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ARTICLE

Feeling comfortable with a mortgage: The impact of framing, financial literacy and advice

Susan Thorp[1,*], Junhao Liu[1], Julie Agnew[2], Hazel Bateman[3], Christine Eckert[4] and Fedor Iskhakov[5]

[1]The University of Sydney Business School, Sydney, NSW, Australia, [2]The College of William and Mary, Williamsburg, VA, USA, [3]UNSW Sydney and CEPAR, Sydney, NSW, Australia, [4]University of Technology Sydney, Sydney, NSW, Australia and [5]The Australian National University, Canberra, ACT, Australia
*Corresponding author. Email: susan.thorp@sydney.edu.au

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Abstract

The family home is the most important asset on household balance sheets, aside from human capital. Choosing a suitable mortgage is therefore critical to financial well-being but households often make costly mistakes. We collect data in an online survey to test borrowers' comfort with, and understanding of, mortgage debt. We analyze the impact of financial literacy, mortgage broker advice and whether the loan is framed as a lump sum debt or an equivalent stream of repayments. We conjecture that participants' comfort with loans and their ability to match lump sum debt to equivalent repayment streams will help them to choose a suitable mortgage. Results show that participants with high financial literacy are less comfortable with mortgage debt in general and also less sensitive to framing than those with low financial literacy. Literate participants are better able to match repayment streams with the equivalent lump sums. Endogeneity-controlled regression analysis shows that consulting brokers leads to higher comfort with debt and lower sensitivity to framing. Survey responses also indicate more uncertainty about future house prices among borrowers who intend to consult brokers than among those who do not.

Keywords: mortgage; choice architecture; financial literacy; mortgage broker

JEL codes: G40; G51; G53

1. Introduction

Aside from human capital, the family home is the most important asset on household balance sheets. Residential property and the associated mortgage make up more than 50% of the assets and liabilities of most middle-wealth families in most countries (Badarinza et al. 2016; Badarinza et al. 2019; Foote et al. 2021; Gomes et al. 2021). Mortgaged households typically use a large fraction of disposable income to repay their home loan, a task that takes decades (OECD 2022).

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While taking a mortgage is common and financially consequential, borrowers do not always choose well. Costly mistakes are widespread (Agarwal et al. 2021; Andersen et al. 2020; Campbell 2006; Campbell et al. 2011). For instance, when choosing between adjustable (ARM) and fixed rate (FRM) mortgages, many borrowers over-emphasize short-term interest rate expectations and under-emphasize longer term cost management (Badarinza et al. 2018; Campbell and Cocco 2003). And households often fail to "shop around" for the lowest fees or the best interest rates (Agarwal et al. 2017; Bhutta et al. 2020; Woodward and Hall 2012).

Poor decisions also matter at the systemic level: optimistic house prices expectations boosted the lending that preceded the Great Recession (Akerlof and Shiller 2010; Foote et al. 2021; Jordà et al. 2016). Likewise, during the low interest rate, high fiscal stimulus, work-from-home period of the COVID-19 pandemic, house prices and mortgage debt escalated in many economies. As restrictions and stimulus are unwound, housing affordability is declining and debt-servicing burdens are increasing, making default and foreclosures more likely (ANZ CoreLogic 2022; National Association of Realtors 2022; OECD 2022).

The importance of housing services, the large share of wealth held in the family home, and the demands of repayments, make choosing a suitable mortgage a critical financial decision. But not all households are equipped for the task. Lusardi and Mitchell (2007a) first showed that such sound financial management depends on financial literacy. Other studies verify that consumers respond to choice architecture (Johnson et al. 2012). In addition, expert advice can guide people when financial decisions go beyond their capability (Mitchell and Smetters 2013).

Here we study borrowers' comfort with home loans. We test the impact of three factors that matter to mortgage choices: financial literacy, mortgage broker advice, and choice architecture, in the form of framing of a home loan as a lump sum debt versus a stream of repayments. We conjecture that borrowers' comfort with loans and their ability to calibrate lump sum debt and repayment streams can help avoid mortgage distress. Such attitudes and skills are likely to be related to financial literacy and influenced by financial advice.

Our study investigates a feature of debt framing: the relation between the liability – the lump sum debt amount, and the servicing burden – the equivalent stream of repayments. In the context of wealth accumulation, Goldstein et al. (2016) showed that lump sum retirement savings are perceived as "larger", and therefore more adequate, than equivalent annuity streams, creating an illusion of wealth. Zhang et al. (2020) find a similar, but negative, perception of student loans. We test this illusion for mortgage debt by measuring differences in participants' comfort or discomfort with home loans framed as lump sum debts versus repayment streams.

We analyze survey information collected in October 2020 from 999 past, current or intending residential mortgage holders in Australia. The survey randomly assigned participants to one of two tasks. One task assessed participants' subjective comfort with a sequence of mortgage debts. The second task evaluated their ability to match lump sums and repayment streams. Both tasks also tested participants' sensitivity to lump sum versus repayment stream framing. When combined with other information collected in the survey, task responses show whether high and low financial literacy participants, and participants with past or intended future engagement with a broker, differ in their subjective comfort with mortgage debt, their debt-repayment calibration, and in their susceptibility to framing.

We make three key contributions to understanding of household attitudes to mortgages. First, we show that borrowers are less comfortable when loans are framed as lump sum debts rather than equivalent repayment streams. Borrowers are also less adept at translating repayment streams into equivalent lump sums than they are going the other way. We thus present new evidence on the psychological "largeness" of lump sums compared with repayments in the context of the most significant loan that most households take.

Second, we show that financial literacy tends to make borrowers less comfortable with debt in general, and also less sensitive to framing. Financially literate borrowers' can

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match liabilities with servicing burdens, a key component of sound mortgage management. While financial literacy has been linked to better mortgage choices in past studies, we connect objective financial literacy with attitudes.

Third, we find that having consulted a mortgage broker is associated with more comfort with debt and less sensitivity to framing. In other words, brokered customers seem more confident to take on loans. Since selection into broker use is non-random, we test these results using two identification strategies. Our results confirm that consulting a mortgage broker increases comfort with mortgage debt, reduces sensitivity to lump sum framing and raises borrowers' ability to calibrate lump sums and repayments. We also show that mortgage broker clients differ from non-broker borrowers in predictable ways: people who intend to consult brokers perceive the housing market as riskier than people who have not, or do not plan to, consult brokers. Both "peace of mind", and help to choose a home loan, matter.

In the next section, we review the literature and propose hypotheses. Section 3 briefly describes the empirical setting for this study, and Section 4 outlines the survey and sample. Section 5 presents analysis and results and Section 6 concludes.

2. Related literature and hypothesis development

2.1 Financial literacy

Our study builds upon the body of research that connects financial literacy with mortgage choice (Campbell 2006; Lusardi and Mitchell 2007a, 2007b). Related studies show that borrowers with higher financial literacy pay lower mortgage interest charges (Cheng et al. 2011; Courchane et al. 2008; Guiso et al. 2022; Huston 2012), avoid complex products and fees (Agarwal et al. 2017; Bergstresser and Beshears 2010; Gathergood and Weber 2017b), report their financial situation more accurately, thus presenting a lower risk of delinquency (Garmaise 2015), are less likely to withdraw home equity (Duca and Kumar 2014), have better operational knowledge of mortgage risks (Bucks and Pence 2008; Cox et al. 2015; Van Ooijen and van Rooij 2016), and make more efficient refinancing decisions (Bajo and Barbi 2018). By contrast, low financial literacy is a barrier to mortgage market participation (Gathergood and Weber 2017a) and predicts default (Gerardi et al. 2013). In general, self-reports of over-indebtedness are negatively related to debt literacy (Lusardi and de Bassa~Scheresberg 2013; Lusardi and Tufano 2015).

Life-cycle models predict optimally higher borrowing for housing at younger ages because housing is an important component of consumption, and mortgages are an accessible source of credit. Similarly, wealthier, higher income and dual-wage earning households can carry higher debt loads and support housing consumption habits (Cocco 2005; Kraft et al. 2018). Higher risk aversion may lead to precautionary savings and make people less comfortable with debt. Similarly, people who are more patient may borrow less and save more. We therefore expect that higher income, better educated, partnered, less risk averse, less patient and younger borrowers may be more comfortable with mortgage debt than those who are older or less well-off.

However, these same direct influences on mortgage borrowing also indirectly affect financial literacy. Since it can be costly to acquire financial knowledge, people who can benefit from greater financial sophistication tend to acquire it (Lusardi et al. 2017; Lusardi and Mitchell 2014). The benefits of financial literacy are likely to outweigh costs for people with higher education and income. In addition, theoretical and empirical studies find that average levels of financial literacy exhibit a hump-shaped pattern with age, peaking in later life (Agarwal et al. 2009; Lusardi et al. 2017). Furthermore, past research shows that females are more inclined to answer "Don't Know" to financial literacy

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questions and test lower on financial literacy assessments than males (Lusardi and Mitchell 2011).

Hence, in our analysis of the relation between financial literacy and subjective comfort with mortgage debt, we condition on age, experience, education, income, marital status, gender, and risk preferences. *A priori*, higher financial literacy could make borrowers either more or less comfortable with debt. However, to the extent that financially literate borrowers consider a wider range of risks, they are likely to be more cautious (Bucks and Pence 2008; Cox et al. 2015; Van Ooijen and van Rooij 2016). We also predict that they will be more discerning with financial information (Engels et al. 2020) and therefore less susceptible to framing, and that they will be better at matching lump sum debt to equivalent repayment streams.

2.2 Mortgage brokers

We also add to understanding of the reasons why borrowers choose mortgage brokers and their impact on mortgage choice. The relation between financial literacy and financial advice seeking in general is debated (Calcagno and Monticone 2015, Hackethal et al. 2012, Van Rooij et al. 2011, Kramer 2016). But there is some evidence that less experienced (ASIC 2019) and less confident (Deloitte 2016) borrowers consult mortgage brokers. Adviser clients, including mortgage broker clients, choose brokers on trust-related factors such as past relationships or personal recommendations (ASIC 2017b), and first impressions (Agnew et al. 2018).

Studies also disagree about the benefit or detriment of consulting a broker. Broker advice can reduce search costs and help with the mortgage process (Conklin 2017). However, agency problems, including racial factors, can mean that brokered mortgages are more expensive and have higher fees (Ambrose et al. 2021; LaCour-Little 2009; Robles-Garcia 2020; Woodward and Hall 2012). Likewise, Australian brokers have incentives to offer larger volume, longer-term loans that increase trail commissions (ongoing fees), and broker customers have reported feeling pressured to take large loans. Many customers say they are unclear about the way brokers are paid for their service (ASIC 2017b, 2019; Deloitte 2016). Gennaioli et al. (2015) argue that investment advisers offer better performance but also provide "peace of mind" to investors. Thus when investment advisers reduce client anxiety and build trust, they can charge higher fees. Brokered mortgages have also been linked to higher rates of default than direct lending (Alexander et al. 2002; Elul et al. 2010; Jiang et al. 2014).

We focus on three aspects of broker usage. First, educating the borrower in the home buying and financing process is a service that is normally performed by mortgage brokers (Conklin 2017). This education, in return, should reduce borrowers' susceptibility to framing in the same way that financial literacy does. We therefore expect broker clients to be better able to calibrate lump sum and repayment stream debt. Second, the impact of consulting a mortgage broker on mortgage debt comfort is an empirical question. On the one hand, individuals who consult mortgage brokers are likely to be better informed about the risks of mortgages, and thus may be less comfortable with mortgage debt. On the other hand, mortgage brokers' ability to give confidence to take risks, as well as broker remuneration structures which are based on the size of the loan, may lead broker clients to be more comfortable with higher loan debt. Third, Gennaioli et al.'s (2015) theory that advisers give investors confidence to take risk implies that people who perceive the housing market to be more risky are more likely to turn to brokers.

