Heterogeneous Attention to Inflation and Monetary Policy*

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Abstract

We study how heterogeneous attention to inflation affects monetary policy transmission. Using household-level surveys for the US and Australia we first show that households' attention to inflation varies with the income level. We find that high-income households pay more attention to inflation compared to other income groups. To quantify the effects for the aggregate economy, we build a Heterogeneous-Agent New Keynesian model with endogenous income inequality arising through an occupational choice where the level of attention varies along the income distribution. Compared to fully rational inflation expectations, we find that monetary policy faces a better inflation-output trade-off when expectations are anchored. Low-income households, that do not fully anticipate a decrease in inflation following a contractionary monetary policy shock, perceive a larger fall in labour income that incentivizes them to increase their labour supply, and as a result the recession is milder. However, the better trade-off is achieved amid a larger decrease in welfare among low-earners.

Keywords: Inattention, HANK, Monetary Policy, Inflation Expectations
JEL Codes: D84, D91, E21, E71, E52

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1. Introduction

How much attention do households pay towards inflation? And does the level of attention vary with their socio-demographic characteristics? In particular, income and wealth inequality as well as heterogeneous exposure to shocks play a central role for the transmission of monetary policy (Auclert, 2019). Additionally, having limited information about the state of the economy substantially changes monetary policy transmission in the aggregate economy (Gabaix, 2020) reinforcing the importance of quantifying how micro-level evidence about households' attention and consumption-saving choices affect macro dynamics.

We address these questions firstly by empirically showing that high-income households pay more attention to inflation than low-income households. Extending the framework by Pfäuti (2021)[1] to control for household-level characteristics, we estimate varying levels of attention to inflation across different household groups. We employ data from the Survey of Consumer Expectations from the New York Fed (SCE) for the US and the Consumer Attitudes, Sentiments and Expectations in Australia Survey (CASiE) for Australia and find robust cross-country evidence of higher attention among high-income households. Other socio-demographic characteristics like age, home-ownership or gender either drive less heterogeneity in attention levels or provide less robust results.

To quantify the effects of our empirical results about heterogeneous attention to inflation on the aggregate economy, we propose a Heterogeneous-Agent New Keynesian (HANK) model with inattention. We find that compared to rational inflation expectations case, monetary policy faces a better inflation-output trade-off with inattention. The better trade-off is achieved because of an increase in labour supply of low-attention low-income households following a contractionary monetary policy shock. Those households who are at the borrowing constraint or close to it, while not having savings buffers to smooth their consumption, increase hours worked in response to monetary tightening - a channel that is absent when we compare representative agent with full information rational expectations (FIRE) to the one with inattention, as a representative household is sufficiently rich to behave in line with her Euler equation and for whom substitution effect dominates income effect of labour supply. Due to the increased labour supply of households with anchored inflation expectations, recession is milder and the inflation-output trade-off is better. However, as a result of disutility from working, low-income households incur large welfare losses following contractionary monetary policy. Thus, distributional consequences of monetary policy are larger with inattention to inflation compared to the results with FIRE (see, for example, Coibion et al. (2017) and Gornemann et al. (2021) for empirical results and results with FIRE). Lowering Taylor rule coefficient in front of the inflation, on the other hand, leads to a rapid increase in attention levels and a worse inflation-output trade-off once the change in attention level is accounted for.

These results are obtained through the lens of the model with three dimensions of heterogeneity. First, as standard in the HANK literature, all households in the economy are subject to uninsurable, transitory, idiosyncratic income risk which they can self-insure against through their savings. Second, households differ in their permanent income level. We model a more permanent

1 Although Pfäuti (2021) framework interprets higher Kalman gain coefficient as higher attention, the inflation expectation process is quite similar to other behavioral frameworks.

income component following Faia et al. (2022) that introduces Roy-type occupational choice into HANK. In this framework, households have occupation-specific skills that through endogenous occupation choice result in households, that are highly skilled for high-wage occupation, to have permanently higher stream of labour incomes. Thus, household's income is a function of idiosyncratic risk and occupation-specific skills. Third, to account for the empirically found heterogeneous inattention to inflation, we draw on Gabaix (2014) and assume that households are inattentive to parts of the economy and face a constraint on how much information they can process. Specifically, households have a "sparse" representation of the world meaning that they only observe variables which are of first order importance to their decision-making. We assume, that they are inattentive to the aggregate price level and inflation, while being fully attentive to the rest of the state of the economy.[2] Households then have to decide once and for all how much attention they want to allocate towards prices and inflation which ultimately affects their subjective inflation expectations. This misperception of prices leads to a suboptimal consumption choice and a loss in utility. The model is calibrated to match the empirical evidence of heterogeneous attention that varies with income levels. We close the model with monopolistically competitive firms that face nominal rigidities to study monetary policy and a Taylor-type rule of the central bank.

Our model results, obtained through the sequence-space Jacobian method by Auclert et al. (2021), show that in response to a contractionary monetary policy shock, the economy experiences a smaller drop in output under inattention and thus inflation-output trade-off is better with inattention. Following a contractionary monetary policy shock, unconstrained households due to the intertemporal substitution decrease their demand for consumption goods, which leads to a fall in labour demand of the firms, that in our model manifests through a fall in wages. A larger perceived fall in real wages of the low-income households, that observe only nominal wages and do not anticipate a decrease in inflation that follows monetary tightening, leads to an increase in labour supply in response to the fall in wages (as the income effect of labour supply dominates the substitution effect among low-earners).[3] This, in turn, due to labour-capital complementarity leads to a smaller fall in investments and a milder recession.

These effects are larger with heterogeneity in inflation expectations compared to a homogeneous inattention case, as low-income households, in line with our empirical estimates, have lower levels of attention. Those lower levels of attention among income-poor are rationalized in the model through a higher cost of paying attention to inflation. We solve for the fixed point between attention levels and volatility of inflation to conduct policy counterfactuals: in particular, we vary Taylor rule coefficient in front of the inflation. The fixed point arises as a result of an inverse relationship between attention levels and inflation volatility following Gabaix (2014). With counterfactually fixed levels of attention from the baseline specification we find that decreasing Taylor rule coefficient from its baseline value improves inflation-output trade-off. Once, the fixed point between attention levels and inflation volatility is solved, a rapid increase in attention levels eliminates the benefits of a less stronger response to inflation deviations from target and implies a worse trade-off.

2 Assuming inattention to wages and interest rates leads to the same effects in terms of a comparison between inattention to inflation and rational inflation expectations.

3 The results of model with real wage rigidities provide an additional evidence that the main channel of inattention is through the perceived drop in real wages.

The idiosyncratic risk in our model exacerbates the welfare losses among the income-poor as compared to income-rich households. An increase in the idiosyncratic risk, or a lack of safety nets in the economy, leads to a larger share of households that are close or at the borrowing constraint. Those households increase their labour supply in response to tightening, as a result, potency of monetary policy is less, as those households while receiving more labour income, consume in subsequent periods more, which leads to a lower cumulative decrease in inflation after the shock.

Larger indirect effects compared to a direct effect outlined in the literature (see, for example, Kaplan et al. (2018)) in our model manifest through a larger fall in consumption due to large indirect effects, especially among low-earners, and in spite of a milder intertemporal substitution effect among high-income households.

We add broadly to four strands of literature. First, we provide new empirical cross-country evidence on household-level inattention to prices and their effects on inflation expectations in both US and Australian data. Cross-sectional variations in inflation expectations have been studied before. Early contributions include Malmendier and Nagel (2016) and Ehrmann and Tzamourani (2012) who show that cohorts build their inflation expectations depending on their lifetime inflation experiences, a fact complemented by recent contributions from Coibion et al. (2020), Weber et al. (2023) and Pfäuti (2021) who observe that households' inattention varies with economic conditions. Link et al. (2023) find that attention to macroeconomic variables is strongly persistent at the individual level, specifically, more attentive households are more likely to adjust inflation expectations during a shock to inflation as the cost of acquiring new information is lower for an attentive household than for an inattentive household which translates to an adjustment of expectations - a finding consistent with theories of inattention (Sims, 2003; Gabaix, 2014). In a recent paper by D'Acunto et al. (2023) the authors document a systematic relation between cognitive abilities and the formation of inflation expectations, in particular agents with high cognitive abilities have lower forecast errors for inflation compared to other groups of agents with lower levels of cognitive abilities. We formalize this finding in our theoretical HANK model by assuming that households' cognitive skills affect their inflation beliefs via their occupational skills. Our contribution on the empirical front is in estimating heterogeneous attention levels using Pfäuti (2021) framework.

Second, our paper adds to the growing literature of macroeconomic models with information frictions. Seminal contributions for the models with limited information include Sims (2003), Maćkowiak et al. (2023), Gabaix and Laibson (2022), Eusepi and Preston (2018), for the models with bounded rationality Gabaix (2020), Gabaix (2014). Recently, these frictions have been also incorporated into models with heterogeneous agents and incomplete markets to not only match macroeconomic moments but to also reconcile them with microeconomic evidence on marginal propensities to consume. One application is Angeletos and Huo (2021) who analyze the consequences of noisy information for agents with different wealth levels. They show that "the habit-like sluggishness generated by informational frictions is amplified when the agents with the highest marginal propensity to consume are also the ones with the most cyclical income". Broer et al. (2021) study wealth taxation and document the impact of heterogeneous expectations on the equilibrium properties of the economy relative to FIRE benchmark resulting in higher macroeconomic volatility. In a methodologically related paper to ours, Guerreiro (2022) builds a HANK model with households who have endogenous but heterogeneous beliefs about their cyclical income. Households are heterogeneously exposed to business cycle shocks which affect their beliefs about future income through their levels of attention they pay to these shocks which eventually amplifies business cycle fluctuations. We add to this literature by applying the sparsity-based model by Gabaix (2014) to a HANK model, allowing agents with heterogeneous income levels to endogenize their attention choice towards prices, ultimately resulting in heterogeneous inflation expectations. This allows us to study how heterogeneity in inflation expectations affects monetary policy transmission.

Third, we contribute to the heterogeneous agent literature studying monetary policy transmission.[4] The closest paper to ours on this front is Auclert et al. (2020). In their paper, the authors study monetary policy transmission in a HANK model in which households are assumed to have sticky expectations. Contrary to them, our model features heterogeneous inflation expectations, whereas in their framework, all households update their expectations and beliefs about their value of illiquid assets infrequently, but with the same probability and information of the state of the economy is updated with the same probability. Further, the information choice in our framework is endogenized and source-dependent while theirs is not. In a partial equilibrium heterogeneous agent model, Laibson et al. (2024) show that present bias increases households' marginal propensity to consume and amplifies the effect of monetary policy, leading to an increase in households' consumption, which however also decelerates monetary transmission. A recent paper by Pfäuti and Seyrich (2022) introduces cognitive discounting in the sense of Gabaix (2020) into a model with wealth heterogeneity. They show that this generates amplification of monetary policy through indirect effects and has strong implications for the business cycle due to unequal exposure of households to different shocks. We add to this literature by quantifying the effects of heterogeneity and information frictions for inflation expectations in a sticky-price model with permanent and idiosyncratic heterogeneity and document the transmission channels in a structural model.

Lastly, our results on the labour supply channel relate our paper to studies of labour supply in heterogeneous agent environments and in response to monetary policy shocks, see Faia et al. (2022), Faia and Shabalina (2023), Eeckhout and Sepahsalari (2020), Gornemann et al. (2021), Ravn and Sterk (2017), Graves et al. (2023), Cantore et al. (2022).

The paper is structured as follows. Section 2 provides the empirical estimation strategy to measure heterogeneity in inflation expectations and also over- and under-reaction to monetary policy and oil supply news shocks. Section 3 presents empirical cross-sectional results for US and Australian survey data. Then, Section 4 introduces our HANK model featuring inattentive agents. Section 5 shows our model results and discusses the implications for monetary policy. Section 6 concludes.

2. Measuring Attention

This section presents our empirical strategy to estimate heterogeneous attention to inflation from micro-level data. We follow Pfäuti (2021), whose approach we describe in the following subsection, and control for cross-sectional household characteristics. We also derive shock-specific attention and use the derived specification to compare changes in inflation expectations to domestic and

4 See also Kaplan et al. (2018),Auclert (2019); Acharya et al. (2023); Bayer et al. (2024).

foreign monetary versus oil supply news shocks. To perform the analysis we employ NY Fed SCE survey for the US and CASiE survey for Australia. Appendix A provides details regarding the datasets.

2.1. Attention to Inflation

Assume that households perceive the following law of motion for inflation

$$\pi_t = \rho\pi_{t-1} + \xi_t \tag{1}$$

where π_t is the inflation rate in year t, $\rho \in (-1, 1]$ is the autocorrelation coefficient and $\xi_t \sim i.i.d.N(0, \sigma_\xi^2)$ is the inflation innovation in year t. Every household belongs to a group $g = 1, 2, \ldots, n$, based on some specific characteristic (in our model this will be income). In every period, each household receives a noisy signal of inflation which according to him is generated as

$$s_{j,t} = \pi_t + \varepsilon_{j,t} \tag{2}$$

where $\varepsilon_{j,t} \sim i.i.d.N(0, \sigma_{\varepsilon^g}^2)$ is the noise in the signal. The noise term is perceived to have different variances σ_g^2 across household groups due to limited attention[5]: different types of households pay different amount of attention to inflation and the larger their attention, the lower the variation in their error about an observed variable, $\varepsilon_{j,t}$. Applying the standard Kalman filter allows us to generate conditional forecast of future inflation as

$$\begin{aligned} E[\pi_{t+1}|\mathcal{I}_{j,t}] = \rho E[\pi_t|\mathcal{I}_{j,t}] &= \rho E[\pi_t|\mathcal{I}_{j,t-1}] + \rho\gamma^g \left(s_{j,t} - E[\pi_t|\mathcal{I}_{i,t-1}]\right) \\ &= \rho E[\pi_t|\mathcal{I}_{i,t-1}] + \rho\gamma^g \left(\pi_t - E[\pi_t|\mathcal{I}_{i,t-1}]\right) + \nu_{j,t} \end{aligned} \tag{3}$$

where $E[\pi_t|\mathcal{I}_{j,t}]$ is the nowcast for inflation of household j once he receives new information, $E[\pi_t|\mathcal{I}_{j,t-1}]$ is the household's prior mean, $\nu_{j,t}$ is the noise. The inflation forecast of household j is a linear combination of the household's prior mean, the product of the Kalman gain, which is the measure of attention towards inflation, γ^g, and the difference between the realized inflation and the previous period inflation forecast. When the household forecasts inflation he corrects his forecast error partially by the amount of attention he pays towards inflation: the lower its level of attention, the less strong the update and the more anchored the prior beliefs. Averaging across j for each group allows us to estimate group-specific attention from the data via the following equation

$$\pi^e_{t+1,t} = \beta_j + \beta_1\pi^e_{t,t-1} + \beta_2^g I_g \left(\pi_t - \pi^e_{t,t-1}\right) + \nu_{j,t} \tag{4}$$

where β_j are the potentially different mean expectations of the households, I_g are type-g dummies, $\beta_1 = \rho$, and $\gamma^g = \frac{\beta_2^g I_g}{\beta_1}$ is the group-specific level of attention. The mean 1-year ahead inflation expectation of households in group g is a linear combination of its own lag and the latest observed forecasting error after the agent observed his signal about inflation. Alternatively, one can further derive the forecast errors of inflation starting from equation (3) by rewriting it for notational convenience as

$$E_{j,t}\pi_{t+1} = \gamma^g E_t\pi_{t+1} + (1 - \gamma^g)\, E_{j,t-1}\pi_{t+1} \tag{5}$$

5 This is different to Pfäuti (2021) who doesn't distinguish between household characteristics and the observed volatility of the shock is the same across households; see also Vellekoop and Wiederholt (2019)

Rewriting inflation as a function of structural shocks

$$\pi_{t+1} = \sum_{s=-\infty}^{\infty} J_{t+1-s} u_{t+1-s} \tag{6}$$

where u_t is a vector of structural shocks that are uncorrelated across time and with each other, and J_t represents impulse response functions (IRFs) of inflation to them, gives the forecast errors as

$$\begin{aligned}\pi_{t+1} - E_{j,t}\pi_{t+1} &= \sum_{s=-\infty}^{\infty} J_{t+1-s} u_{t+1-s} - \gamma^g E_t \pi_{t+1} - (1-\gamma^g) E_{j,t-1}\pi_{t+1} \\ &= \sum_{s=-\infty}^{0} J_{t+1-j} u_{t+1-j} + \sum_{s=1}^{\infty} J_{t+1-s} u_{t+1-s} \left[1 - \gamma^g \sum_{k=0}^{s-1} (1-\gamma^g)^k \rho^k\right]\end{aligned} \tag{7}$$

The first term denotes unpredictable at time t future shocks that affect inflation (i.e. shocks that occur in periods $t+1$ or later). The second term shows how forecast errors depend on past shocks - for example the coefficient in front of the shock in period t, u_t, is simply $J_t(1-\gamma^g)$. Shock-specific attention can then be estimated by regressing forecast errors on past shocks

$$e_{j,t+1} = \beta_j + \beta_1^g I_g u_t^m + \nu_{j,t} \tag{8}$$

where $e_{j,t+1} = \pi_{t+1} - E_{j,t}\pi_{t+1}$ are the forecast errors of inflation, m stands for the shock of interest (for example, monetary policy shock), and $\gamma^g = 1 - \frac{\hat{\beta}_1^g I_g}{J_t^m}$ is the group-g specific attention level. J_t^m can be estimated or taken from other studies. Note, that this equation allows us to estimate attention using different shock series.[6]

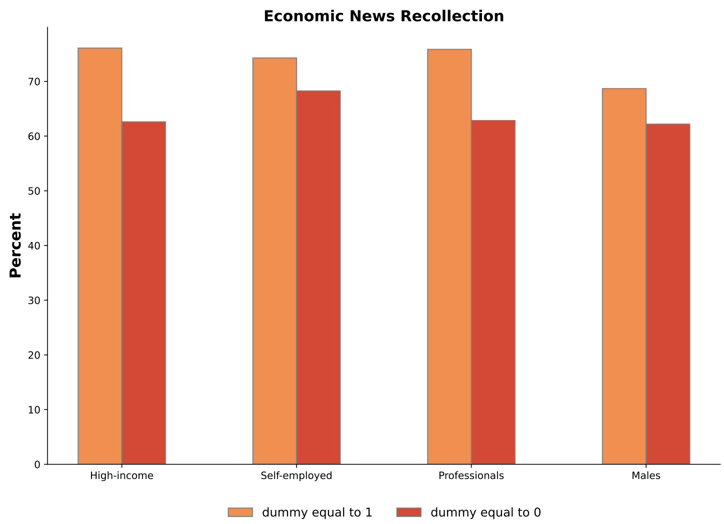
2.2. Estimation Results

To motivate our cross-sectional analysis, we first plot a suggestive evidence for Australia. Figure 1 shows the percentage of households who answer "Yes" to the question "During the last few months, have you read or heard any news of changes in economic conditions?" in CASiE survey for different groups of households. The orange bar shows the response of households who belong to the according groups, the red bar shows the response for households who do not belong to the group of interest. High-income households in Australia have a total pre-tax income of ≥\$90k and are the top 25% earners in the economy while low income have an income of \$40k - \$90k. Self-employed households work for themselves and not self-employed agents work for an employer. Professional households work in economic-related fields where non-professional work in other occupations.[7] In the figure we see that households who are high-income, self-employed, professionals or of male sex collect economic news more often than the other groups. High-income households thereby pay the most attention to changes in the economy.

