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Are Chinese Individuals prone to Money Illusion?

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Are Chinese individuals prone to money illusion?

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Abstract

Using a unique dataset collected through a well-established survey, which was carried out in China, we examine whether Chinese individuals are prone to money illusion. In contrast to the outcomes for US individuals, we find that the Chinese are more likely to base decisions on the real monetary value of economic transactions. We put these observed differences in findings in perspective by comparing the economic conditions in the US and China.

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"It isn't the sum you get, it's how much you can buy with it, that's the important thing; and it's that that tells whether your wages are high in fact or only high in name."

Mark Twain *A Connecticut Yankee in King Arthur's Court* (1889)

1. Introduction

The term "money illusion" refers to a tendency to think in terms of nominal monetary values rather than real monetary values. The relevant literature presents various experiments to establish whether people are subject to money illusion, and various potential psychological causes that underlie this phenomenon. In this paper we examine how people in Beijing, China, respond to changes in inflation and prices, using a questionnaire very similar to the one designed and implemented by Shafir, Diamond and Tversky (1997).

We aim to examine whether people in China tend to think in different terms about economic transactions than people in the United States, where the original questionnaire was held. Shafir et al. (1997) conclude on the basis of the responses to the survey that money illusion is a widespread phenomenon in the United States. As an unexpected bout of inflation hurts creditors and aids debtors, we expect people in China, a creditor's nation, to be less susceptible to money illusion than their American counterparts. Most Chinese people hold significant savings in a deposit account, and interest paid is generally insufficient to make up for inflation.

Our survey-based findings suggest that respondents in China are indeed less prone to money illusion, that is, they are more likely to base decisions on the real monetary value of economic transactions, as compared to respondents in the US. However, if asked explicitly to evaluate an economic transaction in terms of happiness or satisfaction, respondents in China are as likely as respondents in the US to prefer the transaction with the highest nominal

monetary value instead of the economic transaction with the highest real monetary value. When presented with a risk-free and a risky option in real monetary value, respondents in China were almost twice as likely as respondents in the US to choose the risky option over the risk-free option.

The outline of our paper is as follows. We first present some context on inflation. Next, in Section 3 we give a review of the relevant literature on money illusion. Section 4 specifically addresses potential money illusion in China. Section 5 deals with the main contribution of our study, which is the survey and the responses, for which we interviewed many Chinese individuals. This unique dataset allows us to answer the question in the title. In Section 6 we conclude with a discussion of the main results and we suggest avenues for further research.

2. Context

Inflation, or fear of inflation, tends to intensify economic grievances and alienate the middle class. This seems true on either side of the Pacific. The Chinese leadership has made controlling inflation its number one priority. The People's Bank of China increased the one-year lending rate and raised the bank reserve ratio multiple times in an attempt to keep prices on a leash. After all, high and rising inflation may unite disparate groups in China, each of which is unhappy with the status quo (that is, the one-party system) for different reasons and at different times. Galloping inflation can make these groups unhappy at the same time (Pei, 2011).

In the US inflation also proves a contentious issue, albeit for more diffuse reasons than in China. Some commentators argue that accommodative monetary policies will ignite inflation, driving up the price of gold on the spot. Others suggest that the Federal Reserve, in times of high unemployment, should focus uniquely on the second leg of its dual mandate,

which is promoting maximum employment, while largely ignoring the first leg, which is promoting price stability. Then there is still a third group of people who advocate that the Federal Reserve sets an explicit inflation target of – for example – 6 percent, which is about three times the (implicit) inflation target under normal circumstances (Rogoff, 2009). Not only would the higher inflation target help promote employment by lowering real interest rates, the actual price rises would also go a long way to eliminate the public and private debt overhang in the US.

3. Literature overview

In the early '20s John Maynard Keynes coined the term 'money illusion' to describe the tendency of people to be fooled by thinking in nominal rather than real terms, ignoring the effect of inflation on the purchasing power of money. A few years later Irving Fisher devoted an entire book to the subject (Fisher, 1928). But even though money illusion was recognized early on in the economic literature (see also Leontief (1936) and Patinkin (1965)), mainstream economists have generally considered money illusion an anathema, as the phenomenon is irreconcilable with the rational expectations postulate. That did, however, not prevent Shafir, Diamond and Tversky (1997) from drafting a fascinating questionnaire and collecting evidence that people often tend to think about economic transactions in both nominal and real terms, resulting in a bias toward a nominal evaluation.

