Psychology and Economics Field Exam

August 2021

There are 3 questions on the exam. Please answer the 3 questions to the best of your ability. Do not spend too much time on any one part of any problem (especially if it is not crucial to answering the rest of that problem), and don't stress too much if you do not get all parts of all problems. The exam is closed book.

1 Question 1: Reference Dependence

Consider the setting of a reference-dependent house owner who decides to sell her house. As in the model we discussed in 219B, assume a reference-dependent utility with reference point being the initial purchase price P_0

$$v\left(P|P_0\right) = \begin{cases} P + \eta(P - P_0) & \text{if } P \geq P_0; \\ P + \eta\lambda(P - P_0) & \text{if } P < P_0, \end{cases}$$

Assume that the owner maximizes expected utility as in

$$\max_P p(P) v\left(P|P_0\right) + \left(1 - p\left(P\right)\right)\bar{U},$$

where $p(P)$, the probability of sale, is decreasing, capturing the fact that a higher sale price lowers the probability of sale; $\bar{U}$ indicates the outside option in the case the sale falls through.

1.1 Explain what parameters η and λ capture. What are typical parametrizations of these parameters in the literature, if you can recall them? Also, how does this formulation, which builds on Koszegi and Rabin (2009), differ from the original prospect theory formulation of Kahneman and Tversky (1979)?

1.2 Present now features of the solution of the problem above, assuming $\lambda > 1$. Write down the first-order condition, assume that the second-order conditions are satisfied, and discuss the different cases of the solution. Specifically, what is the impact of the initial purchase price P_0 on the optimal sale price P^*?

1.3 Now consider the evidence in Genesove and Mayer (2001). They observe for a set of condos in Boston the listing price $L_{i,t}$, the last purchase price P_0, observable characteristics of the property X_i and time trends in house prices δ_t. Based on X_i and δ_t, they predict $\hat{P}_{i,t}$, the predicted market value of property i at time t. They estimate

$$L_{i,t} = \beta X_i + \delta_t + m 1_{\hat{P}_{i,t} < P_0} \left(P_0 - \beta X_i - \delta_t\right) + \varepsilon_{i,t}$$

Explain how this specification *aims* to capture the impact of loss aversion, what term in the regression above captures it in particular? How well does this specification correspond to the model set out above? What predictions of the reference-dependent model are they testing, and which ones not?

1.4 The estimate is Column 1 of Table II from the paper. What does the LOSS term (corresponding to m in the equation above) indicate? Why is it important to control for the Loan-to-Value (LTV), which is the ratio of the mortgage to the value of the home?

TABLE II
LOSS AVERSION AND LIST PRICES
DEPENDENT VARIABLE: LOG (ORIGINAL ASKING PRICE),
OLS equations, standard errors are in parentheses.

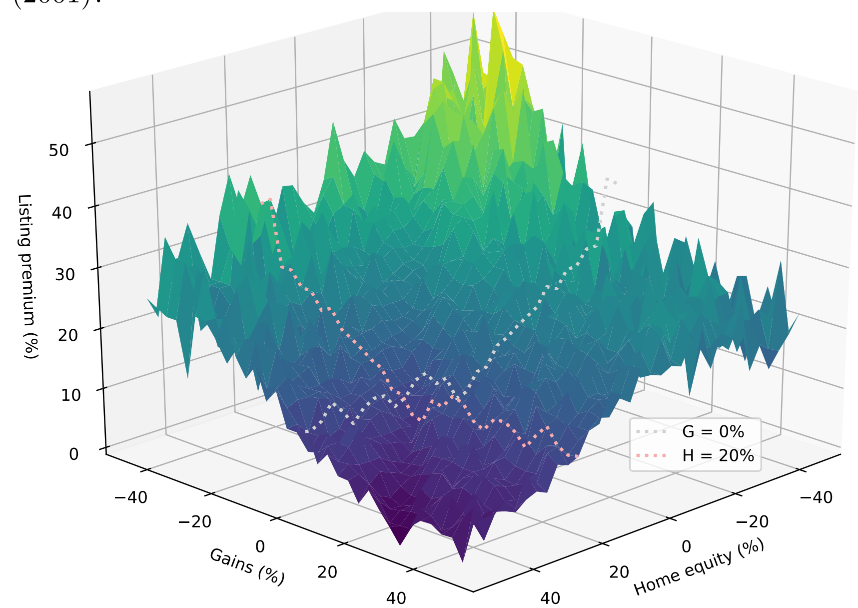
Variable	(1) All listings	(2) All listings	(3) All listings	(4) All listings	(5) All listings	(6) All listings
LOSS	0.35	0.25	0.63	0.53	0.35	0.24
	(0.06)	(0.06)	(0.04)	(0.04)	(0.06)	(0.06)
LOSS-squared			−0.26	−0.26		
			(0.04)	(0.04)		
LTV	0.06	0.05	0.03	0.03	0.06	0.05
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Estimated value in 1990	1.09	1.09	1.09	1.09	1.09	1.09
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Estimated price index at quarter of entry	0.86	0.80	0.91	0.85		
	(0.04)	(0.04)	(0.03)	(0.03)		
Residual from last sale price		0.11		0.11		0.11
		(0.02)		(0.02)		(0.02)
Months since last sale	−0.0002	−0.0003	−0.0002	−0.0003	−0.0002	−0.0003
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dummy variables for quarter of entry	No	No	No	No	Yes	Yes
Constant	−0.77	−0.70	−0.84	−0.77	−0.88	−0.86
	(0.14)	(0.14)	(0.13)	(0.14)	(0.10)	(0.10)
R^2	0.85	0.86	0.86	0.86	0.86	0.86
Number of observations	5792	5792	5792	5792	5792	5792

