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Online Supplement to the paper

“Double-question Survey Measures for the Analysis of Financial Bubbles and Crashes”

by

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S1 Introduction

This supplement is organized as follows. Section S2 provides a derivation of the relationship between expected price changes and the valuation indicator, discussed in Section 2 of the paper, for higher order horizons. Section S3 gives the mathematical details of the FE-TE estimators and their standard errors, and Section S4 generalizes the FE-TE filtered estimators of the time-invariant variables proposed in [Pesaran and Zhou \(2016\)](#) to unbalanced panels. Section S5 describes the GMM estimators used for the dynamic panel regressions of realized house price changes across MSAs reported in Section 6 of the paper. Section S6 provides further details of the RAND American Life Panel (ALP) surveys discussed in Section 3 of the paper. Section S7 provides the survey questions, Section S8 gives the details of the truncation filters applied to the responses. Section S9 compares the socio-demographic characteristics and geographic location of the survey respondents and the US population. Section S10 defines US mainland regions referred to in Section 5 of the paper, and Section S11 describes the spatial weight matrix used in the construction of neighboring crash and bubble indicators used in the regressions. Section S12 contains a brief description of Data Sources as well as the files that replicate the

results reported in paper and this supplement. Section S13 provides summary statistics for selected MSA level variables. Section S14 provides estimates of the price expectation-valuation panel regressions, estimated separately for male and female respondents. Section S15 provides the random effect estimates of the model specifications discussed in Section 4 of the paper, and Section S16 provides a comparison of FE and RE estimates. Section S17 gives the FE-TE filtered estimates. Section S18 provides a comparison of the estimates of $\beta^{(h)}$ (defined in Section 4 of the paper) obtained for different model specifications, as well as the corresponding interest rate estimates. Section S19 reports panel regression results including home-ownership dummies, obtained by matching the DQ Surveys with the “Effects of the Financial Crisis” survey, also carried out by RAND. By matching the two surveys we are able to control for the effects of home-ownership on expectations formation.

S2 Relationship between expected price changes and the valuation indicator for higher order horizons

Advancing both sides of equation (9) in the paper one period ahead we first note that,

$$P_{t+1} = \left(\frac{1}{1+r} \right) \sum_{s=1}^n w_s E_s (P_{t+2} | \Omega_{s,t+1}) + \left(\frac{\theta_n}{1+r} \right) D_{t+1},$$

and applying the conditional expectations operator, $E_i (\cdot | \Omega_{it})$ we have

$$E_i (P_{t+1} | \Omega_{it}) = \left(\frac{1}{1+r} \right) \sum_{s=1}^n w_s E_i \{ [E_s (P_{t+2} | \Omega_{s,t+1})] | \Omega_{it} \} + \frac{E_i (\theta_n)}{1+r} D_t e^{g_i}.$$

But by (2) in the paper, we have $E_i [E_s (P_{t+2} | \Omega_{s,t+1}) | \Omega_{it}] = E_i (P_{t+2} | \Omega_{it}) + 2\xi_{it}^{(2)} P_t$, and hence

$$E_i (P_{t+1} | \Omega_{it}) = \left(\frac{1}{1+r} \right) \left[E_i (P_{t+2} | \Omega_{it}) + 2\xi_{it}^{(2)} P_t \right] + \frac{E_i (\theta_n)}{1+r} D_t e^{g_i}.$$

Substituting this result in (9) in the paper yields

$$P_t = \left(\frac{1}{1+r} \right) \sum_{i=1}^n w_i \left\{ \left(\frac{1}{1+r} \right) \left[E_i (P_{t+2} | \Omega_{it}) + 2\xi_{it}^{(2)} P_t \right] + \frac{E_i (\theta_n)}{1+r} D_t e^{g_i} \right\} + \left(\frac{\theta_n}{1+r} \right) D_t,$$

and after some simplification we have

$$P_t = \left(\frac{1}{1+r} \right)^2 \sum_{s=1}^n w_s E_s (P_{t+2} | \Omega_{st}) + \left(\frac{1}{1+r} \right)^2 \left(\sum_{s=1}^n 2w_s \xi_{st}^{(2)} \right) P_t + \phi_n D_t, \quad (\text{S.1})$$

where

$$\phi_n = \left(\frac{\theta_n}{1+r} \right) + \left(\frac{1}{1+r} \right)^2 \left(\sum_{s=1}^n w_s E_s (\theta_n) e^{g_s} \right). \quad (\text{S.2})$$

As before P_{it}^* is defined by applying the expectations operator $E_i (P_t | \Omega_{it})$ to the right hand side of (S.1), namely

$$\begin{aligned} P_{it}^* &= \left(\frac{1}{1+r} \right)^2 \sum_{s=1}^n w_s E_i [E_s (P_{t+2} | \Omega_{st}) | \Omega_{it}] \\ &\quad + \left(\frac{1}{1+r} \right)^2 \left[\sum_{s=1}^n w_s E \left(2\xi_{st}^{(2)} | \Omega_{it} \right) \right] P_t + E_i (\phi_n) D_t. \end{aligned}$$

Now using (2) and (3) from the paper in the above equation yields

$$\begin{aligned} P_{it}^* &= \left(\frac{1}{1+r} \right)^2 \left[E_i (P_{t+2} | \Omega_{it}) + 2\xi_{it}^{(2)} P_t \right] \\ &\quad + 2w_i \left(\frac{1}{1+r} \right)^2 \xi_{it}^{(2)} P_t + E_i (\phi_n) D_t. \end{aligned}$$

Subtracting P_t from both sides, using (14) from the paper, and after some simplifications, and obtain

$$\pi_{i,t+2}^e = \alpha_i^{(2)} - \frac{(1+r)^2}{2} V_{it} + u_{it}^{(2)},$$

where

$$\begin{aligned}\pi_{i,t+2}^e &= E_i(\pi_{t+2} | \Omega_{it}), \quad \pi_{t+2} = \frac{P_{t+2} - P_t}{2P_t} = \frac{\Delta P_{t+2} + \Delta P_{t+1}}{2P_t}, \\ \alpha_i^{(2)} &= \frac{(1+r)^2 - 1}{2} - \frac{(1+r)^2 (1+r - e^g) E_i(\phi_n)}{2E(\theta_n)}, \quad u_{it}^{(2)} = -(1+w_i)\xi_{it}^{(2)}.\end{aligned}$$

Following similar derivations for $h = 3, 4, \dots$, the general result given by equation (17) in the paper follows.

S3 Fixed effects-time effects (FE-TE) estimators for unbalanced panels

Consider the panel data model

$$y_{it} = \alpha_i + \gamma_t + \theta x_{it} + u_{it}, \tag{S.3}$$

where $i = 1, 2, \dots, H$ and $t = 1, 2, \dots, T_i$ for respondent i , and let $T = \max_i T_i$. Let N_t be the number of respondents observed in period t and let \mathbb{N}_t be the set of respondents observed in period t . Let s_{it} be a binary variable which takes the value of 1 if a response is recorded for respondent i at time period t , and equal to 0, otherwise. Finally, let $N = \sum_t N_t$.^{S1}

Denote the available observations on respondents at time t by the $N_t \times 1$ vector, \mathbf{y}_{t,N_t} , whose elements are members of the set \mathbb{N}_t . Specifically, $N_t = \#\mathbb{N}_t$. \mathbf{x}_{t,N_t} is defined analogously. Stack \mathbf{y}_{t,N_t} and \mathbf{x}_{t,N_t} over $t = 1, 2, \dots, T$ to

^{S1}In terms of paper's notation, y_{it} corresponds to $\hat{\pi}_{i,t+h|t}^e$ in equation (23) of the paper.

obtain

$$\mathbf{y} = \begin{Bmatrix} \mathbf{y}_{.1,N_1} \\ \mathbf{y}_{.2,N_2} \\ \vdots \\ \mathbf{y}_{.T,N_T} \end{Bmatrix}, \text{ and } \mathbf{x} = \begin{Bmatrix} \mathbf{x}_{.1,N_1} \\ \mathbf{x}_{.2,N_2} \\ \vdots \\ \mathbf{x}_{.T,N_T} \end{Bmatrix}.$$

Next, following the procedure described in [Wansbeek and Kapteyn \(1989\)](#), let \mathbf{D}_t be the $N_t \times H$ matrix obtained from the $H \times H$ identity matrix from which the rows corresponding to the respondents not observed in period t have been omitted, and let $\boldsymbol{\iota}_H$ be the $H \times 1$ vector of ones. Define

$$\mathbf{Z}_1 = \begin{Bmatrix} \mathbf{D}_1 & \mathbf{D}_1\boldsymbol{\iota}_H & & & \\ \mathbf{D}_2 & & \mathbf{D}_2\boldsymbol{\iota}_H & & \\ \vdots & & & \ddots & \\ \mathbf{D}_T & & & & \mathbf{D}_T\boldsymbol{\iota}_H \end{Bmatrix},$$

and

$$\mathbf{Z}_2 = \begin{Bmatrix} \mathbf{D}_1\boldsymbol{\iota}_H & & & \\ & \mathbf{D}_2\boldsymbol{\iota}_H & & \\ & & \ddots & \\ & & & \mathbf{D}_T\boldsymbol{\iota}_H \end{Bmatrix},$$

and set $\mathbf{Z} = (\mathbf{Z}_1, \mathbf{Z}_2)$. Also let

$$\bar{\mathbf{Z}} = \mathbf{Z}_2 - \mathbf{Z}_1(\mathbf{Z}'_1 \mathbf{Z}_1)^{-1} \mathbf{Z}'_1 \mathbf{Z}_2,$$

$$\mathbf{Q} = \mathbf{Z}'_2 \mathbf{Z}_2 - \mathbf{Z}'_2 \mathbf{Z}_1 (\mathbf{Z}'_1 \mathbf{Z}_1)^{-1} \mathbf{Z}'_1 \mathbf{Z}'_2,$$

and

$$\mathbf{P} = \mathbf{I}_N - \mathbf{Z}_1(\mathbf{Z}'_1 \mathbf{Z}_1)^{-1} \mathbf{Z}'_1 - \bar{\mathbf{Z}} \mathbf{Q}^- \bar{\mathbf{Z}}',$$

where \mathbf{I}_N is the $N \times N$ identity matrix, and \mathbf{Q}^- is a generalized inverse of \mathbf{Q} . The resultant \mathbf{P} matrix does not depend on the choice of the generalized inverse (see [Wansbeek and Kapteyn \(1989\)](#)). Now define the transformed

variables $\tilde{\mathbf{y}} = \mathbf{P}\mathbf{y}$ and $\tilde{\mathbf{v}} = \mathbf{P}\mathbf{x}$ and consider the transformed panel regression

$$\tilde{y}_{it} = \theta \tilde{x}_{it} + \varepsilon_{it}.$$

We estimate θ by

$$\hat{\theta}_{FE-TE} = \left[\sum_{i=1}^H \sum_{t=1}^T s_{it} (\tilde{x}_{it} - \bar{\tilde{x}})^2 \right]^{-1} \left[\sum_{h=1}^H \sum_{t=1}^T s_{it} (\tilde{x}_{it} - \bar{\tilde{x}}) (\tilde{y}_{it} - \bar{\tilde{y}}) \right], \quad (S.4)$$

where $\bar{\tilde{x}} = \frac{1}{N} \sum_{i=1}^H \sum_{t=1}^T s_{it} \tilde{x}_{it}$, and $\bar{\tilde{y}}$ is defined analogously.

Let $\hat{\varepsilon}_{it,FE-TE} = \tilde{y}_{it} - \bar{\tilde{y}} - (\tilde{x}_{it} - \bar{\tilde{x}})\hat{\theta}_{FE-TE}$, and $\hat{\boldsymbol{\varepsilon}}_{i,FE-TE} = (\hat{\varepsilon}_{it_{1,i},FE-TE}, \hat{\varepsilon}_{it_{2,i},FE-TE}, \dots, \hat{\varepsilon}_{iT_i,FE-TE})'$ where $t_{1,i}$ is the first time period in which respondent i is observed. Also, define

$$\mathbf{x}_{i\cdot}^* = \begin{Bmatrix} \tilde{x}_{it_{1,i}} - \bar{\tilde{x}} \\ \tilde{x}_{it_{2,i}} - \bar{\tilde{x}} \\ \vdots \\ \tilde{x}_{iT_i} - \bar{\tilde{x}}, \end{Bmatrix}.$$

The variance of $\hat{\theta}_{FE-TE}$ is computed as

$$\widehat{Var}(\hat{\theta}_{FE-TE}) = \left(\sum_{i=1}^H \mathbf{x}_{i\cdot}^{*\prime} \mathbf{x}_{i\cdot}^* \right)^{-1} \left(\sum_{i=1}^H \mathbf{x}_{i\cdot}^{*\prime} \hat{\boldsymbol{\varepsilon}}_{i,FE-TE} \hat{\boldsymbol{\varepsilon}}_{i,FE-TE}' \mathbf{x}_{i\cdot}^* \right) \left(\sum_{i=1}^H \mathbf{x}_{i\cdot}^{*\prime} \mathbf{x}_{i\cdot}^* \right)^{-1} \quad (S.5)$$

S4 FE-TE Filtered estimators of the time-invariant effects for unbalanced panels

The parameters of interest is the $k \times 1$ vector of time-invariant effects, $\boldsymbol{\gamma}$,

$$y_{it} = a + \boldsymbol{\gamma}' \mathbf{z}_i + \gamma_t + \theta x_{it} + u_{it} + \varepsilon_i,$$

obtained from (S.3), by replacing α_i with $a + \boldsymbol{\gamma}' \mathbf{z}_i + \varepsilon_i$, where \mathbf{z}_i is the $k \times 1$ vector of time-invariant characteristics of respondent i . To estimate $\boldsymbol{\gamma}$, we assume that \mathbf{z}_i is distributed independently of $\varepsilon_i + \bar{u}_i$, where $\bar{u}_i = \sum_{t=1}^T s_{it} u_{it} / \sum_{t=1}^T s_{it}$, and $s_{it} = 1$ if respondent i is in the sample, and 0 otherwise. Note that $\sum_{t=1}^T s_{it} = T_i$, where T_i denotes the number of time periods that respondent i is observed. To estimate $\boldsymbol{\gamma}$ we extend the method proposed in Pesaran and Zhou (2016) to unbalanced panels with time effects, and adopt a two-stage procedure where in the first-step the effects of x_{it} are filtered out, by considering the individual specific residuals after estimation of θ by application of FE-TE procedure to (S.3). In this way we allow x_{it} and u_{it} to be correlated. Let

$$\hat{u}_{it} = y_{it} - \hat{\theta}_{FE-TE} x_{it},$$

and note that for a fixed T and N large

$$\hat{u}_{it} = a + \boldsymbol{\gamma}' \mathbf{z}_i + \gamma_t + \varepsilon_i + O_p(N^{-1/2}).$$

Then for each respondent averaging \hat{u}_{it} over t , taking into account the unbalanced nature of the panel, we have

$$\bar{\hat{u}}_i = a + \boldsymbol{\gamma}' \mathbf{z}_i + \bar{s}_{\gamma i} + \varepsilon_i + O_p(N^{-1/2}), \quad (\text{S.6})$$

where

$$\bar{s}_{\gamma i} = \left(\frac{\sum_{t=1}^T s_{it} \gamma_t}{\sum_{t=1}^T s_{it}} \right),$$

and

$$\bar{\hat{u}}_i = \left(\sum_{t=1}^T s_{it} \hat{u}_{it} \right) / \left(\sum_{t=1}^T s_{it} \right).$$

We note that $\bar{s}_{\gamma i} = \bar{s}_{\gamma i'}$, if respondents i and i' have the same participation pattern, as represented by $\mathbf{s}_i = (s_{i1}, s_{i2}, \dots, s_{iT})'$. As Table 2 in the paper shows the frequency of participation across the survey waves has been quite high, and there is a good chance that many respondents have the same participation pattern, \mathbf{s}_i . Accordingly, we use a dummy variable to identify the

set of respondents with the same participation pattern. Specifically, let \mathcal{S} be the set of unique response patterns in the data,

$$\mathcal{S} = \{\xi \in \{0, 1\}^T | \xi = \mathbf{s}_i \text{ for at least one } i = 1, 2, \dots, H\}.$$

Denote the cardinality of \mathcal{S} by $|\mathcal{S}| = m$ and assume that the elements of \mathcal{S} are ordered, with ξ_l denoting the l^{th} element of \mathcal{S} . Note that $m \leq 2^T - 1$. Let

$$\mathbf{d}_i = (d_{i1}, d_{i2}, \dots, d_{im}) \quad (\text{S.7})$$

be the vector of time effects of respondent i , with $d_{il} = 1$ if $s_i = \xi_l$, and d_{il} equal to zero, otherwise. In effect, respondents with the same participation pattern are grouped together and assigned a dummy variable which takes the value of unity if a respondent belong to the group and zero otherwise. With these additional dummy variables, (S.6) can be written as

$$\bar{u}_i = a + \boldsymbol{\gamma}' \mathbf{z}_i + \boldsymbol{\lambda}' \mathbf{d}_i + \varepsilon_i + O_p(N^{-1/2}), \quad (\text{S.8})$$

or more compactly as

$$\bar{u}_i = \boldsymbol{\phi}' \mathbf{q}_i + \varepsilon_i + O_p(N^{-1/2}),$$

where $\boldsymbol{\phi} = (a, \boldsymbol{\gamma}', \boldsymbol{\lambda}')'$ and $\mathbf{q}_i = (1, \mathbf{z}'_i, \mathbf{d}'_i)'$. Then the FE-TE filtered (FE-TE-F) estimator of $\boldsymbol{\phi}$ is computed as

$$\hat{\boldsymbol{\phi}}_{FE-TE-F} = \left[\sum_{i=1}^H (\mathbf{q}_i - \bar{\mathbf{q}})(\mathbf{q}_i - \bar{\mathbf{q}})' \right]^{-1} \sum_{i=1}^H (\mathbf{q}_i - \bar{\mathbf{q}})(\bar{u}_i - \bar{u}), \quad (\text{S.9})$$

where $\bar{u} = H^{-1} \sum_{i=1}^H \bar{u}_i$, and H is the total number of respondents in the sample

