EXPECTATIONS AND CREDIT CONSTRAINTS ON CONSUMPTION

	1	2	3	4	5
VARIABLES	consumption	consumption	consumption	consumption	consumption
Inflation Expec	784.047	448.119	1,436.809**	618.938	1,225.615**
	-486.037	-363.72	-601.199	-482.409	-552.819
Constraint = 1	-3,143.137***	-2,011.989***	-463.077		
	-788.091	-510.414	-737.037		
Inflation*Constraint			-1,843.288*		
			-960.254		
Income	0.045***	0.041***	0.041***	0.042***	0.041***
	-0.011	-0.011	-0.011	-0.011	-0.011
Asset	0.027***	0.023***	0.023***	0.024***	0.023***
	-0.005	-0.004	-0.004	-0.004	-0.004
Mortgage Constraint =1				68.857	
				-897.266	
Inflation*Mortgage				-1,200.38	
				-1,401.90	
Card Constraint = 1					-956.064
					-786.125
Inflation * Card					-1,680.188*
					-975.68
Constant	11,275.500***	13,978.605***	13,159.470***	13,262.750***	13,524.442***
	-3,505.78	-2,771.04	-2,873.42	-2,890.47	-2,796.41
Observations	4,492	4,492	4,492	4,492	4,492
R-squared	0.377	0.439	0.439	0.437	0.44
Demographic C	YES	YES	YES	YES	YES
Province FE		YES	YES	YES	YES
Robust standard errors in parent					
*** p<0.01, ** p<0.05, * p<0.					

Table II reports the effect of inflation expectation (which is a dummy equal to 1 if the household has a positive expectation on price increases) on households' overall consumption level. Controlling for demographic characteristics such as age, education, marital status, family size, whether living in an urban area and risk preferences, I find positive but insignificant coefficients. I further included interactions between inflation expectations and credit constraint in Column (3)-(5). Here, "constraint" is defined as households having constraint when applying for mortgage or credit card (Column (4) and (5) look at two different types of constraints separately). The coefficient on the interaction term captures the heterogeneous effect of inflation expectations on consumption for households with and without credit constraint.

For those do not have credit constraint, holding other things constant, households with positive inflation expectations spend 1437 RMB more on average every year, and this effect is 1843 RMB lower for households with credit constraints. If I decompose overall credit constraint into mortgage card or credit constraint, as shown in Column (4) and (5), the signs of the effects remain the same, while only significant for credit card constraint. Coefficients for other economic control variables such as income and asset, are consistent with our intuition and the standard economic models, which lend credence to the CHFS data.

Table III reports how inflation expectation effect households' necessities consumption. Controlling for a rich set of demographics, I find positive but insignificant coefficients. I further include interactions between inflation expectations and credit constraint in Column (3)-(5). For those without credit constraint, holding other things constant, households with positive inflation expectations spend 1698 RMB more on average every year, and credit constraints tremendously lower this effect by 3237 RMB. In the line with this, both mortgage constraints and credit constraints limit necessities spending, by 1528 RMB (insignificant) and 2851 RMB respectively.

