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Frantisek Masek *

Abstract

While the standard New Keynesian model implies that higher households' inflation expectations strongly raise nominal wage expectations and generate a positive consumption response, empirical evidence shows low passthrough to nominal wage expectations and a mixed sign of the consumption response. I study representative agent and heterogeneous agent New Keynesian models that allow for this low passthrough, arising from myopic nominal wage expectations. In the representative agent model, consumption still increases because households receive profits that offset the expected decline in real wages. In contrast, in the heterogeneous agent model, the consumption response becomes negative when the profit channel is weakened and the disconnect between inflation and nominal wage expectations is sufficiently strong.

JEL Codes: E21, E31, E32, E58, E70.

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1. Introduction

How households adjust their consumption when their inflation expectations change is crucial to macroeconomics and to the policy relevance of steering expectations. Does higher expected inflation raise consumption or lower it? The standard New Keynesian model predicts a clearly positive response, yet this prediction is far from guaranteed in the empirical evidence, where the sign is often mixed and in some cases negative (Coibion et al., 2023; Georgarakos et al., 2024). For monetary policy, particularly when expectations are used as a policy tool, the implied consumption response is central.

At its core, the total consumption response depends on what households believe will happen to their real income when inflation rises. A long line of research shows that households' aversion to inflation stems primarily from concerns about diminished purchasing power, as documented extensively in Stantcheva (2024) and earlier in Shiller (1997). Households perceive that nominal wages adjust too slowly to inflation, leading to a persistent decline in their perceived real wages. This mechanism operates not only with realized inflation but also in households' expectations (Jain et al., 2024). Recent empirical evidence confirms this view. Hajdini et al. (2023), Aprigliano and Di Nino (2024), and Granziera et al. (2025) show that when households expect higher inflation, they anticipate only limited passthrough into nominal wages. Put differently, they expect real wages to decline when inflation expectations increase.¹ In line with this evidence, Coibion et al. (2023) demonstrate that this negative real income channel can be an important driver of the negative consumption response to changes in inflation expectations documented in their empirical analyses.

This mechanism is absent in standard New Keynesian (NK) models, where an increase in households' expected inflation leads to an increase in consumption, which is (partially) due to a strong positive response of nominal wage expectations to inflation expectations.² This prediction of complete passthrough to nominal wage expectations stands in stark contrast to the empirical results listed above. This paper shows that once the model incorporates the empirically observed low passthrough from inflation expectations into nominal wage expectations, the standard New Keynesian conclusion is no longer robust.

I build a version of the model in which households form their views about income in nominal terms and in which they expect nominal wage growth to rise less than proportionally when they expect higher inflation. Following the approach of Ascari et al. (2023), I use belief shocks to isolate the causal effect of expected inflation on expected income and on consumption.

¹ This finding is supported by Burke and Ozdagli (2023), Andre et al. (2022), Kamdar and Ray (2025), and D'Acunto et al. (2022), who show that households tend to associate higher inflation expectations with weaker overall economic conditions.

² The positive effect of increasing inflation expectations on current consumption lies behind the whole literature pointing out to virtues of the so-called makeup monetary policy rules like price level targeting (PLT) or average inflation targeting (AIT) in the presence of the lower bound. Once the economy hits the ELB, promising to make up for deviations from the target path should increase inflation expectations compared to the inflation targeting (IT) regime and hence help the economy due to an increase in consumption. The mechanism builds on the intertemporal substitution to consume given that higher inflation expectations decrease ex-ante real interest rate. A parade of articles shows the superiority of the makeup rules in the Representative Agent New Keynesian (RANK) environment (see e.g. Eggertson and Woodford, 2003; Adam and Billi, 2006, 2007; Nakov, 2008; Billi, 2018). Moreover, the mechanism applies also to standard Heterogeneous Agent New Keynesian (HANK) models. The makeup rules in models featuring heterogeneous households framework are studied e.g. in Bilbiie (2024), Amano et al. (2020), Feiveson et al. (2020), Djeutem et al. (2022), Dobrew et al. (2021) or Masek and Zemlicka (2023). However, based on controlled laboratory experiments, Kostyshyna et al. (2025) show that makeup rules may not work as intended in NK models because of a weak expectational channel.