The variance of $\hat{\boldsymbol{\phi}}_{FE-TE-F}$ is estimated by (see also Proposition 2 of Pesaran

and Zhou (2016)),

$$\widehat{Var}(\hat{\phi}_{FE-TE-F}) = H^{-1} \mathbf{Q}_{qq,H}^{-1} \left[\hat{\mathbf{V}}_{qq,H} + \mathbf{Q}_{q\bar{x},H} \left(H \widehat{Var}(\hat{\theta}_{FE-TE}) \right) \mathbf{Q}'_{q\bar{x},H} \right] \mathbf{Q}_{qq,H}^{-1}, \quad (\text{S.10})$$

where $\widehat{Var}(\hat{\theta}_{FE-TE})$ is given by (S.5), and

$$\mathbf{Q}_{qq,H} = \frac{1}{H} \sum_{i=1}^H (\mathbf{q}_i - \bar{\mathbf{q}})(\mathbf{q}_i - \bar{\mathbf{q}})',$$

$$\mathbf{Q}_{q\bar{v},H} = \frac{1}{H} \sum_{i=1}^H (\mathbf{q}_i - \bar{\mathbf{q}})(x_i - \bar{x})', \quad \bar{x} = \sum_{i=1}^H \bar{x}_i / H,$$

$$\hat{\mathbf{V}}_{qq,H} = \frac{1}{H} \sum_{i=1}^H (\hat{\zeta}_i - \bar{\zeta})^2 (\mathbf{q}_i - \bar{\mathbf{q}})(\mathbf{q}_i - \bar{\mathbf{q}})',$$

and

$$\hat{\zeta}_i - \bar{\zeta} = \bar{y}_i - \bar{y} - (x_i - \bar{x})\hat{\theta}_{FE-TE} - (\mathbf{q}_i - \bar{\mathbf{q}})' \hat{\phi}_{FE-TE-F}.$$

S5 Dynamic panel regressions with bubble and crash indicators

In this section we provide additional information on estimation of the dynamic panel regressions of realized house price changes. Note that the DQ surveys were conducted from the middle of one month to the middle of the following month. For example, indicators calculated using survey results conducted from mid-June to mid-July are used as predictors of the realized house price change in August. We follow the procedure described by Arellano and Bond (1991) with some modifications. Consider the model

$$\pi_{s,t+1} = \alpha_s + \lambda \pi_{st} + \beta' \mathbf{x}_{st} + u_{s,t+1} \quad (\text{S.11})$$

and \mathbf{x}_{st} includes the predictors that vary depending on the specification of Models M1 to M4 considered in Section 6 of the paper.

For each $h = 1, 3$, and 12 ,

$$\begin{aligned}\mathbf{x}_{st} &= \hat{\pi}_{s,t+h|t}^e, \text{ for model } M_1, \\ \mathbf{x}_{st} &= (\hat{\pi}_{s,t+h|t}^e, B_{s,t+h|t}, C_{s,t+h|t}, B_{s,t+h|t}^*, C_{s,t+h|t}^*), \text{ for model } M_2, \\ \mathbf{x}_{st} &= (B_{s,t+h|t}, C_{s,t+h|t}, B_{s,t+h|t}^*, C_{s,t+h|t}^*), \text{ for model } M_3.\end{aligned}$$

Models M_1 to M_3 are estimated over $s = 1, 2, \dots, N$ ($= 48$ MSA), and $t = 3, 4, \dots, T$ ($= 11$ months) (June 2012–February 2013). Model M_4 is estimated with MSAs $s = 1, 2, \dots, N$ ($= 48$), over the months August 2012–February 2013 ($T = 7$), with \mathbf{x}_{st} set to $(\hat{\bar{\pi}}_{st}^e, \bar{B}_{s,t-2}, \bar{C}_{s,t-2}, \bar{B}_{s,t-2}^*, \bar{C}_{s,t-2}^*)$, where

$$\begin{aligned}\hat{\bar{\pi}}_{st}^e &= \frac{1}{3}(\hat{\pi}_{s,t+1|t}^e + \hat{\pi}_{s,t+3|t}^e + \hat{\pi}_{s,t+12|t}^e), \\ \bar{B}_{st} &= \frac{1}{3}(B_{s,t+1|t} + B_{s,t+3|t} + B_{s,t+12|t}), \\ \bar{C}_{st} &= \frac{1}{3}(C_{s,t+1|t} + C_{s,t+3|t} + C_{s,t+12|t}),\end{aligned}$$

\bar{B}_{st}^* and \bar{C}_{st}^* are defined analogously.

The GMM estimation is carried out by first differencing equation (S.11) to eliminate the MSA fixed effects, α_s , namely

$$\Delta\pi_{s,t+1} = \lambda\Delta\pi_{st} + \beta'\Delta\mathbf{x}_{st} + \Delta u_{s,t+1},$$

for $s = 1, 2, \dots, N$, and $t = 3, 4, \dots, T$. Then the $T - 2$ available observations are stacked as

$$\begin{aligned}\Delta\boldsymbol{\pi}_{s,+1} &= (\Delta\pi_{s,3}, \Delta\pi_{s,4}, \dots, \Delta\pi_{s,T})', \quad \Delta\mathbf{u}_{s,+1} = (\Delta u_{s,3}, \Delta u_{s,4}, \dots, \Delta u_{s,T})', \\ \Delta\boldsymbol{\pi}_s &= (\Delta\pi_{s,2}, \Delta\pi_{s,3}, \dots, \Delta\pi_{s,T-1})', \quad \Delta\mathbf{X}_s = (\Delta\mathbf{x}'_{s,2}, \Delta\mathbf{x}'_{s,3}, \dots, \Delta\mathbf{x}'_{s,T-1})'.\end{aligned}$$

\mathbf{x}_{st} is treated as predetermined and the following instrumental variable matrix

is used

$$\mathbf{W}_s = \begin{pmatrix} (\pi_{s1}, \pi_{s2}, \mathbf{x}_{s1}, \mathbf{x}_{s2}) & 0 & \dots & \dots & 0 \\ 0 & (\pi_{s2}, \pi_{s3}, \mathbf{x}_{s2}, \mathbf{x}_{s3}) & \dots & \dots & 0 \\ \vdots & \ddots & \ddots & \ddots & 0 \\ 0 & \dots & \dots & \dots & (\pi_{s,T-2}, \pi_{s,T-1}, \mathbf{x}_{s,T-2}, \mathbf{x}_{s,T-1}) \end{pmatrix}.$$

The moment conditions can now be expressed as

$$E(\mathbf{W}'_s \Delta \mathbf{u}_{s,+1}) = 0, \text{ for } s = 1, 2, \dots, N.$$

where

$$\Delta \mathbf{u}_{+1} = \Delta \boldsymbol{\pi}_{+1} - \lambda \Delta \boldsymbol{\pi} - \Delta \mathbf{X} \beta,$$

with

$$\Delta \boldsymbol{\pi}_{+1} = \begin{pmatrix} \Delta \pi_{1,+1} \\ \Delta \pi_{2,+1} \\ \vdots \\ \Delta \pi_{N,+1} \end{pmatrix}, \quad \Delta \boldsymbol{\pi} = \begin{pmatrix} \Delta \pi_1 \\ \Delta \pi_2 \\ \vdots \\ \Delta \pi_N \end{pmatrix}, \quad \Delta \mathbf{X} = \begin{pmatrix} \Delta \mathbf{X}_1 \\ \Delta \mathbf{X}_2 \\ \vdots \\ \Delta \mathbf{X}_N \end{pmatrix}, \quad \Delta \mathbf{u}_{+1} = \begin{pmatrix} \Delta \mathbf{u}_{1,+1} \\ \Delta \mathbf{u}_{2,+1} \\ \vdots \\ \Delta \mathbf{u}_{N,+1} \end{pmatrix}.$$

The two-step Arellano-Bond estimator is given by

$$\hat{\boldsymbol{\gamma}}_{AB,2step} = (\mathbf{G}' \mathbf{Z} \mathbf{S}_N \mathbf{Z}' \mathbf{G})^{-1} \mathbf{G}' \mathbf{Z} \mathbf{S}_N \mathbf{Z}' \Delta \boldsymbol{\pi}, \quad (\text{S.12})$$

where $\hat{\boldsymbol{\gamma}}_{AB,2step} = (\hat{\lambda}_{AB,2step}, \hat{\beta}'_{AB,2step})$, $\mathbf{G} = (\Delta \boldsymbol{\pi}, \Delta \mathbf{X})$, $\mathbf{Z} = (\mathbf{W}, \Delta \mathbf{X})$, $\mathbf{W} = (\mathbf{W}_1, \mathbf{W}_2, \dots, \mathbf{W}_N)'$,

$$\mathbf{S}_N = \left(\sum_{s=1}^N \mathbf{Z}'_s \hat{\mathbf{u}}_s \hat{\mathbf{u}}'_s \mathbf{Z}_s \right)^{-1},$$

$\mathbf{Z}_s = (\mathbf{W}_s, \Delta \mathbf{x}_s)$ and $\hat{\mathbf{u}}_s = \Delta \boldsymbol{\pi} - \mathbf{G} \hat{\boldsymbol{\gamma}}_{AB,1step}$, are the residuals using the first-stage estimates

$$\hat{\boldsymbol{\gamma}}_{AB,1step} = \left[\mathbf{G}' \mathbf{Z} (\mathbf{Z}' \Omega \mathbf{Z})^{-1} \mathbf{Z}' \mathbf{G} \right]^{-1} \mathbf{G}' \mathbf{Z} (\mathbf{Z}' \Omega \mathbf{Z})^{-1} \mathbf{Z}' \Delta \boldsymbol{\pi}, \quad (\text{S.13})$$

with $\Omega = (\mathbf{I}_N \otimes \mathbf{A})$, and

$$\mathbf{A} = \begin{pmatrix} 2 & -1 & \dots & 0 & 0 \\ -1 & 2 & \dots & 0 & 0 \\ \vdots & \ddots & \ddots & \ddots & \vdots \\ 0 & 0 & \vdots & 2 & -1 \\ 0 & 0 & \vdots & -1 & 2 \end{pmatrix}.$$

See also Section 27.4.2 in [Pesaran \(2015\)](#).

S6 American Life Panel Surveys

The American Life Panel (ALP) consists of over 6,000 panel members aged 18 and older. Detailed information about the panel can be found at <https://alpdata.rand.org/index.php?page=panel>. In what follows we provide selected information about the ALP surveys that we deem relevant to the DQs surveys.

S6.1 Recruitment

ALP participants are recruited through a number of sources, including the University of Michigan Monthly Surveys, both internet-panel cohort and phone-panel (CATI) cohort, the National Survey Project cohort, Snowball cohort, phone and mailing experiment cohort, vulnerable population cohort, and ALP Intergenerational Cohort. The origin of each household in the survey is indicated by the “recruitment_type” variable in the excel sheet survey result files.

The ALP invites adult members of participating households to join the panel. Members of the same household can be identified in the panel, which allows for intra-household comparisons. Currently, approximately 17 per cent of surveyed households have more than one panel member.

S6.2 Demographics

Each ALP survey contains a “Demographics” module, which by default contains information on "gender, date of birth, place of birth, US citizenship, household income, household members, employment, state of residence, ethnicity. and education.

S6.3 Response Rates and Attrition

The attrition rate of ALP participants is relatively low. Between 2006 and 2013 the annual attrition rate has been between 6 and 13 percent. Since panel members do not always give formal notification about their decision to leave the panel, in order to avoid retention of non-responding panel members, RAND contacts members who have not been active for at least one year and asks them about their continued interest in participating. The ALP removes all those for whom such contact attempts fail, as well as all those who were not active in the previous year.

Response rates for ALP surveys are calculated by dividing the number of completed interviews by the size of the associated underlying sample. Most selected panel members who complete the interview respond within one week of the fielding of the survey, and almost all do so within two weeks. Response rates for the ALP survey typically average around 70 percent, but can vary significantly by subgroups, how long the survey is kept in the field, and the number of reminders sent.

S7 Survey questions

We are interested in learning your views about prices of houses, stocks and shares, and gold, and appreciate your responses to the following questions.

H1 rate current housing prices

We now have some questions about housing prices. The median price of a

single family home in the [*fill for city nearest to R zip code*] cosmopolitan area is currently around [*converted fill for median housing price in R zip code area*] (Half of all single family homes in the area cost less than the median, and the other half cost more than the median.). Do you believe that current housing prices are:

- 1 just right (in the sense that housing prices are in line with what you personally regard to be fair),
- 2 too high,
- 3 too low as compared to the fair value?

H2_intro

Bearing in mind your response to the previous question, suppose now that someone were to purchase a single family home in [*fill for city nearest to R zip code*] area for the price of [...] What do you expect the house to be worth (Please enter a numeric answer only, with no commas or punctuation)

H2_1month 1 month from now,

H2_3month 3 months from now,

H2_1year 1 year from now.

Respondents who reside further than 500 miles away from a major metropolitan area were provided with **H1_alternate** and **H2_intro_alternate** instead of **H1 and H2_intro**.

H1_alternate rate current housing prices

We now have some questions about housing prices. The median price of a single family home in the USA is currently around \$163,500 (Half of all single family homes in the area cost less than the median, and the other half cost more than the median.). Do you believe that current housing prices are:

- 1 just right (in the sense that housing prices are in line with what you personally regard to be fair),
- 2 too high,
- 3 too low as compared to the fair value?

H2_intro_alternate

Bearing in mind your response to the previous question, suppose now that someone were to purchase a single family home in the USA for the price of \$163,500. What do you expect the house to be worth (Please enter a numeric answer only, with no commas or punctuation)

H2_1month 1 month from now,

H2_3month 3 months from now,

H2_1year 1 year from now.

H3_intro

Will you please elaborate by providing responses to the following: What do you think is the per cent chance that one year from now the house will be worth

H3_percent1 amount minus or plus 5 per cent. Between [*calculated low house value*] and [*calculated high house value*] dollars?

H3_percent2 amount less 5 per cent. Less than [*calculated low house value*] dollars?

H3_percent3 amount more than 5 per cent. More than [*calculated high house value*] dollars?

Your responses should add up to 100 per cent.

E1_rate stock price level

We have some questions about the price of publicly traded stocks. Do you believe the US stock market (as measured by S&P 500 index) to be currently:

1 Overvalued

2 Fairly valued (in the sense that the general level of stock prices is in line with what you personally regard to be fair)

3 Undervalued

E1_note explain stock index

Note: The S&P 500 is an index of 500 common stocks actively traded in the

United States. It provides one measure of the general level of stock prices.

E2_intro estimate 1000 investment

Bearing in mind your response to the previous question, suppose now that today someone were to invest 1000 dollars in a mutual fund that tracks the movement of S&P 500 very closely. That is, this “index fund” invests in shares of the companies that comprise the S&P 500 Index. What do you expect the \$1000 investment in the fund to be worth

E2_1month in one month from now,

E2_3month in three months from now,

E2_1year in one year from now.

E3_intro intro to per cent change

Will you please elaborate by providing responses to the following: What do you think is the per cent chance that a year from today the investment will be worth

E3_percent1 minus 5 to plus 5 per cent. Between [*calculated low stock value*] and [*calculated high stock value*] dollars?

E3_percent2 minus 5 per cent. Less than [*calculated low stock value*] dollars?

E3_percent3 plus 5 per cent. More than [*calculated high stock value*] dollars?

Your responses should add up to 100 **per cent**.

G1 rate current gold prices

We now have some questions about the price of gold bullion traded internationally. Given the current price of gold, do you believe gold prices to be:

1 Overvalued

2 Fairly valued (in the sense that the general level of stock prices is in line with what you personally regard to be fair)

3 Undervalued

G2_intro intro to G2

Bearing in mind your response to the previous question, suppose now that today someone were to invest 1000 dollars in gold bullion. What do you expect the \$1000 investment in gold to be worth

G2_1month 1 month from now,

G2_3month 3 months from now,

G2_1year 1 year from now.

G3_intro intro to G3

Will you please elaborate by providing responses to the following: What do you think is the per cent change that a year from today the investment in gold will be worth

G3_percent1 minus 10 to plus 10 per cent. Between [*calculated low gold value*] and [*calculated high gold value*] dollars?

G3_percent2 minus 10 per cent. Less than [*calculated low gold value*] dollars?

G3_percent3 plus 10 per cent. More than [*calculated high gold value*] dollars?

Your responses should add up to 100 per cent.

S8 Truncation filters

Denote the price of asset a , with $a = eq, gd, hs$ (equity, gold, house), provided to respondent i at time t by $P_{it}^{(a)}$. Note that $P_{it}^{(eq)} = 1000$ and $P_{et}^{(gd)} = 1000$, for all t . The price of asset a expected by the i^{th} respondent in month t for h months ahead is denoted by $P_{i,t+h|t}^{e,(a)}$. Respondent i 's subjective valuation of asset a in period t is denoted by $x_{it}^{(a)}$, with $x_{it}^{(a)} = 1$ if the respondent believes that the asset is over-valued, $x_{it}^{(a)} = -1$ if the respondent believes that the asset is under-valued, and $x_{it}^{(a)} = 0$, otherwise.