6 The regression can either be estimated with each shock individually or with all shocks together. These shocks are structural shocks with the assumption that they are uncorrelated with each other and the regression results will be equivalent.

7 See Appendix A.1 and A.2 for descriptive statistics

Figure 1: Percentage of Households Recalling Economic News



Notes: The figure shows the percentage of households who answer "Yes" to the question "During the last few months, have you read or heard any news of changes in economic conditions?" in the CASiE Australian survey. The answers are shown by groups depending on income, occupation, sex and whether a household is self-employed. "1" indicates that the percentage is calculated among households who belong to the category (so the first bar is the percentage of "yes" answers among income rich) and "0" indicates that the percentage is calculated among households who do not belong to the category.

2.2.1. Cross-Sectional Variation

We analyze cross-sectional[8] variation across households' inflation expectations shown in Table 1 by regressing absolute (columns 2 and 4) or squared (columns 3 and 5) forecast errors about one year ahead CPI inflation on household characteristics specified in column 1. Columns 2 and 3 show the results for Australia, while columns 4 and 5 show the results using US data. The results can be interpreted as follows. In general each household makes an average forecast error, independent of his specific group, denoted in the constant $\hat{\beta}_j$ of the regression. If a household belongs to either of the income, sex, or occupational groups[9], the error is changed by the amount of the coefficient shown in the according columns. To fix ideas let us focus on the column 2: on average households in Australia make a significant inflation forecast error of the magnitude of 4.42%. If the household however is a high-income household, this error significantly diminishes by 1.26%, such that the error decreases to 3.16%. If the household however is self-employed the unconditional error diminishes as well by the magnitude of 0.96%, but the forecast error remains higher than that of a high-income household (3.96%>3.16%). Those characteristics, however, are not mutually exclusive. Similar reasoning is applicable to the other categories. In general, we see that being a high-income household significantly reduces the magnitude of the average individual forecast error of the household robustly across our samples. The results are robust to stricter winsorizing, the inclusion of time fixed effects and macro controls.

8 Appendix B shows results for aggregate over- and under-reaction, which complement our analysis and strengthen our results presented in the cross-sectional analysis

9 In the following analysis we disregard the effects for professionals since it is not available in the SCE

Table 1: Cross-Sectional Distribution of Inflation Expectations

	AUS		USA	
	Abs. Errors	Squared Errors	Abs. Errors	Squared Errors
Income				
Mid Income	-0.68*** (0.22)	-8.04*** (2.99)	-1.45*** (0.14)	-39.35*** (5.42)
High Income	-1.26*** (0.20)	-13.97*** (2.82)	-1.78*** (0.13)	-39.83*** (4.21)
Sex				
male	-0.39*** (0.08)	-3.48*** (0.80)	-2.15*** (0.13)	-49.81*** (4.29)
Occupation				
self-employed	-0.96*** (0.16)	-12.09*** (1.81)	-0.73** (0.24)	-27.78** (8.73)
Demographics	X	X	X	X
Constant	4.42*** (0.33)	32.20*** (4.09)	16.14*** (2.78)	450.14** (141.66)
No. of observations	7151	7151	14,816	14,816
R-squared	0.07	0.05	0.12	0.07

Notes: The table shows regression coefficients for inflation expectation errors on different demographics. Errors are clustered at the time-period level. Results are shown for both Australia and the US. Demographics includes

2.2.2. Heterogeneous Beliefs

Heterogeneous Attention to CPI Inflation across Income Groups. The estimated attention levels using specification in Eq. (4) for the two income-groups groups for both countries are shown in Table 2. γ^1 shows the attention to inflation of high-income households and γ^2 shows the attention for low-income households. We find that there is a significant difference between the attention levels of the household groups. In particular attention levels are higher for high-income groups than for low-income groups.

These results are mostly robust for both estimators, the Arellano-Bond estimator[10] and the pooled OLS estimator. Table 2 confirms our hypothesis that high-income households are more attentive to inflation than low-income households. Further, the results are robust to stricter winsorizing and using an AR(2)-process as a perceived inflation process as well as to the inclusion of macro controls.

We estimated the same specification but for other groups based on: occupation, self-employment status, sex, education level, home-ownership status, age, different states within the country, urban/rural and job-switchers dummies. None of these characteristics produce robust results with larger heterogeneity in attention levels than heterogeneity across income levels. When estimating the attention jointly across a variety of characteristics, income is the characteristic that stands out and produces significant and robust results.

Shock-Specific Attention. To analyze whether there is an identifiable and heterogeneous underlying uncertainty about the source of forecast errors as a response to different shocks

10 The Arellano-Bond estimator is applied since the dependent variable in specification (8) includes a lag on the right-hand side. See also Pfäuti (2021)

Table 2: Heterogeneous Attention of High- and Low-Income Households

	AUS		USA	
	Arellano Bond	Pooled OLS	Arellano Bond	Pooled OLS
γ^1	0.24***	0.24***	0.09***	0.09
γ^2	0.11**	0.10**	0.06***	0.06
No. of observations	214	216	68	70
Robust to AR(2) specification	Yes	Yes	No	No

Notes: The table shows estimated level of attention across income households groups using (4). Attention of households belonging to the group is shown in row with γ^1, and attention of households not belonging to the group is shown in row γ^2. Stars indicate significance relative to the other group.

we estimate shock-specification attention, using local projections following Jordà (2005) and the process for shock-specific attention specified in Eq. (8). To capture supply- and demand-side shocks we consider externally constructed oil supply news shocks by Känzig (2021) and different sets of monetary policy shocks[11] which we interact with the income-level of the household. Figure 8 shows the impulse response functions of inflation forecast errors of low-income and high-income households to externally constructed oil supply news shocks for Australia. We see that high-income households tend to overshoot their expectations on impact a bit more relative to low-income households, implying a slightly higher level of attention to oil supply news shocks which results in a quick update of their expectations such that forecast errors become smaller after a quarter and stay lower for high-income households over the next quarters relative to low-income households. However, the difference between the response of high-income households and low-income households is not statistically significant. We find similarly insignificant results for the oil supply shocks and inflation forecast errors of the US households and for monetary policy shocks for both countries. Thus, either those shocks are salient and high-income households pay more attention to shocks that are less salient (for example, TFP, markup, etc.) which allows them to have lower forecast errors on average and higher estimated attention level to overall inflation, or our datasets are not large enough to statistically differentiate shock-specific attention.

Therefore, we will use results shown in 2 to calibrate our quantitative HANK model.

3. The Household's Attention Choice Problem

To quantify the results from the empirical analysis we propose a HANK model with inattentive households and permanent income heterogeneity. In this section we give some intuition and introduce a reduced form of the full HANK model generalized in Section 4 by abstracting from

11 In particular, we use externally constructed monetary policy shocks for Australia by Beckers et al. (2020) following Romer and Romer (2004) methodology and high-frequency identified monetary policy shocks constructed by Hambur and Haque (2023) following Gürkaynak et al. (2005) with the Kaminska et al. (2021) extension that decomposes shocks into level, path and term-premia components. For the US we use Bauer and Swanson (2023) and Nakamura and Steinsson (2018) shocks. We also regress forecast errors of Australian households on US monetary policy shocks to estimate attention to foreign monetary policy shocks.

idiosyncratic risk[12] and focusing on permanent income and attention heterogeneity. We present the general attention choice problem the household faces, following the framework by Gabaix (2014), further developed in Gabaix (2016) for dynamic programming problems.

Consider an economy that is populated by a continuum of households $j \in [0,1]$. Each household belongs to a group $g \in \{1,2\}$ and gets group-specific labour income $Y_{g,t} \equiv \eta_g^o W_t^o n_t$ which depends on his occupational skill-level η_g^o and where W_t^o is the occupation-o-specific nominal wage, where $o \in \{1,2\}$ denotes the household's occupational choice. n_t are fixed labour hours the household has to work and which are equal for both household groups. If the household has low occupational skills, he belongs to $g = 1$, works in $o = 1$ and gets income Y_1, otherwise the household belongs to the group of households with high occupational skills $g = 2$, works in $o = 2$ and gets income Y_2. We assume that the high-skill occupation pays a higher nominal wage than the low-skill occupation, $Y_2 > Y_1$. Households further hold a risk-free nominal asset a_t^n with nominal interest rate i_t^a between periods $t-1$ and t. Borrowing constraints prevent these households from taking negative bond positions. The household gets utility from consumption c_t and has discount factor β.

At every point in time, the household forms beliefs about the behavior of future variables relevant to his decision problem, in particular, the aggregate price level, labour income and the nominal interest rate. However, to focus on the effects of attention to inflation, we assume that households have correct expectations about their future income $E_t(\{Y_{g,t+h}\}_{h=1}^{\infty})$, they fully observe the correct interest rate and therefore have correct expectations about $i_{t+h}^a, h = 1, 2, \ldots$. We further assume that people know the current aggregate price level. Thus, the only variable to which the household may be inattentive to and forms subjective beliefs about is the future aggregate price level $P_{t+h}, h = 1, 2 \ldots$. The household solves the following maximization problem:

$$\begin{aligned} V_{j,t}(a_{t-1}^n) &= \max_c \{u(c_t) + \beta E[V_{j,t+1}(a_t^n)]\} \\ s.t. \quad P_t c_t + a_t^n &= Y_{g,t} + (1 + i_t^a) a_{t-1}^n, \quad a_t^n \geq 0 \end{aligned} \tag{9}$$

where E is the expectation operator we define in Definition 1.

Definition 1. Subjective Beliefs. *Suppose the inattentive agent observes variable z_t and forms expectations about $\{z_{t+h}\}_{h=1}^{\infty}$. Then, the expectations about the future variable are:*

$$E(z_{t+h}) = \gamma^g E_t(z_{t+h}) \; if \; \gamma^g \in [0,1) \tag{10}$$

$$E(z_{t+h}) = E_t(z_{t+h}), \; if \; \gamma^g = 1 \tag{11}$$

where E_t is the traditional rational expectation operator, γ^g is the attention level to the future variable and we define $E_{j,t} \equiv \gamma^g E_t(z_{t+h})$ as the subjective beliefs operator.

With an increasing amount of attention the quality of his subjective beliefs about inflation increases. Based on Definition 1 we get the following. The *rational* household who observes the variables fully rationally and pays full attention to the entire state of the economy has a utility

$$v_{j,t}(a^n, 1) \equiv u(c) + \beta E_t[V_{j,t+1}(Y_g + (1 + i_t^a)a^n - P_t c, 1)] \tag{12}$$

12 The role of which is assessed in Section 5.3.1.

The *inattentive* household in the simplified model that we described above is inattentive to prices and has utility

$$v_{j,t}(a^n, \gamma^g) \equiv u(c) + \beta E_{j,t}[V_{j,t+1}(Y_{g,t} + (1+i_t^a)a^n - P_t c, \gamma^g)]$$

where $E_{j,t}$ are his subjective beliefs about the state of the economy. Being inattentive however leads to an imperfect policy choice $c_g^*(\gamma^g)$ and a loss in utility

$$\mathcal{L} = v_{j,t}(a^n, \gamma^g) - v_{j,t}(a^n, 1) \tag{13}$$

measured as the difference between the utility under optimal policy $c_g^*(a_t^n, 1)$ under full information for a household j in group g and the imperfect policy $c_g^*(a_t^n, \gamma^g)$ for a household j in group g under inattention. The household thereby wants to minimize his expected loss in utility. However, he can only process a limited amount of information and therefore faces a cognitive constraint, $\chi\gamma^g$, where χ measures the amount of sparsity. When $\chi = 0$, the agent is the traditional rational agent and can acquire new information at 0 cost. Minimizing the expected loss in utility subject to the cognitive constraint[13]

$$\min_{\gamma^g} -\frac{1}{2}\frac{\partial^2 v(a^n, \gamma^g)}{\partial c^2} \sum_{h=1}^{\infty}\sum_{h'=1}^{\infty} \frac{\partial c}{\partial P_h}\frac{\partial c}{\partial P_{h'}}(\gamma^g - 1)^2 \sigma_{P_h P_{h'}} + \chi\gamma^g \tag{14}$$

where $\frac{\partial c}{\partial P_h}$ denotes the household's change in consumption due to a change in the price level at period h, $\sigma_{P_h P_{h'}} = E(P_h P_{h'})$ the perceived variance of the aggregate price level at periods h and h', and $\frac{\partial^2 v(a^n,\gamma^g)}{\partial c^2}$ is the disutility from misoptimized consumption such that $\frac{\partial c}{\partial P_h}(\gamma^g - 1)P_{t+h}$ denotes the error due to inattention, gives optimal attention of the household j to inflation which is group-specific based on his income-level resp. occupational choice.

Proposition 1. Optimal Attention. *The optimal level of attention $\gamma^g \in [0,1]$ towards inflation is given by*

$$\gamma^g = \max\left\{0, 1 - \frac{\chi}{\Lambda}\right\} \tag{15}$$

with the cost-of-inattention factor $\Lambda := \frac{1}{2}\frac{\partial^2 v(a^n,\gamma^g)}{\partial c^2}\sum_{h=1}^{\infty}\sum_{h'=1}^{\infty}\frac{\partial c}{\partial P_h}\frac{\partial c}{\partial P_{h'}}\sigma_{P_h P_{h'}}$.

Proof. See Appendix C.1 □

Optimal level of attention (15), depends on the state of the economy. In particular, it depends on how much the agent changes his consumption today when the aggregate price level changes in period h, his perceived variance of the aggregate price level at future periods and the disutility from choosing suboptimal consumption. When the cost of cognition χ increases, the quality of decisions falls since it is too costly for households to pay attention to inflation. When the cost of cognition however is low, the cost of acquiring information about attention is low such that the household's subjective expectations get closer to the true value of inflation expectations, making their beliefs more precise. Optimal attention increases also when the cost-of-inattention

13 Following Gabaix (2014) we approximate the household's utility function with a second order Taylor approximation; see Appendix C.1 for a detailed derivation.

factor increases holding everything else fixed, i.e. when the change in consumption due to a change in prices is high. On the other hand, a household that has lower income is more likely to be constrained. Therefore she has less incentives to pay attention to changes in prices and the aggregate inflation as it doesn't affect her much.

4. Quantitative Model

In this section we generalize the model from Section 3 to a canonical HANK model with incomplete markets and heterogeneous beliefs. In particular, we allow households to differ in three dimensions of heterogeneity. First, each household is characterized by the idiosyncratic, transitory income. Second, we assume that households additionally differ in their permanent income by making labour income skill- and occupation-specific. This allows us to match the household's income-dependent attention we found in the data. Next, we assume that households are inattentive to future inflation and that households endogenously decide how much attention they want to allocate towards inflation. The firm optimizes production same as in the canonical model by McKay et al. (2016), while the central bank sets the nominal interest rate.

4.1. Household Problem

In the following we present the household problem of our model. The timing is as follows. First, the household makes his attention choice evaluating his loss in utility from misoptimized consumption due to being inattentive. Second he simultaneously makes his occupational choice and consumption-saving decision by evaluating different consumption levels for different occupations.

4.1.1. Baseline Problem: Transitory Income Inequality

In the following we lay out the general setup of a standard one-asset HANK model in which income is determined by an idiosyncratic income shock, against which we benchmark our results.

The economy is populated by a continuum of households $j \in [0, 1]$. Each household has preferences over consumption c_t, hours worked n_t and gets income $e_t W_t n_t$. He also faces a nominal budget and a borrowing constraint for nominal assets. Specifically, each household solves the following Bellman equation

$$\begin{aligned} V_j(a^n_{t-1}, e_t) &= \max_{c_t, n_t, a^n_t} u(c_t, n_t) + \beta E_t V_j(a^n_t, e_{t+1}) \\ \text{s.t.} \quad P_t c_t + a^n_t &= e_t W_t n_t + (1 + i^a_{t-1}) a^n_{t-1} \\ a^n_t \geq 0, \quad u(c_t, n_t) &= \frac{c_t^{1-\sigma} - 1}{1 - \sigma} - \varphi \frac{n_t^{1+\nu}}{1 + \nu} \end{aligned} \tag{16}$$

where W_t is the nominal wage, P_t is the price index, e_t are Bewley-type idiosyncratic income shocks creating transitory income inequality in the economy. Households hold only one risk-free asset which are the nominal savings a^n_t with nominal interest rate i^a_t between periods $t - 1$ and t. We assume that they have rational expectations with respect to each variable relevant to their consumption-saving decisions except for inflation.

4.1.2. Beliefs

At every point in time, the household forms beliefs about the future behavior of variables relevant to his decision-making. We maintain the assumption that households have correct expectations about their future income, they also fully observe the correct interest rate and therefore have correct expectations about the nominal interest rate. Thus, the only variable relevant to their decision-making to which the agent is inattentive to, is the future aggregate price level. We assume that households observe all current and past prices and only form subjective beliefs about future price levels and inflation rates. In the model with borrowing constraints this assumption also guarantees that the constraints are not violated due to misperceptions of current prices. We follow the same formulation of expectations for inflation that we use in our empirical estimation, see Eq. (5), that we generalize for group-specific expectations. We specify subjective beliefs in the following.