There have also been more experimental approaches to money illusion. Using a pricing game with students in Switzerland as participants, Fehr and Tyran (2001) show that seemingly innocuous differences in payoff representation cause pronounced differences in nominal price inertia, indicating the behavioral importance of money illusion. Moreover, money illusion causes asymmetric effects of negative and positive nominal shocks. While

nominal inertia is rather small after a positive shock, it is quite substantial after a negative shock. This may account for downward wage stickiness in the US in the 2000s (Mees, 2011).

Brunnermeier and Julliard (2008) show that a reduction in inflation can fuel run-ups in housing prices if people suffer from money illusion. They mistakenly assume that real and nominal interest rates move in lockstep. Hence, they wrongly attribute a decrease in inflation to a decline in the real interest rate and consequently underestimate the real cost of future mortgage payments. According to Brunnermeier and Julliard (2008), inflation and nominal interest rates explain a large share of the mispricing in the UK housing market from 1966 to 2004.

Bernanke (2010) asserts that mortgages with exotic features, which lowered monthly mortgage installments significantly, are to blame for the US housing boom in the 2000s. This suggests not so much money *illusion* on the part of economic subjects, but rather money *delusion*. Regardless of the veracity of Bernanke's claim (mortgages with exotic features accounted for less than 5 percent of total mortgage originations from 2000 – 2006), Brunnermeier and Julliard (2008) find for the US a similar link between housing market mispricing and inflation as for the UK.

Liu (2010) suggests that money illusion may account to a large extent for the mechanism of sharp run-ups in stock prices during the low inflation period in China. Chinese investors failed to recognize that the nominal dividend growth rate would drop significantly, and estimated the value of the future nominal dividend growth rate simply by extrapolating the historical nominal dividend growth rate. According to Liu, long-term low inflation spurred China's stock market to rise sharply twice via the money illusion effect last decade.

In view of the findings of Brunnermeier and Julliard (2008), Bernanke (2010) and Liu (2010), money illusion may be of greater economic significance than most mainstream economists allow for, because of the interaction between the housing market, stock market

and the real economy. Given its potential impact on the functioning of the economy, it is of interest to see whether money illusion also holds for China.

4. The incidence of money illusion in China

Shafir et al. (1997) distinguish three phenomena in the real economy that suggest the existence of money illusion on the part of economic subjects. One is that prices are sticky. A second is that indexing does not occur in contracts and laws in times of relatively low inflation, as theory would predict. The third occurrence is through conversation, rather than behavior, that is, people talk and write in ways that seem to indicate some confusion between money's nominal and real value. We would like to add a fourth phenomenon to the previous ones, which occurs at the intersection of asset markets and the real economy, and that is that parameters from the real economy (interest, dividends) are used as yardsticks for asset pricing.

Within the context of China, which still has abundant characteristics of a centrally planned economy, price stickiness may primarily be the result of price and quantity controls.[1] Kim, Nan, Wan and Wu (2011), for example, find that significant price stickiness exists for US imports from China. The mean duration is 11 months compared to 7 months for China imports from the US. The price stickiness of US imports from China however declined after June 2005, when China switched from a fixed exchange rate regime to a managed floating one (Kim et al. (2011).

Compared to the US and Europe, you find in China less indexed contracts, which should not come as a complete surprise as China is still very much an economy in transition. As noted by Shafir et al. (1997), even in developed economies you do not find indexed

[1] In an attempt to dampen inflation, the Chinese government in 2010 announced price controls and said it would put state commodity reserves (grains, edible oils and sugar) on the market when necessary in order to guarantee supplies (*China Daily*, November 17, 2010). In May 2011 Unilever got fined $300,000 for simply talking about plans to raise prices (*Christian Science Monitor*, May 9, 2011).

contracts in nearly as many places as economic theory suggests they should be found. As China is the largest foreign holder of US treasuries and agency bonds, it is worthwhile to note that only few are so-called treasury inflation-protected securities (TIPS) that hold their value as inflation rises.[2]

With regard to stock markets, Liu (2010) suggests that money illusion played a major role in the sharp run-ups in Chinese stock prices. There is not similar research available for China's still young housing market, which is currently often deemed to be in bubble-territory. Since the traditional regime of welfare-oriented home distribution was terminated in 1998 and the housing market was liberalized, mortgage loans have become the primary home financing tool for Chinese citizens. Though Hong and Chen (2010) conclude that there is a strong correlation between mortgage credit and housing prices, the variation in inflation and mortgage rates over 10 years is insufficient to find a link between housing market mispricing and inflation.