\mathbf{z}_i is a 7×1 vector of time-invariant characteristics of the i^{th} respondent. Let \mathcal{T}_i be the set of time periods (months) in which respondent i takes part in

the survey. The elements of \mathbf{z}_i are

- $z_{i1} = 1$ if female, 0 otherwise.
- $z_{i2} = \frac{1}{\#\mathcal{T}_i} \sum_{t \in \mathcal{T}_i} \log age_{it}$, average log age of respondent i .
- $z_{i3} = \frac{1}{\#\mathcal{T}_i} \sum_{t \in \mathcal{T}_i} edu_{it}$ respondent's education averaged over the time period the respondent participated in the survey, where $edu_{it} = 0$ if the respondent has no high school diploma, $edu_{it} = 1$ if the respondent is a high school graduate with a diploma, some college but no degree, an associate degree in college occupational/vocational or academic program, and $edu_{it} = 2$ if the respondent has a Bachelor's degree or higher.^{S2}
- $z_{i4} = \frac{1}{\#\mathcal{T}_i} \sum_{t \in \mathcal{T}_i} \log income_{it}$, average log income of respondent i .
- $z_{i5} = 1$ if Asian, 0 otherwise.
- $z_{i6} = 1$ if Black, 0 otherwise.
- $z_{i7} = 1$ if Hispanic/Latino, 0 otherwise.

We came across a few cases where responses to gender and ethnicity questions did not remain invariant over the different survey waves. In such cases we used the following rule. Let d_{it} be the binary variable that denotes the gender or ethnicity (Asian, Black, Hispanic/Latino) of respondent i in month t , and let \mathcal{T}_i denote the set of months during which respondent i participated in the surveys. Let $\bar{d}_i = \frac{1}{\#\mathcal{T}_i} \sum_{t \in \mathcal{T}_i} d_{it}$. If d_{it} varies over time, we consider the following cases.

- If $\bar{d}_i \geq 2/3$, we set $d_{it} = 1$ for all $t \in \mathcal{T}_i$.
- If $\bar{d}_i \leq 1/3$, we set $d_{it} = 0$ for all $t \in \mathcal{T}_i$.
- If $1/3 < \bar{d}_i < 2/3$, we remove respondent i from the data.

^{S2} $z_{5,i}$, $z_{6,i}$ and $z_{7,i}$ are constructed *after* all steps of the truncation filter described in Section S8.0.1 have been applied.

S8.0.1 Truncation filter criteria

For respondent i in period t , $x_{it}^{(a)}$, $P_{i,t+h|t}^{e,(a)}$ for $a = eq, gd, hs$, and $h = 1, 3, 12$, are removed from the data set if any of the following criteria apply:

(a) **Missing responses:**

- $x_{it}^{(a)}$ or $P_{i,t+h|t}^{e,(a)}$ is missing for any $a = eq, gd, hs$ or any $h = 1, 3, 12$,
- $z_{1,i}, z_{2,i}, z_{3,i}, z_{4,i}, age_{it}, income_{it}$ or edu_{it} are missing,

(b) **Equity prices:**

- $P_{i,t+h|t}^{e,(eq)} > 4000$ or $P_{i,t+h|t}^{e,(eq)} = 0$ for any $h = 1, 3, 12$,
- $P_{i,t+h|t}^{e,(eq)} < 100$ for all h , or $P_{i,t+h|t}^{e,(eq)} > 2000$ for all h ,^{S3}

(c) **Gold prices:**

- $P_{i,t+h|t}^{e,(gd)} > 4000$ or $P_{i,t+h|t}^{e,(gd)} = 0$ for any $h = 1, 3, 12$
- $P_{i,t+h|t}^{e,(gd)} < 100$ for all h , or $P_{i,t+h|t}^{e,(gd)} > 2000$ for all h ,

and

(d) **House prices:**

- $P_{i,t+h|t}^{e,(hs)} < 0.5P_{it}^{(hs)}$ or $P_{i,t+h|t}^{e,(hs)} > 2P_{it}^{(hs)}$ or $P_{i,t+h|t}^{e,(hs)} = 0$ for any $h = 1, 3, 12$.

Table S1 provides a comparison of the characteristics of filtered and unfiltered respondents.

^{S3}Examples of responses $(P_{i,t+1|t}^{e,(eq)}, P_{i,t+3|t}^{e,(eq)}, P_{i,t+12|t}^{e,(eq)})$ that would be truncated are: (4020, 1030, 1020), (90, 80, 99), (2020, 2010, 3000). Examples of responses that would not be truncated are (90, 1020, 1010), (2030, 2020, 1050).

Table S1: Comparison of original and filtered respondent samples

Wave	Age		Income		Female		Asian		Black		Hispanic/Latino		Education	
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered								
3	49.05	49.77	52, 887	56, 683	59.62	57.81	2.13	2.31	10.76	8.29	17.39	14.61	1.33	1.39
4	49.04	49.84	51, 965	56, 507	59.17	56.99	2.05	2.33	11.01	8.70	18.27	14.32	1.31	1.38
5	49.09	49.86	51, 285	55, 962	58.96	56.84	1.78	1.98	11.10	8.72	17.84	14.52	1.30	1.37
6	48.90	49.47	51, 736	56, 039	58.78	56.76	1.89	2.13	11.52	8.97	18.53	15.54	1.31	1.37
7	48.70	49.33	51, 518	55, 240	59.51	57.57	1.86	1.96	11.84	9.43	18.58	15.73	1.31	1.37
8	48.86	49.50	51, 967	55, 444	59.62	57.53	1.95	2.03	11.19	9.20	18.99	15.82	1.31	1.37
9	48.99	49.66	51, 423	54, 983	59.35	57.93	1.78	1.87	11.57	9.69	18.50	16.00	1.30	1.36
10	49.11	49.69	51, 900	55, 689	59.09	56.85	1.87	1.99	11.59	9.68	19.07	15.81	1.31	1.37
11	49.02	49.90	52, 003	56, 105	59.20	57.43	1.94	1.99	11.19	9.02	18.11	14.52	1.31	1.38
12	49.33	49.93	51, 423	54, 992	59.10	57.26	1.84	2.00	11.53	9.37	19.40	16.75	1.30	1.36
13	48.78	49.44	51, 659	55, 565	58.98	57.19	1.93	2.17	11.70	9.22	18.50	15.26	1.31	1.38
Average	48.99	49.67	51, 797	55, 746	59.22	57.29	1.91	2.07	11.36	9.12	18.47	15.35	1.31	1.37

(1) - original sample of 5,480 respondents

(2) - filtered sample of 4,971 respondents

Education is equal to 0 if the respondent has no high school diploma, 1 if the respondent is a high school graduate with a diploma, some college but no degree, an associate degree in college occupational/vocational or academic program, and 2 if the respondent has a Bachelor's degree or higher.

S9 Respondent location and respondent characteristics

Figure S1: Age distribution of ALP respondents and US population

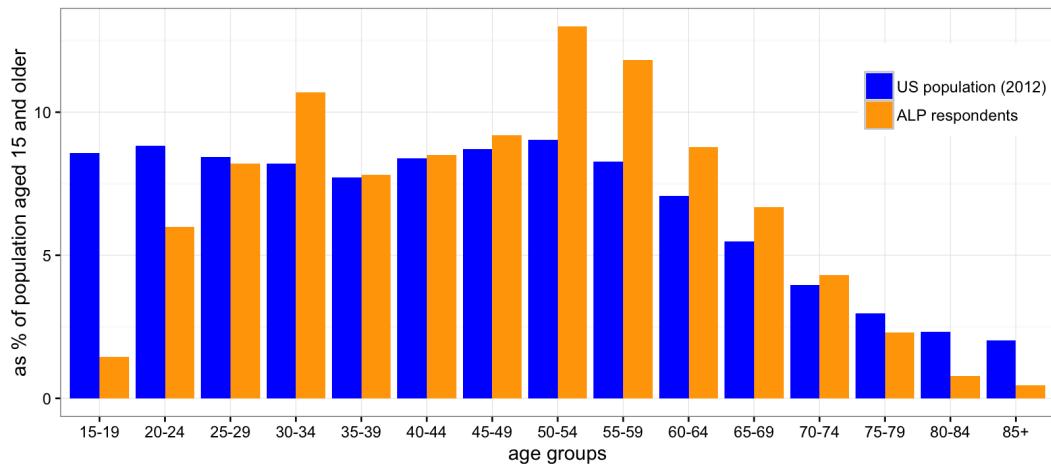
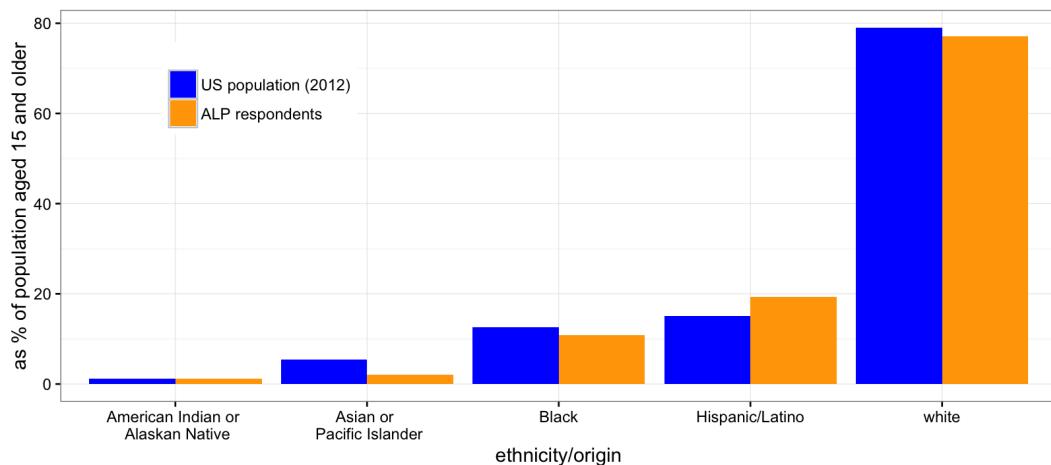


Figure S2: Ethnicity of ALP respondents and US population



The ALP distributions are based on the sample of 4,971 respondents.

The data on US population is obtained from the following sources:

<http://www.census.gov/population/age/data/2012comp.html>

https://www.census.gov/popest/data/historical/2010s/vintage_2012/national.html

Figure S3: Educational attainment of ALP respondents and US population

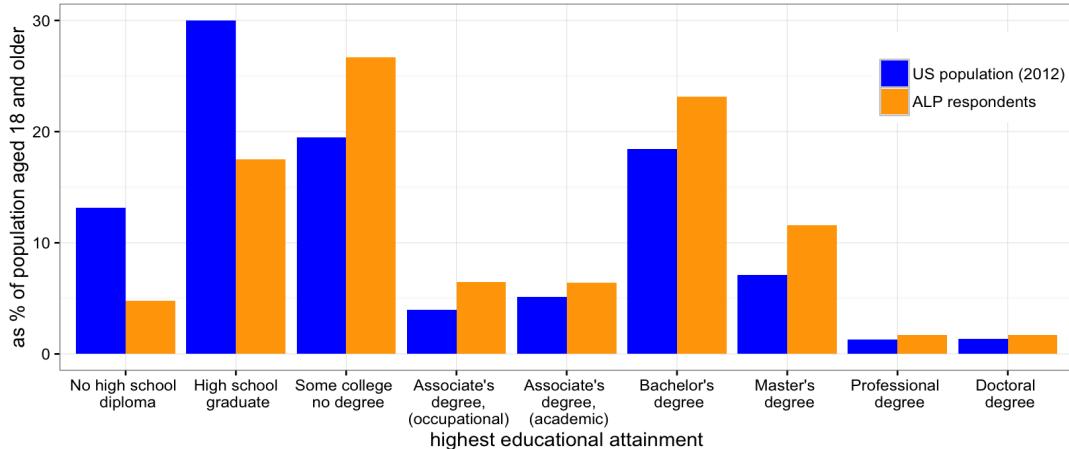
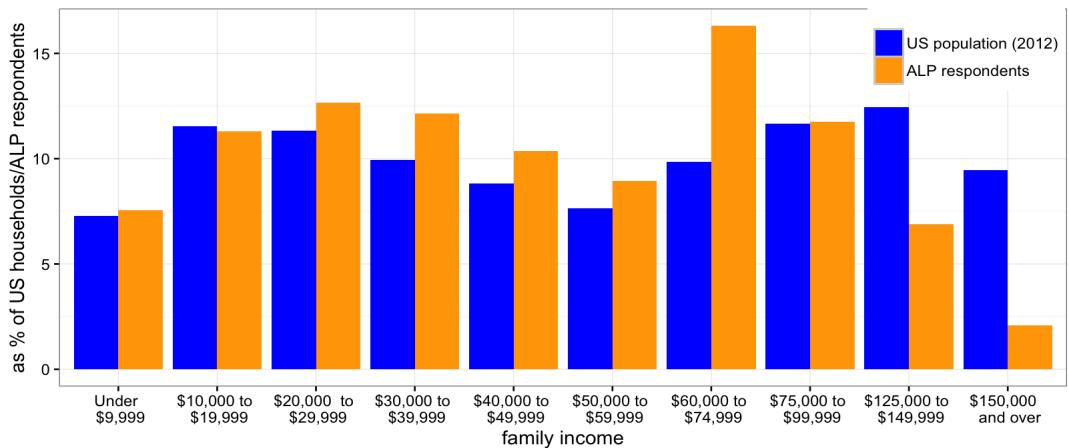


Figure S4: Income distribution of ALP respondents and US population



The ALP education distribution is based on 4,968 (out of 4,971) respondents who are aged 18 or older.

The ALP income distribution is based on the sample of 4,971 respondents.

The data on US population is obtained from the following sources:

<http://www.census.gov/hhes/socdemo/education/data/cps/2012/tables.html>

<http://www.census.gov/data/tables/time-series/demo/income-poverty/cps-hinc/hinc-06.2012.html>.

Figure S5: Location of Respondents in the DQ Surveys

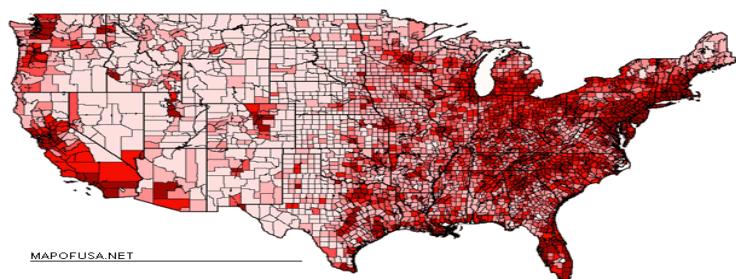


Figure S6: US population density

S10 Definition of US regions

Table S2: Categorization of regions

Region	States
NorthEast	CT, ME, MA, NH, NJ, NY, PA, RI, VT
SouthEast	AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, SC, TN, VA, WV
MidWest	IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI
SouthWest	AZ, NM, OK, TX
West	CA, CO, ID, MT, NV, OR, UT, WA, WY

National Geographic Society proposes this region categorization according to their geographic position on the continent. According to its definition, a region is defined by natural or artificial features, for example language, government, religion, forests, wildlife or climate.

S11 Spatial weight matrix

Consider MSAs $s = 1, 2, \dots, S$. Let $G^{(d)}$ denote the $S \times S$ geodesic based spatial matrix calculated using the Haversine distance between MSAs. Specifically, we say that MSA s and s' are d -neighbors if the Haversine distance between their geographic centers is less than or equal to d miles. Then $G^{(d)}(s, s') = 1$ if s and s' are d -neighbors, and $G^{(d)}(s, s') = 0$ otherwise. Also, $G^{(d)}(s, s) = 0$ for all $s = 1, 2, \dots, S$.

Denote the s^{th} row of a matrix \mathbf{A} by $[\mathbf{A}]_s$ and let $a_{ss'}$ denote the (s, s') element of \mathbf{A} , and let $\mathbf{0}_S$ be a $1 \times S$ vector of zeros, and define $\mathbf{W} = (w_{ss'})$ as follows. For $s = 1, 2, \dots, S$,

- $[\mathbf{W}]_s = [\mathbf{G}^{(100)}]_s$ if $[\mathbf{G}^{(100)}]_s \neq \mathbf{0}_S$.
- If $[\mathbf{G}^{(100)}]_s = \mathbf{0}_S$ and $[\mathbf{G}^{(200)}]_s \neq \mathbf{0}_S$, $[\mathbf{W}]_s = [\mathbf{G}^{(200)}]_s$.
- If $[\mathbf{G}^{(200)}]_s = \mathbf{0}_S$, $w_{ss'} = 1$ for $s' = 1, 2, \dots, S$, $s' \neq s$ and $w_{ss} = 0$.

S12 Data sources

The survey data can be accessed from the link

<https://alpdata.rand.org/index.php?page=data>. The survey is labeled “Asset Price Expectations” [W01]-[W15]. The house price data used in the MSA level analysis is sourced from the National Association of Realtors. The house prices are disaggregated by 180 MSAs as defined by the US Office of Management and Budget. For further details see <http://www.realtor.org/topics/existing-home-sales>.

In Section S12.1 we describe the survey data as released by RAND, and in Section S12.2 we describe how to replicate our results.