1.5 Explain intuitively why in Column 2 they estimate an alternative specification

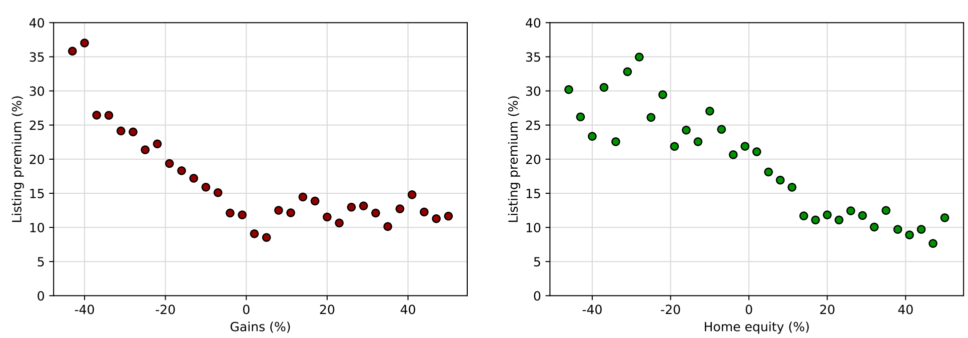
$$L_{i,t} = \beta X_i + \delta_t + \alpha \left(P_0 - \beta X_i - \delta_t\right) + m 1_{\hat{P}_{i,t} < P_0} \left(P_0 - \beta X_i - \delta_t\right) + \varepsilon_{i,t}.$$

In what sense does this specification work as a bound?