Definition 2. Subjective Beliefs, HANK. *Suppose the inattentive agent observes variable z_t and forms expectations about $\{z_s\}_{s>t}$. Then, the expectations about the future variable are:*

$$E(z_s) = \gamma^g E_{j,t} z_s + (1-\gamma^g)\, E_{j,t-1} z_s \,\forall s > t,\; if\; \gamma^g \in [0,1) \tag{17}$$

$$E(z_s) = E_t(z_s),\; if\; \gamma^g = 1 \tag{18}$$

where E_t is the traditional rational expectation operator, γ^g is the attention level to the future variable and we define $E_{j,t} \equiv \gamma^g E_t \pi_s + (1-\gamma^g)\, E_{j,t-1}\pi_s$ as the subjective beliefs operator.

Definition 2 formalizes the same idea as in the Kalman gain, namely that households learn about the state of the economy if they receive a new signal about inflation which allows them to form new beliefs about future inflation. If agents decide to pay attention to inflation, they update their old inflation beliefs and learn from new information. With an increasing amount of attention the quality of his subjective beliefs about inflation increases, eventually minimizing the importance of the previous inflation expectations, which is totally mitigated under $\gamma^g = 1$.

Numerical Solution We solve the model using the Sequence Space Jacobian method by Auclert et al. (2020) which allows us to easily introduce behavioral frictions into the model. For that, we define the expectation matrix as

$$E = \begin{pmatrix} 1 & \gamma^g & \gamma^g & \gamma^g & \dots \\ 1 & 1 & \gamma^g + (1-\gamma^g)\gamma^g & \gamma^g + (1-\gamma^g)\gamma^g & \dots \\ 1 & 1 & 1 & \gamma^g + (1-\gamma^g)(\gamma^g + (1-\gamma^g)\gamma^g) & \dots \\ \vdots & \vdots & \vdots & \vdots & \ddots \end{pmatrix}$$

The lower triangular matrix of ones captures the fact that households have full information about current and past prices. γ^g is the attention level of a household in group g towards the input variable (in our case we only focus on π_t) which affects his consumption, labour and savings choice. If the household holds FIRE, $E(r,m) = 1\ \forall r, m$, i.e. he has rational expectations E_t and pays full attention to the economy with $\gamma^g = 1$, whereby in case of inattention the household has beliefs deviating from FIRE and $\gamma^g \in [0,1)$ given by Definition 2. Using the fact that a change in expectations at time τ for the household is equivalent to a news shock

$$J^{o,\pi}_{t,s} = \sum_{\tau=0}^{\min\{s,t\}} (E_{\tau,s} - E_{\tau-1,s}) J^{FI,o,\pi}_{t-\tau,s-\tau}, \tag{19}$$

the relationship between behavioral Jacobians and FIRE Jacobians can be obtained in the following.

Proposition 2. Behavioral Jacobian. *In the outlined setting, behavioral Jacobians with respect to inflation are related to FIRE Jacobians in the following form*

$$J^{o,\pi}_{t,s} = \begin{cases} \gamma^g J^{FI,o,\pi}_{t,s}, & t=0,\ s>0 \\ J^{FI,o,\pi}_{t,s}, & s=0 \\ \gamma^g J^{FI,o,\pi}_{t,s} + (1-\gamma^g) J^{o,\pi}_{t-1,s-1}, & t>0, s>0 \end{cases} \tag{20}$$

where J^{FI} stands for FIRE Jacobians.

Proof. See Appendix D.1 □

The Jacobian $J^{o,\pi}_{t,s}$ describes the marginal change in period t of the output variable o to a period-s-change in the input variable π. For consumption, the Jacobian would be given by $J^{C,\pi}_{t,s} = \delta C_t / \delta \pi_s$ quantifying the partial response in consumption in t to a partial change in inflation in s. Inattention thereby enters the household's beliefs via the expectation matrix, affecting the household's Jacobian as seen in Eq. (19). Note that we assume $\gamma^g \neq 1$ only for π_t and P_t $\forall s,t$, but keep the assumption of FIRE for every other input variable. In line with the literature, we assume that the price in period t is fully observed. Next, we endogenize γ^g and assume that households solve an attention allocation problem.

4.1.3. The Attention Choice

We assume that households choose their attention level optimally facing a cognitive capacity constrain in the vein of Gabaix (2014). Being inattentive leads to a suboptimal consumptions choice $c^*_g(a^n, e, \gamma^g)$ resulting in a loss in utility compared to the consumption choice under FIRE. The household wants to minimize the loss by choosing his optimal level of attention γ^g.

The *rational* household who observes the variables fully rationally and pays full attention to the entire state of the economy has utility

$$V_j(a^n, e, 1) \equiv u(c) + \beta E[V_j(Y_g + (1+i^a)a^n - Pc, e', 1)] \tag{21}$$

where e_t and a^n_t are the state variables characterizing the economy at point t.

The *inattentive* household is inattentive to prices and has utility

$$V_j(a^n, e, \gamma^g) \equiv u(c) + \beta E_j[V_j(Y_g + (1+i^a)a^n - Pc, e', \gamma^g)]$$

where $E_{j,t}$ are his subjective beliefs about the macro economy which we defined above. Being inattentive leads to an imperfect policy choice $c^*_g(\gamma^g)$ and a loss in utility

$$\mathcal{L} = V_j(a^n, e, \gamma^g) - V_j(a^n, e, 1) \tag{22}$$

where $c^*_{g,t}(1)$ is the optimal policy under full information and $c^*_{g,t}(\gamma^g)$ is the imperfect policy under inattention. The household wants to minimize his expected loss in utility and faces a cognitive constraint on how much information to process, $\chi^g\gamma^g$. Replacing the household's utility function by a linear quadratic approximation allows us to state the household's attention optimization problem

$$\min_{\gamma^g} \; -\frac{1}{2}(\gamma^g - 1)^2\sigma_\pi^2 \sum_e \int \left(\frac{\partial c}{\partial \pi}\right)^2 \frac{\partial^2 V_j(a^n, e, \gamma^g)}{\partial (c)^2} dD^g(e, da) + \chi^g\gamma^g \tag{23}$$

where σ_π^2 the perceived future variance of the inflation, and $\frac{\partial^2 v(a,e,\gamma^g)}{\partial c^2}$ the disutility from misoptimized consumption. The first term in Eq. (23) is the leading term of the second order Taylor approximation of the utility loss of a household in Eq. (22). The second term, $\chi^g\gamma^g$, is the linear psychic cost attention creates, whereby under $\chi^g = 0$ the household is the rational agent. Note, that we allow for varying costs of attention among income groups as those are necessary to match empirical evidence of lower attention among low-earners, see Section 5.3.2. Solving Eq. (23) gives the household's optimal level of attention to inflation.

Proposition 3. Optimal Attention, HANK. *The optimal level of attention to inflation is given by*

$$\gamma^g = \max\left\{0, 1 - \frac{\chi^g}{\sigma_\pi^2 \sum_e \int \left(\frac{\partial c}{\partial \pi}\right)^2 \frac{\partial^2 V^g(a^n,e,\gamma^g)}{\partial (c)^2} dD^g(e, da)}\right\} \tag{24}$$

Proof. See Appendix D.2 □

When $\gamma^g = 0$, the household "does not think about π" and sets a default value for inflation (e.g. a past level of inflation the agent assumes to be true) and doesn't update his inflation expectations, and when $\gamma^g = 1$ the household pays full attention, perceives the true value of inflation and updates his inflation expectations if necessary. Given our definition of expectations, attention accumulates over time and includes new information about the state of inflation in period s. It thereby depends on the volatility of inflation, σ_π^2, the change of group-specific consumption given a change in the equilibrium price level, $\frac{\partial c_g}{\partial \pi}$, the disutility from misoptimized consumption, $\frac{\partial^2 v^g(a^n,e,\gamma^g)}{\partial (c_g)^2}$.

4.1.4. Endogenizing Income: the Permanent Component of Income Inequality

In the baseline model income inequality is exogenous and is fully driven by the persistence and the standard deviation of the Bewley-type idiosyncratic income shocks. We augment the model by introducing occupational choice following Faia et al. (2022). Households thereby differ in their skills and efficiency units of labour that they can provide in each occupation which delivers endogenous labour income inequality. Each household in group g has the same set of skills. He then optimizes his consumption c_t, labour n_t and occupational choice $o \in \{1, ..., O\}$, by solving the following Bellman equation

$$
\begin{aligned}
V_j^g(a_{t-1}^n, e_t, \boldsymbol{\phi_t}) = & \max_{o_t, c_t, n_t, a_t^n} u(c_t, n_t) + \phi_t^o + \beta E_{j,t}^g V_j^g(a_t^n, e_{t+1}, \boldsymbol{\phi_{t+1}}) \\
\text{s.t.} \quad & P_t c_t + a_t^n = \eta_g^o e_t W_t^o n_t + (1 + i_{t-1}^a) a_{t-1}^n \\
& a_t^n \geq 0
\end{aligned} \tag{25}
$$

Each household j in group g makes an occupational choice o based on his occupation-specific vector of skills $\boldsymbol{\eta}_g$. The vector of shocks $\boldsymbol{\phi_t}$ is the O-vector of occupational amenities across all occupations and the non-employment state in which shocks are i.i.d. and drawn from a Gumbel distribution. This allow us to obtain occupational probabilities in a closed form, i.e. the household in group g chooses occupations o with probability

$$
\theta_j^g(o|a_{t-1}^n, e_t) = \frac{\exp(\tilde{V}_j^{o,g}(e_t, a_{t-1}^n))}{\sum_o \exp(\tilde{V}_j^{o,g}(e_t, a_{t-1}^n))} \tag{26}
$$

where $\tilde{V}_j^{o,g}$ is the value function in occupation o of type g household, $V_j^{o,g}(e_t, a_{t-1}^n)$, evaluated at the optimal consumption-saving and labour supply policies $c_j^o(e_t, a_{t-1}^n)$, $a_j^o(e_t, a_{t-1}^n)$ and $n_j^o(e_t, a_{t-1}^n)$. Note that the occupation choice is not a one-time choice and introduces heterogeneity in permanent income of the households. Heterogeneity in labour income is now given by first, the occupation-specific wage, W_t^o, determined by the labour market, second, exogenous idiosyncratic productivity shock e_t, and third, by occupation-specific talents. The occupation-specific wage thereby captures the heterogeneity in workers' skills as they affect the wages (e.g. high-skill households earn higher wages). Given that labour supply is occupation-specific, labour demand is also occupation-specific, see the modification of the production function at the end of Section 4.2.1.

4.2. Rest of the Model

4.2.1. Production

Monopolistic competitive firms produce output by combining total labour input and capital using the Cobb–Douglas production function: $y_t = z_t k_{t-1}^{\nu} L_t^{1-\nu}$, where y_t is the variety, z_t is the total factor productivity, ν is the capital share, k_t is capital and L_t is labour input. Competitive final goods firms aggregate varieties using CES aggregator, thus, optimal demand for each variety is given by $p_t = \left(\frac{Y_t}{y_t}\right)^{\frac{1}{\eta}} P_t$, where P_t is the aggregate price level and is normalized to 1 in the steady state. Monopolistic competitive firms choose prices, p_t, labour demand, capital demand, k_t, and investment, I_t, to maximize the sum of future discounted real profits, which recursively reads as follows

$$
\begin{aligned}
J_t(k_{t-1}) = \max_{p_t, k_t, I_t, L_t} \quad & \left\{ \frac{p_t}{P_t} y_t - w_t L_t - I_t - \frac{\xi}{2}\left(\frac{I_t}{k_{t-1}} - \delta\right)^2 k_{t-1} - \frac{\eta}{2\kappa}(\ln(1+\pi_t))^2 Y_t + \frac{J_{t+1}(k_t)}{1 + r_{t+1}} \right\} \\
\text{s.t.} \quad & k_t = (1-\delta) k_{t-1} + I_t; \\
& p_t = \left(\frac{Y_t}{y_t}\right)^{\frac{1}{\eta}} P_t; \quad y_t = z_t k_{t-1}^{\nu} L_t^{1-\nu}
\end{aligned} \tag{27}
$$

where the first constraint is the capital accumulation equation, δ is the depreciation rate of capital, and $\frac{\eta}{2\kappa}(\ln(1+\pi_t))^2 Y_t$ is the quadratic price adjustment cost which is necessary to study monetary policy. Investment adjustment costs are not necessary for the main mechanism, but they dampen investment volatility that is large otherwise and as shown in Auclert et al. (2020) investment dynamics are an important driver of monetary policy transmission in HANK with deviations from rationality. The first order condition with respect to prices leads to the Phillips curve

$$\ln(1+\pi_t) = \kappa\left(mc_t - \frac{1}{\mu_p}\right) + \frac{Y_{t+1}}{Y_t}\ln(1+\pi_{t+1})\Psi_{t,t+1} \tag{28}$$

where $\mu_p = \frac{\eta}{\eta-1}$ and $\Psi_{t,t+1}$ is the stochastic discount factor and is equal to $\frac{1}{1+r_{t+1}}$ and $\pi_t \equiv P_t/P_{t-1} - 1$. κ is the coefficient for the slope of the Phillips curve.

Occupational Choice. In the case of occupational choice (see Section 4.1.4), the production function is modified to include a CES aggregator of occupation-specific labour: $L_t = \left(\sum_{o=1}^{O}\alpha_o l_{o,t}^{\sigma}\right)^{\frac{1}{\sigma}}$ and the cost of labour for firms are therefore $\sum_{o=1}^{O} w_t^o l_t^o$, such that the labour market clearing is occupation-specific and yields $l_{o,t} = \sum_g m_g \int \gamma_g^o e_t n^o \theta^o dD_g(e_t, a_{t-1}^n)$.

4.2.2. Asset Market and Equilibrium Conditions

Let v_t denote the price of equity and d_{t+1} the firm dividend. The real return on equity is $\frac{d_{t+1}+v_{t+1}}{v_t}$. The no-arbitrage condition is: $v_t = \frac{d_{t+1}+v_{t+1}}{1+r_{t+1}}$. The return on households' assets is: $(1+i_t^a) = \frac{d_t+v_t}{v_{t-1}}(1+\pi_t)$.

The supply of efficient labour is equal to the demanded labour $\int n_t e_t dD_t(e_t, a_t^n) = L_t$. Aggregate supply of goods is equal to aggregate demand of goods, hence: $Y_t = \mathcal{C}_t + I_t$, where consumption is aggregated through the joint distribution, D_t. Finally, asset markets clearing implies: $\mathcal{A}_t = v_t$, where again aggregation is obtained through the joint distribution D_t.

4.2.3. Policy

Monetary policy follows a classical Taylor-type rule, which endogenously responds to macroeconomic conditions as follows: $i_t^a = \rho_r i_{t-1} + (1-\rho_r)(r_t^* + \phi_\pi \pi_t + \phi_y(Y_t - Y_{ss})) + \varepsilon_t^r$, where i_t^a is the monetary policy interest rate, ε_t^r is the monetary policy shock, ρ_r is the smoothing parameter, ϕ_π is the weight on inflation π_t, ϕ_y is the weight on output gap, $(Y_t - Y_{ss})$ with Y_{ss} as the steady state value of output Y_t, r_t is the real interest rate, r_t^* is the natural interest rate, which is equal to the real interest rate in the steady state, and $1 + r_t = \frac{1+i_{t-1}^a}{1+\pi_t}$.

Definition 3. Competitive Equilibrium. *A competitive equilibrium of the economy satisfies the following definition: the sequence* $[c_t, a_t, n_t, o_t]_{t=0}^{\infty}$ *solves households' consumption-saving and labour supply decisions in Equation (16), given the distribution of idiosyncratic shocks,* $P(e_{t+1}|e_t)$ *and the sequence of prices* i_t^a, W_t^o, π_t *and the attention choices. The policy functions resulting from the consumption-saving and attention problem solve a fixed point equilibrium. Aggregate asset holdings and consumption of the households are equal to the product of the individual optimal functions and the distribution of households across occupations, idiosyncratic shocks and assets. Firms choose prices, labour demand, and capital inputs to solve discounted profit* *optimization, given in Equation (28). Market clearing and the aggregate resource constraints are satisfied. Monetary policy determines the short term interest rate according to the Taylor rule.*

4.2.4. Calibration

For the calibration we follow the literature and assume that the steady state is common knowledge. This means that the steady state is solved under fully rational expectations. The occupational choice is calibrated following Faia et al. (2022). For the dynamics, we then incorporate first, the households' beliefs and second, the choice of attention. In calibrating the model to the US economy we follow Auclert et al. (2021). Calibration to Australian economy is based on Gibbs et al. (2018).

Table 3: Calibration

Parameter	Description	Value US	Value AUS
Production Function			
δ	Capital depreciation	0.02	0.0175
K	Capital to output ratio	10.0	12.23
κ	Slope of the price Phillips curve	0.1	0.06
ξ	Investment adj. cost parameter	4.0	4.0
Households			
σ	EIS	0.5	0.5
ρ	Inverse Frisch elasticity	1	1
ρ_z	Autocorrelation of earnings	0.966	0.973
σ_z	Cross-sectional std of log earnings	0.92	1.08
A	Total wealth	14.0	21.19
Asset Markets			
r	Real interest rate	0.0125	0.00875
Monetary and Fiscal Policy			
ϕ_π	Coefficient on inflation in Taylor rule	1.5	1.4
ϕ_y	Coefficient on output gap in Taylor rule	0.08	0.2
ρ_r	Smoothing parameter in Taylor rule	0.8	0.8

Moments for the idiosyncratic income process were obtained using PLIDA administrative dataset from ABS. Wealth statistics are also taken from ABS. Attention is matched to the empirical results through the calibration of the cost of attention parameter χ. Output, labour hours and price level are normalized to 1. In the case of occupations, the share of high-income households is $m_2 = 0.3$, there are two occupations and the wages in those occupations are: 0.43 and 1.21 (wage distribution pins down α_o), labour substitutability across occupations is measured through $\sigma = 0.2$, high-income households have a comparative advantage in high-wage occupation $\eta_2^2 = 1.0$ and $\eta_2^1 = 0.68$, low-income households have a comparative advantage in occupation 1 $\eta_1^1 = 1.0$ and $\eta_1^2 = 0.16$. The occupational wages and skill-distribution is based on O*NET and KLEMS data, see Faia et al. (2022) for details[14].