S12.1 Survey data downloaded from the RAND ALP website

The folder “DQ Survey data Aug 2012-Jan 2013” contains all survey data for the DQ Survey as available on the RAND ALP website. The results of each survey wave is included a separate csv file, and contains the following modules:

- Demographics - demographic information about the respondent, such as age, gender, education, employment etc.
- Base Module - information about the exact time when the respondent filled out the survey.
- Housing Prices - DQ survey module about house prices.
- Stock Prices - DQ survey module about stock prices.
- Gold Value - DQ survey module about gold prices.
- Closing - assessment of the interview experience.

A list of the variables available in each survey wave can be found in the files “List of variables in each survey wave.xlsx”. An overview of the modules

Figure S7: Screenshot of Asset Price Expectations Survey Wave 13

The screenshot shows the survey metadata page for Well Being 318 - Asset Price Expectations [W13]. It includes sections for About the Survey, Fieldwork, Browse Questionnaire, Download Data, and Download Codebook.

About the Survey:
Investigators: Jeff Dominitz, Hashem Pesaran.

Fieldwork:
This survey was in the field from **2012-11-19** until **2012-12-17**. Show the [response overview](#) for this survey.

Browse Questionnaire:

module	description
Demographics	Preloaded Demographic Variables
Base module	Identification, Timestamps, and Initialization Variables
Housing Prices	
Stock Prices	
Gold Value	
Closing	Closing questions, rating of the survey and additional notes

Download Data:
Please [login](#) or [register](#) to download data.

Download Codebook:
[Download Questionnaire \(PDF\)](#)

can be accessed by clicking on the survey name on the RAND website. An example for survey wave 13 is shown in Figure S7. Information about the non-respondents of the survey can also be found on this page. Further information about the questions contained in the module can be accessed by clicking on the name of the module. See Figure S8 for an example, where some of the variables in the Demographics module are displayed. Finally, more information about a variable can be obtained by clicking on the variable name. Figure S9 shows the information displayed if we click on the variable name, “ms318_gender” in survey wave 13.

S12.2 Data and codes for replicating results

All data and codes necessary to replicate the results are provided in the zipped file called “DQ Survey Replication”. When this file is unzipped you should see the folder and file structure displayed in Figure 4. This Figure shows the structure of the folders in which the codes are organized. Folders are marked with a blue color. Files that recreate the data sets used in the estimation are marked in yellow, and the numbers next to the yellow boxes indicate the order in which the files should be executed. Finally, green boxes indicate files that

Figure S8: Screenshot of Accessing Demographic Variables

Well Being 318 - Asset Price Expectations [W13]

Module - Demographics

Preloaded Demographic Variables

Questions and Variables (23)

name	description / question text	variable label
ms318_gender	What is your gender?	GENDER
ms318_calage	What is your age?	CALCULATED AGE
ms318_birthyear	Year	BIRTH YEAR
ms318_currentlivingsituation	Could you tell us what your current...	CURRENT LIVING SITUATION
ms318_borninus	Were you born in the United States?	BORN IN US
ms318_stateborn	In what state were you born?	BORN IN STATE
ms318_citizenus	Are you a citizen of the United Sta...	CITIZEN US

Figure S9: Screenshot of Question about Gender

Well Being 318 - Asset Price Expectations [W13]

Module - Demographics

Question - ms318_gender

Dataset label	GENDER
Question text	What is your gender?
Answer type	Enumerated: 1 Male 2 Female
Empty answer allowed	Yes
Notes	There are no notes for this question.

replicate the estimation results. These can be executed in an arbitrary order. All files necessary to replicate the estimation results are also provided in the “Data” folder. Hence, it is possible to run the estimation scripts marked with green color without previously re-creating the data sets. All estimates are saved in tex tables, which are automatically placed in the folder called “tex”.

The zipped file “DQ Survey Replication” contains a folder with the same name. To run the replication files on a PC, place the zipped folder in a directory of your choice and unzip it. Then change the path names in the files accordingly. For example, if the file is unzipped in the root directory “C:\”, add “C:\” directly before the words “DQ Survey Replication” in the file path, so that the path begins with “C:\DQ Survey Replication”. Additionally, /” in the path definitions need to be changed to “\”.

Similarly, on a Mac or Linux computer, unzip the folder in a directory of your choice. Suppose the folder “DQ Survey Replication” is unzipped in the directory “/Users/home/Desktop/”. Then change the path names in the replication files so that they begin with

“/Users/home/Desktop/DQ Survey Replication”.

The data sets used in the empirical analysis can be found in the folder “DQ Survey Replication/Data/csv/”. The data files are “panel_ind.csv”, “panel_fef_loc.csv” and “panel_fefef.csv”. These are the data sets containing all individual level variables such as valuation and price expectation as well as demographics. The latter two files also contain location and response pattern dummies, respectively. The panel data of 48 MSAs used in the MSA level analysis is contained in the file “Panel 48 MSAs.xlsx” in the same folder.

For convenience, all the survey data files covering the period August 2012 to January 2013 are also available in the zipped file "DQ survey data Aug 2012-Jan 2013".

Figure S10: Structure of Replication Directory

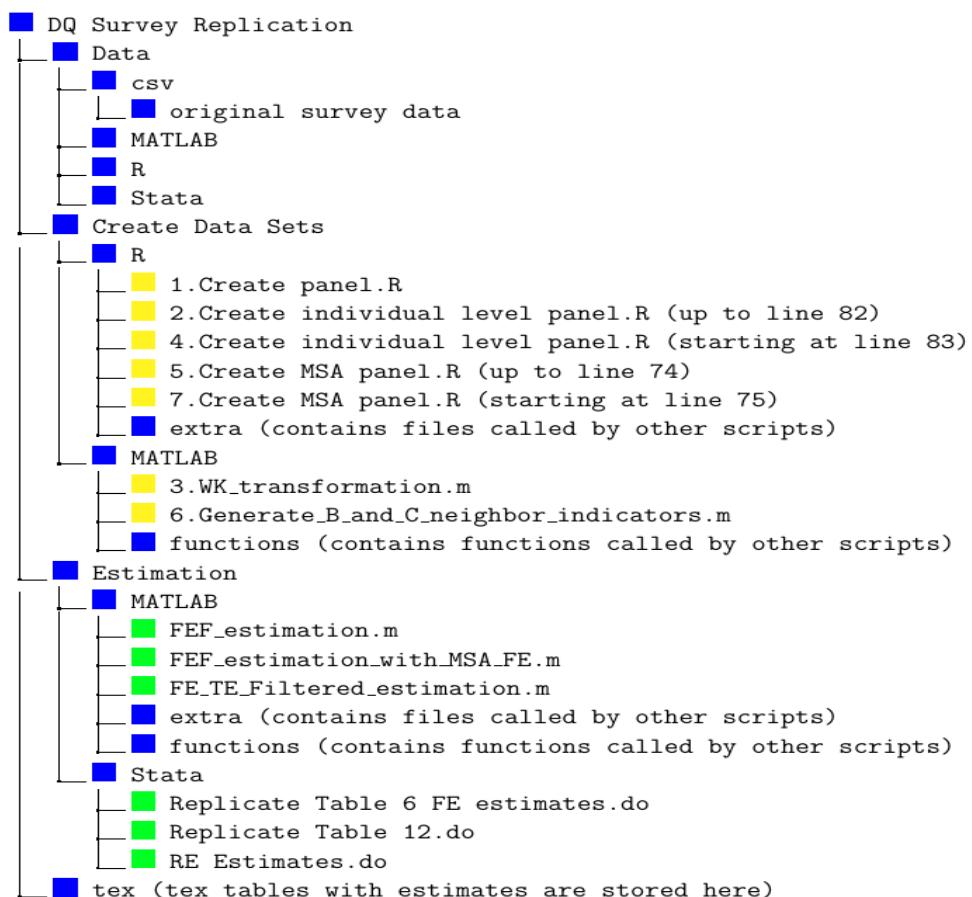


Figure S11:

S13 Selected MSA summary statistics

Table S3: Summary statistics of variables used in the realized house price change regressions

	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
π_{st}	1.726	2.565	-3.408	-0.251	1.401	3.464	10.084
$\hat{\pi}_{s,t+1 t}^e$	-2.181	5.462	-55.552	-2.869	-1.264	-0.159	6.543
$\hat{\pi}_{s,t+3 t}^e$	-0.678	1.991	-18.744	-1.173	-0.391	0.166	5.391
$\hat{\pi}_{s,t+12 t}^e$	0.063	0.682	-5.041	-0.207	0.145	0.426	2.525
$B_{s,t+1 t}$	0.177	0.112	0.000	0.088	0.164	0.250	0.591
$C_{s,t+1 t}$	0.186	0.117	0.000	0.089	0.174	0.265	0.527
$B_{s,t+1 t}^*$	0.167	0.091	0.000	0.104	0.165	0.199	0.552
$C_{s,t+1 t}^*$	0.193	0.098	0.000	0.146	0.187	0.250	0.475
$B_{s,t+3 t}$	0.160	0.104	0.000	0.076	0.148	0.231	0.591
$C_{s,t+3 t}$	0.134	0.099	0.000	0.051	0.117	0.193	0.473
$B_{s,t+3 t}^*$	0.153	0.086	0.000	0.095	0.153	0.184	0.515
$C_{s,t+3 t}^*$	0.141	0.082	0.000	0.097	0.136	0.180	0.409
$B_{s,t+12 t}$	0.159	0.105	0.000	0.076	0.148	0.227	0.591
$C_{s,t+12 t}$	0.073	0.070	0.000	0.022	0.052	0.108	0.350
$B_{s,t+12 t}^*$	0.155	0.088	0.000	0.093	0.149	0.182	0.539
$C_{s,t+12 t}^*$	0.079	0.057	0.000	0.041	0.074	0.100	0.350

The statistics are based on the sample of 48 MSAs and 11 months: April 2012 to February 2013.
 π_{st} and $\hat{\pi}_{s,t+h|t}^e$ for $h = 1, 3, 12$ are expressed in per cent per quarter.

The indicators $B_{s,t+h|t}, C_{s,t+h|t}, B_{s,t+h|t}^*, C_{s,t+h|t}^*$ for $h = 1, 3, 12$ are fractions between 0 and 1.

Table S4: Summary statistics of selected variables by MSA for 48 MSAs

	N_{st}	Average value during the period April 2012–February 2013						
		π_{st}	$B_{s,t+1 t}$	$C_{s,t+1 t}$	$B_{s,t+3 t}$	$C_{s,t+3 t}$	$B_{s,t+12 t}$	$C_{s,t+12 t}$
Albuquerque, NM	27.82	0.55	0.19	0.12	0.17	0.09	0.20	0.07
Amarillo, TX	20.18	0.40	0.32	0.06	0.30	0.03	0.31	0.02
Atlanta-Sandy Springs-Roswell, GA	49.36	3.17	0.06	0.34	0.04	0.27	0.04	0.15
Austin-Round Rock, TX	45.27	2.12	0.33	0.01	0.32	0.004	0.33	0.004
Boise City, ID	22.64	4.02	0.12	0.20	0.09	0.16	0.09	0.09
Chattanooga, TN-GA	29.45	0.89	0.08	0.26	0.07	0.19	0.07	0.07
Chicago-Naperville-Elgin, IL-IN-WI	68	0.43	0.09	0.39	0.07	0.28	0.07	0.13
Cleveland-Elyria, OH	41.55	0.26	0.06	0.40	0.04	0.34	0.03	0.25
Columbus, OH	22.36	0.67	0.08	0.31	0.06	0.25	0.07	0.10
Corpus Christi, TX	59.09	1.54	0.31	0.03	0.29	0.02	0.29	0.01
Cumberland, MD-WV	29.55	0.07	0.15	0.16	0.11	0.10	0.10	0.03
Dallas-Fort Worth-Arlington, TX	63.64	1.48	0.19	0.18	0.17	0.12	0.18	0.07
Denver-Aurora-Lakewood, CO	27.64	2.82	0.31	0.11	0.28	0.07	0.29	0.04
Detroit-Warren-Dearborn, MI	54.91	3.74	0.06	0.42	0.05	0.35	0.04	0.20
Dover, DE	20.45	0.33	0.10	0.22	0.08	0.15	0.09	0.05
El Paso, TX	51.09	0.13	0.27	0.05	0.21	0.04	0.20	0.04
Fort Wayne, IN	36.27	0.67	0.14	0.30	0.08	0.28	0.07	0.23
Grand Rapids-Wyoming, MI	34	2.11	0.07	0.27	0.07	0.22	0.07	0.13
Green Bay, WI	26.73	0.13	0.23	0.15	0.20	0.10	0.15	0.03
Greensboro-High Point, NC	30.82	0.56	0.11	0.21	0.11	0.14	0.09	0.07
Houston-The Woodlands-Sugar Land, TX	46.82	1.83	0.16	0.04	0.14	0.04	0.15	0.03
Indianapolis-Carmel-Anderson, IN	27.45	0.85	0.07	0.25	0.06	0.20	0.06	0.11
Kansas City, MO-KS	26.55	0.93	0.19	0.19	0.19	0.15	0.19	0.09
Lansing-East Lansing, MI	21.82	1.79	0.12	0.26	0.11	0.13	0.12	0.08
Los Angeles-Long Beach-Anaheim, CA	176.18	3.22	0.35	0.06	0.32	0.04	0.30	0.02
Miami-Fort Lauderdale-West Palm Beach, FL	43.09	3.18	0.13	0.14	0.11	0.06	0.11	0.02
Milwaukee-Waukesha-West Allis, WI	24.91	0.15	0.24	0.21	0.22	0.15	0.20	0.12
Minneapolis-St. Paul-Bloomington, MN-WI	36.91	2.32	0.11	0.26	0.11	0.15	0.10	0.10
New York-Newark-Jersey City, NY-NJ-PA	136.36	0.26	0.30	0.08	0.27	0.05	0.26	0.03
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	35.55	0.44	0.14	0.15	0.15	0.10	0.16	0.03
Phoenix-Mesa-Scottsdale, AZ	42.55	5.77	0.07	0.18	0.07	0.14	0.07	0.07
Raleigh, NC	24.82	0.72	0.19	0.12	0.18	0.10	0.17	0.07
Reading, PA	21.27	0.46	0.12	0.32	0.12	0.26	0.13	0.16
Riverside-San Bernardino-Ontario, CA	44.82	3.98	0.21	0.15	0.20	0.10	0.18	0.06
Sacramento-Roseville-Arden-Arcade, CA	64.18	4.83	0.17	0.20	0.15	0.14	0.15	0.07
Salt Lake City, UT	61.64	2.51	0.17	0.22	0.15	0.16	0.15	0.12
San Antonio-New Braunfels, TX	45.09	1.03	0.19	0.05	0.20	0.04	0.21	0.03
San Diego-Carlsbad, CA	36.27	3.55	0.33	0.03	0.32	0.02	0.32	0.002
San Francisco-Oakland-Hayward, CA	21.45	4.52	0.37	0.10	0.36	0.04	0.38	0.004
San Jose-Sunnyvale-Santa Clara, CA	39.64	4.18	0.40	0.05	0.29	0.03	0.32	0.02
Seattle-Tacoma-Bellevue, WA	43.55	3.16	0.24	0.12	0.22	0.07	0.23	0.04
Spartanburg, SC	24.27	0.40	0.02	0.31	0.02	0.20	0.02	0.09
St. Louis, MO-IL	21.36	0.45	0.12	0.32	0.11	0.22	0.10	0.06
Tallahassee, FL	20.45	0.62	0.22	0.10	0.22	0.07	0.20	0.03
Tucson, AZ	26.09	2.44	0.12	0.26	0.14	0.19	0.15	0.10
Tulsa, OK	33	0.65	0.25	0.16	0.19	0.12	0.17	0.01
Washington-Arlington-Alexandria, DC-VA-MD-WV	43.27	1.76	0.22	0.15	0.22	0.09	0.21	0.03
Youngstown-Warren-Boardman, OH-PA	24.91	0.75	0.02	0.22	0.02	0.17	0.04	0.11

N_{st} - number of respondents in month t and MSA s .

π_{st} - realized price change in MSA s and month t , expressed in per cent per quarter.

The data on house prices is sourced from the National Association of Realtors. The house prices are disaggregated by 180 MSAs as defined by the US Office of Management and Budget.

For further details see <http://www.realtor.org/topics/existing-home-sales>.

S14 Estimates for males and females

While not central to our paper, we also analyze how estimates of $\beta^{(h)}$ in model (23) vary in terms of socio-economic characteristics. Specifically, note that our estimates in Table 4 allow for random variation in $\beta_i^{(h)}$ across respondents. In this section we estimate equation (23) separately for male and female respondents. The estimates are summarized in Table S5. For equity prices, we find no statistically significant relationship between expected price changes and the valuation indicators for female respondents at any of the three expectations horizons. But for male respondents we find the relationship to be statistically significant and negative (thus equilibrating) for all three expectations horizons. Similar differences between female and male respondents are also observed in the case of gold prices, with female respondents showing a positive and statistically significant relationship between expected price changes and valuation indicators, whereas for male respondents we find the relationship to be negative at three and twelve month expectations horizons. Finally, in terms of house prices, the valuation-expectation relationship is negative for both males and females. For females the results are statistically significant for all expectation horizons, whilst for males they are statistically significant only at the 12 month expectations horizon.