TABLE III: OLS, EFFECTS OF INFLATION EXPECTATIONS AND CREDIT CONSTRAINTS ON NECESSITIES CONSUMPTION

	1	2	3	4	5
VARIABLES	necessities	necessities	necessities	necessities	necessities
Expectation	309.34	275.594	1,698.229*	443.024	1,315.38
	-743.638	-865.213	-941.898	-949.584	-1,089.19
Constraint=1	-2,811.256***	-2,778.147***	-17.485		
	-792.659	-529.523	-966.044		
Expectation *Constraint			-3,237.345***		
			-1,019.31		
Income	0.029**	0.026**	0.026**	0.027**	0.026**
	-0.013	-0.011	-0.011	-0.012	-0.011
Asset	0.016***	0.016***	0.016***	0.016***	0.016***
	-0.002	-0.002	-0.002	-0.003	-0.002
Mortgage Constraint=1				38.268	
				-1,413.70	
Inflation*Mortgage				-1,528.81	
				-1,918.34	
Card Constraint=1					-983.653
					-1,428.15
Inflation*Card					-2,851.919*
					-1,484.84
Constant	4,914.007*	18,652.342***	17,406.495***	17,897.545***	17,838.314***
	-2,798.55	-777.258	-756.902	-875.109	-849.696
Observations	2,735	2,823	2,823	2,823	2,823
R-squared	0.24	0.269	0.271	0.262	0.274
Demographic C	YES	YES	YES	YES	YES
Province FE		YES	YES	YES	YES
Robust standard errors in parent					
*** p<0.01, ** p<0.05, * p<0.					

TABLE IV: OLS, EFFECTS OF INFLATION EXPECTATIONS AND CREDIT CONSTRAINTS ON LUXURIES CONSUMPTION

	1	2	3	4	5
VARIABLES	luxuries	luxuries	luxuries	luxuries	luxuries
Expectation	127.325	21.754	159.993	-12.065	148.511
	-200.795	-196.365	-306.106	-202.447	-302.665
Constraint	-729.048***	-539.712**	-275.241		
	-228.509	-226.758	-366.079		
Expectation *Constraint			-311.803		
			-408.774		
Income	0.009**	0.008**	0.008**	0.008**	0.008**
	-0.004	-0.003	-0.003	-0.003	-0.003
Asset	0.008***	0.007***	0.007***	0.008***	0.007***
	-0.003	-0.002	-0.002	-0.002	-0.002
Mortgage*Constraint				-187.733	
				-266.633	
Inflation*Mortgage				85.282	
				-303.902	
Card Constraint					-246.659
					-383.885
Inflation*Card					-353.458
					-439.389
Constant	2,167.460***	4,263.021***	4,145.580***	4,173.543***	4,186.303***
	-629.246	-1,100.70	-1,096.60	-1,096.21	-1,096.72
Observations	2,777	2,777	2,777	2,777	2,777
R-squared	0.261	0.297	0.297	0.295	0.297
Demographic C	YES	YES	YES	YES	YES
Province FE		YES	YES	YES	YES
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

I get a small in scale and statistically insignificant correlation between inflation expectations and luxuries. By decomposing the consumption into necessities and luxuries, we find that the increase in consumption because of high inflation expectations primarily comes from the increased spending in necessities instead of luxuries. One potential explanation is that many luxuries are durable goods, and the effect of inflation expectations on durable goods is insignificant as documented by Bachmann *et al*. (2015), [1], [2]

B. Instrumental Variable (IV)

TABLE V: TSLS, EXPECTATIONS OF INFLATION EXPECTATIONS (INSTRUMENTED BY PROVINCE LEVEL AVERAGE)

	1	2	3	4	5	6
VARIABLES	consumption	consumption	necessities	necessities	luxuries	luxuries
inflation	22,771.283***	43,513.621***	18,247.695***	27,984.739**	4,386.28	15,321.798**
	-7,444.18	-15,744.40	-5,797.26	-11,433.10	-3,193.56	-7,264.30
inflation_constraint		-30,184.680*		-14,310.73		-15,442.870**
		-17,129.01		-12,512.17		-7,750.09
constraint	-3,493.087***	21,780.39	-2,830.343***	9,159.46	-724.896***	12,167.837*
	-560.11	-14,325.51	-438.264	-10,472.99	-247.859	-6,459.21
income	0.045***	0.046***	0.028***	0.028***	0.017***	0.017***
	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001
asset	0.026***	0.025***	0.017***	0.017***	0.009***	0.008***
	-0.001	-0.002	-0.001	-0.001	-0.001	-0.001
Constant	-7,505.00	-24,669.910*	-6,468.36	-14,511.37	-927.379	-9,939.71
	-6,628.30	-13,334.66	-5,150.08	-9,671.15	-2,850.60	-6,127.14
Observations	4,492	4,492	4,527	4,527	4,599	4,599
R-squared	0.204	0.056	0.141	0.072	0.169	0.004
Demographic C	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.						