2.3 Choice architecture

We also add to understanding of choice architecture (Johnson et al. 2012; Thaler and Sunstein 2008) on decisions about debt. We focus on how quantities that are

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economically equivalent are not always psychologically equivalent, this time for mortgages. Goldstein et al. (2016) show that people rate lump sum retirement savings as more adequate than the equivalent income (annuity) stream over some value ranges so that income framing encourages more saving. Zhang et al. (2020) show that a large lump sum of student debt can encourage more spending (less saving) than a smaller debt by making repayment goals seem out of reach. They conclude that framing student debt as future repayment obligations could deter students from adding to their loans.

Like Zhang et al. (2020), we investigate the framing of debt, but allowing for differences between the type and temporal features of student debt and mortgage debt. Student debt enables current consumption and will be repaid in the future from an uncertain post-education income – leading to a lack of reference point for the repayments, whereas mortgage debt is repaid immediately from current income and constrains consumption. Research has shown that people can more easily grasp the implications of wealth or debt when they can compare it with regular income (Goldstein et al. 2016; Goda et al. 2014) or place it in a commonly used budgeting period (De La Rosa et al. 2022), or break it into smaller quantities (Basu and Ng 2021; Hershfield et al. 2020). We argue that lump sum presentations of home loans are more difficult to compare with regular income and thus will be psychologically larger than repayment streams. It follows that framing loans as lump sums instead of near-term repayment streams should reduce comfort with loans.

3. Survey setting: The Australian mortgage market

In Australia, where this study is set, around 67% of households own their own residence, the same percentage as in the UK and the US, and 37% of households hold a mortgage, also the same as in the UK, but lower than in the US (47%) (Badarinza et al. 2016). Middle-wealth Australian households hold over 50% of their assets and liabilities in real estate (ABS 2019-20a).

At the time of our survey in late 2020, the Australian housing market was recovering rapidly after a two-year downturn caused by a macroprudential tightening of lending standards (RBA 2019). The Australian real house price index rose by 22.4% in the year after our survey, supported by pandemic-related fiscal and monetary stimulus (RBA 2021; BIS 2022). This was in line with global trends. However, the sharp post-pandemic reversal of macroeconomic policy has raised the debt-servicing burden of a large minority of borrowers (ANZ CoreLogic 2022).

In Australia, as in many countries, mortgage contracts come in daunting variety. Borrowers choose from over 4000 different mortgage contracts with various combinations of adjustable (ARM), fixed (FRM) and hybrid interest rates, principal and interest or interest-only repayments, levels of establishment fees, options to prepay, to transfer a loan from one property to another and to access equity. Also, Australian borrowers can add an "offset" account that offsets a savings balance against outstanding debt, to reduce interest charges. On the other hand, financial literacy is generally not high. Less than 50% of Australian adults can correctly answer all the "Big Three" standard financial literacy questions (Agnew et al. 2013). While higher financial literacy is positively associated with mortgage market participation, borrowers' knowledge of specific mortgage contract terms is low (Worthington 2009).

When considering whether to take out a mortgage, Australian consumers have access to a range of mortgage calculators provided by the regulator (via an online platform called Moneysmart) and home loan providers and mortgage broker firms.[1] Calculators provide information on both the total amount to be paid back and the regular repayment. However

[1] The Moneysmart mortgage calculator can be found at - **Mortgage calculator**, the mortgage calculator provided by a large Australian bank can be found at **Repayments Calculator** and by a mortgage broker firm at **Mortgage Repayments Calculator | Aussie Home Loans**

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most calculators put greater emphasis on repayments: mortgage provider and broker firm calculators are typically labelled 'repayments calculator' and the regulator's calculator highlights 'how much will my repayments be?'. This emphasis partly motivates our interest in framing.

Given the variety of loan terms and the infrequency of the transaction, it is unsurprising that around 46% of Australians mortgage borrowers are not confident that they chose the best option (ACCC 2020; ASIC 2011). Most look for direct help.[2] Along with direct lending institutions, such as banks and credit unions, borrowers can take loans through brokers and comparison websites. Loan suppliers are one of the first places that borrowers go for information and advice (ASIC 2017a), typically banks and credit unions (Chung 2022). Mortgage aggregators sit between brokers and lenders, offering panels of loans to brokers to on-sell, with more than 55% of mortgages in Australia sold by brokers (Deloitte Access Economics 2018). From the loan originator's perspective, brokers provide a new distribution channel with more diversified clients (ASIC 2017a).

Broker, lender and borrower incentives are not always aligned. Loan originators pay brokers an upfront commission (related to loan volume) and a trail commission (an ongoing fee), creating incentives for brokers to steer borrowers towards larger, more leveraged and interest-only mortgages (ASIC 2017b; Sedgwick 2017). But borrowers who go to direct lenders and comparison sites to source loans can also fall victim to mis-selling (Productivity Commission 2018; ACCC 2020). Large banks can obscure prices and make comparisons harder by charging different interest rates and fees to different customers. They also sell mortgages bundled with other (sometimes unnecessary) financial products such as credit cards or insurance cover (Deloitte 2016). Similarly, comparison sites may favor products from commercially-related lenders that are not the best deal for consumers (Productivity Commission 2018).

The complexity and competing incentives of the Australian home loan market make it an ideal setting for survey-based research into financial literacy, choice architecture, and financial advice in relation to mortgage choices.

4. Survey and sample

We collected data through an online survey fielded by a third-part panel provider. The survey began by providing Internal Review Board (Human Ethics) information, checked participant consent, and filtered participants for eligibility, including their past, or intended future, experiences with mortgage borrowing. (We screened out participants who had not taken, and did not intend to take, a residential mortgage. Section 4.2 explains the sample in more detail.) The next part of the survey collected participants' subjective comfort levels with specified lump sum debts and equivalent repayment streams in two different tasks that we describe in detail below. Then followed questions recording participants' housing market expectations, their experiences of mortgage brokers, preparations they may have made for buying a home, and experience with other forms of consumer credit. Next came questions on demographics, risk and time preferences and psychological traits. The last part of the survey covered subjective and

[2] The Australian Government (under the National Consumer Credit Protection Act 2009) requires all home loan providers (lenders) to provide a Key Facts Sheet to potential borrowers (who request one). The Key Facts Sheet provides summary information about the loan including both the total amount (lump sum) to be paid back and the regular repayment (assuming no change in interest rates) as well as the loan amount. Where the mortgage interest rate is fixed for a set period the Key Facts Sheet presents the regular repayment for the fixed interest rate period (generally up to 5 years) and then the regular repayment for the variable interest rate period for the remainder of the loan.

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Table 1. Lump sum loan and monthly repayment values. This table shows the 10 lump sum debt sizes and equivalent monthly repayment amounts used in tasks 1 and 2. Values were approximately calibrated around average new loan sizes for owner occupied dwellings in Australia in 2020 with each set increasing the loan amount at a constant log linear rate of approximately 35%. Monthly principal and interest payments repayments are calculated for a 25 year loan term at an interest rate of 2.9% p.a. and shown in Australian dollars (AUD)

Set	Total loan size ($)	Monthly repayments ($)
1	200,000	950
2	270,000	1250
3	365,000	1700
4	492,000	2300
5	664,000	3100
6	897,000	4200
7	1,211,000	5700
8	1,634,000	7700
9	2,206,000	10,350
10	2,979,000	14,000

objective financial literacy and basic numeracy skills (fractions, percentages and probability) (Lipkus et al. 2001).[3]

4.1 Task design

The survey collected both within- and between-subjects stated preferences for lump sum debt and repayment streams over a range of loan values. We set the range of loans from $200K to almost $3M in 10 steps, shown in Table 1. (All dollar values are Australian dollars AUD.) At each step, the lump sum and equivalent repayment increased by approximately 35%. In other words, the log loan amount rises linearly over the range. The amounts are rounded to lump sums in multiples of thousands and monthly repayments in multiples of fifties. The average new loan size for owner-occupied dwellings at the time of the survey in October 2020 was $537K (Australian Bureau of Statistics (ABS 2020)), an amount between steps 4 and 5 the range. To compute the equivalent monthly loan repayments, we assumed a loan term of 25 years and a mortgage interest rate of 2.9% p.a., which was the average mortgage rate applied to new loans for owner occupied dwellings in the third quarter of 2020 (Reserve Bank of Australia (RBA 2020)).

We randomly assigned participants to one of two tasks. In task 1, participants stated their level of comfort or discomfort with the range of 10 loan amounts framed either as lump sum debts or monthly repayments. Participants had to do this task for both frames, yet the survey randomized the order in which participants saw these frames. It also randomly allocated participants between conditions where underlying loan amounts either increased or decreased over the 10 levels. Figure 1 panel (a) shows the rating task for participants in task 1.

Task 2 presented a similar choice in a different form. In task 2, participants saw a lump sum debt (monthly repayment) and we asked them to use a slider to choose the monthly repayment (lump sum debt) amount on a 25 year loan that made them feel as comfortable or uncomfortable as the lump sum debt (monthly repayment). The survey again

[3] Online Appendix A shows screenshots of the survey Instrument, and the live survey is **here**.

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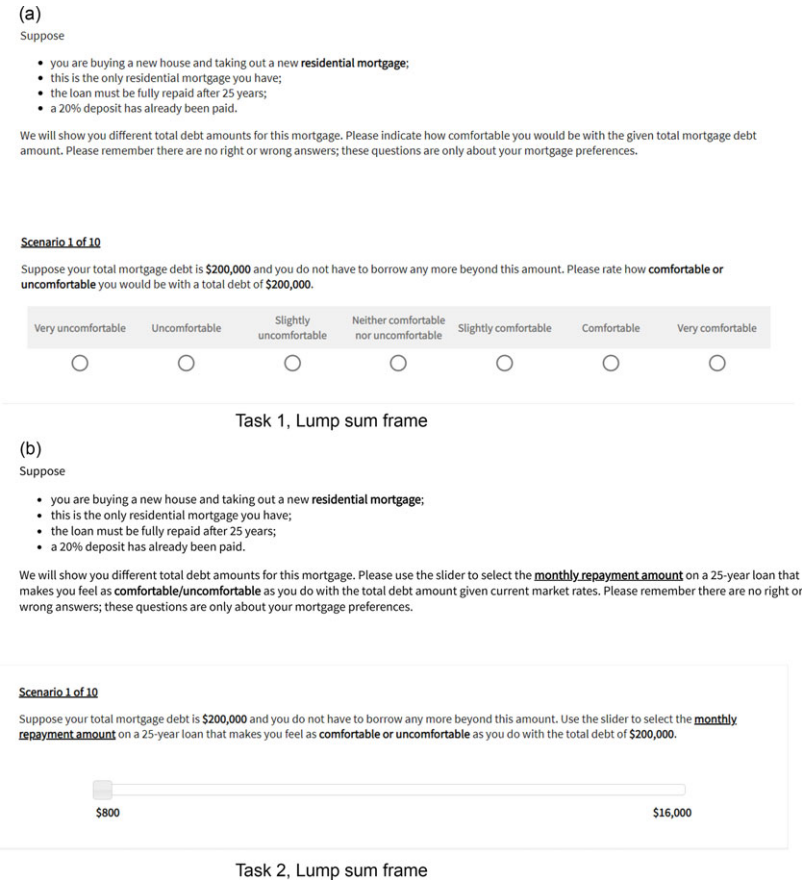

Figure 1. Tasks 1 and 2 screenshots. Panel (a) shows the lump sum condition for task 1 that collects participants' perceived comfort with a mortgage debt. The monthly repayment condition substituted the words "monthly debt repayments" for "total mortgage debt" and "total debt". The monthly repayment condition reported the monthly repayments numbers where lump sum debts appear. Panel (b) shows the lump sum condition for task 2 that collects the repayment amount that gave participants an equivalent level of comfort as a mortgage debt framed as a lump sum. Online Appendix A shows screen shots of the survey including the monthly repayment condition where participants gave the lump sum amount they felt provided an equivalent level of comfort as the repayment amount provided. Debt (repayment levels) ranged from $200K to $2979K ($950 to $14,000). Participants were randomly assigned to i) task 1 or task 2; ii) seeing either the lump sum or repayment framing condition first followed by the alternative; and iii) increasing or decreasing sequences of loan amounts. Each participant made 10 (loan amounts) $\times$ 2 (frame) ratings.

randomized the order of the frames and increasing versus decreasing amounts between subjects. Figure 1 panel (b) shows the rating task for participants assigned to task 2. In task 2, participants could experiment by moving the slider before confirming their choice by a tick box.