Table S5: **Estimates of $\beta^{(h)}$ in the panel regressions of individual expected price changes on their belief valuation indicators for different assets by gender**

Dependent variable: $\hat{\pi}_{i,t+h t}^e$						
Female Respondents						
	Equity		Gold		Housing	
Horizons	FE	FE-TE	FE	FE-TE	FE	FE-TE
One Month	0.192	0.186	1.178***	1.168***	-0.354***	-0.367***
Ahead ($h = 1$)	(1.15)	(1.11)	(4.05)	(4.01)	(-4.85)	(-5.02)
Three Months	0.0895	0.0916	0.593***	0.583***	-0.126***	-0.131***
Ahead ($h = 1$)	(0.88)	(0.90)	(3.80)	(3.74)	(-3.70)	(-3.82)
One Year	0.00299	0.00489	0.181**	0.175**	-0.0402**	-0.0400**
Ahead ($h = 1$)	(0.06)	(0.10)	(2.74)	(2.66)	(-2.98)	(-2.95)
Male Respondents						
	Equity		Gold		Housing	
Horizons	FE	FE-TE	FE	FE-TE	FE	FE-TE
One Month	-0.554**	-0.617**	-0.196	-0.236	-0.202	-0.211
Ahead ($h = 1$)	(-2.83)	(-3.14)	(-0.82)	(-0.99)	(-1.74)	(-1.81)
Three Months	-0.372***	-0.401***	-0.291*	-0.323*	-0.0767	-0.0782
Ahead ($h = 1$)	(-3.33)	(-3.58)	(-2.10)	(-2.32)	(-1.69)	(-1.73)
One Year	-0.300***	-0.308***	-0.304***	-0.319***	-0.0596***	-0.0594***
Ahead ($h = 1$)	(-6.00)	(-6.12)	(-4.32)	(-4.52)	(-3.89)	(-3.87)

Fixed effect (FE) estimates of $\beta^{(h)}$ in the panel regression $\hat{\pi}_{i,t+h|t}^e = \alpha_i^{(h)} + \beta^{(h)}x_{it} + u_{it}^{(h)}$ are obtained with and without time effects (FE-TE) using an unbalanced panel of respondents over 11 months, March 2012 to January 2013.

The regressions for females are estimated using 2,910 respondents and 20,602 responses.

The regressions for males are estimated using 2,061 respondents and 15,359 responses.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively. Standard errors are robust to heteroskedasticity and residual serial correlation.

S15 Random effect estimates

In what follows, we provide estimates of the panel data model

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \delta_t^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}, \quad (\text{S.14})$$

which corresponds to equation (28) in the paper. We provide estimates both with and without time effects, and with and without MSA dummies. For the elements of $\mathbf{z}_i = (z_{i1}, z_{i2}, \dots, z_{i7})'$, we consider $z_{i1} = \ln age_i$, $z_{i2} = \ln income_i$, z_{i3} to z_{i6} are dummy variables that take the value of 1 if the respondent i identifies her/himself as female, Asian, Black and Hispanic/Latino, respectively. Finally, z_{i7} measures the education level of the respondent. For a detailed description of how the time-invariant variables are constructed see Appendix A.2 of the paper. We allow $\varepsilon_{i,t+h} + \psi_i^{(h)}$ to be serially correlated and heteroskedastic. Random effects estimates of model (S.14) are presented in Tables S6-S8.

We also consider the following model

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \delta_t^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}, \quad (\text{S.15})$$

which we estimate with and without time effects and MSA dummies. These estimates are presented in Tables S9-S11. The estimates for equity and gold prices are similar across all model specifications. It is interesting to note that for house prices, time-invariant characteristics cease to be statistically significant once MSA (location) dummies are included.

Table S6: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Equity

		Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
		One Month Ahead					Three Months Ahead				
x_{it}		-0.124 (0.116)	-0.146 (0.116)	-0.133 (0.116)	-0.156 (0.117)	-0.118* (0.0700)	-0.126* (0.0703)	-0.120* (0.0704)	-0.138*** (0.0337)	-0.140*** (0.0339)	-0.139*** (0.0339)
Female		0.654*** (0.261)	0.649*** (0.261)	0.684*** (0.264)	0.680*** (0.264)	0.825*** (0.155)	0.822*** (0.156)	0.826*** (0.156)	0.553*** (0.0778)	0.551*** (0.0783)	0.551*** (0.0783)
Age		-2.464*** (0.441)	-2.465*** (0.441)	-2.345*** (0.442)	-2.344*** (0.264)	-2.417*** (0.264)	-2.426*** (0.264)	-2.358*** (0.265)	-2.361*** (0.265)	-1.580*** (0.130)	-1.588*** (0.131)
Education		-0.305 (0.272)	-0.309 (0.272)	-0.416 (0.280)	-0.420 (0.280)	-0.597*** (0.163)	-0.602*** (0.163)	-0.680*** (0.166)	-0.684*** (0.166)	-0.454*** (0.0800)	-0.457*** (0.0802)
ln income		-0.686*** (0.207)	-0.688*** (0.207)	-0.657*** (0.213)	-0.659*** (0.214)	-0.793*** (0.133)	-0.794*** (0.133)	-0.777*** (0.135)	-0.777*** (0.136)	-0.468*** (0.0646)	-0.470*** (0.0647)
Asian		-1.254 (0.931)	-1.270 (0.931)	-1.191 (0.948)	-1.207 (0.948)	-0.133 (0.552)	-0.153 (0.552)	-0.0571 (0.568)	-0.0821 (0.569)	-0.137 (0.248)	-0.148 (0.249)
Black		0.998* (0.586)	1.006* (0.586)	0.772 (0.599)	0.779 (0.599)	1.523*** (0.335)	1.533*** (0.335)	1.369*** (0.343)	1.373*** (0.343)	1.149*** (0.162)	1.155*** (0.162)
Hispanic/Latino		0.280 (0.505)	0.273 (0.505)	-0.234 (0.559)	-0.245 (0.559)	1.284*** (0.282)	1.281*** (0.282)	1.006*** (0.311)	0.995*** (0.311)	0.916*** (0.133)	0.915*** (0.133)
Time Dummies	No	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
MSA Dummies	No	No	Yes	Yes	No	No	Yes	No	Yes	No	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)} x_{it} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35, 961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.28$, $T_{p75} = 9$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S7: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Gold

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead					Three Months Ahead				
x_{it}	0.581*** (0.177)	0.562*** (0.177)	0.591*** (0.178)	0.572*** (0.178)	0.208** (0.0993)	0.190* (0.0994)	0.213** (0.0997)	0.195* (0.0998)	-0.0565 (0.0455)	-0.0646 (0.0456)
Female	1.143*** (0.321)	1.136*** (0.321)	1.131*** (0.323)	1.125*** (0.323)	1.047*** (0.190)	1.041*** (0.190)	1.050*** (0.190)	1.051*** (0.190)	0.626*** (0.0943)	0.623*** (0.0942)
Age	-3.925*** (0.539)	-3.936*** (0.539)	-3.840*** (0.542)	-3.842*** (0.542)	-3.072*** (0.313)	-3.082*** (0.314)	-3.052*** (0.314)	-3.055*** (0.314)	-1.707*** (0.152)	-1.712*** (0.152)
Education	-1.294*** (0.319)	-1.299*** (0.318)	-1.266*** (0.330)	-1.273*** (0.330)	-1.269*** (0.198)	-1.274*** (0.198)	-1.226*** (0.200)	-1.231*** (0.200)	-0.783*** (0.0965)	-0.768*** (0.0979)
Income	-1.381*** (0.265)	-1.385*** (0.265)	-1.325*** (0.271)	-1.326*** (0.271)	-1.140*** (0.158)	-1.142*** (0.158)	-1.092*** (0.161)	-1.092*** (0.161)	-0.663*** (0.0750)	-0.632*** (0.0751)
Asian	0.758 (1.212)	0.736 (1.208)	0.833 (1.232)	0.801 (1.228)	0.492 (0.651)	0.475 (0.648)	0.590 (0.666)	0.563 (0.662)	0.274 (0.318)	0.365 (0.317)
Black	2.071*** (0.695)	2.078*** (0.695)	1.742** (0.711)	1.742** (0.710)	1.898*** (0.388)	1.904*** (0.388)	1.768*** (0.394)	1.767*** (0.393)	1.297*** (0.189)	1.300*** (0.189)
Hispanic/Latino	1.452** (0.573)	1.449** (0.573)	0.856 (0.645)	0.840 (0.645)	1.674*** (0.327)	1.673*** (0.327)	1.355*** (0.367)	1.341*** (0.367)	0.954*** (0.153)	0.953*** (0.153)
Time Dummies	No No	Yes Yes	No Yes	Yes Yes	No No	Yes Yes	No Yes	Yes Yes	No No	Yes Yes
MSA Dummies	No No	Yes Yes	No Yes	Yes Yes	No No	Yes Yes	No Yes	Yes Yes	No No	Yes Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)}x_{it} + \mathbf{z}'_i\boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p50} = 4$, $T_{p25} = 6$, $\bar{T} = 7.28$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S8: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Housing

Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead		
x_{it}	-0.363*** (0.0604)	-0.374*** (0.0602)	-0.382*** (0.0547)	-0.389*** (0.0546)	-0.144*** (0.0254)	-0.147*** (0.0242)	-0.149*** (0.0242)	-0.151*** (0.0242)	-0.0637*** (0.00945)
Female	0.123 (0.180)	0.119 (0.180)	-0.0138 (0.0920)	-0.0169 (0.0919)	0.0236 (0.0666)	0.0226 (0.0665)	-0.0240 (0.0426)	-0.0246 (0.0426)	0.0356 (0.0250)
ln age	2.007*** (0.280)	1.993*** (0.279)	-0.0146 (0.134)	-0.0207 (0.134)	0.663*** (0.103)	0.659*** (0.103)	-0.00791 (0.0632)	-0.00980 (0.0632)	0.187*** (0.0380)
Education	0.384** (0.181)	0.382** (0.180)	0.114 (0.102)	0.113 (0.102)	0.166** (0.0652)	0.165** (0.0651)	0.0610 (0.0439)	0.0607 (0.0439)	0.0428* (0.0237)
ln income	0.546*** (0.132)	0.547*** (0.131)	0.247*** (0.0733)	0.249*** (0.0731)	0.145*** (0.0502)	0.145*** (0.0501)	0.0497 (0.0353)	0.0502 (0.0352)	0.0137 (0.0196)
Asian	-1.332* (0.716)	-1.343* (0.713)	-0.233 (0.393)	-0.247 (0.390)	-0.443* (0.242)	-0.446* (0.242)	-0.0547 (0.154)	-0.0584 (0.154)	-0.00995 (0.0879)
Black	-1.429*** (0.345)	-1.418*** (0.344)	-0.210 (0.192)	-0.204 (0.192)	-0.411*** (0.128)	-0.411*** (0.128)	-0.0211 (0.0889)	-0.0193 (0.0889)	-0.0362 (0.0500)
Hispanic/Latino	-2.074*** (0.290)	-2.076*** (0.289)	-0.196 (0.159)	-0.202 (0.159)	-0.521*** (0.111)	-0.522*** (0.111)	0.100 (0.0783)	0.0987 (0.0783)	-0.0114 (0.0412)
Time Dummies	No No	Yes Yes	No Yes	No Yes	No Yes	Yes Yes	No No	Yes Yes	No Yes
MSA Dummies	No No	No Yes	No Yes	No Yes	No Yes	Yes Yes	No No	Yes Yes	Yes Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)}x_{it} + \mathbf{z}'_i\gamma^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S9: Random Effect Estimates of Price Expectations and Individual Time-Invariant Characteristics for Equity

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$											
	One Month Ahead				Three Months Ahead				One Year Ahead			
Female	0.665*** (0.260)	0.663*** (0.260)	0.696*** (0.263)	0.693*** (0.263)	0.836*** (0.154)	0.834*** (0.155)	0.837*** (0.156)	0.566*** (0.0778)	0.565*** (0.0779)	0.565*** (0.0783)	0.563*** (0.0784)	
Age	-2.467*** (0.441)	-2.469*** (0.441)	-2.350*** (0.441)	-2.349*** (0.442)	-2.420*** (0.263)	-2.430*** (0.264)	-2.362*** (0.265)	-2.366*** (0.265)	-1.584*** (0.130)	-1.592*** (0.131)	-1.550*** (0.133)	-1.554*** (0.133)
Education	-0.304 (0.272)	-0.308 (0.272)	-0.414 (0.280)	-0.418 (0.280)	-0.596*** (0.163)	-0.600*** (0.163)	-0.678*** (0.166)	-0.683*** (0.166)	-0.453*** (0.0802)	-0.455*** (0.0803)	-0.452*** (0.0803)	-0.492*** (0.0821)
Income	-0.670*** (0.207)	-0.670*** (0.207)	-0.642*** (0.214)	-0.641*** (0.214)	-0.778*** (0.133)	-0.778*** (0.133)	-0.763*** (0.133)	-0.762*** (0.136)	-0.451*** (0.136)	-0.452*** (0.136)	-0.452*** (0.136)	-0.439*** (0.0657)
Asian	-1.256 (0.931)	-1.272 (0.932)	-1.189 (0.948)	-1.205 (0.948)	-0.135 (0.552)	-0.155 (0.552)	-0.0555 (0.569)	-0.0805 (0.569)	-0.139 (0.249)	-0.150 (0.249)	-0.114 (0.258)	-0.129 (0.259)
Black	0.983* (0.585)	0.988* (0.585)	0.757 (0.598)	0.762 (0.598)	1.509*** (0.335)	1.517*** (0.335)	1.356*** (0.343)	1.361*** (0.343)	1.133*** (0.162)	1.138*** (0.162)	1.036*** (0.162)	1.038*** (0.168)
Hispanic/Latino	0.274 (0.505)	0.266 (0.505)	-0.233 (0.559)	-0.243 (0.559)	1.279*** (0.282)	1.275*** (0.282)	1.007*** (0.311)	0.996*** (0.311)	0.909*** (0.133)	0.908*** (0.133)	0.782*** (0.146)	0.775*** (0.147)
Time Dummies	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
MSA Dummies	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S10: Random Effect Estimates of Price Expectations and Individual Time-Invariant Characteristics for Gold

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$											
	One Month Ahead						Three Months Ahead					
	One Month Ahead			Three Months Ahead			One Year			Ahead		
	Female	1.118*** (0.320)	1.111*** (0.320)	1.105*** (0.323)	1.099*** (0.323)	1.038*** (0.190)	1.033*** (0.190)	1.047*** (0.190)	1.043*** (0.190)	0.629*** (0.0942)	0.626*** (0.0943)	0.641*** (0.0941)
Age	-3.781*** (0.536)	-3.798*** (0.536)	-3.696*** (0.538)	-3.703*** (0.538)	-3.021*** (0.311)	-3.036*** (0.312)	-3.001*** (0.312)	-3.007*** (0.312)	-1.721*** (0.151)	-1.728*** (0.151)	-1.721*** (0.151)	-1.724*** (0.152)
Education	-1.264*** (0.319)	-1.270*** (0.319)	-1.239*** (0.331)	-1.247*** (0.330)	-1.259*** (0.198)	-1.264*** (0.198)	-1.216*** (0.201)	-1.222*** (0.201)	-0.786*** (0.0965)	-0.788*** (0.0966)	-0.786*** (0.0966)	-0.770*** (0.0979)
Income	-1.356*** (0.264)	-1.360*** (0.264)	-1.301*** (0.270)	-1.303*** (0.270)	-1.131*** (0.158)	-1.134*** (0.158)	-1.083*** (0.158)	-1.084*** (0.160)	-0.666*** (0.160)	-0.668*** (0.160)	-0.666*** (0.160)	-0.634*** (0.0751)
Asian	0.781 (1.211)	0.758 (1.207)	0.852 (1.231)	0.819 (1.226)	0.500 (0.650)	0.482 (0.647)	0.597 (0.665)	0.570 (0.662)	0.272 (0.318)	0.263 (0.317)	0.363 (0.328)	0.350 (0.327)
Black	2.033*** (0.696)	2.042*** (0.695)	1.705*** (0.711)	1.706*** (0.711)	1.885*** (0.388)	1.892*** (0.388)	1.754*** (0.394)	1.755*** (0.394)	1.301*** (0.189)	1.304*** (0.189)	1.304*** (0.189)	1.244*** (0.193)
Hispanic/Latino	1.434*** (0.574)	1.432*** (0.573)	0.842 (0.645)	0.826 (0.645)	1.667*** (0.327)	1.667*** (0.327)	1.350*** (0.367)	1.337*** (0.367)	0.956*** (0.153)	0.955*** (0.153)	0.801*** (0.170)	0.795*** (0.170)
Time Dummies	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
MSA Dummies	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \mathbf{z}'_i \gamma^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.
Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S11: Random Effect Estimates of Price Expectations and Individual Time-Invariant Characteristics for Housing

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$										
	One Month Ahead					Three Months Ahead					One Year Ahead
Female	0.144 (0.180)	0.140 (0.180)	0.00295 (0.0926)	0.000163 (0.0925)	0.0320 (0.0669)	0.0311 (0.0667)	-0.0175 (0.0429)	-0.0180 (0.0429)	0.0393 (0.0251)	0.0243 (0.0217)	0.0243 (0.0217)
Age	2.085*** (0.280)	2.072*** (0.280)	0.0594 (0.134)	0.0546 (0.134)	0.694*** (0.103)	0.690*** (0.103)	0.0207 (0.0631)	0.0192 (0.0631)	0.201*** (0.0381)	0.200*** (0.0381)	0.0348 (0.0336)
Education	0.406** (0.182)	0.405** (0.181)	0.145 (0.102)	0.144 (0.102)	0.175*** (0.0654)	0.175*** (0.0653)	0.0729* (0.0441)	0.0728* (0.0441)	0.0467** (0.0238)	0.0467** (0.0238)	0.0134 (0.0211)
Income	0.607*** (0.131)	0.609*** (0.131)	0.307*** (0.0731)	0.309*** (0.0729)	0.169*** (0.0502)	0.170*** (0.0501)	0.0727** (0.0353)	0.0738** (0.0352)	0.0244 (0.0197)	0.0245 (0.0197)	0.000657 (0.0180)
Asian	-1.370* (0.716)	-1.383* (0.713)	-0.241 (0.395)	-0.256 (0.392)	-0.459* (0.242)	-0.462* (0.242)	-0.0579 (0.155)	-0.0617 (0.155)	-0.0171 (0.0883)	-0.0174 (0.0883)	0.0663 (0.0758)
Black	-1.531*** (0.345)	-1.523*** (0.345)	-0.298 (0.194)	-0.294 (0.194)	-0.455*** (0.128)	-0.452*** (0.128)	-0.0553 (0.0894)	-0.0541 (0.0894)	-0.0542 (0.0500)	-0.0537 (0.0500)	0.0403 (0.0458)
Hispanic/Latino	-2.143*** (0.290)	-2.148*** (0.290)	-0.224 (0.160)	-0.230 (0.160)	-0.549*** (0.111)	-0.550*** (0.111)	0.0896 (0.0786)	0.0879 (0.0786)	-0.0237 (0.0413)	-0.0238 (0.0413)	0.125*** (0.0392)
Time Dummies	No MSA Dummies	No No	Yes Yes	No No	Yes Yes	No No	Yes Yes	No Yes	No No	Yes Yes	Yes Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$
Random effect estimates with standard errors clustered at individual level.
Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

S16 Comparison of FEF and RE estimates of the price expectation equations

In tables S12 to S14 we present the fixed effects filtered and random effects estimates for the panel regressions discussed in Section 4.1 of the paper. Specifically, we consider the panel data model

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \delta_t^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \varepsilon_{i,t+h} + \psi_i^{(h)}. \quad (\text{S.16})$$

For the RE estimates we assume that $\psi_i^{(h)}$ and x_{it} are independently distributed, and we allow $\varepsilon_{i,t+h} + \psi_i^{(h)}$ to be serially correlated and heteroskedastic. For the FEF estimates we allow $\psi_i^{(h)}$ and x_{it} to be correlated, and employ the two-stage approach proposed by Pesaran and Zhou (2016). For a detailed discussion of the estimators and estimates see Section 4.1 of the paper. The FEF and RE estimates are similar across all model specifications. As noted earlier, time-invariant respondent characteristics cease to be significant predictors of the respondent's expected house price changes once we condition on the respondent's location. This is true for FEF and RE estimates.