To address the potential endogeneity problem about inflation expectations, I use the average inflation expectation in each province as instruments for households' inflation expectations. The signs of the results are similar to those from OLS, however, the magnitude is different since we took average on the province level to get the instruments while only used dummy variables in the OLS regression. For overall consumption, the signs for coefficients of Inflation and the interaction term are the same as the OLS regression. If we look at necessities and luxuries separately, however, we got positive effect of inflation expectations on luxury consumption in the IV regression. Similarly, a credit constraint significantly lowers the positive effect of inflation expectations described above.

V. CONCLUSION

This paper examines the relationship between inflation expectation and consumption on necessities and luxury goods. Whether households act on the inflation expectations is a debatable question depending on different contexts, and I focus on Chinese households who experienced rapid increase in inflation rates these years. Also, credit constraint plays an important role since households with credit constraints may be incapable of smoothing consumption. This paper found that households consume more if they expect price increase in the future, especially for necessities. This is consistent with the substitution effect in the standard model based on Fisher equation and Euler equation. I also found that the effect of inflation expectations on consumption is larger for households without credit constraint because they are able to smooth consumption over time.

There exists some limits in our data. Firstly, the consumption is self-reported and may suffer from inaccuracy. We do not have access to their real consumption records. Secondly, it would be ideal if we have panel data and follow up households with different inflation expectations, which could allow us to see how their reaction to inflation expectation change with and without credit constraints.

With the current available survey data, we used both OLS and IV specification and got similar results that higher inflation expectation leads to higher current consumption. One should be cautious in generalizing our results to other regions given the mixed evidence from previous studies, the relationship described above may be context specific.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

[1] M. A. Burke and A. Ozdagli, "Household inflation expectations and consumer spending: Evidence from panel data," Working Papers, pp. 13-25, 2013.

[2] B. Rüdiger, T. O. Berg, and E. R. Sims, "Inflation expectations and readiness to spend: Cross-sectional evidence," *American Economic Journal: Economic Policy*, vol. 7, no. 1, pp. 1-35, 2015.

[3] P. Filip and E. Stanisławska, "The impact of inflation expectations on Polish consumers' spending and saving," *Eastern European Economics*, vol. 55, no. 1, pp. 3-28, 2017.

[4] D. Francesco, D. Hoang, and M. Webe, "Inflation expectations and consumption expenditure," *Chicago Booth Global Market Working Paper Series*, 2015.

[5] N. Tsuyoshi, T. Imanishi, and T. Akasaka, "MicroRNAs and cardiovascular diseases," *BioMed Research International*, 2015.

[6] A. S. Borağan, and F. Schorfheide, "Sticky prices versus monetary frictions: An estimation of policy trade-offs," *American Economic Journal: Macroeconomics*, vol. 3, no. 1, pp. 60-90, 2011.

[7] B. Rüdiger, T. O. Berg *et al*., "Precautionary savings, illiquid assets, and the aggregate consequences of shocks to household income risk," *Econometrica*, vol. 87, no. 1, pp. 255-290, 2019.

[8] D. Matthias and M. Schneider, "Inflation and the redistribution of nominal wealth," *Journal of Political Economy*, vol. 114, no. 6, pp. 1069-1097, 2006.

[9] M. A. Burke and M. Manz, "Economic literacy and inflation expectations: evidence from a laboratory experiment," *Journal of Money, Credit and Banking*, vol. 46, no. 7, pp. 1421-1456, 2014.

[10] C. Cédine, P. van Els, and M. van Rooij, "Dutch households' perceptions of economic growth and inflation," *De Economist*, vol. 154, no. 2, pp. 277-294, 2006.

[11] E. Michael, D. Pfajfar, and E.Santoro, *Consumers' Attitudes and Their Inflation Expectations*, 2015.

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