We asked participants to treat loan amounts as a sole residential mortgage, not an addition to current household debt. We also said that a 20% deposit had been paid, the term of the loan would be 25 years, and that the loan would be fully paid out in 25 years. This information ruled out features that might add to discomfort for some participants, such as borrowing for investment properties, interest-only loans and high loan-to-valuation mortgages that would require lender's mortgage insurance. We did not assign an interest rate to the loan because we wanted participants' subjective comfort rating and not their

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calculation of financial equivalence. These features of the tasks mirror the approach of Goldstein et al. (2016).

4.2 Sample

We put the online survey to field in October 2020 through a third-party commercial survey panel provider, Pureprofile. We first collected 105 responses for a pilot survey and then, after checking the pilot, we collected 999 responses from new participants. We set the total sample size so that 499 participants completed task 1 and 500 participants completed task 2. The 499 (500) participants in task 1 (2) were randomly assigned to different orders of framing and increasing or decreasing loan amount conditions.

Pureprofile sent invitations to potentially suitable panel members by email. On clicking a link, participants were invited to join the survey. The panel provider filled pre-set gender and age group quotas that matched Australian population characteristics. To ensure that we were collecting data from people who were genuinely interested in home loans, we chose participants from among Australian adults, aged between 25 years and 64 years (inclusive) and who earned over $52,000 per year. We also screened out otherwise eligible participants who, at the time of the survey, had never taken a mortgage and did not plan to take a mortgage in the future. Pureprofile compensated participants who completed the survey for their time (approximately $4). The majority of participants completed the survey in under 15 minutes, and the entire data collection process took around two weeks. Pureprofile collected responses until the survey quota was filled. They do not report standard response rates since not all panel members are invited to the survey. Table 2 reports sample descriptive statistics.

Demographics: The gender and age distribution of the sample represents the 25–64 years Australian population as set by quota. Approximately 67% of Australian households own their residence, with or without a mortgage, but home ownership is concentrated in the second and higher quartiles of the wealth distribution. Few low wealth households participate in the mortgage market (ABS 2019-20a, 2019-20b). Accordingly, because we select past, current or future mortgage holders, people who are partnered, high income, educated and employed are over-represented compared with the population.

Financial literacy: We measure financial literacy using the "Big Three" financial literacy questions on interest, inflation and diversification, with the wording of the third question changed slightly to match the Australian context (Agnew et al. 2013; Lusardi and Mitchell 2011).[4] Rates of correct responses to the "Big Three" by participants are similar to rates reported by Agnew et al. (2013) from a wider sample. Around 10% of the sample answered no questions correctly, a majority answered the interest and inflation questions correctly and less than half answered all three questions correctly. In the estimation to follow, we assign high financial literacy to participants who answered all three questions correctly.

Numeracy: We tested participants' numeracy separately using the scale developed by Lipkus et al. (2001). Gerardi et al. (2013) show that mortgage default is more likely for borrowers who lack mathematical skills, but is not related to choice of mortgage. We

[4] Financial literacy questions with correct answers in bold typeface: (Interest) Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? (**More than $102**; Exactly $102; Less than $102; Do not know); (Inflation) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? (More than today; Exactly the same; **Less than today**; Do not know); (Diversification) Please evaluate whether this statement is true or false. 'Buying shares in a single company usually provides a safer return than buying units in a managed share fund'. (True; **False**; Do not know). Online Appendix A shows screenshots of the survey instrument.

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Table 2. Survey sample descriptive statistics. This table presents descriptive statistics for 999 survey participants, October 2020, $n = 999$. Population statistics are from the 2021 Australian census

	% Survey	% 25–64 yrs Aust'n pop'n
Gender: Female	50.0	50.9
Partnered: Married or Living in long-term partnership	73.0	61.9
Age:		
25–29 years	14.2	13.3
30–34 years	14.6	13.9
35–39 years	13.5	13.8
40–44 years	12.3	12.3
45–49 years	12.6	12.2
50–54 years	10.4	12.0
55–59 years	11.7	11.5
60–64 years	10.6	11.0
State of residence:		
New South Wales	35.0	32.0
Victoria	29.0	26.0
Queensland	17.0	20.0
South Australia	9.0	7.0
Western Australia	7.0	10.0
Tasmania	2.0	2.0
ACT and NT	1.0	3.0
Household weekly income:		
$1000 – $1249	13.4	21.0
$1250 – $1499	12.9	16.9
$1500 – $1999	23.5	15.5
$2000 – $2499	16.4	11.9
$2500 – $2999	12.2	21.1
$3000 – $3499	9.0	4.9
$3500 – $3999	6.0	8.6 ($3,500+)
$4000 – $4999	3.7	–
$5000+	2.8	–
Education: Bachelor's degree or higher	63.0	33.4
Employment: Employed full time or part time	85.0	72.8
Risk aversion: Average or higher risk aversion	55.2	–
Patience: Average or higher patience	61.6	–
Financial literacy:		
Low (no questions correct)	10.9	8.1[a]
Low (interest & inflation correct)	59.3	63.7[a]
High (three correct)	47.0	42.9[a]

(*Continued*)

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Table 2. (*Continued*)

	% Survey	% 25–64 yrs Aust'n pop'n
Numeracy:		
Low (no questions correct)	21.6	–
Low (one questions correct)	23.7	–
High (three questions correct)	54.6	–
Mortgage experience: Current or past mortgage	81.8	–
Monotonic task responses:		
Task 1	78.2	–
Task 2	23.3	–
Past use of mortgage broker:		
Yes	55.4	55.7[b]
Intention to use mortgage broker in future:		
Yes	45.0	–
Have previously and will consult in future	34.2	–
Have not previously but will consult in future	10.8	–

[a]Source: Agnew et al. (2013); [b]Source: Deloitte Access Economics (2018).

aim to measure the relation between numeracy, subjective comfort with home loans and susceptibility to framing.[5]

Around one fifth of the sample failed to answer any of these questions correctly but 55% answered all three correctly. In the estimation to follow, we assign high numeracy to participants who answered all three questions correctly and low numeracy to other participants.

Mortgage broker users: Consistent with other surveys, we find that more than half of this sample have consulted a mortgage broker in the past (55.4%) (Deloitte Access Economics 2018). Additionally, 45% of participants say they intend to consult a broker in the future. Three quarter of this group of future users consists of who have used a mortgage broker before, and one quarter who have not.

5. Analysis and results

5.1 Comfort with lump sum debt and repayment streams: Task 1

The first task in the survey asked participants to rate their comfort with home loans on a seven point scale from "very uncomfortable" to "very comfortable". They gave this rating over 10 loan amounts (Table 1) shown either first as lump sums and then as monthly repayment streams, or in the reverse order.

[5] Numeracy questions with correct answers in bold typeface: (Fractions) Imagine that we rolled a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up even? (Please enter a number between 0 to 1000 in the box; **500 times**); (Percentages) In a lottery, the chance of winning a $500 prize is 1%. What is your best guess of how many people would win the prize if 1,000 people each buy a single ticket in the lottery? (Please enter a number between 0 to 1000 in the box; **10 people**); (Probabilities) In a raffle, the chance of winning a car is 1 in 1,000. What per cent of tickets in the raffle win a car? [Please enter a percentage; **0.1%**]. Online Appendix A shows screenshots of the survey instrument.

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5.1.1 Preliminary comparisons

Table 3 reports comparisons of mean comfort rating by groups of participants distinguished by framing, borrowing experience, financial literacy and broker use. Table 4 defines the variables.

On average, participants were significantly less comfortable when loans were framed as lump sum debts instead of equivalent monthly repayment streams. Highly financially literate and numerate participants were more uncomfortable (by around 10%; mean of 3.146 for high financial literacy Cf. 3.655 for low financial literacy), on average over the 10 loan amounts, than their less capable counterparts. (Average ratings for people with and without current or past experience with a mortgage were not significantly different.) On the other hand, on average, participants who have consulted, or plan to consult, a mortgage broker said they are more comfortable (by around 20%) with debt than the comparison groups (ASIC 2017b).

Figure 2 shows the difference between average comfort levels at each of the 10 debt and repayment levels we tested. The graph shows several notable features, apart from general discomfort with lump sum framing. First, participants say they are equally comfortable with lump sums and repayment streams in the center of the range. Values in this region were close to the average loan size for households taking out new mortgages at the time of the survey. Many participants would have first-hand experience of loan sizes and associated repayments at these values. Second, unlike Goldstein et al. (2016), we do not find a reversal of the framing effect. They found that, at lower wealth levels, participants perceived lump sums as more adequate for retirement than monthly amounts, but that this perception reversed at higher wealth levels. Over the range of values we tested, participants expressed less comfort with lump sums, with more relative discomfort at smaller loan sizes.

5.1.2 Regression results

Table 5 reports regression analysis of the responses to task 1. The estimates in model (1) show the variation in average comfort level by condition. As expected, participants grew more uncomfortable as total debt or repayments rose. Participants were also sensitive to increasing sequences: those who saw debt or repayments going up over the 10 choices expressed more discomfort than those who saw them going down. This presentation effect reduces average comfort by around 10% and may be related to participants anchoring to a lower starting value.

In terms of choice architecture, we see that participants were sensitive to the framing of mortgage debt. The coefficient on the (de-meaned) lump sum condition indicator is significant and negative, and amounts to a 3% reduction in the average comfort level. In our debt and repayment tasks, participants rate the repayment stream that can be readily compared with income as *more* comfortable than a less-easily-compared lump sum debt. One interpretation is that households treat lump sum debt as "larger" than monthly repayments, possibly because they are less comparable with regular income or with the participants' experience with loan repayments (De La Rosa et al. 2022; Goldstein et al. 2016). The danger when borrowers use initial repayments to guide choices of loan size is that repayments will change with interest rates. Capacity to service a loan is also vulnerable to shocks to household income.

We now turn to the question of how financial literacy or interactions with an adviser – here a mortgage broker – can change comfort with mortgage debt and sensitivity to framing. We measure financial literacy using the "Big Three" questions that have been widely implemented and tested in studies globally (Lusardi and Mitchell 2011). We also add an indicator for having taken a mortgage in the past since this experience is likely to add to participants' financial literacy, and include scores on numeracy that test

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Table 3. Summary statistics: Subjective comfort with mortgage debt. This table shows mean values of ratings from 1 = "Very uncomfortable" to 7 = "Very comfortable" on debt/repayment levels by participant subgroup in the main survey, task 1 ($n = 500$). Since each participant gave a rating for 10 lump sum debt and monthly repayment levels in two sets, the total number of observations is $20 \times 500 = 10{,}000$. Table 4 describes the variables. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

	Mean	Standard error	t-stat (equal means)
Total	3.411	2.329	
Framing: Repayments	3.466	0.033	
Framing: Lump sum	3.356	0.033	2.345**
No mortgage experience	3.334	0.056	
Mortgage experience	3.426	0.026	−1.491
Financial literacy (low)	3.655	0.032	
Financial literacy (high)	3.146	0.034	10.972***
Numeracy (low)	3.525	0.028	
Numeracy (high)	3.150	0.042	7.406***
Has not used mortgage broker	3.041	0.034	
Has used mortgage broker	3.692	0.031	−14.102***
Will not use mortgage broker	3.143	0.030	
Will use mortgage broker	3.758	0.036	−13.116***
Observations		10,000	

understanding of fractions, percentages and probability. We also use another marker of numeracy and attentiveness: an indicator for whether participants gave comfort ratings that (weakly) decreased as loan amounts increased (labelled "monotonic responses"). We expect that the natural response to higher loan amounts is lower comfort. As such, we interpret responses that do not follow that pattern to indicate either low numeracy (i.e., participants are unable to correctly process the loan amount) or inattention (i.e., people replied without consideration). Around 80% of participants gave monotonic responses in task 1. We can also separate the survey participants into those who have consulted a mortgage broker in the past and those who have not.