5. The survey

In this section we will examine to what extent there is money illusion in China. For that purpose we rely on a well-established survey, which was implemented in Shafir et al. (1997). We translated the survey questions designed by Shafir et al. (1997) to Mandarin, using Chinese names and adapting prices and dates to present respondents with realistic choices in the context of Beijing anno 2011. Shafir, Diamond and Tversky collected responses from people in Newark International Airport, and in two New Jersey shopping malls. In addition, they surveyed undergraduate students at Princeton University. In most cases, responses from these diverse groups did not differ significantly, and the data were reported in a combined format. Inspired by their choice of locations, we collected responses from undergraduate

[2] The US Treasury Department, responding to growing demand from China and other investors, announced in August 2009 that it would boost the sale of inflation-protected bonds (*Wall Street Journal*, August 6, 2009).

students from Peking University and Tsinghua University in Beijing, as well from workers at Alibaba, a tech company with a large office in Beijing. The survey questions were in part handed out on paper sheets and in part collected through an Internet survey tool. More than 400 respondents participated in the survey. Where appropriate, respondents answered only one version of a survey question. For each single survey question we had at least as many respondents as for the original 1997 survey and often we had many more respondents than Shafir et al. (1997).

The use of surveys has obvious limitations, but this is true for all research in the field of applied social sciences, including applied economics, as Buiter (2009) convincingly argues. Economics is not a discipline where controlled experiments are possible. The situation that an economically relevant problem can be studied by means of a control group and a treatment group that are identical except for one external or exogenous driver, whose influence can as a result be isolated, identified and measured, does not often arise in practice. Carefully constructed survey questions can nevertheless provide useful information about the problem under study, as Shafir et al. (1997) show.

We test the differences between the scores for the US and China by using the following test. Denote p_2 as the relevant fraction in the sample of size N_2 (China) and p_1 as the associated fraction in the sample of size N_1 (US). Further, denote p as the relevant total fraction in the total sample N_1+N_2. The test statistic is then given by

$$\frac{p_2 - p_1}{\sqrt{p(1-p)(\frac{1}{N_1}+\frac{1}{N_2})}} \sim N(0,1)$$

Each time we evaluate the fractions for China relative to the fractions for the US, assuming that it each time deals with a binary choice. We indicate significant differences at the 5% level with a * and at the 1% level with **. Detailed test results are available from the authors.

A. Earnings

The following survey presented three different groups of subjects with a scenario involving two individuals who receive raises in salary. One group was asked to rate the two protagonists' salary raises on purely "economic terms;" a second group was asked to indicate which of the two they thought would be happier; the third group was asked to indicate which of the two was more likely to leave her present job for another position. (To the right of each option is the percentage of subjects who chose it, while the percentage in parentheses reflects the US-based result given by Shafir et al.).

Problem 1

Consider two individuals, Li Li (李丽) and Wang Lan (王兰), who graduated from the same college a year apart. Upon graduation, both took similar jobs with publishing firms. Li Li started with a yearly salary of 120,000 ¥. During her first year on the job there was no inflation, and in her second year Li Li received a 2% (2400 ¥) rise in salary. Wang Lan also started with a yearly salary of 120,000 ¥. During her first year on the job there was 4% inflation, and in her second year Wang Lan received a 5% (6000 ¥) rise in salary.

Economic terms (N=137):

As they entered their second year on the job, who was doing better in economic terms?

Li Li: 82% (71%)* Wang Lan: 18% (29%)*

Happiness (N=138):

As they entered their second year on the job, who do you think was happier?

Li Li: 39% (36%) Wang Lan: 61% (64%)

Job attractiveness (N=134):

As they entered their second year on the job, each received a job offer from another firm. Who do you think was more likely to leave her present position for another job?