Table S12: Fixed Effect Filtered and Random Effect Estimates of Price Expectation Equations for Equity

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead			RE
	FEF	FEF	RE	FEF	FEF	RE	FEF	FEF	FEF	RE
$x_{it}^{(1)}$	-0.099 (0.127)	-0.099 (0.127)	-0.124 (0.116)	-0.133 (0.076)	-0.090 (0.076)	-0.118* (0.0700)	-0.120* (0.0703)	-0.115*** (0.036)	-0.138*** (0.0337)	-0.139*** (0.0339)
Female	0.767** (0.301)	0.793*** (0.302)	0.654** (0.261)	0.684*** (0.264)	0.898*** (0.171)	0.896*** (0.172)	0.825*** (0.155)	0.570*** (0.084)	0.567*** (0.084)	0.553*** (0.0783)
Age	-2.845*** (0.511)	-2.718*** (0.508)	-2.464*** (0.441)	-2.345*** (0.441)	-2.633*** (0.296)	-2.568*** (0.297)	-2.417*** (0.264)	-2.358*** (0.265)	-1.668*** (0.142)	-1.628*** (0.144)
Education	-0.343 (0.329)	-0.424 (0.337)	-0.305 (0.272)	-0.416 (0.280)	-0.622*** (0.184)	-0.690*** (0.187)	-0.597*** (0.163)	-0.680*** (0.166)	-0.467*** (0.087)	-0.502*** (0.089)
ln income	-0.663*** (0.241)	-0.624** (0.247)	-0.686*** (0.207)	-0.657*** (0.213)	-0.816*** (0.148)	-0.790*** (0.148)	-0.793*** (0.133)	-0.777*** (0.135)	-0.479*** (0.070)	-0.461*** (0.071)
Asian	-1.577 (1.056)	-1.430 (1.061)	-1.254 (0.931)	-1.191 (0.948)	-0.210 (0.619)	-0.082 (0.629)	-0.133 (0.552)	-0.0571 (0.568)	-0.170 (0.274)	-0.133 (0.280)
Black	0.956 (0.665)	0.787 (0.681)	0.998* (0.586)	0.772 (0.599)	1.501*** (0.368)	1.377*** (0.376)	1.523*** (0.335)	1.369*** (0.343)	1.135*** (0.173)	1.046*** (0.178)
Hispanic/Latino	-0.098 (0.586)	-0.612 (0.640)	0.280 (0.505)	-0.234 (0.559)	1.205*** (0.310)	0.928*** (0.341)	1.284*** (0.282)	1.006*** (0.311)	0.895*** (0.142)	0.759*** (0.157)
MSA dummies	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta(h)x_{it} + \mathbf{z}_i'\gamma(h) + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{max} = 9$.

FEF - estimator of Pesaran and Zhou (2016). Standard errors are robust to heteroskedasticity and serial correlation.
RE - random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.
(1) - The FE estimates of $\beta(h)$ reported in the table are the same as those summarized in Table 4.

Table S13: Fixed Effect Filtered and Random Effect Estimates of Price Expectation Equations for Gold

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$														
	One Month Ahead						Three Months Ahead						One Year Ahead		
	FE	FE	RE	RE	FE	FE	RE	RE	FE	FE	RE	FE	RE	RE	
$x_{it}^{(1)}$	0.602*** (0.197)	0.602*** (0.197)	0.581*** (0.177)	0.591*** (0.178)	0.222** (0.108)	0.222** (0.093)	0.208** (0.093)	0.213** (0.097)	-0.023 (0.049)	-0.023 (0.049)	-0.0565 (0.0455)	-0.0524 (0.0457)			
Female	1.174*** (0.356)	1.166*** (0.358)	1.143*** (0.321)	1.131*** (0.323)	1.062*** (0.203)	1.072*** (0.202)	1.047*** (0.190)	1.056*** (0.190)	0.622*** (0.098)	0.634*** (0.098)	0.626*** (0.0943)	0.639*** (0.0942)			
Age	-4.132*** (0.591)	-4.039*** (0.595)	-3.925*** (0.539)	-3.840*** (0.542)	-3.140*** (0.332)	-3.117*** (0.334)	-3.072*** (0.313)	-3.052*** (0.314)	-1.725*** (0.158)	-1.725*** (0.158)	-1.722*** (0.159)	-1.707*** (0.152)			
Education	-1.312*** (0.370)	-1.277*** (0.387)	-1.294*** (0.319)	-1.266*** (0.330)	-1.280*** (0.220)	-1.235*** (0.223)	-1.269*** (0.198)	-1.226*** (0.200)	-0.798*** (0.103)	-0.780*** (0.103)	-0.783*** (0.104)	-0.768*** (0.0965)			
ln income	-1.362*** (0.302)	-1.302*** (0.309)	-1.381*** (0.295)	-1.325*** (0.271)	-1.119*** (0.172)	-1.070*** (0.175)	-1.140*** (0.158)	-1.092*** (0.161)	-0.656*** (0.080)	-0.624*** (0.080)	-0.633*** (0.0750)	-0.632*** (0.0751)			
Asian	0.981 (1.407)	1.046 (1.421)	0.758 (1.212)	0.833 (1.232)	0.556 (0.687)	0.651 (0.706)	0.492 (0.651)	0.590 (0.666)	0.299 (0.325)	0.389 (0.338)	0.274 (0.318)	0.365 (0.327)			
Black	1.977*** (0.751)	1.639*** (0.769)	2.071*** (0.695)	1.742** (0.711)	1.886*** (0.409)	1.756*** (0.414)	1.898*** (0.388)	1.768*** (0.394)	1.309*** (0.198)	1.254*** (0.198)	1.297*** (0.201)	1.240*** (0.193)			
Hispanic/Latino	1.280** (0.640)	0.645 (0.717)	1.452** (0.573)	0.856 (0.645)	1.682*** (0.353)	1.339*** (0.395)	1.674*** (0.327)	1.355*** (0.367)	0.967*** (0.161)	0.802*** (0.179)	0.954*** (0.153)	0.800*** (0.170)			
MSA dummies	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes			

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta(h)x_{it} + \mathbf{z}_i'\gamma(h) + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{max} = 9$.

FEF - estimator of Pesaran and Zhou (2016). Standard errors are robust to heteroskedasticity and serial correlation.
RE - random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.
(1) - The FE estimates of $\beta(h)$ reported in the table are the same as those summarized in Table 4.

Table S14: Fixed Effect Filtered and Random Effect Estimates of Price Expectation Equations for Housing

Dependent variable: $\hat{\pi}_{i,t+h t}^e$												
		One Month Ahead			Three Months Ahead			One Year Ahead			RE	
		FE	FE	RE	FE	FE	RE	FE	FE	RE		
$x_{it}^{(1)}$		-0.292*** (0.064)	-0.292*** (0.064)	-0.363*** (0.0604)	-0.382*** (0.0547)	-0.106*** (0.027)	-0.144*** (0.0254)	-0.149*** (0.0242)	-0.048*** (0.010)	-0.048*** (0.00945)	-0.0634*** (0.00940)	
Female		0.139 (0.185)	-0.000 (0.107)	0.123 (0.180)	-0.0138 (0.092)	0.032 (0.069)	-0.016 (0.047)	0.0236 (0.0666)	-0.0240 (0.0426)	0.037 (0.026)	0.0356 (0.0250)	0.0216 (0.0216)
Age		2.041*** (0.287)	0.046 (0.162)	2.007*** (0.280)	-0.0146 (0.134)	0.673*** (0.107)	0.002 (0.073)	0.663*** (0.103)	-0.00791 (0.0632)	0.189*** (0.040)	0.024 (0.037)	0.187*** (0.0380)
Education		0.389** (0.187)	0.086 (0.121)	0.384** (0.181)	0.114 (0.102)	0.165*** (0.068)	0.044 (0.049)	0.166*** (0.0652)	0.061 (0.0439)	0.042* (0.025)	0.006 (0.022)	0.0428* (0.0237)
ln income		0.549*** (0.135)	0.248*** (0.087)	0.546*** (0.132)	0.247*** (0.0733)	0.145*** (0.052)	0.047 (0.040)	0.145*** (0.0502)	0.0497 (0.0353)	0.0497 (0.021)	0.011 (0.019)	0.0137 (0.0196)
Asian		-1.300* (0.738)	-0.097 (0.443)	-1.332* (0.716)	-0.233 (0.393)	-0.448* (0.246)	-0.041 (0.159)	-0.443* (0.242)	-0.0547 (0.154)	-0.016 (0.089)	0.067 (0.076)	-0.00995 (0.0879)
Black		-1.490*** (0.354)	-0.289 (0.222)	-1.429*** (0.345)	-0.210 (0.192)	-0.433*** (0.133)	-0.035 (0.100)	-0.414*** (0.128)	-0.0211 (0.0889)	-0.040 (0.053)	0.054 (0.049)	-0.0362 (0.0500)
Hispanic/Latino		-2.033*** (0.295)	-0.165 (0.185)	-2.074*** (0.290)	-0.196 (0.159)	-0.500*** (0.114)	0.119 (0.088)	-0.521*** (0.111)	0.100 (0.0783)	-0.004 (0.043)	0.135*** (0.042)	-0.0114 (0.0412)
MSA dummies		No	Yes	No	No	Yes	No	Yes	No	Yes	No	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)} x_{it} + \mathbf{z}_i' \gamma^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

FEF - estimator of Pesaran and Zhou (2016). Standard errors are robust to heteroskedasticity and serial correlation.

RE - random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.
(1) - The FE estimates of $\beta^{(h)}$ reported in the table are the same as those summarized in Table 4.

S17 FE-TE Filtered estimates of the price expectation equations

We consider the following model.

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}'_i \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}, \quad (\text{S.17})$$

with \mathbf{d}_i as specified in equation (S.7). There are $m = 943$ unique response patterns in our data, 456 of which belong to at least two respondents. We estimate two specifications of the model. In the first one we introduce dummies for each response pattern, i.e. $\mathbf{d}_i \in \mathbb{R}^{942}$ (we leave out one dummy). Second, we estimate a model with time dummies for response patterns shared by at least two respondents, $\mathbf{d}_i \in \mathbb{R}^{456}$. Finally, as a benchmark, we estimate a model with no response pattern effects. Estimates of these models, with and without MSA dummies, are presented in Tables S15 -S20. As before, inclusion of location dummies have little effects on the estimates for equity and gold price equations across all specifications. For house prices, however, the estimates differ significantly depending on whether MSA fixed effects are included or not. Specifically, respondent characteristics cease to be statistically significant once a location (MSA) dummy is included.

Table S15: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 942 Response Pattern Dummies)

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$								
	One Month Ahead			Three Months Ahead			One Year Ahead		
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing
Female	0.817*** (0.310)	1.067*** (0.377)	-0.018 (0.192)	0.951*** (0.178)	1.016*** (0.215)	-0.009 (0.071)	0.582*** (0.087)	0.610*** (0.103)	0.025 (0.028)
ln age	-2.880*** (0.597)	-3.586*** (0.658)	1.386*** (0.302)	-2.536*** (0.337)	-2.737*** (0.369)	0.489*** (0.114)	-1.536*** (0.157)	-1.492*** (0.171)	0.180*** (0.044)
Education	-0.220 (0.346)	-1.161*** (0.397)	0.044 (0.194)	-0.410** (0.191)	-1.051*** (0.234)	0.041 (0.070)	-0.328*** (0.090)	-0.643*** (0.107)	0.024 (0.025)
ln income	-0.593*** (0.272)	-1.145*** (0.328)	0.430*** (0.145)	-0.771*** (0.161)	-0.892*** (0.188)	0.109* (0.056)	-0.422*** (0.076)	-0.536*** (0.087)	0.010 (0.022)
Asian	-1.637 (1.054)	2.232 (1.445)	-1.575** (0.764)	-0.008 (0.641)	1.379** (0.686)	-0.550** (0.251)	-0.199 (0.312)	0.578* (0.334)	-0.065 (0.089)
Black	1.217* (0.727)	1.948** (0.795)	-1.355*** (0.390)	1.333*** (0.401)	1.507*** (0.436)	-0.403*** (0.146)	0.963*** (0.188)	1.043*** (0.210)	-0.071 (0.057)
Hispanic/Latino	-0.330 (0.621)	0.883 (0.680)	-1.706*** (0.321)	0.912*** (0.330)	1.380*** (0.376)	-0.415*** (0.123)	0.693*** (0.152)	0.818*** (0.171)	-0.002 (0.047)

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}'_i \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.
Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

Table S16: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 942 Response Pattern Dummies and MSA Dummies)

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$							
	One Month Ahead		Three Months Ahead		One Year Ahead			
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold
Female	0.817*** (0.315)	1.118*** (0.383)	-0.034 (0.120)	0.929*** (0.179)	1.043*** (0.214)	-0.016 (0.051)	0.575*** (0.088)	0.633*** (0.102)
In age	-2.852** (0.596)	-3.603*** (0.668)	-0.025 (0.192)	-2.517*** (0.338)	-2.786*** (0.374)	0.003 (0.084)	-1.530*** (0.161)	-1.519*** (0.174)
Education	-0.335 (0.359)	-1.155*** (0.418)	0.007 (0.135)	-0.477*** (0.198)	-1.007*** (0.240)	0.009 (0.053)	-0.357*** (0.093)	-0.627*** (0.109)
In income	-0.577** (0.274)	-1.045*** (0.335)	0.190* (0.097)	-0.770*** (0.163)	-0.836*** (0.190)	0.030 (0.044)	-0.417*** (0.076)	-0.506*** (0.086)
Asian	-1.470 (1.035)	2.131 (1.455)	0.161 (0.405)	0.102 (0.647)	1.394*** (0.702)	0.019 (0.151)	-0.165 (0.315)	0.635* (0.344)
Black	1.205 (0.737)	1.815** (0.811)	-0.309 (0.265)	1.309*** (0.410)	1.507*** (0.444)	-0.058 (0.114)	0.927*** (0.192)	1.033*** (0.213)
Hispanic/Latino	-0.645 (0.675)	0.351 (0.754)	-0.264 (0.209)	0.754*** (0.365)	1.072*** (0.416)	0.040 (0.094)	0.621*** (0.170)	0.676*** (0.188)
MSA Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}'_i \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$

is expressed in per cent per quarter for all h .