We derive optimal attention analytically and find that it is an inverse function of the volatility

14 The analysis can of course be extended to more than 2 occupation-specific income levels, see also Faia et al. (2022) who analyze 8 occupational groups.

Table 4: Shock Process Parameters

Shocks	Monetary Policy	Markup	TFP
ρ	0.15	0.69	0.995
σ	0.24	0.04	0.04

Notes: The table shows the parameters used for the specification of the shock process. The values for the monetary policy and markup shocks are taken from Smets and Wouters (2007) and the values for TFP shocks are calibrated to match output and consumption volatility from the US data for the period of 1996-2023.

of inflation. We simulate the model under three shocks: monetary policy, markup and technology shocks. Table 4 shows the values for the shock process parameters we used in the calibration. The values for monetary policy and markup shocks are taken from Smets and Wouters (2007), parameters for the technology shocks are calibrated to match output and consumption volatility from the data (US, since 1966, HP filter).

We find attention for different values of ϕ_π by solving a fixed point between the attention levels of two types of households and the volatility of inflation. Particularly, we guess the volatility for inflation σ_π, solve for attention levels given the volatility of inflation, simulate the model with the found levels of attention under the above specified calibration of shocks, verify that the guessed volatility of inflation is close to the levels we find in the data and if not, we update the guess of inflation volatility and repeat until convergence.

5. Model Results

The following section presents model results for our HANK model with inattention to inflation. We firstly present impulse responses to a monetary policy shock.[15] We compare results for HANK and RANK economies, both under FIRE and endogenous inattention. Then, we conduct two policy experiments varying the variance of idiosyncratic risk to capture the role of safety nets and varying the Taylor rule inflation coefficient to study inflation-output trade-off under different policy rules in a model with households heterogeneous in attention levels, income, and wealth.

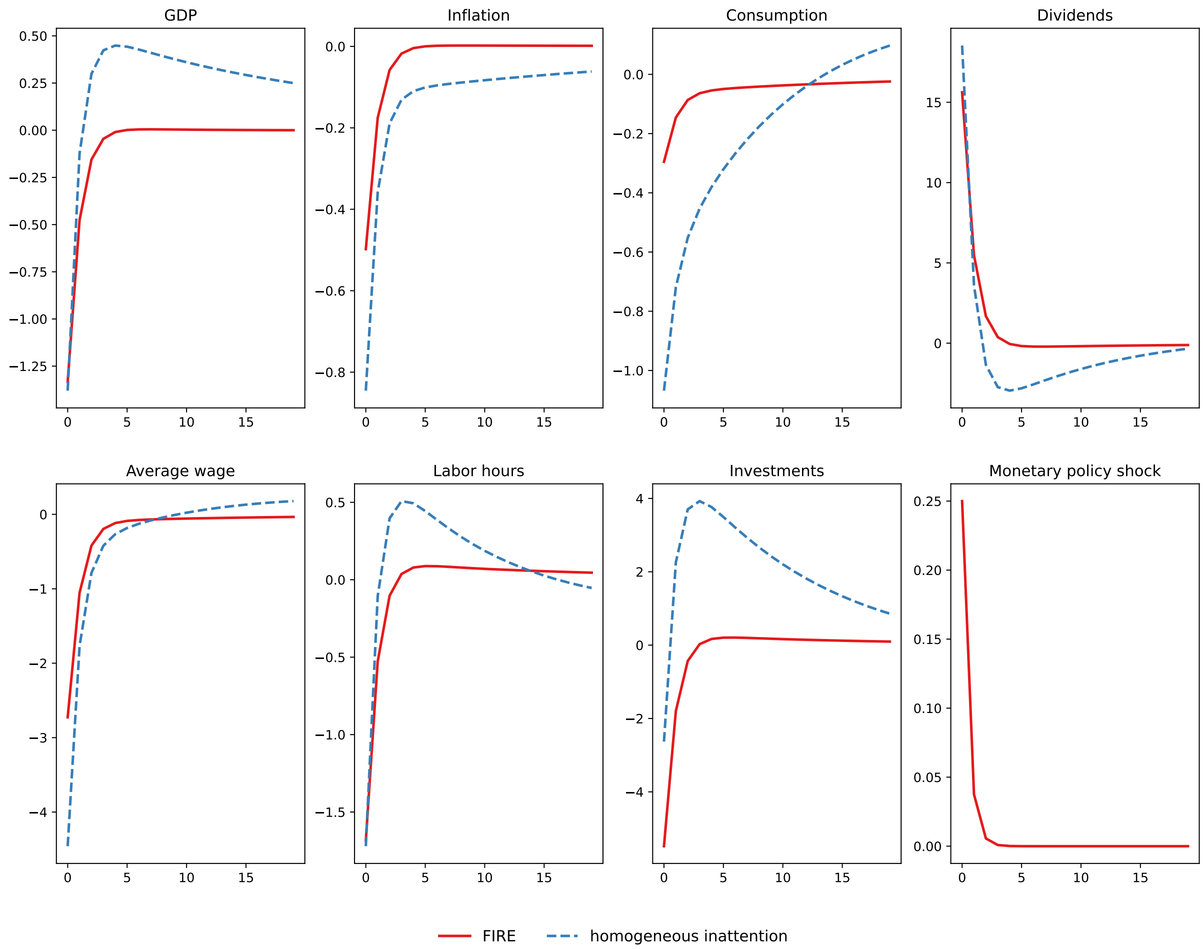
5.1. Homogeneous Inattention

Figure 2 and Figure 3 show the impulse response functions for the US to a 25 basis points contractionary monetary policy shock, for the results for Australia, see Figure 15 in Appendix E. We compare results of the traditional, FIRE baseline model with exogenous wage inequality to the responses in a homogeneous inattention economy in which households have the same level of inattention. For the model calibrated to the US we also show how those responses compare to RANK with FIRE and with inattention. In both countries, the US and Australia, a contractionary monetary policy shock induces a recession and a decrease in inflation (see first row, the first two graphs). In all cases, wages go down because of the decrease in labour demand which

15 Impulse Response functions to TFP and markup shocks can be found in the Appendix E.

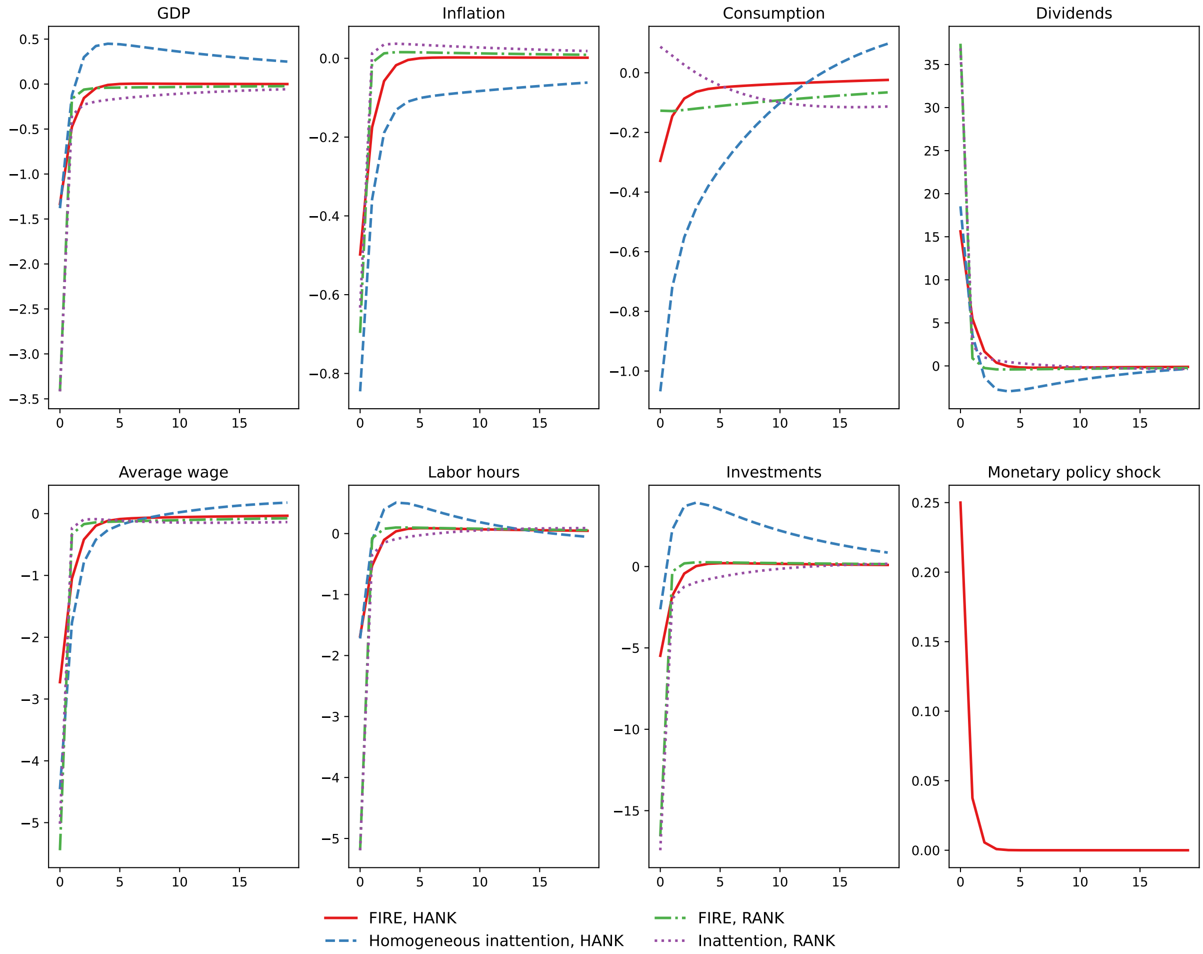
follows a decrease in consumption of uncontrained households due to intertemporal substitution. As a result of a decrease in wages, labour supply and consumption also fall (see second row, second graph). However, with inattentive households the perceived real wage falls by more and the perceived real interest rate increases by less. Reason being that due to inattention to prices, the household does not realize that a decrease in inflation or the price level actually implies a less severe decrease in real wage (households observe nominal wages). Therefore, households perceive themselves to be poorer than they actually are, inclining them to work more to compensate for their perceived loss in income and the drop in macroeconomic conditions they observe. The larger perceived drop in labour income leads to a larger decrease in consumption which dominates the more muted intertemporal substitution effect that stimulates consumption. This is another manifestation of larger indirect effects compared to a direct effect in models with heterogeneous households. As a result, in RANK, where indirect effects are small, the difference between FIRE and the model with inattention is less.

Figure 2: Impulse Response Functions to a Monetary Policy Shock, USA



Notes: The figure shows in percentage points the impulse-responses of output, inflation, dividends, consumption, average wage labour hours and investments to a contractionary 25 bps monetary policy shock with 0.15 persistence for the US. The red lines show the impulse response function under full information rational expectations for the HANK model, the dashed blue lines show the results under homogeneous inattention in a HANK model.

Figure 3: Impulse Response Functions to a Monetary Policy Shock, US



Notes: The figure shows in percentage points the impulse-responses of output, inflation, dividends, consumption, average wage labour hours and investments to a contractionary 25 bps monetary policy shock with 0.15 persistence for the US. The red lines show the impulse response function under full information rational expectations for the HANK model, the dash-dotted green lines show the results under FIRE in RANK model, the dashed blue lines show the results under homogeneous inattention in a HANK model and the dotted purple lines show the results under homogeneous inattention in a RANK model.

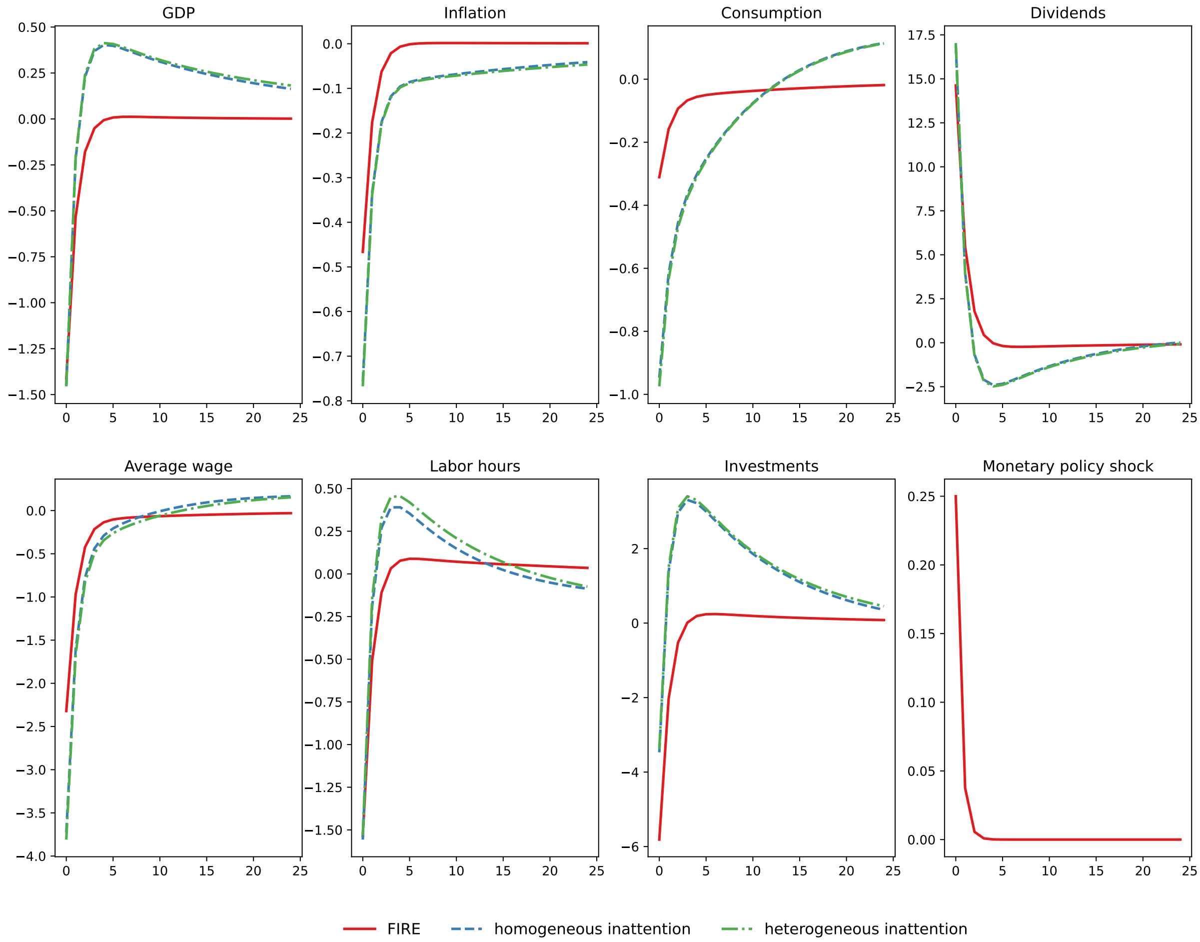
Additionally, the increase in the household's marginal propensity to consume incentives the agent to increase his labour supply and due to labour capital complimentarity, also incentives firms to increase investments (see second row, the third graph), stimulating the overall economy, making the recession less deep. The inflation-output trade-off thereby is better in an inattentive economy reinforcing the importance of anchored expectations for stabilizing aggregate economy.

Results with real wage rigidity are shown in the Appendix E.6 in Figure 18 and show less of a difference between the responses of the economy under FIRE HANK and HANK with inattention. This provides additional evidence that that the main channel of inattention is through the perceived drop in wages. When there are real wages rigidities and agents anticipate that, they perceive the drop in real incomes as less severe.

5.2. Heterogeneous Inattention along the Endogenous Income Dimension

To study the effects of heterogeneous inattention we now extend the model to include endogenous income inequality dimension by allowing for occupational choice and heterogeneity in skills. We compare impulse-responses in our model with heterogeneous inattention ($\gamma^1 \neq \gamma^2$ for groups $g = 1, 2$) to the two counterfactual economies: homogeneous inattention (every household group has the same level of inattention, $\gamma^1 = \gamma^2 \neq 1$) and the traditional full information rational expectations (every household group has full attention, $\gamma^g = 1\ \forall g$). As the mechanism is the same for both countries we focus on the US in the following.