Li Li: 65% (65%) Wang Lan: 35% (35%)

Just as in Shafir et al. (1997), the majority of respondents correctly evaluate the above scenario in real rather than in nominal terms when economic terms are emphasized. However, significantly more respondents in China than in the US (82% versus 71%) were likely to evaluate the scenario correctly, suggesting that respondents in China better seem to understand the logic of inflation. When the emphasis is not on economic terms, but on terms like 'happiness' and 'job attractiveness' instead, Chinese respondents are as likely as their American peers to prefer the transaction that is most attractive in nominal terms. Just like in the US, wellbeing in China is driven primarily by a nominal rather than a real evaluation.

B. Transactions

If we consider people's assessment of specific transactions instead of income, we see below that respondents in China are twice as likely to assess the transactions represented to them correctly in real terms rather than in economic terms.

Problem 2 (N=415):

Suppose Zhang (张）, Wang (王) and Li (李) each received an inheritance of $200,000, and each used it immediately to purchase a house. Suppose that each of them sold the house a year after buying it. Economic conditions, however, were different in each case:

* When Zhang owned the house, there was a 25% deflation – the prices of all goods and services decreased by approximately 25%. A year after Zhang bought the house, he sold it for 616,000 ¥ (23% less than he paid).

* When Wang owned the house, there was no inflation or deflation – prices had not changed significantly during that year. He sold the house for 792,000 ¥ (1% less than he paid for it).

* When Li owned the house, there was 25% inflation – all prices increased by approximately 25%. A year after he bought the house, Li sold it for 984,000 ¥ (23% more than he paid).

Please rank Zhang, Wang, and Li in terms of the success of their house-transactions. Assign '1' to the person who made the best deal and '3' to the person who made the worst deal.

	Zhang	Wang	Li
Nominal transaction:	– 23%	– 1%	+ 23%
Real transaction:	+ 2%	– 1%	– 2%

Rank:

1st:	64%	(37%)**	12%	(17%)*	12% (48%)**
2nd:	13%	(10%)	80%	(73%) *	18% (6%)**
3rd:	23%	(53%) **	8%	(10%)	70% (36%)**

Note that the question was to assess Zhang, Wang, and Li's transactions in terms of "success," which is a rather neutral phrasing that does not frame the case in economic terms, or in terms of happiness for that matter. Compared to respondents in the US, respondents in China were twice as likely to rank Zhang, who had the best deal in real terms but the worst deal in nominal terms, number 1 and also twice as likely to rank Li, who had the best deal in nominal terms but the worst deal in real terms, number 3. These differences are significant and suggests that respondents in China are either (much) better at understanding the logic of inflation than their peers in the US, or they are more likely to conceive "success" in economic terms while respondents in the US are more likely to conceive "success" in terms of happiness. In view of the previous results (problem 1), we propose that it is a combination of both.

Case #3:

Changes in the economy often have an effect on people's financial decisions. Imagine that China experienced unusually high inflation that affected all sectors of the economy. Imagine that within a six-month period all benefits and salaries, as well as the prices of all goods and services, went up by approximately 25%. You now earn and spend 25% more than before.

Six months ago, you were planning to buy a leather armchair whose price during the 6-month period went up from 3200 ¥ to 4000 ¥. Would you be more or less likely to buy the armchair now? (N=209)

More:		Same:		Less:	
19%	(7%)**	29%	(55%)**	59%	(38%)**

Six months ago, you were also planning to sell an antique desk you own, whose price during the 6-month period went up from 3200 ¥ to 4000 ¥. Would you be more or less likely to sell your desk now? (N=202)

More:		Same:		Less:	
15%	(43%)**	17%	(42%)**	68%	(15%)**

While inflation makes respondents in the US more likely to sell at higher prices and less likely to buy at higher prices, a majority of respondents in China exhibit significantly greater wariness to buy as well as to sell at higher prices. This may seem at odds with the previous outcome (case #2), where the judgment of respondents in China did not seem to be clouded by inflation, but is not. In case #2 respondents were asked to evaluate – ex-post – transactions that had already taken place, following decisions taken by others. Respondents were not asked to reflect on whether they themselves would have been more likely to sell a house at a lower nominal price but higher real price, or vice versa.