Model (2) shows results from the regression of comfort levels on the experiment indicators, participant financial literacy indicators and broker advice indicators, preference indicators and socio-demographic controls. In this conditional model, we find that participants who answered all three financial literacy questions correctly chose significantly *lower* comfort ratings with any mortgage debt irrespective of amount and framing. High financial literacy lowers the average comfort level of 3.411 by more than 10%. Higher numeracy and attentiveness reduce comfort. Participants with higher numeracy express about 5% less comfort than average with all debt amounts. But mortgage experience increases comfort by around 4%. In other words, higher financial literacy and numeracy are related to less comfort with home loan debt overall, but experience may make borrowers more comfortable.

Moreover, sensitivity to lump sum framing is significantly less for the more financially literate, as we hypothesized (Section 2). In fact, the size of the positive coefficient on the interaction between indicators for high financial literacy and for lump sum framing offsets the negative coefficient on the framing indicator alone. Thus, people with high financial literacy are more uncomfortable with mortgage debt than the average participant but

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Table 4. Variable descriptions. This table reports definitions of variables used in estimation. Variables are computed from responses to an online survey of a sample of Australian adults who are past, current or intended future mortgage holders conducted in October 2020 ($n = 999$).

Variable name	Description
Experiment indicators	
Log loan size	Natural logarithm of loan amount in tasks (framed as either initial lump sum or equivalent monthly repayments over 25 year loan. Assumed interest rate of 2.9% p.a.) Loans take ten values from \$200K - \$2979K (Table 1).
Increasing debt condition	Indicator variable that equals 1 for conditions where loan amounts or equivalent repayments ran from lowest to highest value over ten choices; equals 0 for conditions where loan amounts or equivalent repayments from highest to lowest value.
Lump sum condition	Indicator variable that equals 1 for conditions where participants were shown loan amounts framed as lump sums; equals 0 for conditions where participants were shown repayment streams.
Outcome variables	
Comfort level	Participant i's rating of their subjective comfort on seven point scale from 1="Very uncomfortable" to 7="Very comfortable" for lump sums or monthly repayment amounts.
Absolute deviation	The absolute value of the proportional deviation defined as $deviation_{i,l} = chosen_{i,l}/correct_l - 1$ where $chosen_{i,l}$ is the value of lump sum (repayment) selected by participant i as equally comfortable as lump sum or repayment amount $l = 1, \ldots 10$ and $correct_l$ is the true equivalent.
Participant characteristics	
Monotonic responses	An indicator variable that equals 1 if the participant gave weakly monotonic responses in tasks, 0 otherwise. For task 1, monotonic participants chose no higher comfort with larger mortgage lump sums or repayments. For task 2, monotonic participants matched no higher repayment values at smaller lump sums or vice versa.
Mortgage experience	An indicator variable that equals 1 if the participant is a current or past mortgage holder; equals 0 if the participant intends to take out a mortgage in the future.
Financial literacy	An indicator variable that equals 1 if the participant answered three financial literacy questions correctly, 0 otherwise. Questions test simple interest, inflation and diversification.
Numeracy	An indicator variable that equals 1 if the participant answered three numeracy questions correctly. Questions test fractions, percentages, and probabilities.
Used mortgage broker	Indicator variable that equals 1 if the participant had consulted a mortgage broker in the past, 0 otherwise.
Will use mortgage broker	Indicator variable that equals 1 if the participant will consult a mortgage broker in the future, 0 otherwise.
Have and will use mortgage broker	Indicator variable that equals 1 if the participant has consulted a broker in the past and will consult a mortgage broker in the future, 0 if the participant has not consulted a broker in the past but will consult a mortgage broker in the future.
Female	An indicator variable that equals 1 if the participant is female, 0 otherwise.
Partnered	An indicator variable that equals 1 if the participant is married or living in a long-term partnership, 0 otherwise.
Age	Categorical variable (1–8) for ages between 25 to 64 in five year intervals.

(*Continued*)

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Table 4. (*Continued*)

Variable name	Description
Household income	Categorical variable (1–9) for weekly household income between $1000 to $5000+.
Bachelor degree or higher	An indicator variable that equals 1 if the participant has a bachelor or higher degree, 0 otherwise.
Employed	An indicator variable that equals 1 if the participant is employed full or part time, 0 otherwise.
Risk aversion	Indicator variable that equals 1 if participant has above average risk aversion measured by responses to the question "Are you generally a person who is fully prepared to take risks in financial matters or do you try to avoid taking risks?" on a 0–10 scale where 0 was "Unwilling to take risks in financial matters" and 10 was "Fully prepared to take risk in financial matters", with an average response close to 5.
Patience	Indicator variable that equals 1 if participant has above average patience measured by responses to the question "Are you generally an impatient person, or someone who always shows great patience?" with responses on a 0–10 scale from "Very impatient" and 10 was "Very patient", 0 otherwise.
Upside house price risk	Weighted sum of probabilities (0 to 100 scale) that participants chose to answer "What are the chances that 5 years from now the value of your home (homes in your postcode) will have gone up by more than 10 (20) percent?" Weights are are squared percentage house prices changes.
Downside house price risk	Weighted sum of probabilities (0 to 100 scale) that participants chose to answer "What are the chances that 5 years from now the value of your home (homes in your postcode) will have gone down by more than 10 (20) percent?" Weights are are squared percentage house prices changes.
Instrumental variables	
Financial adviser count	Number of ASIC-registered financial advisers in participant's postcode.
Mortgage broker user count	Number of respondents to a separate survey who reside in the same postcode as the participant who report having used a mortgage broker in the past. (The separate survey sampled 1601 different individuals in April 2021. See Online Appendix D.)

their discomfort is not affected by whether the loan obligation is shown as monthly repayments or a total lump sum owed. By contrast, estimates also show that participants with high numeracy and direct mortgage experience *are* more susceptible to lump sum framing. One possible explanation of this result is that participants with experience may be more strongly anchored to regular repayments than the less experienced, and therefore susceptible to framing.

We also see differences and similarities between high financial literacy participants and those who consulted mortgage brokers. First, participants who consulted brokers are significantly more comfortable with home loans at around 8% above the average participant rating and 18% above the average high-financial-literacy participant. Their comfort increases when loans are framed as lump sums versus repayments. Broker users' average comfort with lump sums is almost 5% higher than comfort with monthly repayments. We find that both financially literate and broker-advised participants are insensitive to framing, but that broker-advised participants are relatively more comfortable with mortgage debt in general, while financially literate participants are less comfortable.

The estimated effects of other covariates on comfort with mortgage debt are unsurprising. Results for model (2) show that participants with better financial situations – those who are male, more educated, partnered, employed, in their early forties and with higher

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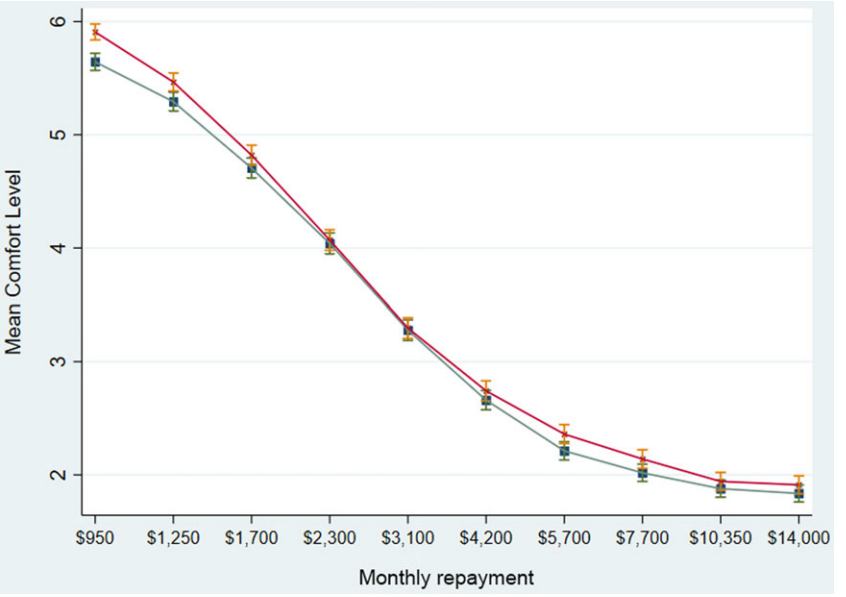

Figure 2. Subjective comfort with varying mortgage debts depending on whether they are expressed as a lump sum or equivalent monthly loan repayment. This graph shows the mean comfort level (seven point scale from "Very uncomfortable" to "Very comfortable") on the vertical axis against monthly repayments (red line) on the horizontal axis and the equivalent lump sums (green line) for Survey 1, task 1. Repayment and debt levels ranged from $950 ($200K) to $14,000 ($2979K). Error bars show one standard deviation around the means.

incomes – are more comfortable with mortgage debt. More risk averse participants are less comfortable with debt. But participants who rate themselves as more patient give higher comfort ratings. This preference relation could be explained by patient borrowers seeing home loans more as a form of saving through acquiring an asset than as a form of consumption of housing services.

5.1.3 Accounting for selection into broker use

Past studies find that clients may go to brokers for "peace of mind" as well as for help with choosing, and applying for, a home loan. Selection into broker use is therefore unlikely to be random. Thus, the results discussed so far (i.e., model (2), Table 5) cannot conclusively answer the question of whether using a broker causes increases in clients' comfort with mortgage debt.

To separately identify the influence of brokers on comfort with home loans and the framing of mortgage debt, we use two methods. First, we employ instrumental variables to estimate a two-stage GMM model of comfort level. We compute two instruments that are correlated with broker use but unlikely to be related to comfort with mortgages after conditioning on the other explanatory variables. These instruments are the number of financial advisers in the postcode of the participant, as registered by the regulator, ASIC. We reason that (pre-determined) ease of access to local advisers and advice firms that typically offer mortgage brokerage services is likely to be positively related to broker use, but independent of the errors in the comfort equation. We also compute an instrument from a separate survey on mortgage choice that collected responses from a new, different sample of 1601 past, current or future Australian mortgage borrowers in April

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Table 5. Regression results: Subjective comfort with mortgage debt. This table reports OLS and IV-GMM regressions of participants' comfort ratings from 1="Very uncomfortable" to 7="Very comfortable" from task 1 on experiment indicators and participant characteristics. Variable definitions are shown in Table 4. Each participant ($n = 500$) rated their comfort with 10 lump sum debt and monthly repayment levels, making a total number of observations of $20 \times 500 = 10{,}000$. Columns 1 and 2 report OLS regression results for all participants who completed task 1. Column 3 reports second stage regression results from IV-GMM estimations where "Used broker" is instrumented by 1) the number of registered financial advisers in the postcode of the participant as supplied by the regulator ASIC, and 2) the number of respondents to a separate survey who reside in the same postcode as the participant and who report having previously consulted a mortgage broker (see Online Appendix D). Online Appendix B reports first stage estimates and test statistics. Column 4 reports OLS estimates for comfort ratings for the subset of task 1 participants who stated that they intended to consult a mortgage broker in the future ($n = 218$). This group comprises 171 participants who have consulted a broker previously ("Have and will use broker") and 47 participants who have not consulted a broker previously ("Have not and will use broker"). Robust standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Dependent variable:	OLS	OLS	IV-GMM	OLS
Comfort level (1–7 scale)	(1)	(2)	(3)	(4)
Log(size)(de-meaned)	−1.590***	−1.590***	−1.590***	−1.580***
	(0.021)	(0.019)	(0.02)	(0.03)
Increasing condition (de-meaned)	−0.335***	−0.344***	−0.312***	−0.394***
	(0.038)	(0.034)	(0.039)	(0.054)
Lump sum (de-meaned)	−0.112***	−0.112***	−0.112***	−0.255***
	(0.038)	(0.033)	(0.035)	(0.090)
Log(size) × Lump sum (both de-meaned)	0.040	0.040		−0.051
	(0.041)	(0.038)		(0.059)
Monotonic responses (de-meaned)		−0.658***	−0.626***	−0.516***
		(0.051)	(0.057)	(0.068)
Mortgage experience (de-meaned)		0.126**	−0.424	−0.020
		(0.058)	(0.330)	(0.095)
Financial literacy (de-meaned)		−0.392***	−0.463***	−0.502***
		(0.039)	(0.059)	(0.063)
Numeracy (mean-centered)		−0.171***	−0.190***	−0.386***
		(0.040)	(0.043)	(0.064)
Used mortgage broker (de-meaned)		0.263***	1.406**	
		(0.037)	(0.677)	
Have and will use broker (de-meaned)				0.199**
				(0.083)
Mortgage experience × Lump sum		−0.373***		−0.408***
		(0.090)		(0.156)
Financial literacy × Lump sum		0.185**		0.114
		(0.074)		(0.113)
Numeracy × Lump sum		−0.189**		−0.138
		(0.077)		(0.119)