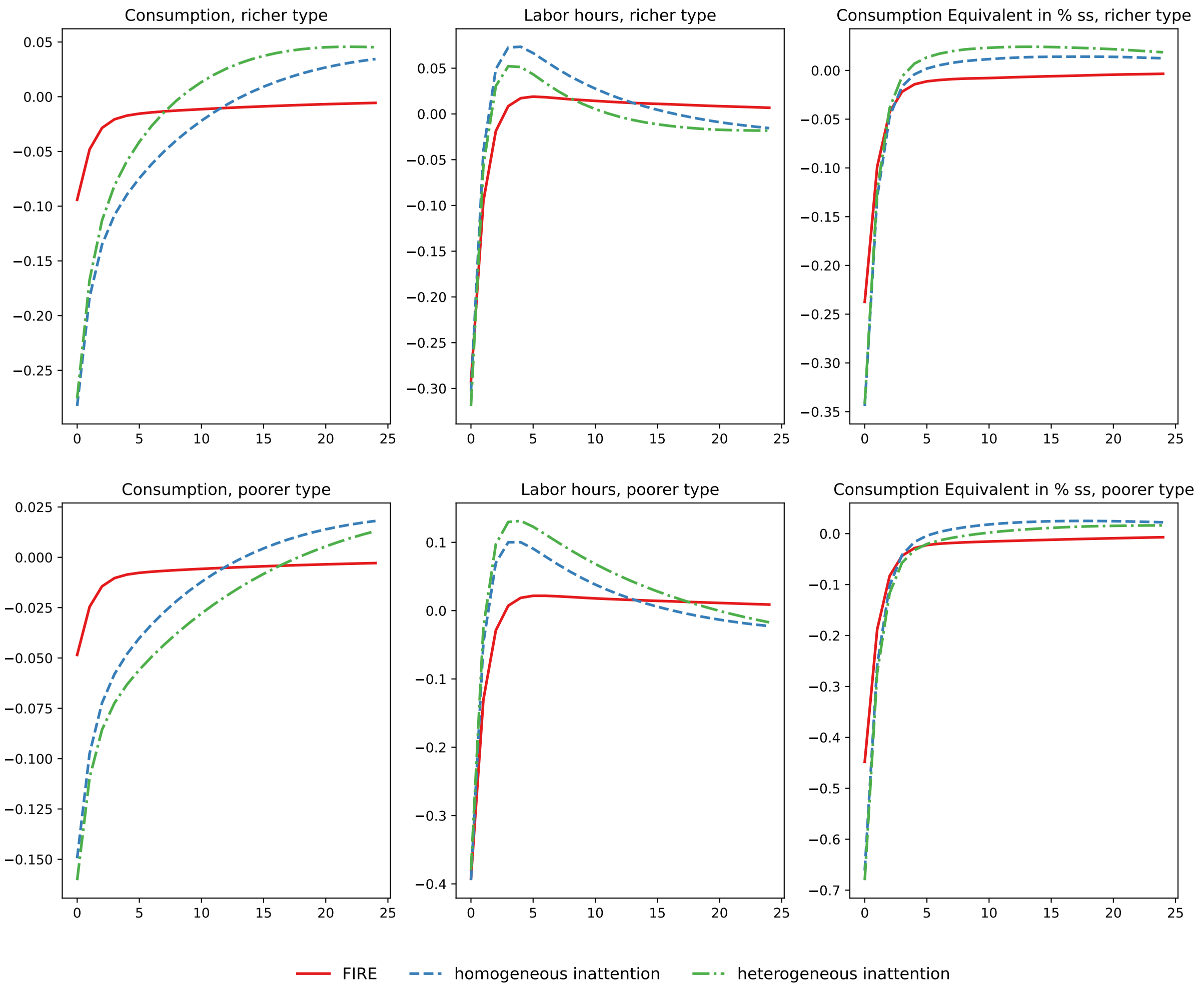
Figure 4: Impulse Response Functions to a Monetary Policy Shock with Endogenous Occupation, US



Notes: The figure shows in percentage points the impulse-responses of output, inflation, consumption, dividends, average wage, labour hours and investments to a contractionary 25 bps monetary policy shock with 0.15 persistence for the US in the HANK model with endogenous occupation. The red line shows the impulse response function under full information rational expectations, the dashed blue line shows the results under homogeneous inattention in HANK model and the dash-dotted ed green line shows the results under heterogeneous inattention.

Figure 4 shows impulse response functions to the same 25 basis points contractionary monetary policy shock for the aggregate variables as in the previous exercise. The monetary policy shock again creates a recession in the FIRE economy as well as in the economies with homogeneous and heterogeneous inattention, whereby again, the output-inflation trade-off is better in an economy with anchored expectations allowing households to be inattentive to inflation. However, with heterogeneous inattention, the consumption drop is mostly concentrated among more constrained households. Their lower attention and larger perceived drop in wages leads to an even larger increase in labour hours, which can be seen in the lower panel of Figure 4, elucidating the dominance of the income effect in an economy with inattentive households, amplified with heterogeneous levels of attention.

Figure 5: Heterogeneity across Income Types, US



Notes: The figure shows in percentage points the impulse-responses of consumption, labour hours and the consumption equivalent welfare variation to a 25 bps monetary policy shock with 0.15 persistence for the US in the HANK model with endogenous occupation. The red line shows the impulse response function under full information rational expectations, the dashed blue line shows the results under homogeneous inattention in HANK model and the dash-dotted green line shows the results under heterogeneous inattention. The top panel shows the results for high-income households, the lower panel shows the results for low-income households

Welfare Analysis. Figure 5 extends this analysis and decomposes the aggregate effect into its income-specific components. The figure shows the responses of consumption, labour hours and the welfare into the responses for high-income (richer type) households in the top panel and the low-income (poor type) households in the bottom panel. Although at the aggregate in Figure 4 the responses between homogeneous and heterogeneous attention do not differ much, Figure 5 shows that there are significant differences in the type-specific responses. The welfare losses in consumption equivalent units following contractionary monetary policy shock are larger among low-income households even under FIRE. This result is well-documented empirically, see for example Coibion et al. (2017), and theoretically, see for instance Gornemann et al. (2021). The share of borrowing-constrained households among high-income is less, so the intertemporal substitution channel is more operative, which leads to a larger drop in consumption, but their levels of consumption are higher, thus, their welfare losses are less compared to the income-poor households.

With inattention we uncover a novel channel. As real wages decrease, households face income and substitution effect of labour supply and with inattention the income effect, i.e. an increase in labour supply to compensate for the lost income, dominates, leading to an overshooting response of labour hours (see second row, middle graph). The labour supply is even larger with heterogeneous inattention, as low-income households are less attentive to inflation and perceive the fall in real wages larger with heterogeneous attention to inflation compared to the homogeneous attention and rational expectations cases. The increase in labour supply, however, leads to an even larger welfare costs among low-earners due to high disutility of labour. Therefore, distributional consequences of monetary policy are underestimated under rational inflation expectations.

5.3. Policy Counterfactuals

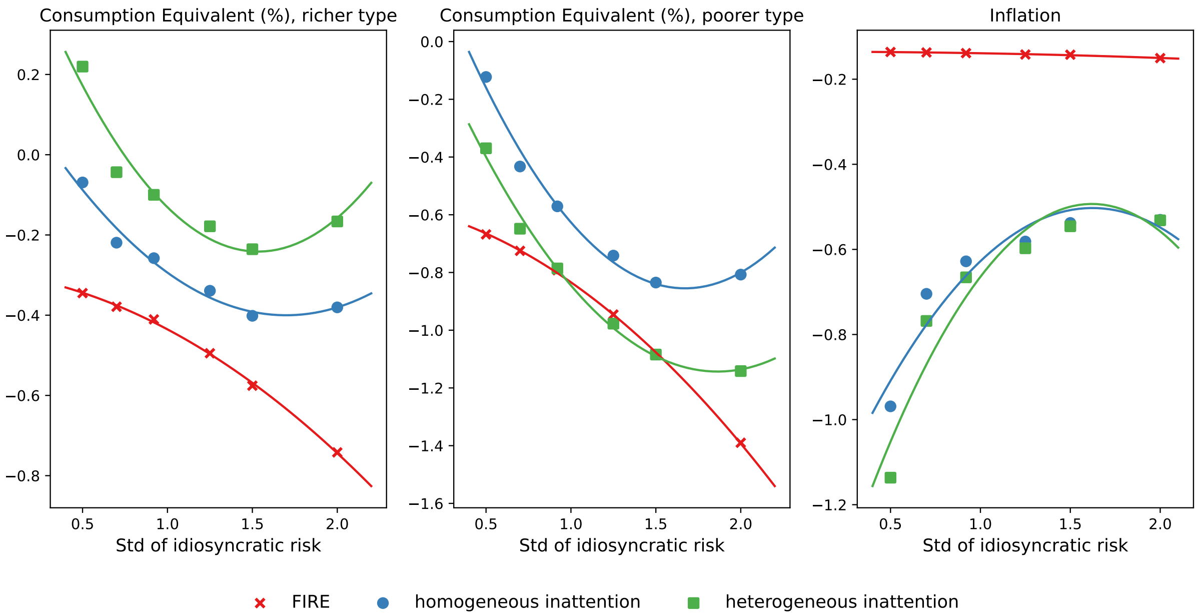
5.3.1. The Role of Transitory Income Inequality

Figure 6 presents cumulative welfare losses in consumption equivalent terms for a 25 basis point contractionary monetary policy shock as a function of the variance of idiosyncratic risk, which reflects the safety nets present in the economy. The first and second graphs show how idiosyncratic risk amplifies the difference in welfare costs between inattentive low- and high-income earners[16]. This is because with higher levels of idiosyncratic risk, more households are at the borrowing constraint or close to it. Those households precautionary supply labour to smooth their consumption and incur large losses in terms of welfare from labour disutility.

The results reinforce our previous conclusions: along the increase in idiosyncratic risk, heterogeneous attention has opposite effects on high- and low-income households compared to homogeneous attention - it increases welfare for high-income households and decreases it for low-income households due to the lack in the smoothing mechanism of poor households. The effects on inflation are mostly flat under FIRE. However, with inattention, as risk levels increase, households supply more labour hours, thus, receive more labour income, which allows them to decrease consumption by less in future periods, so aggregate demand falls by less and the potency of monetary policy decreases.

16 see Appendix E for an analysis without permanent, occupation-induced income inequality

Figure 6: The role of Idiosyncratic Risk



Notes: The figure shows the change of consumption equivalent welfare variation and inflation as a function of the change of the standard deviation of idiosyncratic risk for high-income (left panel) and low-income (right panel) households under full information rational expectations, homogeneous and heterogeneous inattention. Each dot shows a cumulative loss in consumption equivalent terms.

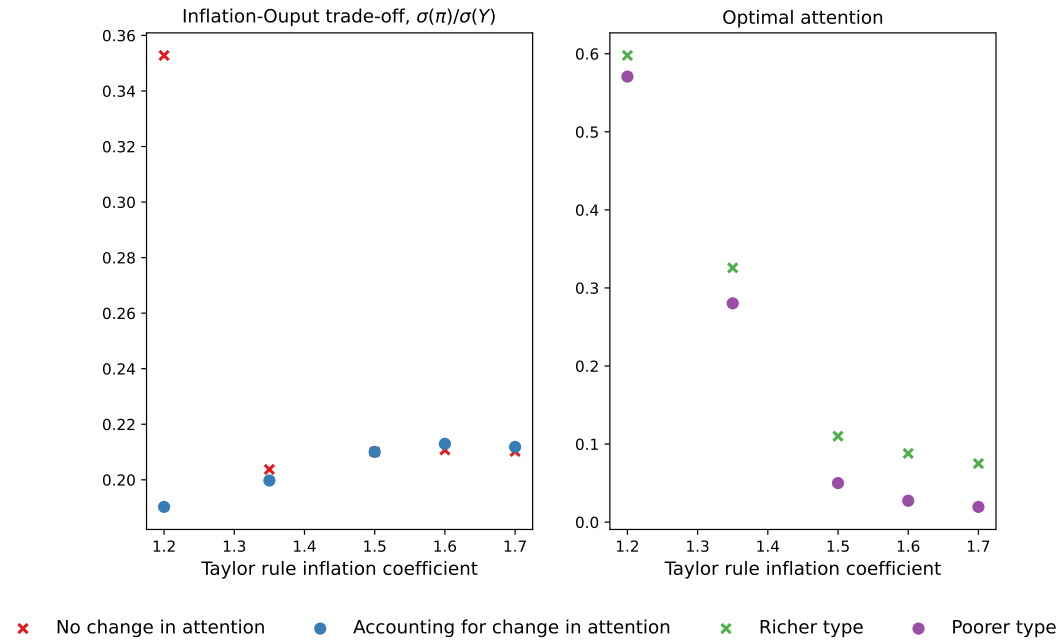
5.3.2. The Role of Monetary Policy

To analyze how attention to inflation affects monetary policy trade-off we simulate the model for different Taylor-rule coefficients in front of the inflation, ϕ_π. In particular, we use our baseline calibration of the model and change the Taylor rule coefficient in it. We then reassess volatility of inflation under the shock processes specification reported in Table 4. In line with Equation 24 for optimal attention level, we recompute attention levels of both types of households in the economy given the new volatility of inflation. Given the new attention levels we recompute inflation volatility and repeat the procedure until convergence. The results are shown in Figure 7.

This figure shows both the inflation-output trade-off the central bank faces in terms of the ratio between inflation volatility and volatility of output (left graph) and the optimal attention level of the households for each value of the Taylor rule coefficient (right graph). We assess the trade-off when first, households have a constant level of attention and do not change their attention to inflation when the central bank changes its reaction to inflation (so without the fixed point), and second, when the households change their attention level in response to the central bank's policy. The optimal attention levels consistent with the ϕ_π values are evaluated for low-income (poorer type) and high-income (richer type) households shown in the right panel.

If attention to inflation is kept counterfactually fixed, central bank faces a better inflation-output trade-off with lower coefficients in front of the inflation. This is because the central bank does not induce a deep recession each time inflation deviates from target. However, larger

Figure 7: The Role of Monetary Policy



Notes: The figure shows the ratio between inflation volatility and output volatility σ_π/σ_y for different values of ϕ_π (panel on the left side) with the optimal level of attention that is consistent with the volatility of inflation (blue dots) and with fixed attention as in the baseline (red crosses). Right panel shows optimal attention for high-income (richer type, green crosses) and low-income (poorer type, purple dots) households.

inflation volatility leads to higher levels of attention as seen in the second graph. Both types of households increase attention levels rapidly with a decrease in ϕ_π. This leads to a worse inflation-output trade-off once change in attention is accounted for. As low-income households have larger costs of paying attention[17], their attention levels drop faster compared to high-income households in response to a higher ϕ_π.

6. Conclusion

This paper studies how attention varies across distribution of households and what implications it has for monetary policy transmission. We have shown empirical cross-country evidence for varying attention across demographic groups, specifically income levels. We find significant results for higher attention of high-income households. To quantify the results we introduce behavioral inattention into a one-asset HANK model in which households are inattentive to inflation. We calibrate our model to match empirical evidence on inattention that we find in the data. Counterfactual exercises show that compared to the fully rational expectations monetary policy has a better inflation-output trade-off with anchored expectations. However the better trade-off is achieved through a larger decrease in welfare among low-earners following a contractionary monetary policy shock, thus distributional consequences of monetary policy are

17 As they loose from inattention more in terms of welfare, the model rationalizes their lower levels of attention found in the data through larger costs of paying attention.

exacerbated by inattention. More muted response to inflation, however, worsens trade-off due to a rapid rise in attention levels to inflation.

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A. Data

In this section we describe the data used in Section 2.2. For the US we us the Survey of Consumer Expectations (SCE) provided by the New York Fed, the St. Louis Fed FRED data to recover macro variables and the administrative dataset PLIDA to match moments for the idiosyncratic income process. For Australia we use data from the Consumer Attitudes, Sentiments and Expectations in Australia Survey (CASiE).

A.1. Australia Descriptive Statistics

Table 5 shows the summary statistics for data in CASiE and the monetary shocks by Romer and Romer (2004); Hambur and Haque (2023); Beckers et al. (2020) and the oil supply news shocks by Känzig (2021). We use quarterly data for the period of 1974 - 2023.

To quantify heterogeneous inflation expectations from the data we use responses to the following question: "By what percentage do you think prices will have gone up by this time next year?" Respondents are asked to assign probabilities to values between 0 and 100.

Table 5: Summary Statistics, AUS

Variable	Median	25%	75%	1%	99%
Inflation expectations	5.0	2.0	6.0	-2.0	15.0
CPI inflation	2.5	1.7	3.1	-0.3	7.3
Romer-Romer shocks	0.008	-0.06	0.08	-0.40	0.35
Romer-Romer aug. shocks	0.008	-0.07	0.09	-0.50	0.38
Level shocks	0.0	-0.10	0.03	-2.16	2.24
Path shocks	0.0	-0.20	0.0	-1.46	2.36
Term-premia shocks	0.0	-0.04	0.13	-1.94	2.07
Oil news shocks	-0.05	-0.35	0.37	-1.58	1.30
Oil news shocks precovid	-0.005	-0.38	0.39	-1.44	1.35
Male	1.0	0.0	1.0	0.0	1.0
Income level	\$40-90k	$\leq$ \$40k	$\geq$ \$90k	$\leq$ \$40k	$\geq$ \$90k
Self-employed	0.0	0.0	0.0	0.0	1.0
Education	above school	school or below	above school	school or below	above school
Home-owners	1.0	1.0	1.0	0.0	1.0
Age	$\geq$ 45	34-45	$\geq$ 45	18-34	$\geq$ 45
Full-time workers	1.0	0.0	1.0	0.0	1.0

Note: The table shows summary statistics of the Australian data. We show the statistics for 1-year-ahead inflation expectations and the households characteristics we consider from CASiE, CPI inflation and the monetary and oil supply news shocks we consider for the analysis.

A.2. US Descriptive Statistics

Table 6 shows the summary statistics of the SCE data from the New York Fed for the period June 2013 - January 2023. For the US we consider two sets of monetary policy shocks, in particular we use shocks constructed by Nakamura and Steinsson (2018) and Bauer and Swanson (2023) and for the oil supply shocks we again consider the shocks constructed by Känzig (2021). We define a similar set of variables and cross-sectional characteristics for the US data as we did for the Australian survey. Income is categorized into three groups: the bottom 25.5% are those households that had a pre-tax income in the last 12 months of less than $\$40,000$, that of the 44.7% mid income households is $\$40,000 - \$99,999$ and high income households are the top 29.8% of our total population and have a total pre-tax income level of $\geq \$100,000$. CPI Inflation is the annualized, quarterly CPI inflation rate constructed using the US consumer price index from the St. Louis Fed FRED database (CPIAUCSL). For inflation expectations, we use responses to the following question: "What do you expect the rate of inflation/deflation to be over the next 12 months?" Respondents are asked to assign some probabilities. For the analysis we drop extreme values of $> |50|\%$.

Table 6: Summary Statistics, USA

Variable	Median	25%	75%	1%	99%
Inflation expectation	3.0	2.0	6.0	-25.0	49.0
CPI Inflation	2.17	1.41	3.35	-3.86	9.21
Nakamura and Steinsson	0.00	0.00	0.19	-1.37	1.99
Bauer and Swanson	0.0	0.0	0.01	-0.08	0.05
Oil news shocks, pre-Covid	-0.09	-0.46	0.39	-1.69	1.36
Oil news shocks	-0.05	-0.36	0.38	-1.66	1.49
Male dummy	1.0	0.0	1.0	0.0	1.0
Income level	$40-99k	$< \$40$k	$\geq \$100$k	$< \$40$k	$\geq \$100$k
Self-employed	0.0	0.0	0.0	0.0	1.0
Education	College	Some College	College	High School	College
Home-owners	1.0	0.0	1.0	0.0	1.0
Age	40-60	< 40	> 60	< 40	> 60
Full-time workers	1.0	0.0	1.0	0.0	1.0

Note: The table shows summary statistics of the relevant variables for the New York Fed CSE. Nakamura and Steinsson are the monetary policy shocks constructed by Acosta (2022) following Nakamura and Steinsson (2018). Bauer and Swanson are the monetary policy shocks constructed by Bauer and Swanson (2023) using high-frequency data. Oil news shocks are taken from Känzig (2021). CPI Inflation is the quarterly change of the CPI.