In case #3, on the other hand, respondents were asked whether they themselves would be more or less likely to buy or sell (durable) consumption goods in times of high inflation. The fact that respondents in China are less likely to engage in economic transactions of any kind in times of high inflation probably does not imply money illusion. After all, if that were the case you would see an asymmetry with regard to buying and selling (less likely to buy,

more likely to sell). The actual outcome may well reflect (1) path-dependence of inflation expectations (respondents in China expect prices to increase even further), (2) a more general association of inflation with economic hardship that may result in economic paralysis at the level of the individual, or a combination of (1) and (2).[3]

C. Contracts

We asked subjects to consider signing a contract for a future transaction in an inflationary context, and to decide whether to agree upon a specified amount to be paid upon delivery or, instead, agree to pay whatever the price is at the future time. A risk-averse decision-maker is likely to prefer an indexed contract since, at a future time, a predetermined nominal amount may be worth more or less than its anticipated real worth. On the other hand, a nominally risk-averse decision maker may perceive indexed contracting as riskier as the indexed amount may end up being greater or smaller in nominal terms than a fixed dollar amount (Shafir et al., 1997). The following case was presented in China in the spring of 2011.

> Case #4-1 (N=68):
>
> Imagine that you are the head of a corporate division located in Singapore that produces office computer systems. You are now about to sign a contract with a local firm for the sale of new systems, to be delivered in January 2013.
>
> These computer systems are currently priced at 4000 ¥ a piece but, due to inflation, all prices, including production costs and computer prices, are expected to increase during the next couple of years. Experts' best estimate is that prices in Singapore two years from now will be about 20% higher, with an equal likelihood that the increase will be

[3] Nineteen percent of respondents in China (versus 7% in the US) indicated that they were more likely to buy at a higher price, which suggests that they expected further price increases and hoped to beat future inflation.

higher or lower than 20%. The experts agree that a 10% increase in all prices is just as likely as a 30% increase.

You have to sign the contract for the computer systems now. Full payment will be made only upon delivery in January 2013. Two contracts are available to you. Indicate your preference between the contracts by checking the appropriate contract below:

One group of subjects chose between contracts A and B below.

Contracts framed in real terms:

Contract A: You agree to sell the computer systems (in 2013) at 4800 ¥ a piece, no matter what the price of computer systems is at that time. Thus, if inflation is below 20% you will be getting more than the 2013-price, whereas if inflation exceeds 20% you will be getting less than the 2013-price. Because you have agreed on a fixed price, your profit level will depend on the rate of inflation.

59% (19%)**

Contract B: You agree to sell the computer systems at 2013's price. Thus, if inflation exceeds 20%, you will be paid more than 4800 ¥, and if inflation is below 20%, you will be paid less than 4800 ¥. Because both production costs and prices are tied to the rate of inflation, your "real" profit will remain essentially the same regardless of the rate of inflation.

41% (81%)**

<u>Case #4-2 (N=70):</u>

Another group of subjects chose between contracts C and D:

Contracts framed in nominal terms:

Contract C: You agree to sell the computer systems (in 2013) at 4800 ¥ a piece, no matter what the price of computer systems is at that time.

53% (41%)

Contract D: You agree to sell the computer systems at 2013's price. Thus, instead of selling at 4800 ¥ for sure, you will be paid more if inflation exceeds 20%, and less if inflation is below 20%.

47% (59%)

Case #4-3 (N=69):

A third group of subjects was presented with the following, neutral version of the problem:

Contracts under a neutral frame:

Contract E: You agree to sell the computer systems (in 2013) at 4800 ¥ a piece, no matter what the price of computer systems is at that time.

60% (46%)

Contract F: You agree to sell the computer systems at 2013's prices.

40% (54%)

We have run a second version of the above study; this time exploring people's contracting preferences as buyers rather than sellers. The following problem, along with the alternative framings of contract choices, is identical to those of Problem 4 except that the subject is now buying instead of selling.

Case #4-4 (N=66):

Contracts framed in real terms:

Contract A': You agree to buy the computer systems (in 2013) at 4800 ¥ a piece, no matter what the price of computer systems is at that time. Thus, if inflation exceeds 20%, you will be paying for the computers less than the 2013-price, whereas if inflation is below 20%, you will be paying more than the 2013-price. Because you have agreed on a fixed price, your profit level will depend on the rate of inflation.