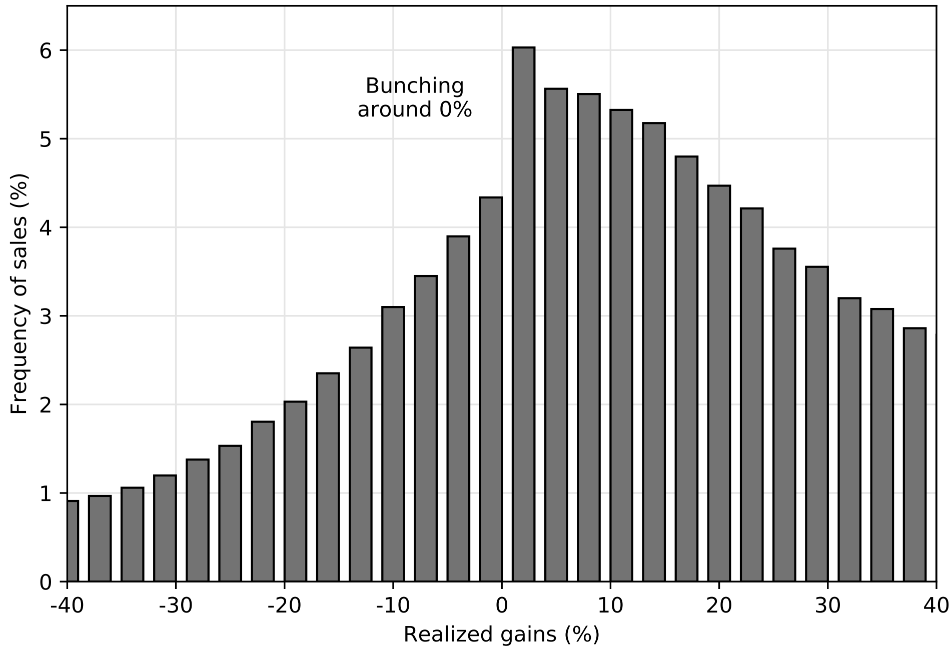
1.6 Consider now the Andersen, Badarinza, Liu, Marx, and Ramadorai (2020) paper which uses an administrative data set of house sales in Denmark for 1992-2016 with 217,028 listings. They compute $ln(\hat{P})$ with hedonic model, similar to the above. They compute the predicted gain $\widehat{ln(G)} = ln(\hat{P}) - ln(P_0)$, as well as the mortgage exposure, similar to the LTV measure above: mortgage exposure $ln(\hat{P}) - ln(M)$. This figure displays on the y axis the sales price (computed as log premium over the estimated sales price) as a function of these two key variables, the predicted gain, and the mortgage exposure. Below, the figure reports the marginals visible also in the figure above. Consider in particular the marginal on the left which relates the price of sale to the predicted gain. How does the "hockey stick" pattern relate to reference dependence and the findings in Genesove and Mayer (2001)?



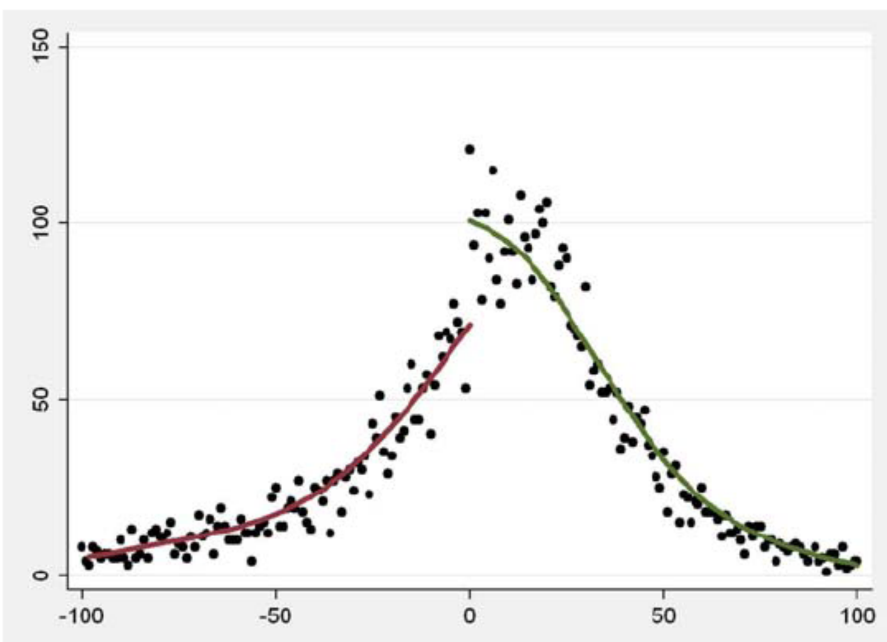
Panel B: Listing premia moments



1.7 The authors also consider the distribution of the selling price relative to the listing price (realized gains), in the figure below. What do we learn from this graph? Relate this to your discussion of points 1.2 and 1.3.



1.8 Consider now a different paper and context, merger offer from Baker, Pan and Wurgler. The plot below plots the distribution of the merger offer price that the acquirer offers for the target, relative to the reference point, which is the 52-week high price for the target. What does this plot indicate? Comment on the similarities or differences to the plot in the point above.



2 Question 2: Short Questions

2.1 Relative to full-information rational expectations, survey data on macroeconomic expectations often exhibit the following pattern: individual forecast overreacts to macroeconomic news (Bordalo, Gennaioli, Ma, and Shleifer, 2020), while the average forecast under-reacts to macroeconomic news (Coibion and Gorodnichenki, 2012 & 2015). Describe a unified framework that can explain both phenomena.

2.2 Use your favorite model of imperfect strategic interaction to explain the sluggish response of price level to a monetary supply shock.