B. Additional Results to Section 2.2

B.1. Aggregate Regressions

Based on group-specific inflation expectation equation (4) we can derive an equivalent equation for the average inflation expectation by averaging across g to get the expression for average inflation expectations as

$$\bar{\pi}_{t+1,t} = \bar{\beta} + \beta_1 \bar{\pi}_{t,t-1} + \beta_2(\pi_t - \bar{\pi}_{t,t-1}) + \bar{\epsilon}_t \tag{B.1}$$

where $\bar{\pi}_{t+1,t}$ denotes the average one period ahead inflation expectation in year t and $\bar{\beta}$ denotes the average of β_i. Following the same steps as in (7) we derive an equation of aggregate forecast errors of inflation, in the vein of Kučinskas and Peters (2022). In particular, we estimate the following regression

$$\bar{e}_{t+1} = \beta_0 + \beta_1 u_t^m + \bar{\nu}_t \tag{B.2}$$

where $\bar{e}_{t+1} = \pi_{t+1} + \bar{\pi}_{t+1,t}$ are the average forecast errors of inflation across groups, u_t^m is either the shock of interest (monetary policy or oil price news shock) directly or is used as an instrument for the central bank interest rate (if we consider monetary policy shocks) or the oil price change (if we consider oil price news shocks).

Table 7 shows the results for equation (B.2). The first row of Panel A and B shows the regression coefficients if we use the shocks, noted in the header, as an instrument for the central bank interest rate (columns 2-6) and the oil price change (columns 7-8), whereby the second row of Panel A and B shows the regression output when we regress forecast errors on the shocks specified in columns 2-8 directly.

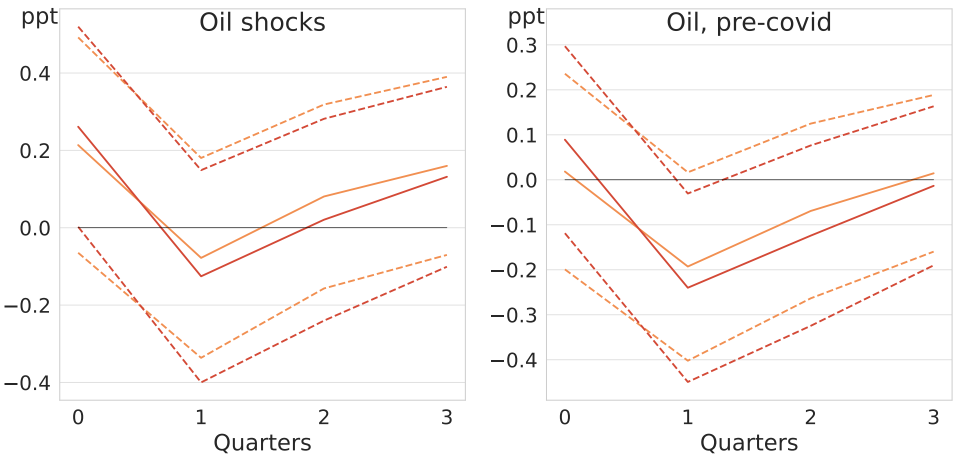
Table 7: Forecast Errors on Shocks, Aggregate Level

	Panel A: AUS						
	Romer-Romer	Romer-Romer aug.	Level	Path	Term-premia	Oil News	Oil News pre-covid
IV	0.10 (0.61)	-0.05 (1.17)	0.03 (0.58)	6.08 (25.94)	-0.42 (4.70)	1.75 (1.21)	0.59 (1.00)
Reduced Form	0.12 (0.78)	-0.03 (0.81)	-0.01 (0.10)	-0.06 (0.10)	-0.01 (0.10)	0.23 (0.16)	0.07 (0.13)
No. of observations	96	96	109	109	109	109	100
	Panel B: USA						
	NS	GSS target	GSS path	Acosta	MPS	Oil News	Oil News pre-covid
IV	-2.36 (8.45)	0.03 (0.31)	-0.56 (0.86)	-0.09 (0.37)	4.13 (19.67)	1.77 (3.63)	1.99 (2.55)
Reduced Form	0.33 (0.51)	0.06 (0.64)	0.29 (0.51)	-4.92 (19.08)	10.92 (9.25)	0.25 (0.50)	0.25 (0.32)
No. of observations	36	36	36	36	27	36	27

Note: The table shows regression coefficients for aggregated across households inflation forecasting errors regressed on different shocks either directly (reduced form) or using IV (where shocks are used as an instrument for central bank interest rate or oil price changes) estimating (B.2). Panel A shows the result for Australia using a set of externally constructed monetary policy shocks and oil price new shocks.Romer-Romer shocks are monetary policy shocks constructed for Australia by Beckers et al. (2020) following Romer and Romer (2004). Level, path and term-premia shocks are high-frequency identified monetary policy shocks constructed by Hambur and Haque (2023) following Gürkaynak et al. (2005) with the Kaminska et al. (2021) extension that decomposes shocks into level, path and term-premia components. Oil news shocks are taken from Känzig (2021). Panel B shows the regression results of (B.2) for the US using a set of monetary policy and oil price news shocks. Acosta shocks contain the 30-minute change in expectations of the FFR immediately after each FOMC meeting, constructed by Acosta (2022). NS shocks are the monetary policy shocks constructed by Acosta (2022) following Nakamura and Steinsson (2018). Target and path shocks are high-frequency identified monetary policy shocks all constructed by Acosta (2022) following Gürkaynak et al. (2005). MPS shocks are the monetary policy shock instrument constructed by Bauer and Swanson (2023) using high-frequency data. Oil news shocks are taken from Känzig (2021).

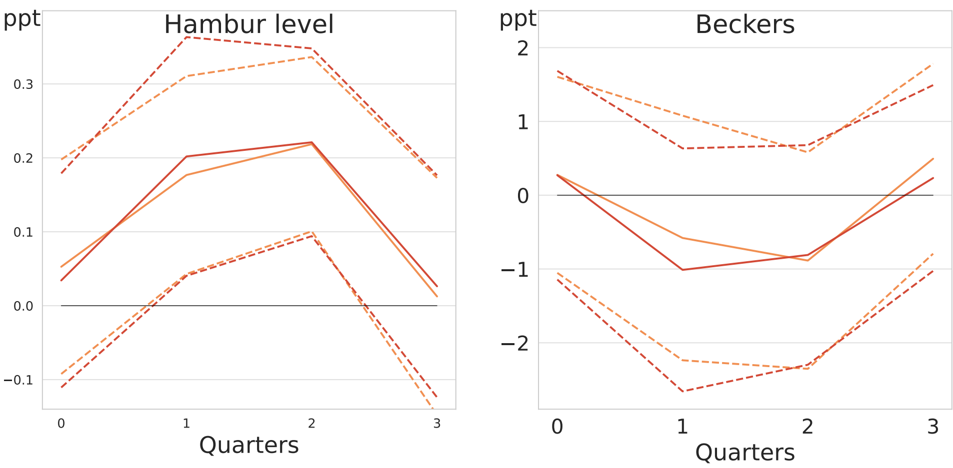
B.2. Shock-specific Attention

Figure 8: Responses of Inflation Forecast Errors to Oil Supply News Shocks



Notes: The figure shows in percentage points the impulse-responses of inflation forecast errors to externally constructed oil supply news shocks. Responses of high-income households are shown in red, responses of lower-income households are shown in orange. Dotted lines show 90% confidence intervals.

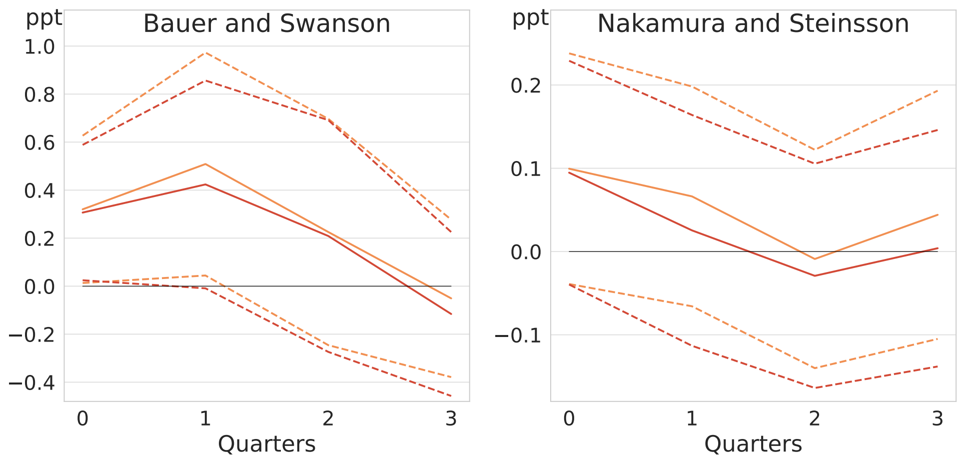
Figure 9: Responses of Inflation Forecast Errors to Domestic Monetary Policy Shocks



Notes: The figure shows in percentage points the impulse-responses of inflation forecast errors to externally constructed monetary policy shocks. Responses of high-income households are shown in red, responses of lower-income households are shown in orange. Dotted lines show 90% confidence intervals.

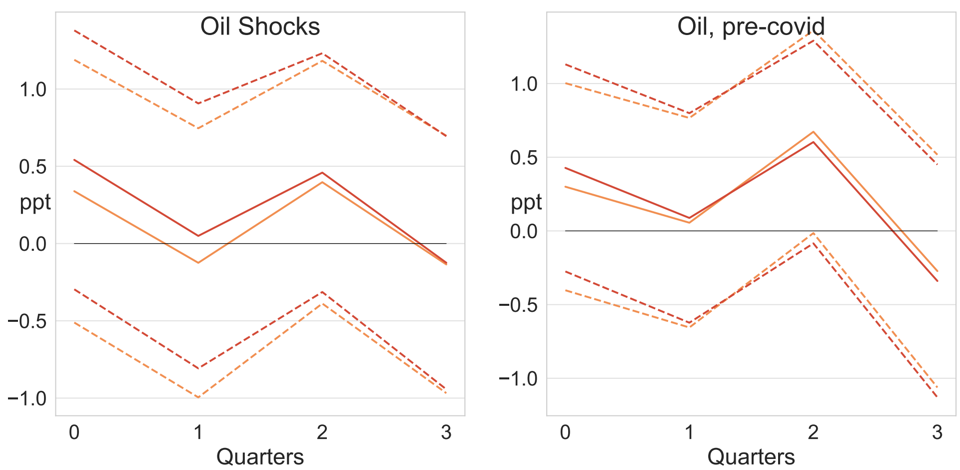
B.3. Panel Regressions

Figure 10: Responses of Inflation Forecast Errors to US Monetary Policy Shocks



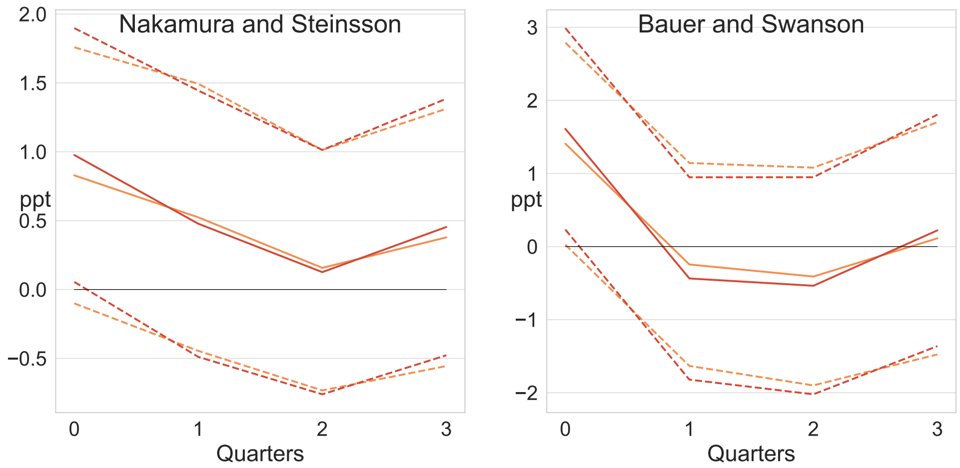
Notes: The figure shows in percentage points the impulse-responses of inflation forecast errors to externally constructed US monetary policy shocks. Responses of high-income households are shown in red, responses of lower-income households are shown in orange. Dotted lines show 90% confidence intervals.

Figure 11: Responses of Inflation Forecast Errors to Oil Supply News Shocks



Notes: The figure shows in percentage points the impulse-responses of inflation forecast errors to Känzig (2021) oil supply news shocks. Responses of high-income households are shown in red, responses of lower-income households are shown in orange. Dotted lines show 90% confidence intervals.

Figure 12: Responses of Inflation Forecast Errors to Monetary Policy Shocks



Notes: The figure shows in percentage points the impulse-responses of inflation forecast errors to Bauer and Swanson (2023) and Nakamura and Steinsson (2018) monetary policy shocks. Responses of high-income households are shown in red, responses of lower-income households are shown in orange. Dotted lines show 90% confidence intervals.

Table 8: Forecast Errors on Shocks, Cross-Section

	Panel A: AUS						
	Romer-Romer	Romer-Romer aug.	Level	Path	Term-premia	Oil News	Oil News pre-covid
IV	-0.52*** (0.19)	-0.57* (0.31)	-0.23 (0.20)	-5.01** (2.50)	-11.00 (16.50)	1.13** (0.47)	-0.39 (0.38)
Reduced form	-0.93*** (0.33)	-0.67* (0.37)	0.04 (0.03)	-0.13*** (0.03)	0.11*** (0.03)	0.14** (0.06)	-0.05 (0.05)
No. of observations	832	832	1035	1035	1035	1035	896
	Panel B: USA						
	NS	GSS target	GSS path	Acosta	MPS	Oil News	Oil News pre-covid
IV	-2.20 (3.21)	-0.01 (0.13)	-0.51* (0.37)	-0.14 (0.14)	3.27 (4.58)	1.97 (1.49)	2.29* (1.13)
Reduced Form	0.26 (0.20)	-0.01 (0.26)	0.25 (0.20)	-7.24 (7.37)	10.17** (3.46)	0.28 (0.20)	0.29* (0.14)
No. of observations	284	284	284	284	212	284	212

Note: The table shows regression coefficients for aggregated across households inflation forecasting errors regressed on different shocks either directly (reduced form) or using IV (where shocks are used as an instrument for central bank interest rate or oil price changes) estimating (B.2). Panel A shows the result for Australia using a set of externally constructed monetary policy shocks and oil price new shocks.Romer-Romer shocks are monetary policy shocks constructed for Australia by Beckers et al. (2020) following Romer and Romer (2004). Level, path and term-premia shocks are high-frequency identified monetary policy shocks constructed by Hambur and Haque (2023) following Gürkaynak et al. (2005) with the Kaminska et al. (2021) extension that decomposes shocks into level, path and term-premia components. Oil news shocks are taken from Känzig (2021). Panel B shows the regression results of (B.2) for the US using a set of monetary policy and oil price news shocks. Acosta shocks contain the 30-minute change in expectations of the FFR immediately after each FOMC meeting, constructed by Acosta (2022). NS shocks are the monetary policy shocks constructed by Acosta (2022) following Nakamura and Steinsson (2018). Target and path shocks are high-frequency identified monetary policy shocks all constructed by Acosta (2022) following Gürkaynak et al. (2005). MPS shocks are the monetary policy shock instrument constructed by Bauer and Swanson (2023) using high-frequency data. Oil news shocks are taken from Känzig (2021).

Table 9: Forecast Errors on Foreign Shocks for AUS, Cross-Section

	NS	GSS target	GSS path	Acosta	MPS
IV	4.11*** (1.23)	-3.63 (2.34)	9.36*** (1.98)	-1.26 (1.79)	3.22*** (0.74)
Reduced Form	0.10*** (0.03)	-0.09* (0.05)	0.20*** (0.03)	-0.89 (1.18)	0.38*** (0.08)
No. of observations	1003	1003	1003	1003	864

Note: The table shows regression coefficients for households inflation forecasting errors regressed on different shocks either directly (reduced form) or using IV (where shocks are used as an instrument for FFR rate changes). Acosta shocks contain the 30-minute change in expectations of the FFR immediately after each FOMC meeting (first component of the policy news shock), constructed by Acosta (2022). NS shocks are the monetary policy shocks constructed by Acosta (2022) following Nakamura and Steinsson (2018). Target and path shocks are high-frequency identified monetary policy shocks all constructed by Acosta (2022) following Gürkaynak et al. (2005). MPS shocks are the monetary policy shock instrument constructed by Bauer and Swanson (2023) using high-frequency data.