50% (36%)

Contract B': You agree to buy the computer systems at 2013's price. Thus, if inflation exceeds 20%, you will pay more than 4800 ¥, and if inflation is below 20%, you will pay less than 4800 ¥. Because the prices of both computer systems and financial services are tied to the rate of inflation, your "real" profit will remain essentially the same regardless of the rate of inflation.

50% (64%)

Case #4-5 (N=67):

Contracts framed in nominal terms:

Contract C': You agree to buy the computer systems (in 2013) at 4800 ¥ a piece, no matter what the price of computer systems is at that time.

60% (51%)

Contract D': You agree to buy the computer systems at 2013's price. Thus, instead of buying at 4800 ¥ for sure, you will pay more if inflation exceeds 20%, and less if inflation is below 20%.

40% (49%)

Case #4-6 (N=68):

Contracts under a neutral frame:

Contract E': You agree to buy the computer systems (in 2013) at 4800 ¥ apiece, no matter what the price of computer systems is at that time.

58% (52%)

Contract F': You agree to buy the computer systems at 2013's price.

42% (48%)

In the US the framing of the case – either in real, nominal or neutral terms – significantly influenced respondents' choices between contracts. In China, on the other hand, the framing of the case did not notably impact respondents' choices. A majority of respondents in China consistently preferred the option that was risky in real terms, no matter how the decision was framed although the differences found were often not significant.

The outcome of cases #4-1 through #4-6 reinforces the notion that respondents in China are less clouded by the "veil of money" (Schumpeter, 1908) compared to respondents in the US. While respondents in the US exhibit frame-dependent risk-aversion (a larger proportion opt for the contract that is nominally riskless when the contracts are framed in nominal terms than when they are framed in real terms), we do not find frame-dependent risk-aversion in China. Not only does the framing of the question not predict the outcome, also respondents in

China exhibit risk-preference instead of risk-aversion (in real terms at least), which somewhat runs counter to common (western) perceptions about Asian culture. The demographics of our respondents (young and talented with a promising future), the demographics of China in general (the population is so vast that you cannot stand out by playing safe), or – most likely – a combination of both, may account for this result.

D. Mental accounting

Money illusion may arise from the use of historic cost, which can differ from replacement cost because of a change in the value of money or because of a change in relative prices. With nominal and real prices changing, people's assessment of the value of their possessions may present them with some conflicting intuitions, as illustrated by the following problem that Shafir and Thaler (1996) presented to experienced wine collectors and subscribers to a wine newsletter in the US. We did not look for wine connoisseurs in China. Judging by Shafir et al. (1997), however, that should not prejudice the plausibility of our outcome. They presented a variant of the case to students at Princeton University, which yielded identical results as the case presented to wine connoisseurs. So, we will do that also for our survey participants in China.

Case #5 (N=415):

Suppose you bought a case of good 1982 Bordeaux in the futures market for 160 ¥ a bottle. The wine now sells at auction for about 600 ¥ a bottle. You have decided to drink a bottle of this wine with dinner.

Which of the following best captures your feeling of the cost to you of drinking this bottle?

Costs 600 ¥	48% (20%)**
Doesn't cost anything	25% (30%)
Feels like saving 440 ¥	27% (25%)

Shafir and Thaler (1996) included two other possibilities (feels like it costs $ 20 (historic cost) and feels like it costs $ 20 plus interest) so the results are not entirely comparable. However, the observation that respondents in China were more than twice as likely to see the replacement cost as the actual cost of drinking the bottle of wine, suggests that they are less susceptible to money illusion.

Case #6 (N=412):

Two competing bookstores have in stock an identical leather-bound edition of Oscar Wilde's collected writings. Store A bought its copies for 80 ¥ each. Liu, who works for Store A, has just sold 100 copies of the book to a local high school for 176 ¥ a copy. Store B bought its copies a year after Store A. Because of a 10% yearly inflation, Store B paid 88 ¥ per copy. Xiao Wu, who works for Store B, has just sold 100 copies of the book to another school for 180 ¥ a copy.