(*Continued*)

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Table 5. (*Continued*)

Dependent variable:	OLS	OLS	IV-GMM	OLS
Comfort level (1–7 scale)	(1)	(2)	(3)	(4)
Used broker × Lump sum		0.163**		
		(0.069)		
Have and will use broker × Lump sum				0.279*
				(0.156)
Female		−0.277***	−0.236***	−0.390***
		(0.038)	(0.047)	(0.062)
Age				
(base level 25–29 years)				
30–34		−0.207***	−0.202***	−0.185**
		(0.067)	(0.07)	(0.092)
35–39		−0.269***	−0.308***	−0.137
		(0.073)	(0.08)	(0.108)
40–44		0.279***	0.214**	0.370***
		(0.077)	(0.088)	(0.111)
45–49		−0.208***	−0.104	−0.081
		(0.075)	(0.099)	(0.118)
50–54		−0.457***	−0.221	−0.007
		(0.078)	(0.159)	(0.129)
55–59		−0.467***	−0.164	−0.334**
		(0.076)	(0.196)	(0.133)
60–64		−0.364***	0.039	−0.563***
		(0.082)	(0.253)	(0.159)
Household weekly income				
(Base $1000–$1249 p.w.)				
$1250–$1499		0.263***	0.396***	−0.171
		(0.063)	(0.103)	(0.107)
$1500–$1999		0.399***	0.457***	0.237**
		(0.055)	(0.068)	(0.094)
$2000–$2499		0.495***	0.506***	0.199*
		(0.062)	(0.066)	(0.115)
$2500–$2999		0.644***	0.742***	0.261**
		(0.068)	(0.092)	(0.123)
$3000–$3499		0.742***	0.756***	0.201*
		(0.075)	(0.078)	(0.119)
$3500–$3999		0.852***	0.767***	0.410***
		(0.080)	(0.096)	(0.138)

(*Continued*)

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Table 5. (*Continued*)

Dependent variable:	OLS	OLS	IV-GMM	OLS
Comfort level (1–7 scale)	(1)	(2)	(3)	(4)
$4000–$4999		1.081***	0.943***	0.782***
		(0.107)	(0.135)	(0.148)
$5000+		0.684***	0.848***	0.291*
		(0.105)	(0.150)	(0.150)
Partnered		0.209***	0.140**	0.450***
		(0.041)	(0.058)	(0.069)
Bachelor degree or higher		0.231***	0.185***	0.235***
		(0.038)	(0.048)	(0.068)
Risk aversion above average		−0.514***	−0.453***	−0.454***
		(0.037)	(0.054)	(0.061)
Patience above average		0.234***	0.203***	0.393***
		(0.034)	(0.041)	(0.06)
Employed		0.310***	0.356***	0.492***
		(0.050)	(0.061)	(0.116)
Constant	3.411***	2.865***	2.719***	2.602***
	(0.019)	(0.095)	(0.133)	(0.182)
R^2	0.352	0.499	0.450	0.482
Observations	10,000	10,000	10,000	4,360
First stage test statistics IV-GMM	Under-ident'n	Weak ident'n		
Use broker (mean centered)	$F(2,9969)$	SW $\chi^2(2)$		
	39.07***	78.39***		
Second stage test statistics IV-GMM	Under-ident'n	Weak ident'n	Hansen J test	
	Kleibergen-Paap LM	Cragg-Donald F	$\chi^2(1)$ p-value	
	73.021***	22.612	0.300	

2021. (The online appendix describes this data collection in detail.) This instrument is the number of broker users, from the separate data collection, who reside in the same postcode as the participants we study here. We reason that the number of broker users in the postcode of a participant is likely to be positively related to the participant's broker use but independent of their conditional comfort level with mortgage debt. Second, we condition on a participant's *intention* to consult a mortgage broker in the future and estimate the impact of having *actually* consulted a broker in the past, on comfort and susceptibility to framing. This second method should minimize selection effects but we cannot rule out possible unobservable factors that motivated completing a consultation rather than only intending to.

Table 5, model (3), reports results for the IV-GMM regression of comfort level on framing and condition indicators and participant characteristics. Test results from the first stage estimation reject under identification and weak identification, supporting a

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conclusion that the instruments are not weak. (Online Appendix B reports the full first stage results.) The second stage Hansen J test indicates that the instruments are exogenous.

Results from the IV estimation confirm several key findings from the OLS models (2). Participants express lower average comfort with larger loans and with loans shown as lump sums. Again, we find evidence that more financially literate and numerate participants report lower comfort levels than those who are less financially capable. However, the coefficient on the mortgage experience indicator changes from positive to negative possibly because we drop the interaction term between mortgage experience and the framing indicator because the standard instruments, created by interactions between the framing indicator and the instrumental variables, are weak. We exclude other interactions with the framing indicator so that main effects can be compared easily. Importantly, the IV estimation confirms that participants who have used brokers are, on average, significantly more comfortable with mortgage debt (around 50% above the unconditional average).

Table 5, model (4), reports OLS estimates of comfort levels on experiment indicators and participant characteristics for the subset of participants ($n = 218$) who say they intend to consult a mortgage broker in the future (20 choices $\times$ 218 participants = 4360 observations). This subsample includes participants who have consulted a broker and intend to in the future ("Have and will use broker" = 1; $n = 171$) and who intend to go to a broker but have not yet ("Have and will use broker" = 0, $n = 47$). The participants who have actually consulted a broker and intend to in the future are significantly *more* likely (5% increase on the unconditional mean of 3.75) to feel comfortable with home loans than those who plan to talk to a mortgage broker but have not yet. We also estimate a significantly lower sensitivity to lump sum framing among the group who have actually consulted a broker relative to those who are yet to do so (7% increase over the unconditional mean). These estimates further support the inference that after consulting a broker, clients feel more comfortable with home loan debt, and lump sum framing.

5.2 Comfort equivalence: Task 2

In task 2, we show a randomly selected *different* group of participants ($n = 499$) values from Table 1 and asked them to use a slider to choose an amount in the alternative framing that they felt equally comfortable with. Figure 1, panel (b), shows a screen shot of the task for the lump sum frame. For example, participants chose the repayment stream that represented the same level of subjective comfort as the lump sum shown to them, and vice versa. We hypothesized that a participant who has an accurate knowledge of the monthly repayments associated with a lump sum debt would assign approximately equal comfort to both. In addition, comfort equivalences should be insensitive to framing.

5.2.1 Preliminary comparisons between participant groups

A natural way to evaluate responses to this task is to compare participants' subjective matches with the objectively correct matches. We can also measure the size of the difference between subjective and objective matches. To do this, we calculate a proportional deviation as $deviation_{i,l} = chosen_{i,l}/correct_l - 1$ where $chosen_{i,l}$ is the value of debt (repayment) selected by participant i and $correct_l$ is the objective match for debt or repayment amount $l = 1, \ldots 10$ from Table 1. In the analysis reported below we take the absolute value of *deviation* to make interpretation easier.

Table 6 reports the unconditional mean absolute deviation, and compares group means, for participants who completed task 2. Across both frames and all debt levels, the average absolute proportional deviation is 110.8%. This large unconditional mean suggests that

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Table 6. Summary statistics: Absolute deviation. This table shows mean values of absolute deviations by participant subgroup in task 2. The absolute deviation is the absolute value of $deviation_{i,l} = chosen_{i,l}/correct_l - 1$ where $chosen_{i,l}$ is the value of debt (repayment) selected by participant i for debt or repayment amount $l = 1, \ldots 10$ from Table 1. For 10 lump sum debt levels (monthly repayments), each participant chose a monthly repayment (lump sum debt) with which they felt equally comfortable, making a total number of observations of $20 \times 499 = 9980$. Table 4 describes the variables. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

|Deviation|	Mean	Standard error	t-stat (equal means)
Total	1.108	1.983	
Framing: Repayments	1.220	0.031	
Framing: Lump sum	0.995	0.025	5.687***
No mortgage experience	1.208	0.050	
Mortgage experience	1.083	0.021	2.299**
Financial literacy (low)	1.310	0.030	
Financial literacy (high)	0.869	0.024	11.442***
Numeracy (low)	1.237	0.025	
Numeracy (high)	0.804	0.029	11.313***
Has not used mortgage broker	1.021	0.027	
Has used mortgage broker	1.182	0.029	−4.083***
Will not use mortgage broker	0.983	0.023	
Will use mortgage broker	1.251	0.033	−6.628***
Observations	9980		

participants found this task harder than task 1. Another indicator of task difficulty is the low rate of monotonic responses to this task – only 23% of respondents choose (weakly) increasing (decreasing) repayments or lump sums as the total debt level increases (decreases) over 10 choices.

Mean absolute deviations are significantly larger when participants are selecting lump sums to match their comfort with given monthly repayment levels (122% Cf., 99.5%). Importantly, the standard error of the absolute deviation is also larger for the repayment frame. In other words, participants are less comfortable with, and less clear about, the lump sum debt implications of a home loan described in terms of repayments than the reverse framing. Participants with higher financial literacy select equivalent debts or repayments that are closer to objectively equivalent levels, as do participants with higher numeracy. By contrast, average deviations for broker users are significantly higher than for non-broker users (118.2% Cf., 102.1%), with a similar difference for participants who intend to use brokers versus those who do not (125.1% Cf., 98.3%). This preliminary result implies that broker users are less likely than non-broker users to rate objectively equivalent lump sum debts and repayments as equally comfortable.