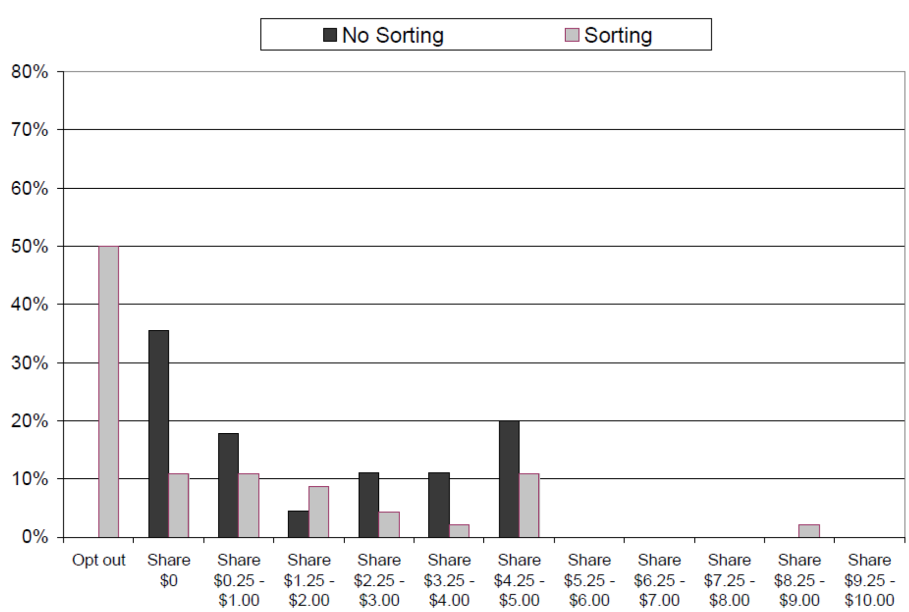
2.3 Briefly explain how ambiguity aversion differs from the standard risk aversion. What type of economic behavior can ambiguity aversion capture?

2.4 Empirical evidence shows that consumers sometimes still exhibit excess sensitivity to current income away from liquidity constraints (e.g., Fagereng, Holm, and Natvik, 2020). Discuss whether and how hyperbolic discounting and mental accounting can explain this evidence.

2.5 Empirical evidence shows that people are often averse to a small, independent gamble, even when the gamble is actuarially favorable (e.g., Barberis, Huang, and Thaler, 2006). Can loss aversion alone explain this empirical evidence? Do we need any other behavioral element?

2.6 This is the distribution of giving in Lazear, Malmendier, and Weber (2012) comparing a standard dictator game and a dictator game with sorting, which allows an option to have $10 without the other player knowing there is a dictator game. Describe the patterns in the data, and what they imply for models of social preferences.

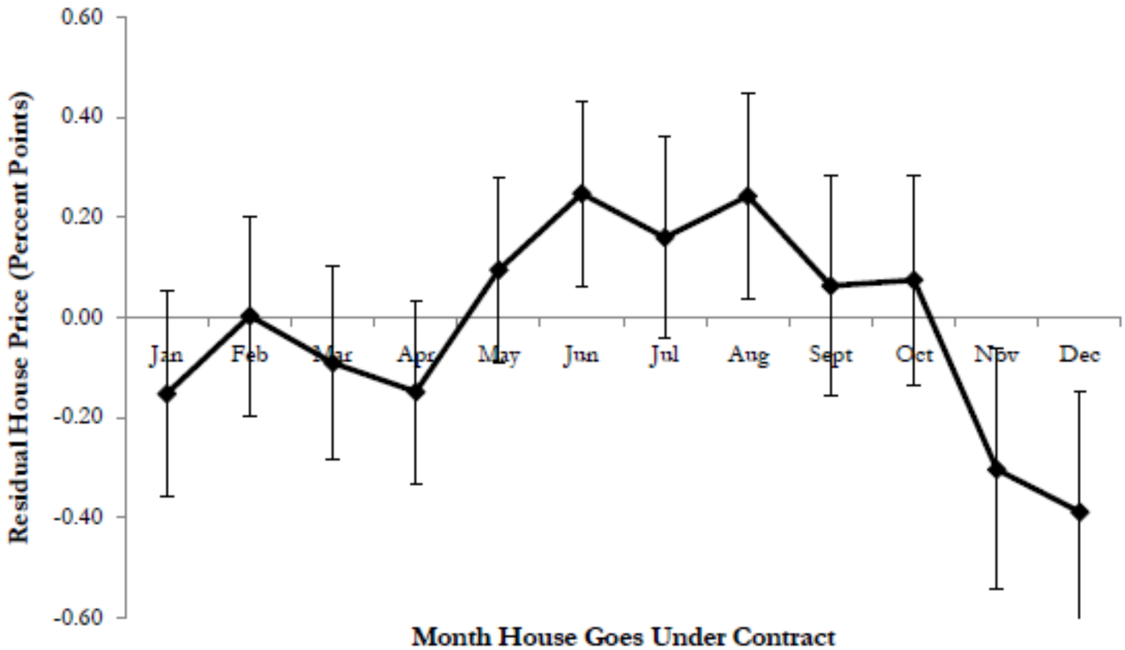
Figure 1A. Distributions of Amounts Shared
(Experiment 1, Berkeley)