Who do you think made a better deal selling the books, Liu or Xiao Wu?

Liu	69% (87%)**
Xiao Wu	31% (13%)**

Like in the US, a majority of respondents in China perceived Liu, who had the highest profit margin in nominal terms, as having the better book selling deal. But just as in previous cases, we see that respondents in China are somewhat less likely to be guided by nominal monetary

values than by real monetary values, indicating that they are significantly less prone to money illusion.

E. Fairness and morale

Community standards of fairness appear to have a significant influence on economic behavior. The perception of fairness is expected to impinge on worker morale and, consequently, may have implications for actual job decisions. To explore this issue, we presented respondents in China with the hypothetical scenario below, followed by one of two questions. Half the subjects received the "morale" question, the other half the "job decision" question:

Case #7:

Ablex and Booklink are two publishing firms, each employing a dozen editors. Because the firms are small, unequal raises in salary can create morale problems. In a recent year of no inflation, Ablex gave half its editors a 6% raise in salary and the other half a 1% rise. The following year there was 9% inflation, and Booklink gave half its editors a 15% raise in salary and the other half a 10% rise.

Morale (N=204):

In which firm do you think there were likely to be more morale problems?

Ablex 51% (49%)

Booklink: 27% (8%)**

Same in both: 21% (43%)**

Job decision (N=202):

Suppose that an editor who received the lower raise in each firm was then offered a job with a competing company. Which editor do you think was more likely to leave their present position for another job?

The editor who received the lower raise in Ablex	60%	(57%)
The editor who received the lower raise in Booklink	7%	(5%)
The two were equally likely	33%	(38%)

Case #7 describes two situations where salary raises were the same in real terms, but proportionally different in nominal terms. Virtually to the same extent as respondents in the US, respondents in China expected morale problems in Ablex, where there was a 500 percent difference in salary raises in nominal terms (between 1 percent and 6 percent).

However, there were quite a few respondents in China who expected morale problems at Booklink, where the editors received higher raises in nominal terms and where the difference between the nominal raises was smaller, that is 50 percent. It is unclear what led respondents in China to see significantly more often greater morale problems with Booklink compared to Ablex. Perhaps respondents considered the salary raises at Ablex negligible altogether, while the pay rises at Booklink were more ostensible, and hence the difference in pay rises.

Asked subsequently who was more likely to leave his job, the outcome in the US and China was nearly identical. Just like in the US, most participants in China thought that the editor who received a 1 percent rather than a 6 percent raise would be more likely to leave his present job than the editor who got 10 percent rather than 15 percent. As Shafir et al. (1997) suggested, money illusion enters into respondents' perceptions of fairness and worker morale,

and then naturally extends to their views regarding workers' propensity to quit their present position. Note the striking similarity with case #1, where respondents in China and the US also gave nearly identical responses to a question pertaining to the likelihood that a worker would decide to quit her job.

6. Discussion

Money illusion seems to be the stepchild of economic theory. Most economists do not even wish to ponder its existence as money illusion ostentatiously violates the rational expectations postulate that has been so central to economic theorizing in the past decades. Recent research, however, shows that money illusion may play a much greater and more disruptive role in the economy than mainstream economists allow for (Brunnermeier and Julliard (2008), Bernanke (2010) and Liu (2010)). Therefore our study, which sheds further light on the phenomenon now for China, seems to be well timed.

Our findings suggest that respondents in China are less prone to money illusion, that is, they are more likely to base decisions on the real monetary value of economic transactions instead of on the nominal monetary value, as compared to respondents in the US. However, if asked explicitly to evaluate an economic transaction in terms of happiness or satisfaction instead of economic terms, respondents in China are as likely as respondents in the US to prefer the transaction with the highest nominal monetary value to the economic transaction with the highest real monetary value.

The results show that considerations of happiness, morale and job satisfaction are intimately related with each other, in contrast to economic considerations. The default decision-making framework for respondents in China appears to be dominated by economic considerations, while the default decision-making framework for respondents in the US appears to be dominated by considerations of happiness, morale and/or job satisfaction. This

may well reflect the difference in affluence between respondents in the US and China, with the former having already conquered the top layers of Maslow's pyramid of needs while (many of) the latter find themselves still scrambling at the bottom (Maslow, 1943). It also suggests that affluent societies are more prone to money illusion and, hence, more susceptible to irrational exuberance (Akerlof and Shiller, 2009).