Table 10: Group-Specific Forecast Errors on Shocks, AUS

	Romer-Romer	Romer-Romer aug.	Level	Path	Term-premia	Oil News	Oil News pre-covid
				Income level			
High-income	-0.88* (0.46)	-0.50 (0.49)	-0.01 (0.04)	-0.13*** (0.04)	0.12** (0.05)	0.10 (0.08)	-0.04 (0.06)
Mid and low-income	-0.98** (0.48)	-0.85 (0.55)	0.09* (0.05)	-0.13*** (0.04)	0.10** (0.05)	0.18** (0.09)	-0.05 (0.07)
				Entrepreneurs			
Self-employed	-1.36*** (0.52)	-1.09* (0.58)	0.04 (0.04)	-0.16*** (0.04)	0.13*** (0.05)	0.08 (0.09)	-0.10 (0.07)
Not self-employed	-0.50 (0.41)	-0.26 (0.45)	0.03 (0.04)	-0.10*** (0.04)	0.09** (0.04)	0.20*** (0.07)	0.01 (0.05)
				Occupation			
Professionals	-1.14** (0.46)	-0.91* (0.51)	0.05 (0.04)	-0.11*** (0.04)	0.12*** (0.05)	0.06 (0.08)	-0.07 (0.07)
Not professionals	-0.72 (0.47)	-0.43 (0.53)	0.03 (0.04)	-0.14*** (0.04)	0.10** (0.05)	0.22*** (0.08)	-0.03 (0.06)
				Sex dummy			
Female	-0.85* (0.47)	-0.76 (0.53)	0.02 (0.05)	-0.17*** (0.04)	0.14*** (0.05)	0.10 (0.08)	-0.06 (0.07)
Male	-1.01** (0.46)	-0.58 (0.52)	0.05 (0.04)	-0.08** (0.04)	0.08* (0.05)	0.19** (0.08)	-0.04 (0.06)
No. of observations	832	832	1034	1034	1034	1034	896

Note: The table shows regression coefficients for households inflation forecasting errors regressed on different shocks (reduced form) interacted with different dummies (one at a time). Romer-Romer shocks are monetary policy shocks constructed for Australia by Beckers et al. (2020) following Romer and Romer (2004) methodology. Level, path and term-premia shocks are high-frequency identified monetary policy shocks constructed by Hambur and Haque (2023) following Gürkaynak et al. (2005) with the Kaminska et al. (2021) extension that decomposes shocks into level, path and term-premia components. Oil news shocks are taken from Känzig (2021)

Table 11: Panel Regressions of Inflation Expectations across Household Characteristics, USA

	NS	GSS target	GSS path	Acosta	MPS	Oil News	Oil News pre-covid
				Income level			
High-income	0.29 (0.30)	-0.03 (0.40)	0.27 (0.30)	-7.99 (11.05)	11.28* (4.65)	0.34 (0.29)	0.39 (0.19)
Mid and low-income	0.25 (0.27)	0.01 (0.32)	0.23 (0.27)	-6.38 (9.43)	8.97 (5.17)	0.21 (0.28)	0.18 (0.21)
				Entrepreneurs			
Self-employed	0.19 (0.31)	-0.09 (0.39)	0.19 (0.26)	-9.68 (10.61)	8.62 (5.21)	0.29 (0.31)	0.31 (0.24)
Not self-employed	0.36 (0.26)	0.07 (0.35)	0.31 (0.30)	-4.48 (10.12)	11.88** (4.47)	0.27 (0.26)	0.28 (0.16)
				Sex dummy			
Female	0.08 (0.33)	-0.08 (0.41)	0.10 (0.32)	-10.93 (11.10)	8.69 (5.29)	0.15 (0.32)	0.24 (0.23)
Male	0.46 (0.24)	0.06 (0.32)	0.40 (0.23)	-3.32 (9.56)	11.70* (4.55)	0.41 (0.24)	0.34* (0.17)
No. of observations	284	284	284	284	212	284	212

Note: The table shows regression coefficients for households inflation forecasting errors regressed on different shocks (reduced form) interacted with different dummies (one at a time). Acosta shocks contain the 30-minute change in expectations of the FFR immediately after each FOMC meeting (first component of the policy news shock), constructed by Acosta (2022). NS shocks are the monetary policy shocks constructed by Acosta (2022) following Nakamura and Steinsson (2018). Target and path shocks are high-frequency identified monetary policy shocks all constructed by Acosta (2022) following Gürkaynak et al. (2005). MPS shocks are the monetary policy shock instrument constructed by Bauer and Swanson (2023) using high-frequency data. Oil news shocks are taken from Känzig (2021). Oil news shocks are taken from Känzig (2021).

C. Appendix to Section 3

C.1. Attention Choice

In general, the household in our economy solves the following problem:

$$\begin{aligned} V_{j,t}(a^n_{t-1}) &= \max_c \{u(c_t) + \beta E[V_{j,t+1}(a^n_t)]\} \\ s.t. \quad P_t c_t + a^{'}_{t-1} &= Y_g + (1+i^a_t)a^n_t \end{aligned} \tag{C.1}$$

where E is the expectation operator, we define in Definition 1.

In the traditional, fully attentive economy, the household pays full attention to all variables that are relevant to his decision making. He thereby has fully rational expectations about the entire state of the economy. If the household however is even only slightly inattentive to some state variable, he has a "sparse" representation of the world and anchors expectations about this state variable on a default value which is equal to some level of deviation form the fully rational observed value.

The *rational* household who observed the variables fully rational and pays full attention to the entire state of the economy solves

$$V_{j,t}(a^n, 1) = \max_c \{u(c) + \beta E_t[V_{j,t+1}(Y_g + (1+i^a_t)a^n - P_t c, 1)]\} \tag{C.2}$$

where we define his utility as $v_{j,t}(a^n, \gamma^g) \equiv u(c) + \beta E_t[V_{j,t+1}(Y_g + (1+i^a_t)a^n - P_t c)]$.

The *inattentive* household is inattentive to prices and solves

$$V_{j,t}(a^n) = \max_c \{u(c) + \beta E_{j,t}[V_{j,t+1}(Y_g + (1+i^a_t)a^n - P_t c)]\}$$

with utility $v_{j,t}(a^n, 1) \equiv u(c) + \beta E_{j,t}[V_{j,t+1}(Y_{g,t} + (1+i^a_t)a^n - P_t c)]$.
Taking the imperfect policy $c^*_g(\gamma^g)$ however leads to a loss in the agent's utility

$$\mathcal{L} = v_{j,t}(a^n, \gamma^g) - v_{j,t}(a^n, 1) \tag{C.3}$$

which is the difference between the optimal consumption $c^*_g(a^n, 1)$ the household chooses under full information and the imperfect consumption $c^*_g(a^n, \gamma^g)$ the household chooses under imperfect information.

To quantify (C.3), we follow Gabaix (2014) and replace $v_{j,t}$ by a second order Taylor approximation around small deviations of the state variables from their default (long-run) values. We define the default model as the model at the steady state with steady state values for consumption, wealth and income, and only prices P_t potentially variable. The household pays full attention to all the variables, except for prices for which the default attention value is $\gamma^g_d = 0$. He now has to decide how much he wants to deviate from this default attention in order to make an optimal consumption choice. Assuming perfect foresight and resorting to the recursive nature of the optimization problem allows us to rewrite the agent's utility, independent of the attention level, as

$$
\begin{aligned}
v_{j,t} &= v_i + v_c \hat{c}_t + v_{a^n} \hat{a}_t^n + v_Y \hat{Y}_{g,t} + \sum_{h=1}^{\infty} v_P \hat{P}_{t+h} \\
&+ \frac{1}{2} \left(\frac{\partial^2 v}{\partial c^2} \hat{c}_t^2 + \frac{\partial^2 v}{\partial c \partial Y_g} \hat{c}_t \hat{Y}_g + \frac{\partial^2 v}{\partial c \partial a^n} \hat{c}_t \hat{a}^n + \sum_{h=1}^{\infty} \frac{\partial^2 v}{\partial c \partial P_h} \hat{c}_t \hat{P}_{t+h} + \dots \right)
\end{aligned}
$$

where we use the notation $\hat{x}_t = x_t - \bar{x}$ as the deviation of x_t from the long-run value of the variable, $v_x \equiv \frac{\partial v_j(a^n, \gamma^g)}{\partial x}\Big|_{c=\bar{c}, a^n=\bar{a}^n, P=\bar{P}, Y_g=\bar{Y}_g}$.

Notice that from the household's Euler equation that $v_c = 0$. Since inattention enters the model linearly, we can rewrite the expected loss from being inattentive as

$$
\begin{aligned}
L &= E_{j,t}(v_{j,t}(a^n, \gamma^g) - v_{j,t}(a^n, 1)) \\
&= \frac{1}{2} \frac{\partial^2 v}{\partial c^2} \left(\sum_{h=1}^{\infty} \frac{\partial c}{\partial P_h} (\gamma^g - 1) P_{t+h} \right)^2 = \frac{1}{2} \frac{\partial^2 v}{\partial c^2} \left(\sum_{h=1}^{\infty} \frac{\partial c}{\partial P_h} (\gamma^g P_{t+h} - P_{t+h}) \right)^2 \\
&= \frac{1}{2} \frac{\partial^2 v}{\partial c^2} \sum_{h=1}^{\infty} \sum_{h'=1}^{\infty} \frac{\partial c}{\partial P_h} \frac{\partial c}{\partial P_{h'}} (\gamma^g - 1)^2 P_{t+h} P_{t+h'}
\end{aligned}
$$

The household wants to minimize his expected loss in consumption by choosing his optimal inflation-attention level γ^g facing a cognitive constraint $\chi \gamma^g$

$$
\min_{\gamma^g} L = \min_{\gamma^g} -\frac{1}{2} \frac{\partial^2 v}{\partial c^2} \sum_{h=1}^{\infty} \sum_{h'=1}^{\infty} \frac{\partial c}{\partial P_h} \frac{\partial c}{\partial P_{h'}} (\gamma^g - 1)^2 \sigma_{P_h P_{h'}} + \chi \gamma^g \tag{C.4}
$$

with the cost-of-inattention factor $\Lambda := -\frac{1}{2} \frac{\partial^2 v}{\partial c^2} \sum_{h=1}^{\infty} \sum_{h'=1}^{\infty} \frac{\partial c}{\partial P_h} \frac{\partial c}{\partial P_{h'}} \sigma_{P_h P_{h'}}$. Solving optimization problem (C.4) gives the result in Proposition 1.

D. Appendix to Section 4

D.1. Behavioral Jacobians

Here we derive the Jacobians of our model with inattentive households. To solve for the behavioral Jacobians we closely follow Auclert et al. (2020) section **D.3**.

Our model considers two groups of households: first, those households who have paid attention to the macroeconomy at $t \geq \tau$ and have all information about the shock arising in $t = 0$ and second, those households who didn't pay attention and still have to learn about the shock to inflation. Learning has probability $\gamma^g(1-\gamma^g)^\tau$, where γ^g is the attention parameter we use in (5). Aggregating across the households gives the following Jacobian which specifies the response of output o to inflation π:

$$J^{o,\pi} = \gamma^g \sum_{\tau=0}^{\infty}(1-\gamma^g)^\tau J^{o,\pi,\tau} \tag{D.1}$$

where $J^{o,\pi,\tau}$ is the Jacobian for the group of households learning about the shock to inflation π at date τ. It is the policy at t that responds to the shock to π at date s. The Jacobian for a given s is given by:

$$\begin{aligned} J^{o,\pi,\tau}_{t,s} &= \gamma^g \sum_{\tau=0}^{s}(1-\gamma^g)^\tau J^{o,\pi,\tau}_{t,s} \\ &= \gamma^g (J^{o,\pi,0}_{t,s} + (1-\gamma^g)J^{o,\pi,1}_{t,s} + \ldots + (1-\gamma^g)^s J^{o,\pi,s}_{t,s}) \\ &= (1-\gamma^g)^s J^{o,\pi,s}_{t,s} + \gamma^g \sum_{\tau=0}^{s-1}(1-\gamma^g)^\tau J^{o,\pi,\tau}_{t,s} \end{aligned} \tag{D.2}$$

To derive the Jacobians for each period t we further observe:

1. for $s \geq \tau$, we assume that households respond to a news shock about the date-s-change in π similarly to a news shock about the date-$(s-\tau)$-change in π, i.e. $J^{o,\pi,\tau}_{t,s} = \ldots = J^{o,\pi,0}_{t-\tau,s-\tau}$.
2. for $\tau > s$ the household has already updated her information in s about the news shock to π in s and therefore is irrelevant, such that $J^{o,\pi,\tau}_{t,s} = J^{o,\pi,s}_{t,s}, \forall t$

For any $t, s > 0$ this allows us to rewrite (D.2) as:

$$\begin{aligned} J^{o,\pi,\tau}_{t,s} &= (1-\gamma^g)^s J^{o,\pi,s}_{t,s} + \gamma^g J^{o,\pi,0}_{t,s} + \gamma^g \sum_{\tau=1}^{s-1}(1-\gamma^g)^\tau J^{o,\pi,\tau}_{t,s} \\ &= (1-\gamma^g)^s J^{o,\pi,s}_{t-1,s-1} + \gamma^g J^{o,\pi,0}_{t,s} + \gamma^g \sum_{\tau=0}^{s-2}(1-\gamma^g)^{\tau+1} J^{o,\pi,\tau}_{t-1,s-1} \\ &= (1-\gamma^g)^s J^{o,\pi}_{t-1,s-1} + \gamma^g J^{o,\pi,0}_{t,s} \end{aligned} \tag{D.3}$$

For $s = 0$, $\forall t$ (D.2) simplifies to

$$J^{o,\pi,\tau}_{t,s} = (1-\gamma^g)J^{o,\pi,0}_{t,s} + \gamma^g J^{o,\pi,0}_{t,s} = J^{o,\pi,0}_{t,s} \tag{D.4}$$

For $t = 0, s > 0$, and since $t \geq \tau$, the impulse response functions are only relevant if $\tau = 0$, such that

$$J_{t,s}^{o,\pi,\tau} = (1-\gamma^g)^s J_{t,s}^{o,\pi,s} + \gamma^g J_{t,s}^{o,\pi,\tau} = \gamma^g J_{t,s}^{o,\pi,0} \tag{D.5}$$

In period $\tau = 0$ the household has full information, i.e. paid fully attention. Since $J_{t,s}^{o,\pi,0}$ is the Jacobian for households that learn at $\tau = 0$ about shocks and as in Auclert et al. (2020) define the FIRE-Jacobian $J_{t,s}^{o,\pi,FI} \equiv J_{t,s}^{o,\pi,0}$, we get (20).

D.2. Attention Choice

Here we follow the same procedure as in Section C while also extending to idiosyncratic income shocks. The *rational* household who observed the variables fully rational and pays full attention to the entire state of the economy solves

$$V_{i,t}(a^n, e, 1) = \max_c \{u(c) + \beta E_t[V_{i,t+1}(Y_g + (1+i_t^a)a^n - P_t c, e, 1)]\} \tag{D.6}$$

where we define his utility as $v_{i,t}(a^n, e, \gamma^g) \equiv u(c) + \beta E_t[V_{i,t+1}(Y_g + (1+i_t^a)a^n - P_t c, e, 1)]$.

The *inattentive* household is inattentive to prices and solves

$$V_{i,t}(a^n, e, \gamma^g) = \max_c \{u(c) + \beta E_{i,t}[V_{i,t+1}(Y_g + (1+i_t^a)a^n - P_t c, e, \gamma^g)]\}$$

with utility $v_{i,t}(a^n, e, \gamma^g) \equiv u(c) + \beta E_{i,t}[V_{i,t+1}(Y_{g,t} + (1+i_t^a)a^n - P_t c, e)]$.
The loss in the agent's utility from choosing suboptimal consumption is

$$L = v_{i,t}(a_t^n, e_t, \gamma^g) - v_{i,t}(a_t^n, e_t, 1) \tag{D.7}$$

The household's expected loss in consumption from being inattentive is weighted by the ergodic distribution as

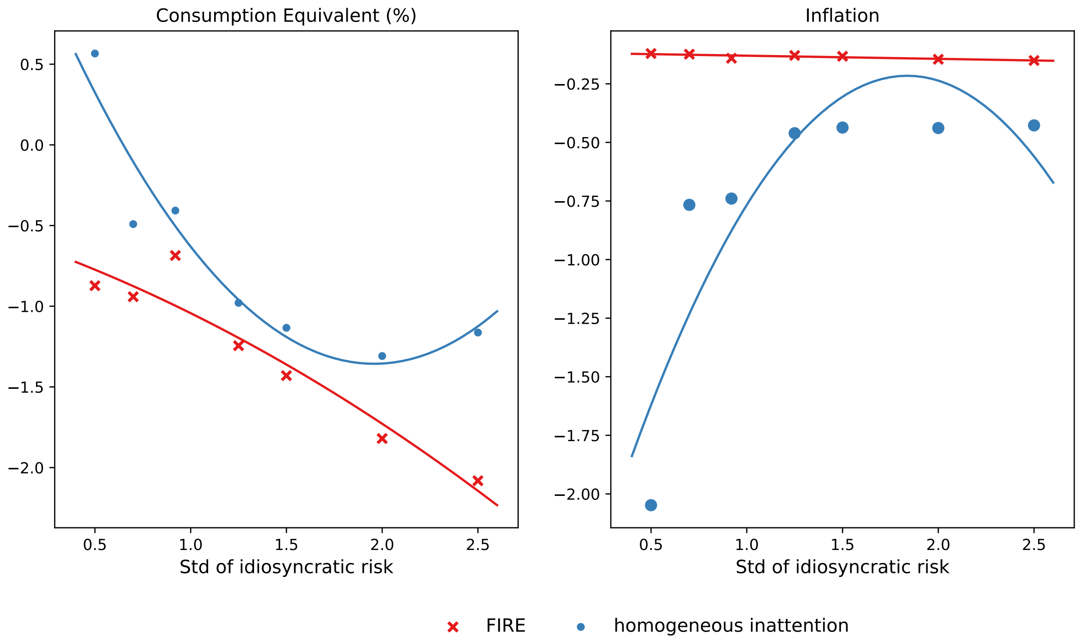
$$\min_{\gamma^g} -\frac{1}{2}(\gamma^g - 1)^2 \sigma_P^2 \sum_e \int \left(\frac{\partial c}{\partial P}\right)^2 \frac{\partial^2 v(a^n, e, \gamma^g)}{\partial (c)^2} dD^g(e, da) + \chi \gamma^g \tag{D.8}$$

with the cost-of-inattention factor $\Lambda := -\frac{1}{2}\sum_e \int \left(\frac{\partial c}{\partial p}\right)^2 \frac{\partial^2 v^g(a^n, e, \gamma^g)}{\partial (c)^2} dD^g(e, da)$. Solving (D.8) gives the solution we propose in Proposition 3.