While the results show that participants make choices that match lump sums and repayments in the center of the range, they choose high debt amounts (repayment amounts) for smaller loans and choose low debt amounts (repayment amounts) for higher loans. Figure 3, panel (a), graphs the average of the (natural log) of the repayments that participants rated as equally comfortable (or uncomfortable) as the debt amounts on the horizontal axis. In comparison with the diagonal line that shows the objective equivalents, comfort-equivalent choices are significantly flatter. Panel (b) that graphs the average log debt that participants said was equally comfortable as the repayments shows a similar pattern, but is even flatter

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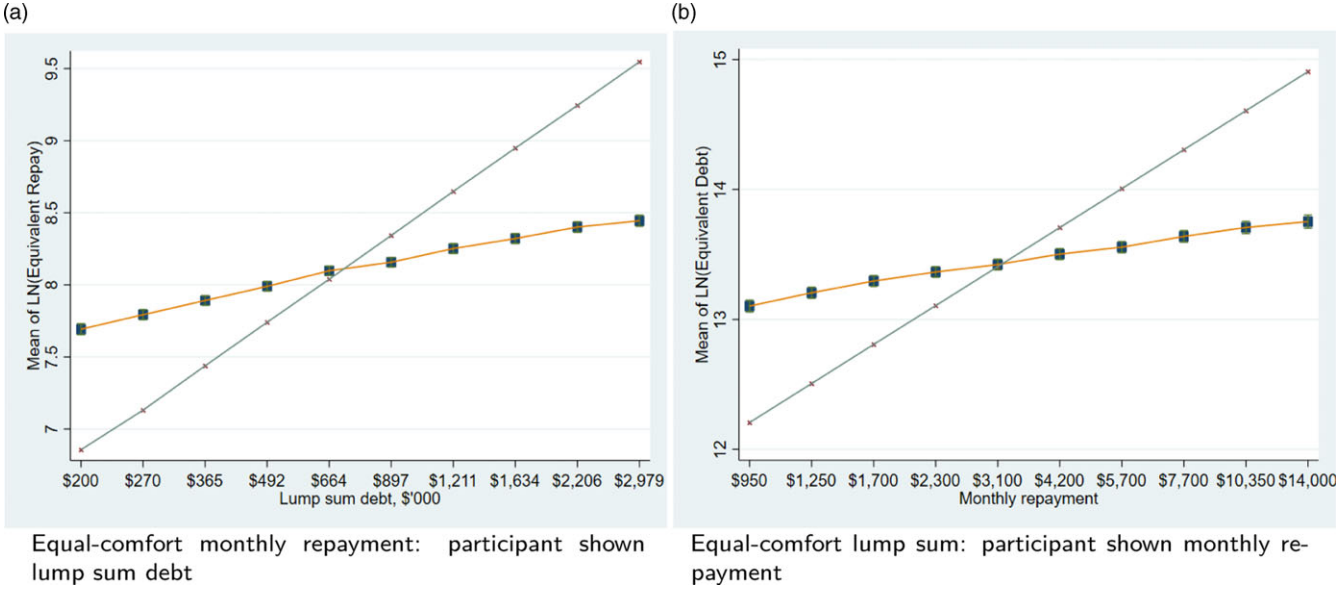

Figure 3. Subjective equal-comfort lump sum debt or monthly repayment at varying mortgage debts. These graphs show means of responses to task 2. Panel (a) shows the log of mean equivalent repayments that participants selected as being equally comfortable as varying lump sum mortgage debts. The thin line shows the objective equivalent values. Panel (b) shows the log of mean equivalent lump sums that participants selected as being equally comfortable as varying monthly mortgage repayments. The thin line shows the objective equivalent values. Repayment and debt levels ranged from $950 ($200K) to $14,000 ($2979K).

than for the lump sum framing. In fact, participants match repayments within a remarkably narrow range of debt levels when asked what they felt was equally comfortable. These graphs are further preliminary evidence for a finding that we investigate in more detail below, that people deviate more from the objective equivalent when they are shown the repayment framing than when they are shown the lump sum framing.

5.2.2 Regression results

Table 7 reports results from regressions of the absolute deviation of subjective comfort matches of lump sum and repayment stream from objectively matched values on condition indicators and participant characteristics. We add a quadratic term in log(loan size) to model the increasing absolute deviations at the extremes of the debt range, as shown in Figure 3. The OLS results reported in columns 1 and 2 confirm most results from Table 6. The coefficient on the framing indicator ("Lump sum condition") shows that the lump sum presentation lowers the absolute deviation by around 20% compared with the unconditional mean of 1.108. In other words, participants choose comfort-equivalent repayment streams that are closer to the objective values when presented with lump sum loan amounts. When asked to choose a lump sum to match a repayment amount, they deviate more from the objective value.

Participants with current or past mortgage experience, higher financial literacy or higher numeracy also match amounts that were significantly closer to the objective equivalents. Coefficients on each of these indicators show that skill and experience can reduce absolute deviations by over 20% of the unconditional mean. Coefficients on interactions between the framing indicator and numeracy and mortgage experience significantly moderated these effects, whereas we do not estimate a significant interaction for high financial literacy participants. Overall, financial literacy is related to better calibration between lump sums and repayment streams. In terms of broker users, we expect that consulting a broker would help clients better match lump sums and repayment streams. However, the coefficient on the indicator for broker use in model (2) is significant and positive, amounting to around an 8% increase in absolute deviation over the unconditional mean.

In Table 7 we again aim to control for selection into broker use by presenting results from IV-GMM (model (3)), and a model that is estimated only on the subsample of respondents who intend to consult a broker in the future (model (4)). We use the same instruments for IV-GMM estimation here as we did for task 1 (Table 5). However, some test results indicate instrument weakness and we interpret the results with caution.

In contrast to model (2), estimates from models (3) and (4) are evidence that consulting a broker significantly lowers participants' absolute deviations. In model (3) the sign on the coefficient for broker use in the second stage estimation is negative. Similarly, model (4) estimates show that the group of intending broker users who have previously consulted a broker have significantly lower absolute deviations than those who intend to consult a broker, but have not yet. This result could be interpreted as showing that brokers do help their clients understand the debt size implications of a repayment stream and vice versa. Both of these broker-use-dependent results suggest that brokers may help educate clients.

The results of both survey tasks show that financial literacy is associated with less comfort with mortgage debt and a better grasp of the connection between the lump sum liability and the servicing burden of repayments. These results hold after conditioning on an array of demographic, preference and experience indicators. We also find that people are generally less comfortable with lump sum debts than equivalent repayment streams, and less able to consistently map from a repayment stream to the equivalent lump sum debt. Financial literacy however, tends to reduce these framing effects. Going to a broker for advice is related to higher comfort with mortgage debt, and higher comfort with loans framed as lump sums. It is also related to smaller deviations when

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Table 7. Regressions results: Absolute deviations between comfort-equivalent debt or repayments. This table reports OLS and IV-GMM regressions using the data from the main survey, task 2. The dependent variable is the absolute value of proportional deviations of participants' selections of equal-comfort debt or repayment amounts from objective equivalence on debt/repayment levels. Explanatory variables are experiment indicators and participant characteristics. Variable definitions are shown in Table 4. For 10 lump sum debt levels (monthly repayments), each participant chose a monthly repayment (lump sum debt) with which they felt equally comfortable, making a total number of observations of $20 \times 499 = 9980$. Columns 1 and 2 report OLS regression results for all participants who completed task 2. Column 3 reports second stage regression results from IV-GMM estimations where "Used broker" is instrumented by 1) the number of registered financial advisers in the postcode of the participant as supplied by the regulator ASIC, and 2) the number of respondents to a separate survey who reside in the same postcode as the participant and who report having previously consulted a mortgage broker (see Online Appendix D). Online Appendix B reports first stage estimates and test statistics. Column 4 reports OLS estimates for absolute deviations for the subset of task 2 participants who stated that they intended to consult a mortgage broker in the future ($n = 232$). This group comprises 171 participants who have consulted a broker previously ("Have and will use broker"=1) and 61 participants who have not consulted a broker previously ("Have not and will use broker"). Robust standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Dependent variable:	OLS	OLS	IV-GMM	OLS
Absolute Deviation	(1)	(2)	(3)	(4)
Log(loan size) (de-meaned)	−15.651***	−15.651***	−15.647***	−19.499***
	(0.968)	(0.923)	(1.163)	(1.493)
Log(loan size squared) (de-meaned)	0.549***	0.549***	0.549***	0.683***
	(0.035)	(0.033)	(0.042)	(0.054)
Increasing condition (de-meaned)	−0.163***	−0.147***	−0.071	0.033
	(0.037)	(0.037)	(0.071)	(0.064)
Lump sum (de-meaned)	−0.225***	−0.225***	−0.223***	−0.166**
	(0.037)	(0.035)	(0.049)	(0.084)
Log(size) × Lump sum (both de-meaned)	0.247***	0.247***		0.243***
	(0.056)	(0.053)		(0.086)
Monotonic responses (de-meaned)		−0.581***	−0.597***	−0.742***
		(0.037)	(0.059)	(0.062)
Mortgage experience (de-meaned)		−0.284***	0.781	−0.331***
		(0.056)	(0.613)	(0.088)
Financial literacy (de-meaned)		−0.288***	−0.276***	−0.531***
		(0.038)	(0.054)	(0.061)
Numeracy (mean-centered)		−0.252***	−0.200***	−0.129**
		(0.037)	(0.063)	(0.063)
Used mortgage broker (de-meaned)		0.088**	−3.014*	
		(0.037)	(1.757)	
Have and will use broker (de-meaned)				−0.139*
				(0.081)
Mortgage experience × Lump sum		0.169*		0.201
		(0.098)		(0.161)
Financial literacy × Lump sum		−0.116		−0.1
		(0.071)		(0.11)

(*Continued*)

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Table 7. (*Continued*)

Dependent variable:	OLS	OLS	IV-GMM	OLS
Absolute Deviation	(1)	(2)	(3)	(4)
Numeracy × Lump sum		0.186***		0.089
		(0.071)		(0.114)
Used broker × Lump sum		−0.099		
		(0.07)		
Have and will use broker × Lump sum				−0.045
				(0.155)
Female		−0.286***	−0.248***	−0.252***
		(0.037)	(0.057)	(0.062)
Age				
(base level 25–29 years)				
30–34		0.191***	0.528**	0.326***
		(0.058)	(0.215)	(0.086)
35–39		0.410***	0.950***	0.481***
		(0.07)	(0.318)	(0.1)
40–44		0.122*	0.522**	0.184*
		(0.069)	(0.236)	(0.097)
45–49		0.264***	0.695***	0.518***
		(0.067)	(0.264)	(0.107)
50–54		0.440***	0.265*	0.800***
		(0.078)	(0.145)	(0.164)
55–59		0.315***	0.025	1.051***
		(0.069)	(0.197)	(0.168)
60–64		0.449***	0.066	0.508***
		(0.07)	(0.243)	(0.148)
Household weekly income				
(Base $1000–$1249 p.w.)				
$1250–$1499		−0.104	−0.031	−0.239
		(0.081)	(0.124)	(0.153)
$1500–$1999		−0.242***	−0.389***	−0.480***
		(0.069)	(0.124)	(0.134)
$2000–$2499		−0.258***	−0.311***	−0.268*
		(0.075)	(0.106)	(0.15)
$2500–$2999		−0.265***	−0.178	−0.467***
		(0.083)	(0.124)	(0.159)
$3000–$3499		−0.252***	−0.412***	−0.828***
		(0.093)	(0.148)	(0.159)

(*Continued*)

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Table 7. (*Continued*)

Dependent variable:	OLS	OLS	IV-GMM	OLS
Absolute Deviation	(1)	(2)	(3)	(4)
$3500–$3999		−0.629***	−0.581***	−0.805***
		(0.087)	(0.132)	(0.149)
$4000–$4999		−0.329***	0.5	−0.744***
		(0.106)	(0.511)	(0.19)
$5000+		−0.478***	−0.544***	−0.778***
		(0.093)	(0.155)	(0.175)
Partnered		0.146***	0.451**	0.533***
		(0.042)	(0.187)	(0.07)
Bachelor degree or higher		0.404***	0.417***	0.636***
		(0.035)	(0.054)	(0.056)
Risk aversion above average		−0.345***	−0.481***	−0.420***
		(0.038)	(0.098)	(0.062)
Patience above average		0.153***	0.175***	0.204***
		(0.033)	(0.051)	(0.053)
Employed		0.231***	0.668***	0.635***
		(0.042)	(0.257)	(0.073)
Constant	1.108***	0.761***	0.064	0.069
	(0.018)	(0.09)	(0.425)	(0.172)
R^2	0.15	0.23	−0.276	0.297
Observations	9980	9980	9980	4640
First stage test statistics IV-GMM	Under-ident'n	Weak ident'n		
Use broker (mean centered)	F(2,9948)	SW $\chi^2(2)$		
	7.93***	15.90***		
Second stage test statistics IV-GMM	Under-ident'n	Weak ident'n	Hansen J test	
	Kleibergen-Paap LM	Cragg-Donald F	$\chi^2(1)$ *p*-value	
	16.02***	7.33	0.015	

calibrating lump sums and repayment streams. We now turn to the question of which borrowers engage brokers.

5.3 Characteristics of mortgage broker clients

In this section, we identify the differences between participants who have gone to mortgage brokers for advice in the past and who intend to consult brokers in the future, either again or for the first time. While the predictors of financial literacy are well established by other studies, it is less clear what types of borrowers go to mortgage brokers.