There are two distinct reasons why respondents in China are less prone to money illusion than respondents in the US. First, when asked specifically to judge a transaction on economic terms, respondents in China are more likely to correctly choose the transaction with the highest real monetary value. Second, if no guidance is given on whether to judge a transaction on economic terms or terms of well-being, respondents in China are more likely to adopt a decision-making framework that is dominated by economic considerations. Hence, they are more likely to correctly choose the transaction with the highest real monetary value instead of the transaction with the highest nominal monetary value.

Our initial conjecture, that respondents in China are wary of inflation because China is a creditor nation and many Chinese people personally stand to lose from inflation since the interest on their deposit accounts is insufficient to make up for inflation, is neither supported nor disproved by our results.

When presented with a risk-free and a risky option in real monetary value, respondents in China were almost twice as likely compared to respondents in the US to choose the risky option over the risk-free one.

The results of our surveys in China are interesting in their own right, but still we believe there are further issues to be examined. First, our survey amounts to a cross section and, given China’s rapid development, it would be insightful to carry our similar surveys in future years. When China approaches US economic standards, also in terms of equality and wealth, we may expect that money illusion may become more prevalent in China too. Second,

as apparently the degree of money illusion corresponds with economic progress, it would be interesting to see if other emerging economies in, say Africa or South America, give similar survey results. Third, it may be interesting to tie individual responses to individual background characteristics, like age, income/wealth and education. Finally, as money illusion can be associated with a few economic conditions that may generate economic downturns, it would be beneficial for China to learn from US experiences, and perhaps carry out educational programs to inform people about money illusion.

References

Akerlof, George A. and Robert J. Shiller (2009), *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*, Princeton University Press.

Bernanke, Ben S. (2010), "Monetary Policy and the Housing Bubble," http://www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm.

Brunnermeier, Markus K. and Julliard, Christian (2008), "Money illusion and housing frenzies," *Review of financial studies*, 21 (1). pp. 135-180.

Buiter, Willem (2009), "I know I know nothing; but at least I know that*," FT Blog Maverecon*, http://blogs.ft.com/maverecon/?s=liberating#axzz1ZvyuAjaa.

Fehr, Ernst, Tyran, Jean-Robert (2001), "Does Money Illusion Matter?" *American Economic Review*, 91 (5): 1239–1262.

Fisher, Irving (1928), *The Money Illusion*, New York: Adelphi Company.

Leontief, Wassily (1936), "The Fundamental Assumptions of Mr. Keynes' Monetary Theory of Unemployment," *Quarterly Journal of Economics*, 5(4):192–7.

Hong, Fang and Jie Chen (2010), "The relationship between home mortgage loan and real estate market in China: evidences and insights from a regional perspective," Working Paper.

Liu, Renhe (2010), “The Effects of Inflation on China`s Stock Prices: An Explanation Based on Money Illusion Hypothesis,” Working Paper.

Mees, Heleen (2011), “US Monetary Policy and the Interest Conundrum,” Working Paper, http://www.heleenmees.com/PDF/papers/US_Monetary_Policy.pdf.

Mees, Heleen (2011), “Beware of runaway headline inflation,” VoxEU, http://voxeu.org/index.php?q=node/6448.

Patinkin, Don (1965), *Money, Interest, and Prices*, Harper and Row, New York.

Pei, Minxin (2011), “Why China's Leaders Fear Inflation,” Carnegie Endowment for International Peace.

Rogoff, Kenneth (2010), “Why America Isn’t Working, ”http://www.project-syndicate.org/commentary/rogoff72/English.

Schumpeter, Joseph A. (1908), *Das Wesen und der Hauptinhalt der theoretischen Nationalökonomie*, Leipzig:Duncker & Humblot.

Shafir, Eldar and Richard H. Thaler (1996), “Invest now, drink later, spend never: On the mental accounting of delayed consumption,” *Journal of Economic Psychology*, 27 (2006) 694–712.

Shafir, Eldar, Peter A. Diamond and Amos Tversky (1997), "On Money Illusion," *Quarterly Journal of Economics*, 112 (2): 341–374.