2.7 Reproduced below is the pattern from Busse, Pope, Pope, Silva-Risso (2013) on the sale price of houses with swimming pools as a function of the month of sale. Relate to projection bias if appropriate, and consider also alternative interpretations, and how they may, or may not, fit these patterns.

Figure 11 - Seasonal Value of a Swimming Pool. Panel A shows the average residual values for homes with swimming pools that go under contract during each month of the year. Panel B shows the estimated effect of a swimming pool on a house's residual sales price, conditional on other house characteristics, as estimated by Equation (7). 95% confidence intervals are also presented.

Panel A. Residuals by Month



2.8 Explain intuitively how the noise traders in the De Long et al. (1990) can impact asset prices despite the presence of arbitrageurs.

2.9 Drawing from the material in behavioral development economics (Kremer, Rao, Schilbach, 2020), would you say it is fair to say that the behavioral evidence in developing countries points to very different behavioral deviations than the one in developed countries? Give a couple examples.

3 Question 3: Rational Inattention and Sparsity

In this problem, we will compare two popular approaches to model attention: rational inattention by Sims (2003) and sparsity by Gabaix (2014).

Consider a simple one-dimensional tracking problem under rational attention (Sims, 2003). The decision maker chooses her action a to minimize the difference from the fundamental $\theta \sim \mathcal{N}\left(0, \sigma^2\right)$, subject to costly attention. Specifically, the decision maker's utility is given by

$$-\frac{\omega}{2}\mathbb{E}\left[(a-\theta)^2\right] - \eta I\left(\theta, s\right), \tag{1}$$

where s is her signal about θ, $I\left(\theta, s\right)$ is the cognitive cost measured in terms of mutual information, and ω and η are scalars parametrizing utility costs of tracking errors and attention.

3.1 Let the decision maker's signal s be given by

$$s = \theta + \epsilon,$$

where $\epsilon \sim \mathcal{N}\left(0, \sigma_\epsilon^2\right)$ is independent of θ. Show the cognitive cost of attention, $I\left(\theta, s\right)$, can be written as $I\left(\theta, s\right) = \frac{1}{2}\log_2\left(\frac{1}{1-\lambda}\right)$, where $\lambda = \frac{\sigma^2}{\sigma^2+\sigma_\epsilon^2}$. Give an interpretation of λ.

3.2 Find the decision maker's optimal action a given her signal s.

3.3 Rewrite the expected racking error $\mathbb{E}\left[(a-\theta)^2\right]$ as a function of λ and σ^2. Rewrite the rational inattention problem in (1) as an optimization problem over λ.

3.4 Solve the optimal λ^* as a function of the model's primitives.

3.5 What happened to the optimal λ^* when ω or σ^2 converges to zero? What is the economic interpretation of this result?

3.6 In this simple one-dimensional setting, the sparsity problem in Gabaix (2014) can be written as

$$\max_{\lambda} -\frac{\omega}{2}\mathbb{E}\left[\left(a^s\left(\theta, \lambda\right) - \theta\right)^2\right] - \eta\mathcal{C}\left(\lambda\right), \tag{2}$$

where the sparse action is given by $a^s\left(\theta, \lambda\right) = \lambda\theta$ and the cost of attention is given by $\mathcal{C}\left(\lambda\right) = \lambda^\alpha$. Discuss the similarities and the differences between the problem in (2) and (1).

3.7 Discuss the similarities and the differences between the sparsity problem and the rational inattention problem in a more general multi-dimensional setting.