In Table 8 we summarize the characteristics of participants from this sample who have consulted brokers, and those who have not yet, but intend to. Column 1 shows marginal effects from a logit model that predicts the probability that a survey participant has used a broker in the past, conditional on a range of financial literacy measures, demographics,

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Table 8. Marginal effects: Logit estimation of broker use. This table reports analysis of mortgage broker use. The model in column 1 is estimated on the full survey sample ($n = 999$). It shows marginal effects from a logit regression of the indicator for previously consulting a mortgage broker on participant characteristics. Column 2 reports p-values for the tests that the differences in predictive margins reported in column 1 are insignificantly different from zero using delta-method standard errors. The model in column 3 is estimated on the sub-sample of participants who have not previously consulted a mortgage broker ($n = 446$). It shows marginal effects from a logit regression of an indicator that the participant says that they intend to consult a mortgage broker in the future on participant characteristics. Column 4 reports p-values for the tests that the differences in predictive margins reported in column 3 are zero using delta-method standard errors. Online Appendix C reports the underlying logit estimation results. Variable definitions are shown in Table 4. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

	Have used broker		Will use broker|No past use	
	55.4%		24.2%	
	Marginal Effect		Marginal Effect	
Base probability	% change	p-value	% change	p-value
Financial Literacy (High v. Low)	4.0	0.234	0.1	0.988
Numeracy (High v. Low)	1.4	0.696	−5.0	0.172
Female (v. Male)	−0.02	0.995	−1.2	0.767
Young Age (<45 v. 45+)	16.6***	0.000	5.3	0.324
Weekly income (< $2000 v. > $2000)	−5.3 *	0.087	10.0	0.796
Partnered (v. single)	8.0**	0.021	5.9*	0.092
Bachelor degree or higher (v. lower)	−0.9	0.394	−0.9	0.823
Risk aversion (above mean v. below mean)	−4.7	0.164	−7.8*	0.055
Patience (above mean v. below mean)	1.7	0.588	−2.0	0.611
Employed (v. not employed)	7.8*	0.073	5.6	0.247
Monotonic task responses (v. non-monotonic)	1.6	0.141	−5.1*	0.141
Mortgage experience (v. intended future mortgage)	40.6***	0.000	−43.9***	0.000
Upside house price risk (High v. Low)	−4.3	0.447	11.2	0.101
Downside house price risk (High v. Low)	15.3**	0.019	0.7	0.936
Upside price risk|Mortgage experience (High v. Low)	1.3	0.831	1.7	0.790
Upside price risk|No experience (High v. Low)	−25.8**	0.038	33.5*	0.067
Downside price risk|Mortgage experience (High v. Low)	13.3**	0.048	13.4	0.160
Downside price risk|No experience (High v. Low)	20.8	0.186	−26.7	0.155
Observations	999		446	

preference indicators and a measure of participants' estimates of the chance of upwards or downwards house price changes. (The online appendix reports the full results from the logit estimation.) The unconditional probability of having used a broker is 55.4%. Participants in the 25–44 year age group are 16.6 percentage points more likely than the 45–64 year group to have used a mortgage broker. Participants who report higher incomes, who are partnered or who are employed are also significantly more likely to have used a broker, consistent with brokers being the choice of people who have higher borrowing capacity. Unsurprisingly, participants who have a current mortgage, or have taken one in the past, are 40.6 percentage points more likely to have consulted a broker than participants who are yet to actually take out a loan.

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If clients consult brokers partly to lower their anxiety, participants who perceive house prices as more risky may be more likely to look for reassurance from a broker-adviser, as theorised by Gennaioli et al. (2015). Survey responses can help us gauge participants' subjective risk perceptions about the housing market. The survey collected participants' estimates of the chances of a range of changes in house prices 5 years from the time of the survey. We use responses to the following questions to make a proxy variable for participants' beliefs about upside and downside risk to house values: "On a scale from 0 percent to 100 percent where 0 means that you think there is no chance and 100 means that you think the event is absolutely sure to happen, what do you think are the chances that 5 years from now the value of your home ("homes in your postcode" for participants who do not yet own a home) will have gone up (down) by more than 10 (and 20) percent?". We computed upside (downside) perceived house price risk as the weighted sum of the two probabilities that each participant assigned to the 10 and 20 percent house price rises (falls) where weights are squared percentage house prices changes.

The outcomes are two variables that proxy for individuals' subjective house price semivariances on a scale between 0 and 5. The mean of the upside risk variable is 2.4 and the mean of the downside risk variable is 1.5, with a standard deviation of 1.3 in both cases. Marginal effects reported in column 1 of Table 8 show that as the downside house price risk variable rises from its minimum (0) to its maximum (5) the likelihood of having used a broker rises by 15.3 percentage points, while the marginal effect of the upside risk variable is insignificant. When we break this effect out by the group of participants who have previously taken a mortgage versus those who have not, we see a difference between upside and downside price changes. Higher probability of broker use is related to higher perception of downside house price risk among the group who are already home owners. (Only 48 participants have previously consulted a broker but have not taken a mortgage.) But lower probability of having used a broker is related to a higher perception of upside house price risk among those who have not yet borrowed.

To explore this further, in column 2 of Table 8 we report marginal effects from a logit model estimated on the subset of 446 survey participants who have not yet consulted a mortgage broker. This model estimates the probability that a participant who had not yet consulted a broker intends to do so in the future versus not intending to. The unconditional probability of intending to consult a broker is 24.2%. We again find that having had a mortgage previously matters. In this case we see a significantly lower likelihood that a participant plans to go to a broker if they have already had a mortgage without using a broker. In terms of house price risk perception, we find that participants who have not previously had a mortgage, but who assign high probabilities to *rising* house prices, are more likely to plan to use a broker. The marginal effect is 33.5 percentage points as the upside risk proxy increases from 0 to 5.

One interpretation of these effects is that past or intended broker users perceive more risk than non-broker users. When this group is yet to buy a home, their risk perception manifests in concern that rising house prices will outpace their capacity to get a loan. Once they own a home, the focus of their risk perception shifts to falling home asset (and wealth) values. Overall, we can conclude that higher subjective risk perception, although not higher measured risk aversion, is associated with engagement with brokers. The effect of higher risk perception is some support for the prediction that borrowers turn to advisers for "peace of mind".

6. Conclusion

Residential real estate assets and liabilities absorb the majority of household balance sheets, so households that can choose serviceable debts, and that can withstand shocks to income, are more likely to stay out of repayment stress. In this study, we investigated

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three factors that can impact households' ability to make sound choices of residential mortgages: choice architecture in the form of framing loans as lump sum debts or monthly repayments, financial literacy, and financial advice in the form of consultation with a mortgage broker. We conducted a large scale survey of people who have taken, or intend to take out, a mortgage. Our survey collected an array of information about participants, including financial literacy and numeracy, experience with brokers, and expectations about house prices. In a series of randomly assigned tasks, we collected participants' subjective comfort with a range of home loan amounts, framed as lump sum debts or equivalent repayment streams. We also investigated the extent to which borrowers realistically match debts and repayments. We found significant impacts of financial literacy, interaction with mortgage brokers, and framing.

We show that framing home loans as repayment streams makes borrowers feel more comfortable with loans. This is important because many loan calculators emphasize the repayment obligations of debts more than lump sum size. We also demonstrate that higher financial literacy and numeracy are related to more discomfort with mortgage debt overall and less susceptibility to framing and to better calibration between lump sums and repayment streams. [6]

However, interaction with mortgage brokers has very different effects from financial literacy. People who have consulted advisers, in this case mortgage brokers, report higher levels of comfort with debt in general, and less discomfort with lump sums compared to repayment streams. Brokers also seem to help clients better grasp the link between loan amounts and repayments. Thus while brokers increase clients' confidence and probably improve their understanding of home loans, brokers also appear to be able to influence clients toward comfort with debt. Higher client comfort with debt also facilitates the volume and loan-term based remuneration received by brokers from lenders. A follow-up survey confirmed that participants who had been clients of brokers were willing to increase loan size significantly more than participants who had not consulted brokers.[7]

We explored the characteristics of participants who have, and intend to, consult mortgage brokers and found evidence that the borrowers who consult brokers perceive more risk in house prices than those who do not use brokers. Thus, consistent with Gennaioli et al. (2015), the search for "peace of mind" is likely to motivate borrowers to turn to mortgage brokers.

Our results have several implications for practice and policy. First, financial education is likely to improve household mortgage decisions and reduce mortgage stress by inducing caution in borrowers and reducing susceptibility to framing. Second, our finding that choice architecture can motivate different reactions to debt and repayment streams indicates that any focus on short-run debt servicing should be matched with information about total debt. It should highlight possible variation in repayment capacity when interest rates change or households experience income shocks. Third, the significant influence of brokers on attitudes to, and understanding of, mortgage debts means that incentive alignment between brokers and clients matters.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/flw.2023.3

[6] This survey was fielded in April 2021. The Online Appendix D reports the design, sample characteristics and key results.

[7] The follow up survey of 1601 new participants used an entirely between-subjects design. See results in Table D4 in Online Appendix D.

References

Agarwal, S., I. Ben-David, and V. Yao. 2017. "Systematic Mistakes in the Mortgage Market and Lack of Financial Sophistication." *Journal of Financial Economics* 123(1): 42–58.

Agarwal, S., J. C. Driscoll, X. Gabaix, and D. Laibson. 2009. "The Age of Reason: Financial Decisions over the Life Cycle and Implications for Regulation." *Brookings Papers on Economics Activity Fall*, 51–101.

Agarwal, S., C. H. Liu, W. N. Torous, and V. Yao. 2021. "The Mistakes People Make: Financial Decision Making When Buying and Owning a Home." MIT Center for Real Estate Research Paper 21/09.

Agnew, J. R., H. Bateman, C. Eckert, F. Iskhakov, J. Louviere, and S. Thorp. 2018. "First Impressions Matter: An Experimental Investigation of Online Financial Advice." *Management Science* 64(1): 288–307.

Agnew, J. R., H. Bateman, and S. Thorp. 2013. "Financial Literacy and Retirement Planning in Australia." *Numeracy* 6(2): 7.

Akerlof, G. A. and R. J. Shiller. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton University Press, 2010.

Alexander, W. P., S. D. Grimshaw, G. R. McQueen, and B. A. Slade. 2002. "Some Loans are more Equal than Others: Third–Party Originations and Defaults in the Subprime Mortgage Industry." *Real Estate Economics* 30(4): 667–697.

Ambrose, B. W., J. N. Conklin, and L. A. Lopez. 2021. "Does Borrower and Broker Race Affect the Cost of Mortgage Credit?" *Review of Financial Studies* 34(2): 790–826.

Andersen, S., J. Y. Campbell, K. M. Nielsen, and T. Ramadorai. 2020. "Sources of Inaction in Household Finance: Evidence from the Danish Mortgage Market." *American Economic Review* 110(10): 3184–3230.

ANZ CoreLogic. 2022. *ANZ CORELOGIC Housing Affordability Report*. Accessed October 20, 2022, https://news.anz.com/posts/2022/08/anz-news-corelogic-housing-affordability-report-aug-2022

Australian Bureau of Statistics (ABS). *Household Income and Wealth, Australia*. Australian Bureau of Statistics, 2019-20a.

Australian Bureau of Statistics (ABS). *Housing Occupancy and Costs*. Australian Bureau of Statistics, 2019-20b.

Australian Bureau of Statistics (ABS). *Lending indicators, October 2020*. Australian Bureau of Statistics, 2020.

Australian Competition and Consumer Commission (ACCC). Home Loan Price Inquiry - Interim Report. *Australian Competition and Consumer Commission*, 2020.

Australian Government Productivity Commission (Productivity Commission). *Competition in the Australian Financial System. Productivity Commission Inquiry Report*, no. 89, 2018.

Australian Securities and Investments Commission (ASIC). *ASIC Consumer Financial Confidence Survey*. Australian Securities and Investments Commission, 2011.

Australian Securities and Investments Commission (ASIC). *Productivity Commission Inquiry into Competition in the Australian Financial System: Submission by ASIC*. Australian Securities and Investments Commission, 2017a.

Australian Securities and Investments Commission (ASIC). *REP 516 Review of Mortgage Broker Remuneration*. Australian Securities and Investments Commission, 2017b.