$N = 35, 961, T_{min} = 1, T_{p50} = 4, T_{p25} = 6, \bar{T} = 7.23, T_{p75} = 9, T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

Table S17: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 456 Response Pattern Dummies)

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead			
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing	
Female	0.792*** (0.297)	1.181*** (0.363)	0.071 (0.181)	0.888*** (0.171)	1.075*** (0.208)	0.003 (0.068)	0.567*** (0.084)	0.646*** (0.099)	0.029 (0.026)	
ln age	-2.895*** (0.550)	-3.781*** (0.616)	1.297*** (0.283)	-2.506*** (0.314)	-2.871*** (0.349)	0.458*** (0.107)	-1.523*** (0.089)	-1.513*** (0.146)	0.172*** (0.160)	
Education	-0.171 (0.327)	-1.144*** (0.375)	0.137 (0.182)	-0.463** (0.181)	-1.084*** (0.223)	0.089 (0.066)	-0.360*** (0.085)	-0.676*** (0.102)	0.042* (0.024)	
ln income	-0.695*** (0.257)	-1.292*** (0.310)	0.417*** (0.135)	-0.773*** (0.154)	-0.980*** (0.178)	0.105*** (0.053)	-0.426*** (0.072)	-0.565*** (0.082)	0.006 (0.021)	
Asian	-2.073* (1.181)	1.029 (1.523)	-1.653*** (0.761)	-0.121 (0.647)	0.808 (0.704)	-0.535*** (0.246)	-0.200 (0.295)	0.412 (0.330)	-0.035 (0.084)	
Black	1.107 (0.679)	1.664** (0.747)	-1.214*** (0.352)	1.387*** (0.376)	1.630*** (0.414)	-0.341*** (0.132)	1.019*** (0.176)	1.117*** (0.198)	-0.032 (0.054)	
Hispanic/Latino	-0.139 (0.564)	1.161* (0.628)	-1.750*** (0.298)	1.027*** (0.308)	1.559*** (0.352)	-0.402*** (0.114)	0.786*** (0.142)	0.902*** (0.161)	0.019 (0.044)	
MSA Dummies	No	No	No	No	No	No	No	No	No	No

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}'_i \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

Table S18: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 456 Response Pattern Dummies and MSA Dummies)

Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead		
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing
Female	0.801*** (0.301)	1.208*** (0.365)	-0.027 (0.112)	0.877*** (0.173)	1.099*** (0.207)	-0.031 (0.048)	0.564*** (0.084)	0.668*** (0.099)	0.017 (0.023)
ln age	-2.849*** (0.551)	-3.740*** (0.624)	-0.031 (0.173)	-2.476*** (0.315)	-2.883*** (0.352)	0.002 (0.077)	-1.511*** (0.149)	-1.532*** (0.163)	0.053 (0.038)
Education	-0.322 (0.337)	-1.161*** (0.391)	0.068 (0.123)	-0.548*** (0.187)	-1.060*** (0.227)	0.044 (0.049)	-0.399*** (0.087)	-0.669*** (0.104)	0.024 (0.022)
ln income	-0.672*** (0.260)	-1.227*** (0.316)	0.183*** (0.089)	-0.767*** (0.156)	-0.940*** (0.180)	0.029 (0.041)	-0.417*** (0.073)	-0.541*** (0.082)	-0.011 (0.019)
Asian	-1.859 (1.167)	1.058 (1.529)	-0.113 (0.476)	0.022 (0.658)	0.874 (0.719)	-0.015 (0.161)	-0.166 (0.300)	0.495 (0.340)	0.078 (0.072)
Black	1.042 (0.690)	1.390* (0.764)	-0.243 (0.233)	1.315*** (0.383)	1.521*** (0.421)	-0.015 (0.102)	0.955*** (0.181)	1.066*** (0.202)	0.049 (0.050)
Hispanic/Latino	-0.428 (0.617)	0.749 (0.698)	-0.129 (0.190)	0.870** (0.340)	1.324*** (0.389)	0.124 (0.087)	0.714*** (0.158)	0.790*** (0.177)	0.137*** (0.042)
MSA Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}_i' \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}_i' \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961, T_{min} = 1, T_{p25} = 4, T_{p50} = 6, \bar{T} = 7.23, T_{p75} = 9, T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

Table S19: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 0 Response Pattern Dummies)

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead			
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing	
Female	0.764** (0.301)	1.173*** (0.356)	0.139 (0.185)	0.898*** (0.171)	1.061*** (0.203)	0.031 (0.069)	0.570*** (0.084)	0.622*** (0.098)	0.037 (0.026)	
ln age	-2.844*** (0.511)	-4.127*** (0.591)	2.039*** (0.287)	-2.633*** (0.296)	-3.135*** (0.332)	0.672*** (0.107)	-1.668*** (0.142)	-1.723*** (0.158)	0.189*** (0.040)	
Education	-0.343 (0.329)	-1.311*** (0.370)	0.389** (0.187)	-0.622*** (0.184)	-1.279*** (0.220)	0.165** (0.068)	-0.467*** (0.087)	-0.797*** (0.103)	0.042* (0.025)	
ln income	-0.666*** (0.241)	-1.361*** (0.302)	0.547*** (0.135)	-0.817*** (0.148)	-1.118*** (0.172)	0.144*** (0.052)	-0.479*** (0.070)	-0.656*** (0.080)	0.011 (0.021)	
Asian	-1.577 (1.056)	0.982 (1.407)	-1.299* (0.738)	-0.210 (0.619)	0.557 (0.687)	-0.448* (0.246)	-0.170 (0.274)	-0.299 (0.325)	-0.016 (0.089)	
Black	0.959 (0.665)	1.976*** (0.751)	-1.487*** (0.354)	1.502*** (0.368)	1.885*** (0.409)	-0.433*** (0.133)	1.136*** (0.173)	1.308*** (0.198)	-0.040 (0.053)	
Hispanic/Latino	-0.097 (0.586)	1.279** (0.640)	-2.031*** (0.295)	1.206*** (0.310)	1.681*** (0.353)	-0.499*** (0.114)	0.895*** (0.142)	0.966*** (0.161)	-0.004 (0.043)	
MSA Dummies	No	No	No	No	No	No	No	No	No	No

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \mathbf{d}'_i \boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

Table S20: FE-TE Filtered Estimates of $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Different Assets (with 0 Response Pattern Dummies and MSA Dummies)

Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead		
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing
Female	0.791*** (0.302)	1.165*** (0.358)	-0.001 (0.107)	0.895*** (0.172)	1.071*** (0.202)	-0.016 (0.047)	0.567*** (0.084)	0.634*** (0.098)	0.023 (0.023)
Image	-2.717*** (0.508)	-4.034*** (0.595)	0.044 (0.162)	-2.568*** (0.297)	-3.113*** (0.334)	0.001 (0.073)	-1.627*** (0.144)	-1.720*** (0.159)	0.024 (0.037)
Education	-0.424 (0.337)	-1.276*** (0.387)	0.085 (0.121)	-0.690*** (0.187)	-1.234*** (0.223)	0.044 (0.049)	-0.502*** (0.089)	-0.780*** (0.104)	0.006 (0.022)
ln income	-0.627** (0.247)	-1.301*** (0.309)	0.246*** (0.087)	-0.791*** (0.151)	-1.069*** (0.175)	0.046 (0.040)	-0.461*** (0.071)	-0.624*** (0.080)	-0.012 (0.019)
Asian	-1.430 (1.061)	1.047 (1.421)	-0.097 (0.443)	-0.082 (0.629)	0.651 (0.706)	-0.041 (0.159)	-0.133 (0.280)	-0.133 (0.338)	0.067 (0.076)
Black	0.790 (0.681)	1.638** (0.769)	-0.286 (0.222)	1.378*** (0.376)	1.755*** (0.414)	-0.34 (0.100)	1.046*** (0.178)	1.253*** (0.201)	0.054 (0.049)
Hispanic/Latino	-0.612 (0.640)	0.645 (0.717)	-0.164 (0.185)	0.928*** (0.341)	1.338*** (0.395)	0.119 (0.088)	0.759*** (0.157)	0.802*** (0.179)	0.135*** (0.042)
MSA Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}_i'\boldsymbol{\gamma}^{(h)} + \beta^{(h)}x_{it} + \mathbf{d}_i'\boldsymbol{\xi}^{(h)} + \varepsilon_{i,t+h} + \psi_i^{(h)}$ using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

FE-TE Filtered estimates with standard errors robust to heteroskedasticity and serial correlation.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Filtered estimates are computed using the estimator of Pesaran and Zhou (2016).

S18 Comparison of alternative estimates of $\beta^{(h)}$ and implied interest rate r

In Table S22 we present a comparison of the estimates of $\beta^{(h)}$ in the equation

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \mathbf{z}'_i \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \varepsilon_{i,t+h} + \psi_i^{(h)} \quad (\text{S.18})$$

for different model specifications. We consider FE and FE-TE estimates of $\beta^{(h)}$. We also consider a model where $\psi_i^{(h)}$ is treated as random. We estimate the RE model with and without the time-invariant characteristics \mathbf{z}_i , and with/without time and MSA dummies.

Then, using the estimates of $\beta^{(h)}$ for the housing market, we calculate the estimated interest rate, \hat{r} . Given the estimates $\hat{\beta}^{(h_1)}$ and $\hat{\beta}^{(h_2)}$, compute the interest rate estimates as follows:

$$\hat{r}_{h_1, h_2} = \left(\frac{h_1}{h_2} \frac{\beta^{(h_1)}}{\beta^{(h_2)}} \right)^{\frac{1}{h_1 - h_2}} - 1,$$

for cases where $|\hat{\beta}^{(h_1)}| < |\hat{\beta}^{(h_2)}|$. The interest rate estimates are presented in Table S21.

Table S21: Alternative estimates of the discount rate r , using FE, FE-TE and RE estimates of $\beta^{(h)}$ for house prices

	FE	FE-TE	RE							
$\hat{r}_{3,1}$	0.044	0.039	0.082	0.082	0.055	0.057	0.091	0.086	0.082	0.079
$\hat{r}_{12,1}$	0.064	0.060	0.058	0.055	0.055	0.053	0.070	0.067	0.065	0.063
$\hat{r}_{12,3}$	0.069	0.065	0.053	0.049	0.055	0.052	0.066	0.063	0.061	0.059
Time Dummies			No	Yes	No	Yes	No	Yes	No	Yes
MSA Dummies			No	No	Yes	Yes	No	No	Yes	Yes
Demographics			No	No	No	No	Yes	Yes	Yes	Yes

Table S22: Estimates of $\beta^{(h)}$ in equation (26) for different model specifications

horizon	FE	FE-TE	RE					
			eqwt _t			old _t		
One Month Ahead	-0.0991 (0.127)	-0.126 (0.128)	-0.0849 (0.116)	-0.107 (0.116)	-0.131 (0.117)	-0.124 (0.116)	-0.146 (0.116)	-0.133 (0.117)
	-0.0905 (0.0760)	-0.0995 (0.0760)	-0.0719 (0.0703)	-0.0798 (0.0703)	-0.0908 (0.0705)	-0.0988 (0.0705)	-0.118* (0.0700)	-0.126* (0.0700)
	-0.115*** (0.0365)	-0.117*** (0.0364)	-0.111*** (0.0339)	-0.112*** (0.0339)	-0.121*** (0.0340)	-0.122*** (0.0340)	-0.138*** (0.0337)	-0.140*** (0.0339)
	0.602*** (0.197)	0.581*** (0.198)	0.409 *** (0.175)	0.389 *** (0.176)	0.455 *** (0.176)	0.435 *** (0.177)	0.581 *** (0.177)	0.562 *** (0.177)
	0.222** (0.108)	0.203* (0.109)	0.0850 (0.0986)	0.0678 (0.0987)	0.113 (0.0990)	0.0960 (0.0992)	0.208 ** (0.0993)	0.190 * (0.0994)
	-0.0226 (0.0488)	-0.0316 (0.0489)	-0.114 ** (0.0453)	-0.122 *** (0.0454)	-0.0996 ** (0.0455)	-0.108 ** (0.0455)	-0.0565 (0.0455)	-0.0646 (0.0456)
One Month Ahead	-0.292*** (0.0643)	-0.303*** (0.0642)	-0.443 *** (0.0602)	-0.456 *** (0.0601)	-0.412 *** (0.0545)	-0.419 *** (0.0544)	-0.363 *** (0.0604)	-0.374 *** (0.0602)
	-0.106*** (0.0273)	-0.109*** (0.0274)	-0.173 *** (0.0252)	-0.178 *** (0.0252)	-0.153 *** (0.0239)	-0.156 *** (0.0239)	-0.144 *** (0.0254)	-0.147 *** (0.0254)
	-0.0481*** (0.0102)	-0.0479*** (0.0102)	-0.0687 *** (0.00941)	-0.0686 *** (0.00943)	-0.0618 *** (0.00937)	-0.0616 *** (0.00939)	-0.0638 *** (0.00945)	-0.0637 *** (0.00947)
	Time Dummies	No	Yes	No	Yes	No	Yes	No
	MSA Dummies	No	No	Yes	No	No	Yes	Yes
	Demographics	No	No	No	No	Yes	Yes	Yes

The equation $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)} x_{it} + \mathbf{z}_i' \boldsymbol{\gamma}^{(h)} + \alpha_i + \delta_t + \varepsilon_{i,t+h}$ is estimated using an unbalanced panel of 4,971 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 35,961$, $T_{min} = 1$, $T_{p25} = 4$, $T_{p50} = 6$, $\bar{T} = 7.23$, $T_{p75} = 9$, $T_{max} = 11$

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Standard errors are robust to heteroskedasticity and serial correlation.

† Female= 1

S19 Regression results controlling for home-ownership

In this section we present results obtained by matching the data from the DQ Survey with another survey carried out by RAND ALP - the Effects of the Financial Crisis Survey. The Financial Crisis Survey was fielded during November 2008 - January 2016, and the survey data can be accessed at <https://alpdata.rand.org/index.php?page=data>. The survey is of interest to us since it contains information on home-ownership. To match the respondents from the two surveys, we used the fact that the respondent identifier variable, “prim_key”, is uniquely assigned to a respondent across all surveys. For each month from March 2012 through January 2013, we kept those respondents of the Double Question Survey who had also participated in the Financial Crisis Survey in the same month. We also applied analogous filters to the one used for gender and race, which eliminates respondents who provide information that is not consistent over time with respect to the home-ownership variable. We ended up with a sample of 3,325 respondents who had participated in both surveys, and for whom we knew whether they were homeowners or not. The fraction of homeowners in this sample is 29%. This is significantly lower than the national rate of home-ownership, which was around 65% during the survey period.

We then estimate the model introduced in equation (23) in the paper separately for homeowners and non-homeowners. Specifically, we consider

$$\hat{\pi}_{i,t+h|t}^e = \alpha_i^{(h)} + \beta_1^{(h)} x_{it} + \delta_t^{(h)} + \varepsilon_{i,t+h} \text{ for } i \in \Theta_1, \quad (\text{S.19})$$

and

$$\hat{\pi}_{i,t+h|t}^e = \alpha_i^{(h)} + \beta_2^{(h)} x_{it} + \delta_t^{(h)} + \varepsilon_{i,t+h} \text{ for } i \in \Theta_2, \quad (\text{S.20})$$

where Θ_1 and Θ_2 is the set of homeowners and non-homeowners, respectively. The estimates of $(\beta_1^{(h)}, \beta_2^{(h)})$ for the three different asset classes, and for all the

three horizons, $h = 1, 3$, and 12 , are summarized in Table S23.

Table S23: Estimates of $\beta^{(h)}$ in the panel regressions of individual expected price changes on their belief valuation indicators for different assets by homeownership

Dependent variable: $\hat{\pi}_{i,t+h t}^e$						
Horizons	Homeowners					
	Equity		Gold		Housing	
FE	FE-TE	FE	FE-TE	FE	FE-TE	FE
One Month	-0.259 (-0.71)	-0.236 (-0.66)	0.656 (1.38)	0.725 (1.52)	-0.170 (-1.43)	-0.164 (-1.38)
Three Months	-0.133 (-0.66)	-0.142 (-0.72)	0.0932 (0.33)	0.128 (0.46)	-0.0364 (-0.59)	-0.0301 (-0.49)
One Year	-0.0636 (-0.62)	-0.0665 (-0.65)	-0.0305 (-0.22)	-0.0258 (-0.19)	-0.0526 (-1.93)	-0.0494 (-1.81)
Non-Homeowners						
Horizons	Equity		Gold		Housing	
	FE	FE-TE	FE	FE-TE	FE	FE-TE
One Month	-0.112 (-0.68)	-0.141 (-0.86)	0.0965 (0.44)	0.0604 (0.27)	-0.203 (-1.86)	-0.223 (-2.06)
Three Months	-0.179 (-1.83)	-0.198* (-2.04)	-0.0729 (-0.59)	-0.0996 (-0.81)	-0.0818* (-2.05)	-0.0897* (-2.27)
One Year	-0.202*** (-4.59)	-0.210*** (-4.76)	-0.185** (-3.06)	-0.190** (-3.14)	-0.0493*** (-3.69)	-0.0507*** (-3.80)

Fixed effect (FE) estimates of $\beta^{(h)}$ in the panel regression $\hat{\pi}_{i,t+h|t}^e = \alpha_i^{(h)} + \beta^{(h)}x_{it} + u_{it}^{(h)}$ are obtained with and without time effects (FE-TE) using an unbalanced panel of respondents over 11 months, March 2012 to January 2013.

The regressions for homeowners are estimated using 2,910 respondents and 20,602 responses.

The regressions for non-homeowners are estimated using 2,061 respondents and 15,359 responses.

Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively. Standard errors are robust to heteroskedasticity and residual serial correlation.