E. Appendix to Section 5: Additional Results and Figures

E.1. The Role of Transitory Income Inequality

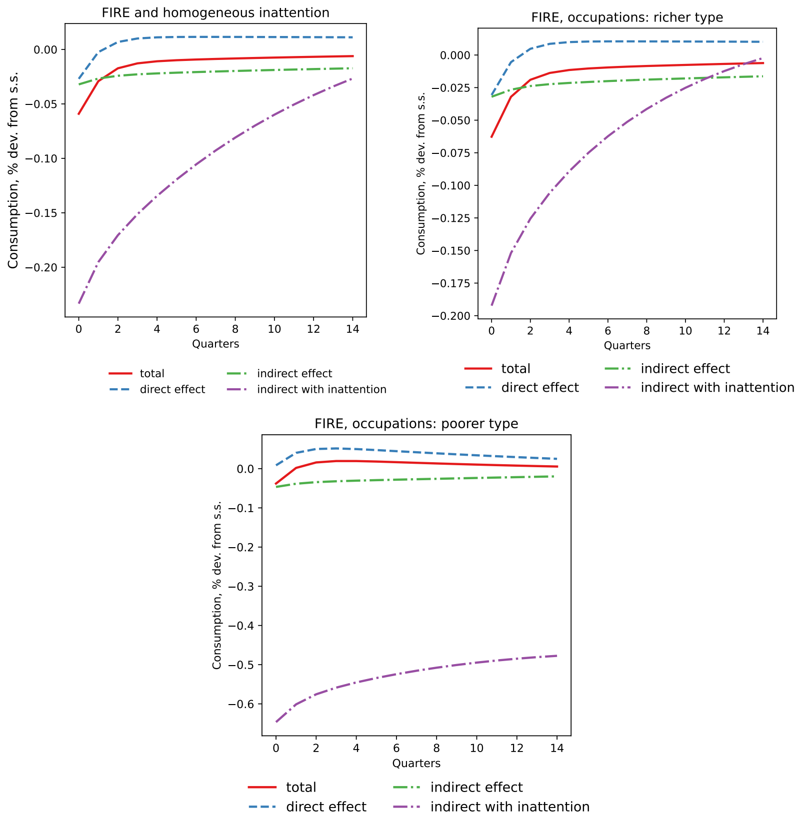
Figure 13: The role of transitory income inequality



Notes: The figure shows the change of consumption equivalent welfare variation and inflation relative to the change of the standard deviation of households' idiosyncratic risk under full information rational expectations and homogeneous inattention. Each dot shows a cumulative loss in consumption equivalent terms.

E.2. Direct and Indirect Effects

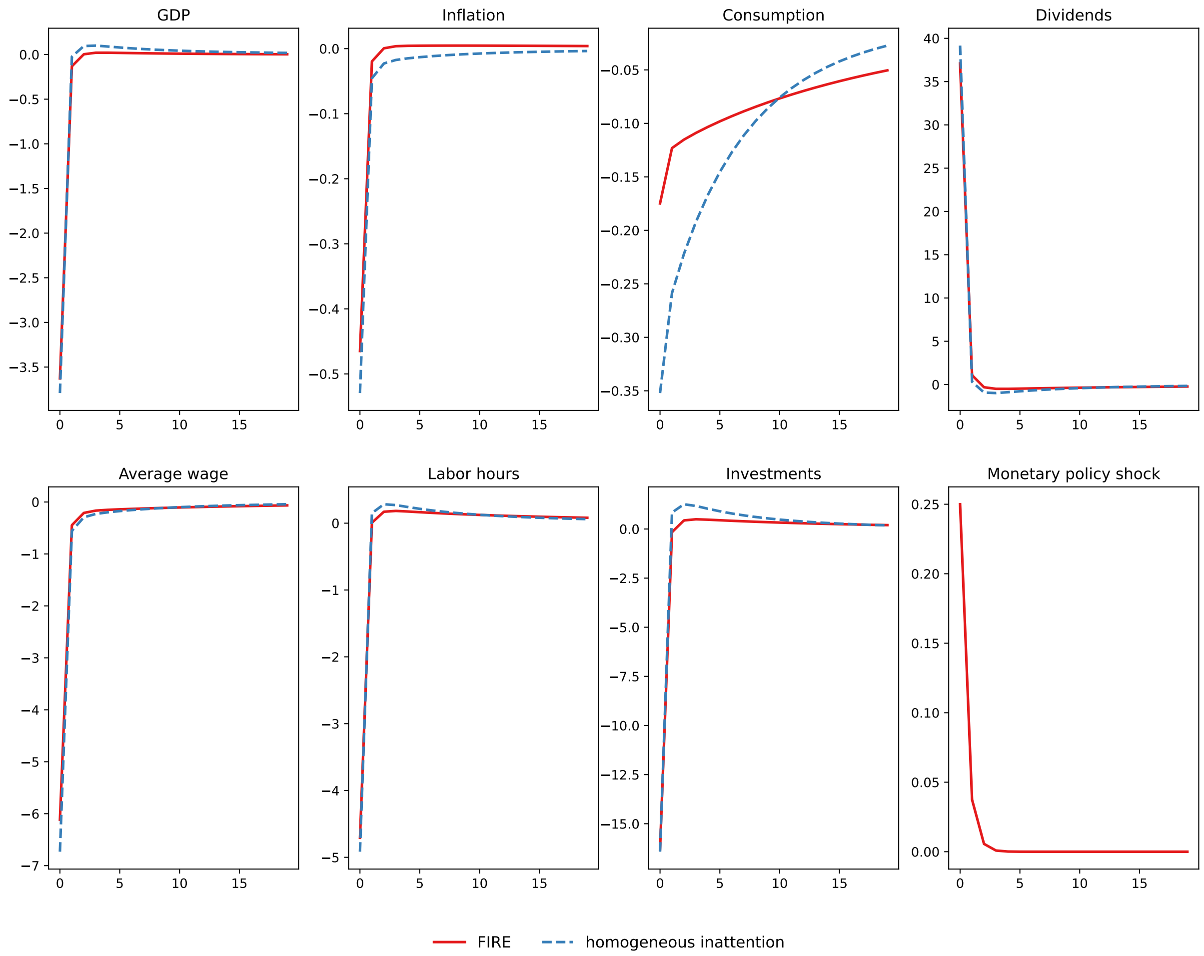
Figure 14: Direct and Indirect Effects



Notes: The figure shows direct and indirect effects for the model without occupational choice (first panel), and for each type of households (second and third panels) in a model with occupational choice. Indirect effects in our model include dynamics of wages and prices (inflation).

E.3. Results for Australia

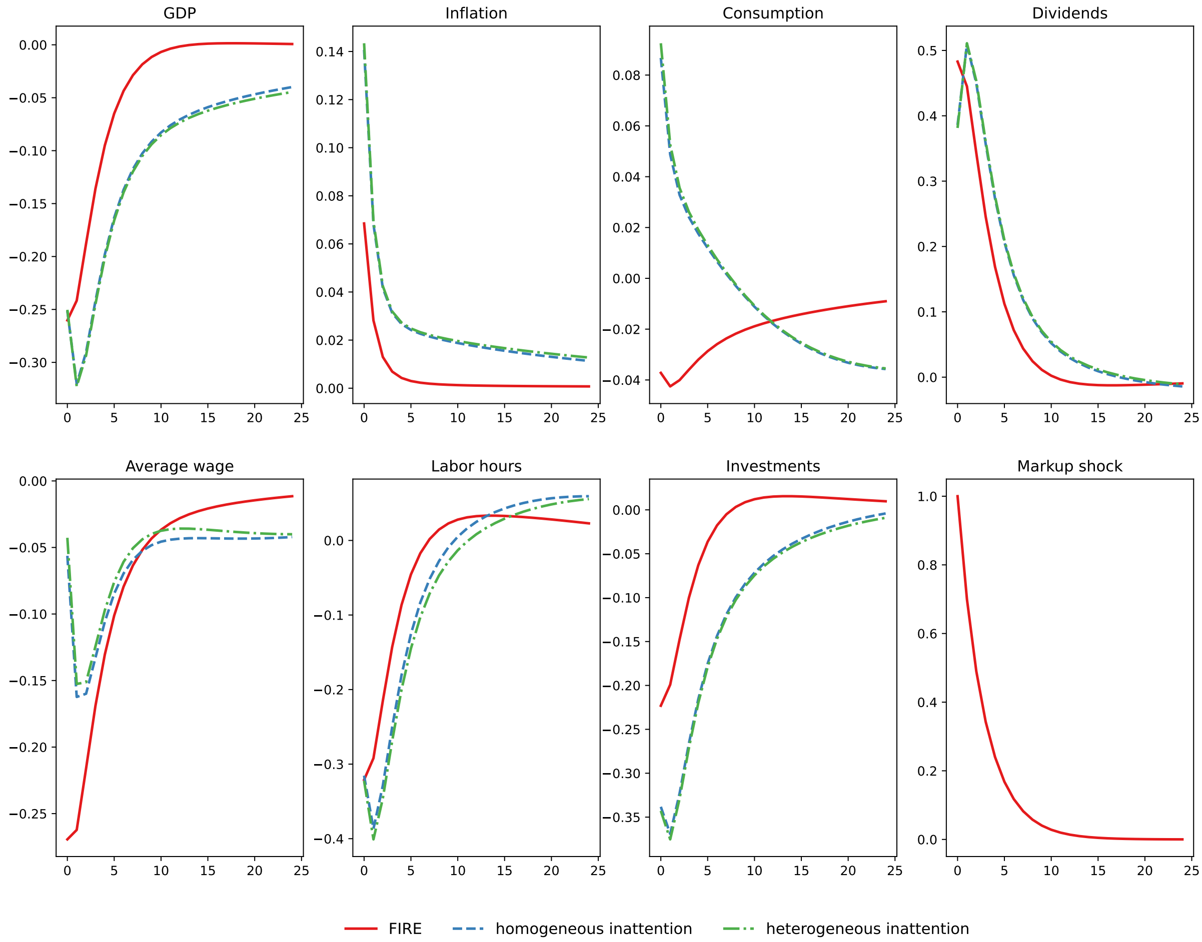
Figure 15: Impulse Response Functions to a Monetary Policy Shock, AUS



Notes: The figure shows in percentage points the impulse-responses of output, inflation, consumption, dividends, average wage, labor hours, investments to a contractionary 25 bps monetary policy shock for Australia. The red lines show the impulse response function under full information rational expectations and the dashed blue lines shows the results under homogeneous inattention.

E.4. Markup Shocks

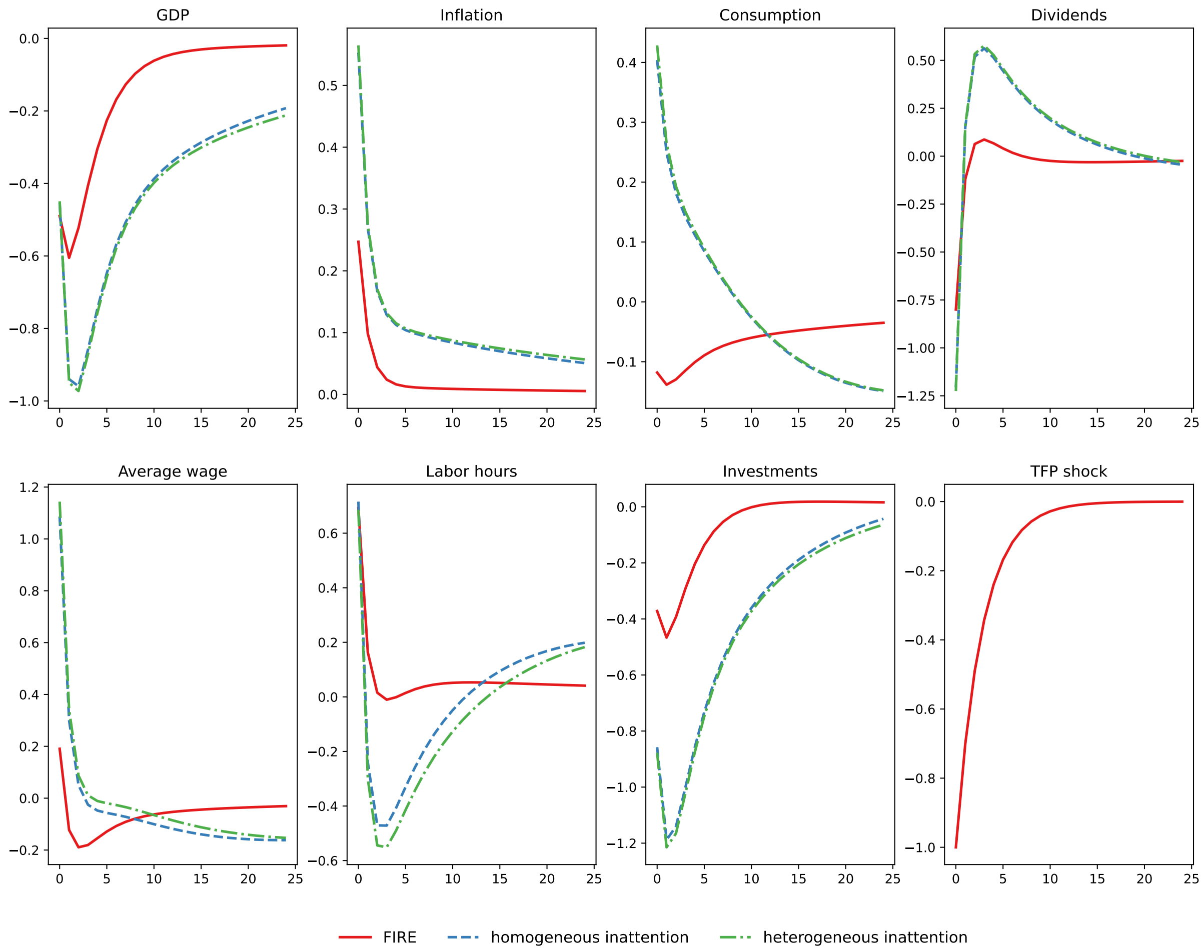
Figure 16: Markup Shock, Heterogeneity across Types



Notes: The graph shows impulse responses to a 1% markup shock. The red lines show the responses in a HANK with FIRE, the dashed blue line for the HANK with homogeneous inattention and the dash-dotted green line for the HANK with heterogeneous inattention.

E.5. TFP shocks

Figure 17: TFP Shock, Heterogeneity across Types

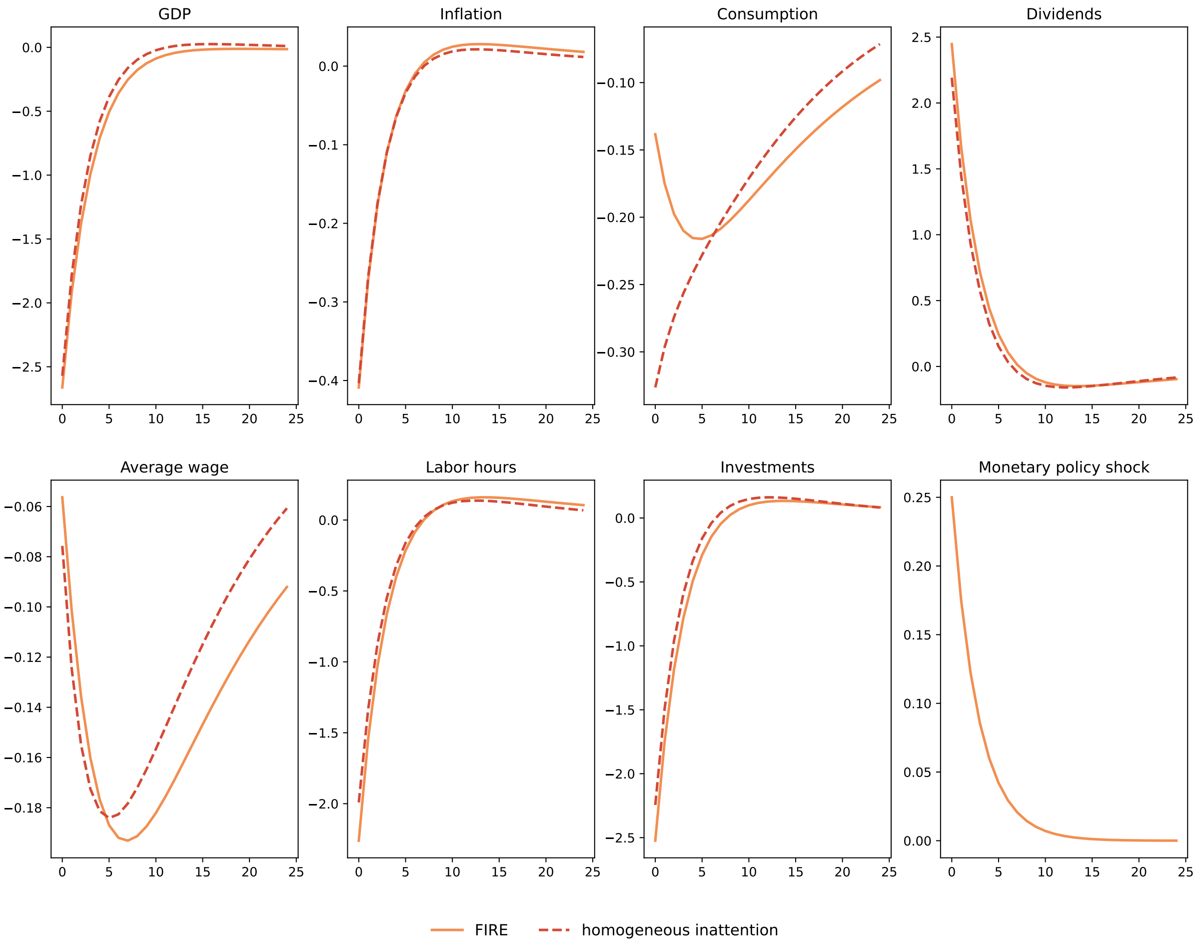


Notes: The shows the impulse responses to a 1% TFP shock. The red lines show the responses in a HANK with FIRE, the dashed blue lines for the HANK with homogeneous inattention and the dash-dotted green lines for the HANK with heterogeneous inattention.

E.6. Sticky Wages

Figure 18 shows the impulse response functions in the model with sticky wages and fully-flexible prices after a contractionary 25 bps monetary policy shock.

Figure 18: Real Wage Rigidity, USA



Notes: The figure shows the impulse responses to a contractionary 25 bps monetary policy shock in a model with real wage rigidity. The orange line shows the responses in a HANK with FIRE and the red dotted line shows the responses in a HANK with homogeneous inattention.