Australian Securities and Investments Commission (ASIC). *REP 628 Looking for a mortgage: Consumer Experiences and Expectations in Getting a Home Loan*. Australian Securities and Investments Commission, 2019.

Badarinza, C., V. Balasubramaniam, and T. Ramadorai. 2019. "The Household Finance Landscape in Emerging Economies." *Annual Review of Financial Economics* 11: 109–129.

Badarinza, C., J. Y. Campbell, and T. Ramadorai. 2016. "International Comparative Household Finance." *Annual Review of Economics* 8: 111–144.

Badarinza, C., J. Y. Campbell, and T. Ramadorai. "What Calls to ARMs? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages." *Management Science* 64(5): 2275–2288.

Bajo, E. and M. Barbi. 2018. "Financial Illiteracy and Mortgage Refinancing Decisions." *Journal of Banking & Finance* 94: 279–296.

Bank for International Settlements (BIS). *Real Residential Property Prices for Australia [QAUR628BIS]*, 2022. Accessed from FRED, Federal Reserve Bank of St. Louis, October 20, 2022. https://fred.stlouisfed.org/series/QAUR628BIS.

Basu, S. and S. Ng. 2021. "100 a Month or 1,200 a Year? Regulatory Focus and the Evaluation of Temporally Framed Attributes." *Journal of Consumer Psychology* 31(2): 301–318.

Bergstresser, D. and J. Beshears. *Who Selected Adjustable-Rate Mortgages? Evidence from the 1989-2007 Surveys of Consumer Finances*. Harvard Business School Working Paper 10-083, 2010.

Bhutta, N., A. Fuster, and A. Hizmo. *Paying Too Much? Price Dispersion in the US Mortgage Market*. Technical report, Washington: Board of Governors of the Federal Reserve System, 2020. https://doi.org/10.17016/FEDS.2020.062.

Bucks, B. and K. Pence. 2008. "Do Borrowers Know Their Mortgage Terms?" *Journal of Urban Economics* 64(2): 218–233.

Calcagno, R. and C. Monticone. 2015. "Financial Literacy and the Demand for Financial Advice." *Journal of Banking & Finance* 50: 363–380.

Campbell, J. Y. 2006. "Household Finance." *Journal of Finance* 61(4): 1553–1604.

https://doi.org/10.1017/flw.2023.3 Published online by Cambridge University Press

Campbell, J. Y. and J. F. Cocco 2003. "Household Risk Management and Optimal Mortgage Choice." *Quarterly Journal of Economics* 118(4): 1449–1494.
Campbell, J. Y., H. E. Jackson, B. C. Madrian, and P. Tufano. 2011. "Consumer Financial Protection." *Journal of Economic Perspectives* 25(1): 91–114.
Cheng, P., Z. Lin, and Y. Liu. 2011. "Do Women Pay More for Mortgages? *Journal of Real Estate Finance and Economics* 43(4): 423–440.
Chung, S. *Mortgage Choice and Consumption and Investment Behaviour*. PhD thesis, The University of Sydney, 2022.
Cocco, J. F. 2005. "Portfolio Choice in the Presence of Housing." *The Review of Financial Studies* 18(2), 535–567.
Conklin, J. N. 2017. "Financial Literacy, Broker–Borrower Interaction and Mortgage Default." *Real Estate Economics* 45(2): 376–414.
Courchane, M., A. Gailey, and P. Zorn. 2008. "Consumer Credit Literacy: What Price Perception?" *Journal of Economics and Business* 60(1-2): 125–138.
Cox, R., D. Brounen, and P. Neuteboom. 2015. "Financial Literacy, Risk Aversion and Choice of Mortgage Type by Households." *Journal of Real Estate Finance and Economics* 50(1): 74–112.
De La Rosa, W., A. B. Sussman, E. Giannella, and M. Hell. 2022. "Communicating Amounts in Terms of Commonly Used Budgeting Periods Increases Intentions to Claim Government Benefits." *Proceedings of the National Academy of Sciences* 119(37): e2205877119.
Deloitte. *Customer Experiences of Using Mortgage Brokers: Report Prepared for the Mortgage and Finance Association of Australia by Deloitte*, 2016. Accessed from Deloitte, October 22, 2022. https://www2.deloitte.com/content/dam/Deloitte/au/Documents/financial-services/deloitte-au-fs-home-loan-preferences-041116.pdf.
Deloitte Access Economics. *The Value of Mortgage Broking*, 2018. Accessed from Deloitte, October 22, 2022. https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-value-mortgage-broking-230718.pdf.
Duca, J. V. and A. Kumar. 2014. "Financial Literacy and Mortgage Equity Withdrawals." *Journal of Urban Economics* 80: 62–75.
Elul, R., N. S. Souleles, S. Chomsisengphet, D. Glennon, and R. Hunt. 2010. "What "Triggers" Mortgage Default?" *American Economic Review* 100(2): 490–494.
Engels, C., K. Kumar, and D. Philip. 2020. "Financial Literacy and Fraud Detection." *The European Journal of Finance* 26(4-5): 420–442.
Foote, C. L., L. Loewenstein, and P. S. Willen. 2021. "Cross-Sectional Patterns of Mortgage Debt during the Housing Boom: Evidence and Implications." *Review of Economic Studies* 88(1): 229–259.
Garmaise, M. J. 2015. "Borrower Misreporting and Loan Performance." *Journal of Finance* 70(1): 449–484.
Gathergood, J. and J. Weber. 2017a. "Financial Literacy: A Barrier to Home Ownership for the Young?" *Journal of Urban Economics* 99: 62–78.
Gathergood, J. and J. Weber. 2017b. "Financial Literacy, Present Bias and Alternative Mortgage Products." *Journal of Banking & Finance* 78: 58–83.
Gennaioli, N., A. Shleifer, and R. Vishny. 2015. "Money Doctors." *Journal of Finance* 70(1): 91–114.
Gerardi, K., L. Goette, and S. Meier. 2013. "Numerical Ability Predicts Mortgage Default." *Proceedings of the National Academy of Sciences* 110(28), 11267–11271.
Goda, G. S., C. F. Manchester, and A. J. Sojourner. 2014. "What Will My Account Really Be Worth? Experimental Evidence on How Retirement Income Projections Affect Saving." *Journal of Public Economics* 119: 80–92.
Goldstein, D. G., H. E. Hershfield, and S. Benartzi. 2016. "The illusion of wealth and its reversal." *Journal of Marketing Research* 53(5): 804–813.
Gomes, F., M. Haliassos, and T. Ramadorai. 2021. "Household Finance." *Journal of Economic Literature* 59(3): 919–1000.
Guiso, L., A. Pozzi, A. Tsoy, L. Gambacorta, and P. E. Mistrulli. 2022. "The Cost of Steering in Financial Markets: Evidence from the Mortgage Market." *Journal of Financial Economics* 143(3): 1209–1226.
Hackethal, A., M. Haliassos, and T. Jappelli. 2012. "Financial Advisors: A Case of Babysitters?" *Journal of Banking & Finance* 36(2): 509–524.
Hershfield, H. E., S. Shu, and S. Benartzi. 2020. "Temporal Reframing and Participation in a Savings Program: A Field Experiment." *Marketing Science* 39(6): 1039–1051.
Huston, S. J. 2012. "Financial Literacy and the Cost of Borrowing." *International Journal of Consumer Studies* 36(5): 566–572.
Jiang, W., A. A. Nelson, and E. Vytlacil. 2014. "Liar's Loan? Effects of Origination Channel and Information Falsification on Mortgage Delinquency." *Review of Economics and Statistics* 96(1): 1–18.
Johnson, E. J., S. B. Shu, B. G. C. Dellaert, C. Fox, D. G. Goldstein, G. Häubl, R. P. Larrick, J. W. Payne, E. Peters, and D. Schkade. 2012. "Beyond Nudges: Tools of a Choice Architecture." *Marketing Letters* 23: 487–504.
Jordà, Ò., M. Schularick, and A. M. Taylor. 2016. "The Great Mortgaging: Housing Finance, Crises and Business Cycles." *Economic Policy* 31(85): 107–152.

https://doi.org/10.1017/flw.2023.3 Published online by Cambridge University Press

Kraft, H., C. Munk, and S. Wagner. 2018. "Housing Habits and Their Implications for Life-Cycle Consumption and Investment." *Review of Finance* 22(5): 1737–1762.
Kramer, M. M. 2016. "Financial Literacy, Confidence and Financial Advice Seeking." *Journal of Economic Behavior & Organization* 131: 198–217.
LaCour-Little, M. 2009. "The Pricing of Mortgages by Brokers: An Agency Problem?" *Journal of Real Estate Research* 31(2): 235–263.
Lipkus, I. M., G. Samsa, and B. K. Rimer. 2001. "General Performance on a Numeracy Scale among Highly Educated Samples." *Medical Decision Making* 21(1): 37–44.
Lusardi, A. and C. de Bassa Scheresberg. "Financial Literacy and High-Cost Borrowing in the United States." NBER Working Paper No. 18969, National Bureau of Economic Research, 2013.
Lusardi, A., P.-C. Michaud, and O. S. Mitchell. 2017. "Optimal Financial Knowledge and Wealth Inequality." *Journal of Political Economy* 125(2): 431–477.
Lusardi, A. and O. S. Mitchell. 2007a. "Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth." *Journal of Monetary Economics* 54(1): 205–224.
Lusardi, A. and O. S. Mitchell. 2007b. "Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education." *Business Economics* 42(1): 35–44.
Lusardi, A. and O. S. Mitchell. 2011. "Financial Literacy around the World: An Overview." *Journal of Pension Economics and Finance* 10(04): 497–508.
Lusardi, A. and O. S. Mitchell. 2014. "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature* 52(1): 5–44.
Lusardi, A. and P. Tufano. 2015. "Debt Literacy, Financial Experiences, and Overindebtedness." *Journal of Pension Economics & Finance* 14(4): 332–368.
Mitchell, O. S. and K. Smetters. *The Market for Retirement Financial Advice*. Oxford University Press, 2013.
National Association of Realtors. *Housing Affordability Index (Fixed) [FIXHAI]. retrieved from FRED*, Federal Reserve Bank of St. Louis, 2022. Accessed on October 20, 2022. https://fred.stlouisfed.org/series/FIXHAI.
OECD. *Housing Taxation in OECD Countries. OECD Tax Policy Studies*, No. 29, Paris, 2022.
Reserve Bank of Australia (RBA). *Financial Stability Review – April 2019*. Reserve Bank of Australia, 2019.
Reserve Bank of Australia (RBA). *Statistical Tables F6 - Housing Lending, series FLRHOFVA*. Reserve Bank of Australia, 2020.
Reserve Bank of Australia (RBA). *Statement on Monetary Policy - November 2021*. Reserve Bank of Australia, 2021.
Robles-Garcia, C. *Competition and incentives in mortgage markets: The role of brokers*. Unpublished Working Paper, 2020. https://economics.sas.upenn.edu/system/files/2020-09/.
Sedgwick, S. *Retail Banking Remuneration Review Report*. Australian Banking Association, 2017.
Thaler, R. H. and C. R. Sunstein. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven, CT: Yale University Press, 2008.
Van Ooijen, R. and M. C. van Rooij. 2016. "Mortgage Risks, Debt Literacy and Financial Advice." *Journal of Banking & Finance* 72: 201–217.
Van Rooij, M., A. Lusardi, and R. Alessie. 2011. "Financial Literacy and Stock Market Participation." *Journal of Financial Economics* 101(2): 449–472.
Woodward, S. E. and R. E. Hall. 2012. "Diagnosing Consumer Confusion and Sub-Optimal Shopping Effort: Theory and Mortgage-Market Evidence." *American Economic Review* 102(7): 3249–3276.
Worthington, A. C. 2009. "The Usage and Understanding of Australian Household Mortgages." *International Journal of Housing Markets and Analysis* 2(4): 347–362.
Zhang, Y., R. T. Wilcox, and A. Cheema. 2020. "The Effect of Student Loan Debt on Spending: The Role of Repayment Format." *Journal of Public Policy & Marketing* 39(3): 305–318.

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