Then we estimate the panel data model

$$\hat{\pi}_{i,t+h|t}^e = \alpha^{(h)} + \tilde{\mathbf{z}}_i' \boldsymbol{\gamma}^{(h)} + \beta^{(h)} x_{it} + \varepsilon_{i,t+h} + \psi_i^{(h)}, \quad (\text{S.21})$$

where the variables are the same as previously defined, except for $\tilde{\mathbf{z}}_i$, which now includes a home-ownership dummy in addition to the previously considered time-invariant individual characteristics. FEF and RE estimates of the model are presented in tables S27-S26. Looking at the RE estimates in Tables S24-S26, we see that homeowners form slightly higher equity price expectations than non-homeowners for the three month and one year expectation horizons. There are no significant effects for gold expectations, and the effects for housing are positive after controlling for MSA fixed effects. Looking at the FEF estimates in Table S27, we see that the equity price expectations for three month and one year horizons are higher for homeowners, there are no significant effects for gold, and the one month house price expectations for homeowners are lower.

Table S24: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Equity for Samples with Home-ownership Indicators

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead					Three Months Ahead			One Year Ahead	
x_{it}	-0.197 (0.135)	-0.2292* (0.134)	-0.180 (0.136)	-0.205 (0.135)	-0.205** (0.0799)	-0.220*** (0.0795)	-0.192** (0.0805)	-0.207*** (0.0802)	-0.190*** (0.0388)	-0.184*** (0.0389)
Female	0.121 (0.255)	0.118 (0.255)	0.147 (0.260)	0.144 (0.260)	0.448*** (0.159)	0.442*** (0.159)	0.488*** (0.163)	0.482*** (0.163)	0.431*** (0.0836)	0.427*** (0.0836)
Age	-0.894* (0.505)	-0.877* (0.506)	-0.829* (0.503)	-0.813 (0.504)	-1.157*** (0.295)	-1.167*** (0.296)	-1.113*** (0.294)	-1.118*** (0.295)	-0.842*** (0.152)	-0.854*** (0.152)
Education	-0.331 (0.268)	-0.332 (0.269)	-0.575** (0.270)	-0.575** (0.270)	-0.489*** (0.163)	-0.493*** (0.163)	-0.620*** (0.166)	-0.627*** (0.166)	-0.360*** (0.0833)	-0.363*** (0.0834)
ln income	-0.505*** (0.211)	-0.505*** (0.212)	-0.510*** (0.216)	-0.511*** (0.216)	-0.453*** (0.141)	-0.458*** (0.142)	-0.469*** (0.144)	-0.474*** (0.144)	-0.284*** (0.0744)	-0.290*** (0.0744)
Asian	-0.309 (0.976)	-0.320 (0.976)	-0.462 (1.008)	-0.470 (1.007)	0.333 (0.601)	0.336 (0.601)	0.264 (0.636)	0.261 (0.634)	0.105 (0.286)	0.115 (0.285)
Black	0.983 (0.639)	0.984 (0.640)	0.648 (0.624)	0.652 (0.624)	1.628*** (0.381)	1.647*** (0.382)	1.444*** (0.377)	1.461*** (0.378)	1.210*** (0.200)	1.228*** (0.200)
Hispanic/Latino	0.886 (0.587)	0.879 (0.584)	0.408 (0.617)	0.404 (0.616)	1.137*** (0.335)	1.159*** (0.334)	0.877*** (0.362)	0.880*** (0.362)	0.703*** (0.159)	0.731*** (0.159)
Homeowner	0.233 (0.376)	0.236 (0.376)	0.256 (0.393)	0.260 (0.393)	0.527** (0.220)	0.540** (0.220)	0.554** (0.227)	0.562** (0.227)	0.373*** (0.112)	0.384*** (0.113)
Time Dummies	No No	Yes Yes	No Yes	No Yes	No No	Yes Yes	No Yes	No Yes	Yes No	No Yes
MSA Dummies	No No	Yes Yes	No Yes	No Yes	No No	Yes Yes	No Yes	No Yes	Yes Yes	Yes Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)} x_{it} + \mathbf{z}_i' \boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)}$ using an unbalanced panel of 3,325 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 20,663$, $T_{min} = 1$, $T_{p25} = 3$, $T_{p50} = 5$, $T_{p75} = 10$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S25: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Gold for Samples with Home-ownership Indicators

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$														
	One Month Ahead					Three Months Ahead					One Year Ahead				
x_{it}	0.410*** (0.184)	0.391*** (0.185)	0.425*** (0.186)	0.406*** (0.187)	0.0352 (0.109)	0.0178 (0.110)	0.0474 (0.111)	0.0301 (0.0552)	-0.150*** (0.0553)	-0.155*** (0.0554)	-0.144*** (0.0555)				
Female	0.681*** (0.330)	0.673*** (0.330)	0.648* (0.336)	0.641* (0.336)	0.791*** (0.212)	0.787*** (0.212)	0.819*** (0.214)	0.816*** (0.214)	0.517*** (0.108)	0.515*** (0.108)	0.546*** (0.108)				
ln age	-3.306*** (0.639)	-3.319*** (0.640)	-3.391*** (0.640)	-3.396*** (0.640)	-2.700*** (0.399)	-2.703*** (0.399)	-2.691*** (0.400)	-2.688*** (0.401)	-1.513*** (0.198)	-1.512*** (0.198)	-1.520*** (0.198)				
Education	-1.400*** (0.332)	-1.399*** (0.332)	-1.384*** (0.336)	-1.386*** (0.335)	-1.306*** (0.210)	-1.307*** (0.210)	-1.275*** (0.212)	-1.277*** (0.212)	-0.774*** (0.106)	-0.774*** (0.106)	-0.770*** (0.108)				
ln income	-1.672*** (0.302)	-1.685*** (0.302)	-1.741*** (0.303)	-1.753*** (0.302)	-1.233*** (0.193)	-1.240*** (0.193)	-1.221*** (0.192)	-1.228*** (0.192)	-0.671*** (0.0944)	-0.673*** (0.0944)	-0.656*** (0.0923)				
S58	Asian	0.750 (1.073)	0.786 (1.070)	0.839 (1.093)	0.857 (1.089)	0.582 (0.686)	0.598 (0.684)	0.724 (0.699)	0.732 (0.696)	0.414 (0.363)	0.419 (0.363)	0.516 (0.366)	0.519 (0.365)		
Black	2.103*** (0.845)	2.141*** (0.846)	1.872*** (0.831)	1.901*** (0.831)	1.851*** (0.506)	1.870*** (0.507)	1.707*** (0.502)	1.722*** (0.502)	1.084*** (0.231)	1.091*** (0.231)	1.037*** (0.234)				
Hispanic/Latino	0.988 (0.670)	1.061 (0.671)	0.451 (0.753)	0.476 (0.752)	0.793* (0.407)	0.830** (0.407)	0.411 (0.462)	0.422 (0.461)	0.497** (0.194)	0.507*** (0.195)	0.321 (0.217)	0.323 (0.217)			
Homeowner	-0.119 (0.475)	-0.0992 (0.474)	-0.195 (0.486)	-0.187 (0.486)	0.163 (0.288)	0.173 (0.288)	0.228 (0.294)	0.233 (0.294)	0.135 (0.142)	0.138 (0.142)	0.197 (0.145)	0.199 (0.145)			
Time Dummies	No MSA Dummies	Yes No	Yes Yes	No Yes	No Yes	Yes No	No Yes	Yes Yes	No Yes	Yes Yes	Yes Yes				

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)}x_{it} + \mathbf{z}_i'\boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 3,325 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 20,663$, $T_{min} = 1$, $T_{p25} = 3$, $T_{p50} = 5$, $T_{p75} = 10$, $T_{max} = 11$

Random effect estimates with standard errors clustered at individual level.

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S26: Random Effect Estimates of $\beta^{(h)}$ and $\gamma^{(h)}$ in the Panel Regressions of Individual Expected Price Changes on Belief Valuation Indicators for Samples with Home-ownership Indicators

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$									
	One Month Ahead			Three Months Ahead			One Year Ahead			
x_{it}	-0.256*** (0.0777)	-0.276*** (0.0773)	-0.321*** (0.0672)	-0.338*** (0.0671)	-0.106*** (0.0304)	-0.113*** (0.0305)	-0.128*** (0.0284)	-0.135*** (0.0286)	-0.0658*** (0.0112)	-0.0664*** (0.0113)
Female	0.0887 (0.200)	0.0864 (0.200)	-0.0358 (0.105)	-0.0334 (0.106)	0.0289 (0.0751)	0.0283 (0.0750)	-0.0178 (0.0497)	-0.0167 (0.0497)	0.0357 (0.0273)	0.0205 (0.0238)
Age	2.285*** (0.354)	2.286*** (0.353)	0.116 (0.163)	0.137 (0.163)	0.812*** (0.132)	0.812*** (0.131)	0.0949 (0.0811)	0.101 (0.0811)	0.259*** (0.0485)	0.261*** (0.0485)
Education	0.124 (0.202)	0.123 (0.201)	-0.00314 (0.108)	-0.000636 (0.108)	0.114 (0.0746)	0.114 (0.0745)	0.0497 (0.0499)	0.0509 (0.0499)	0.0353 (0.0269)	0.00878 (0.0241)
ln income	0.712*** (0.169)	0.712*** (0.169)	0.433*** (0.0933)	0.441*** (0.0931)	0.252*** (0.0649)	0.253*** (0.0647)	0.170*** (0.0448)	0.173*** (0.0448)	0.0695*** (0.0249)	0.0532*** (0.0223)
Asian	-1.708*** (0.836)	-1.727*** (0.834)	-0.601 (0.407)	-0.617 (0.409)	-0.466 (0.290)	-0.473 (0.290)	-0.121 (0.171)	-0.127 (0.172)	-0.0167 (0.102)	-0.0187 (0.103)
Black	-0.946*** (0.440)	-0.948*** (0.440)	-0.275 (0.262)	-0.287 (0.262)	-0.260 (0.164)	-0.262 (0.164)	-0.0424 (0.120)	-0.0478 (0.120)	-0.0195 (0.0591)	-0.0201 (0.0591)
Hispanic/Latino	-2.671*** (0.393)	-2.685*** (0.393)	-0.608*** (0.197)	-0.627*** (0.197)	-0.826*** (0.149)	-0.832*** (0.149)	-0.157 (0.0968)	-0.165* (0.0969)	-0.115** (0.0533)	-0.118** (0.0534)
Homeowner	-0.529* (0.277)	-0.524* (0.276)	0.283* (0.151)	0.283* (0.150)	-0.104 (0.104)	-0.103 (0.103)	0.179** (0.0710)	0.179** (0.0709)	0.0510 (0.0381)	0.0505 (0.0381)
Time Dummies	No No	Yes No	No Yes	No Yes	No No	Yes Yes	No Yes	No Yes	No Yes	Yes Yes
MSA Dummies	No No	Yes No	No Yes	No Yes	No No	Yes Yes	No Yes	No Yes	No Yes	Yes Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)} x_{it} + \mathbf{z}_i' \gamma^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 3,325 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .
 $N = 20,663$, $T_{min} = 1$, $T_{p25} = 3$, $T_{p50} = 5$, $T_{p75} = 10$, $T_{max} = 11$
Random effect estimates with standard errors clustered at individual level.
Standard errors are in parentheses, *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table S27: Fixed Effects Filtered Estimates of Price Expectation Equations for Samples with Home-ownership Indicators

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$							
	One Month Ahead				Three Months Ahead			
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold
$\beta^{(h)}$	-0.153 (0.156)	0.271 (0.213)	-0.194** (0.085)	-0.166* (0.090)	-0.021 (0.121)	-0.069** (0.033)	-0.163*** (0.043)	-0.137** (0.060)
Female ($\gamma_3^{(h)}$)	0.056 (0.297)	0.621* (0.359)	0.108 (0.207)	0.437** (0.177)	0.771*** (0.222)	0.038 (0.078)	0.427*** (0.090)	0.511*** (0.112)
In age ($\gamma_1^{(h)}$)	-1.171** (0.549)	-3.546*** (0.698)	2.315*** (0.364)	-1.308*** (0.316)	-2.774*** (0.416)	0.821*** (0.137)	-0.870*** (0.159)	-1.516*** (0.202)
Education ($\gamma_7^{(h)}$)	-0.369 (0.316)	-1.410*** (0.368)	0.126 (0.211)	-0.534*** (0.183)	-1.320*** (0.223)	0.117 (0.078)	-0.389*** (0.089)	-0.784*** (0.110)
In income ($\gamma_2^{(h)}$)	-0.568** (0.240)	-1.709*** (0.333)	0.733*** (0.175)	-0.483*** (0.153)	-1.236*** (0.202)	0.260*** (0.068)	-0.291*** (0.078)	-0.669*** (0.097)
Asian ($\gamma_4^{(h)}$)	-0.639 (1.197)	0.331 (1.271)	-1.676* (0.863)	0.229 (0.661)	0.470 (0.736)	-0.443 (0.298)	0.070 (0.299)	0.373 (0.378)
Black ($\gamma_5^{(h)}$)	0.811 (0.706)	1.930*** (0.895)	-0.934*** (0.448)	1.601*** (0.404)	1.822*** (0.527)	-0.255 (0.169)	1.190*** (0.208)	1.066*** (0.238)
Hispanic/Latino ($\gamma_6^{(h)}$)	0.812 (0.691)	0.894 (0.738)	-2.663*** (0.400)	1.105*** (0.369)	0.784* (0.427)	-0.829*** (0.153)	0.711*** (0.168)	0.501* (0.201)
Homeowner ($\gamma_8^{(h)}$)	0.207 (0.418)	-0.143 (0.522)	-0.551* (0.287)	0.525** (0.238)	0.160 (0.305)	-0.118 (0.109)	0.389*** (0.119)	0.153 (0.148)

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)}x_{it} + \mathbf{z}_i\gamma^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 3,325 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 20,663$, $T_{min} = 1$, $T_{p25} = 3$, $T_{p50} = 5$, $T_{p75} = 10$, $T_{max} = 11$

Standard errors are in parentheses, * and ** denote statistical significance at 10%, 5% and 1% levels, respectively.
Estimates of $\gamma^{(h)}$ are obtained using the FE Filtered estimator or Pesaran and Zhou (2016).

Table S28: Fixed Effects Filtered Estimates of Price Expectation Equations for Samples with Home-Ownership Indicators and MSA Dummies

	Dependent variable: $\hat{\pi}_{i,t+h t}^e$								
	One Month Ahead			Three Months Ahead			One Year Ahead		
	Equity	Gold	Housing	Equity	Gold	Housing	Equity	Gold	Housing
$\beta^{(h)}$	-0.153 (0.156)	0.271 (0.213)	-0.194** (0.085)	-0.166* (0.090)	-0.021 (0.121)	-0.069** (0.033)	-0.163*** (0.043)	-0.137** (0.060)	-0.050*** (0.012)
Female ($\gamma_3^{(h)}$)	0.074 (0.299)	0.579 (0.364)	-0.017 (0.121)	0.478*** (0.180)	0.799*** (0.224)	-0.007 (0.055)	0.442*** (0.091)	0.540*** (0.111)	0.025 (0.025)
In age ($\gamma_1^{(h)}$)	-1.119** (0.535)	-3.660*** (0.692)	0.111 (0.191)	-1.266*** (0.311)	-2.779*** (0.414)	0.085 (0.090)	-0.815*** (0.159)	-1.527*** (0.200)	0.082* (0.044)
Education ($\gamma_7^{(h)}$)	-0.600* (0.316)	-1.399*** (0.371)	-0.036 (0.125)	-0.662*** (0.185)	-1.295*** (0.224)	0.043 (0.055)	-0.444*** (0.092)	-0.784*** (0.111)	0.003 (0.025)
In income ($\gamma_2^{(h)}$)	-0.594** (0.241)	-1.793*** (0.330)	0.501*** (0.111)	-0.509*** (0.154)	-1.232*** (0.199)	0.188*** (0.050)	-0.305*** (0.078)	-0.658*** (0.094)	0.054*** (0.023)
Asian ($\gamma_4^{(h)}$)	-0.788 (1.208)	0.438 (1.265)	-0.728 (0.524)	0.158 (0.691)	0.617 (0.746)	-0.131 (0.194)	0.083 (0.315)	0.476 (0.381)	0.055 (0.090)
Black ($\gamma_5^{(h)}$)	0.542 (0.681)	1.763*** (0.870)	-0.298 (0.293)	1.439*** (0.394)	1.697*** (0.518)	-0.045 (0.129)	1.107*** (0.209)	1.021*** (0.237)	0.038 (0.058)
Hispanic/Latino ($\gamma_6^{(h)}$)	0.358 (0.716)	0.345 (0.834)	-0.695*** (0.223)	0.855** (0.400)	0.382 (0.488)	-0.193* (0.106)	0.585*** (0.185)	0.315 (0.224)	0.017 (0.051)
Homeowner ($\gamma_8^{(h)}$)	0.219 (0.429)	-0.244 (0.529)	0.263 (0.178)	0.539** (0.244)	0.212 (0.309)	0.167** (0.080)	0.415*** (0.122)	0.210 (0.150)	0.128*** (0.036)
MSA Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The estimates reported refer to the panel regressions $\hat{\pi}_{i,t+h|t}^e = \beta^{(h)}x_{it} + \mathbf{z}_i\boldsymbol{\gamma}^{(h)} + \alpha_i^{(h)} + \varepsilon_{i,t+h}$ using an unbalanced panel of 3,325 respondents over 11 months, March 2012 to January 2013.

$\hat{\pi}_{i,t+h|t}^e$ is expressed in per cent per quarter for all h .

$N = 20,633$, $T_{min} = 1$, $T_{p25} = 3$, $T_{p50} = 5$, $T_{p75} = 10$, $T_{max} = 11$

Standard errors are in parentheses, * , ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Estimates of $\boldsymbol{\gamma}^{(h)}$ are obtained using the FE Filtered estimator or Pesaran and Zhou (2016).

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