The total consumption effect can be separated into two components. The first is a negative real income effect. The second is the standard positive intertemporal substitution effect. In the representative agent version of the model the negative income effect never dominates. This is because the representative household receives both labor income and profits. When expected real wages fall, expected profits rise one for one, which offsets the expected loss in labor income. As a result, expected total income does not decline enough to overturn the substitution channel.³

The situation changes once profits no longer insure forward looking households against an expected fall in real wages. Using the tractable heterogeneous agent models of Bilbiie (2008) and Bilbiie (2024), or the stylized workers and capitalists framework of Broer et al. (2020), I show that the sign of the consumption response depends entirely on the elasticity of intertemporal substitution (EIS). Under the balanced growth preferences of King et al. (1988), the total effect is zero. For empirically relevant values of the elasticity, which are below one (Havranek, 2015), the effect becomes negative. The standard positive response is obtained only when the EIS parameter is greater than one.

I then compute how large the passthrough from expected inflation to expected nominal wages must be in order to recover the usual positive consumption response. The values needed are far above those observed in the empirical evidence of Hajdini et al. (2023), Aprigliano and Di Nino (2024), Jain et al. (2024), and Granziera et al. (2025).

I also use data from the New York Fed Survey of Consumer Expectations to document that the profits income channel, which sustains the positive consumption response in the representative agent model under low passthrough, is largely irrelevant for how households form their income expectations.⁴

While the real income channel is the primary focus of the analysis, both because it dominates households' perceptions of inflation (Stantcheva, 2024) and because empirical studies highlight its relevance (Hajdini et al., 2023; Coibion et al., 2023; Granziera et al., 2025), I also examine an additional mechanism: the wealth effect arising from changes in expected inflation. To capture this channel, I employ the Perpetual Youth OLG framework of Rachel and Ravn (2025), where the wealth effect can play an important role. The total consumption response can then be decomposed into three components: the real income effect, the intertemporal substitution effect, and the wealth effect. I show that the presence of a negative wealth effect, stemming from higher expected inflation eroding the real purchasing power of nominal assets, can overturn the impossibility of a negative total consumption response found in the standard RANK model, as it introduces yet another force pushing households to reduce consumption.

Overall, I show that once the standard New Keynesian framework is enriched with empirically grounded features, in particular incomplete passthrough from expected inflation to expected nominal wages and the limited relevance of the profits income channel, a substantially dampened positive or even outright negative consumption response to higher households' inflation expectations becomes a realistic outcome. This stands in sharp contrast to the conventional positive effect embedded in many policy applications of New Keynesian models.

The standard New Keynesian model embeds that households understand that higher inflation expectations stimulate economic activity. Motivated by the extensive empirical evidence showing that households' perceptions of inflation and its consequences differ markedly from this view (Jain et al.,

³ This also holds when the utility function includes habit formation, as in medium scale DSGE models inspired by Christiano et al. (2005) and Smets and Wouters (2007).

⁴ Details of this empirical evidence are provided in Appendix K.

2024; Andre et al., 2022; Burke and Ozdagli, 2023; D'Acunto et al., 2022), I show that the stimulative effects of increases in inflation expectations, which the effective lower bound literature relies on (Krugman, 1998; Eggertson and Woodford, 2003; Eggertsson, 2006), do not necessarily follow, especially once the implausible offsetting role of profits in expected total real income is muted (Broer et al., 2020).

This paper underscores the importance of clear communication regarding the mechanisms and channels through which policies are intended to operate. The effects of using inflation expectations as a policy tool can yield unintended outcomes even within an otherwise standard New Keynesian framework that is enriched only with two empirically relevant features: low passthrough from inflation expectations to nominal wage expectations and a muted profits income channel. Clear communication of how desired future inflation is expected to translate into higher nominal wages for households is therefore essential when using inflation expectations as a policy tool (Coibion et al., 2020), because it can increase the passthrough and allow the mechanism to operate as intended within the standard New Keynesian framework.

Related literature. My paper is related to Farhi and Werning (2019) and Pfäuti and Seyrich (2022) in that I relax both the representative agent and rational expectations assumptions within the NK framework. Unlike my work, however, they do not investigate the negative real income channel that arises from changes in inflation expectations.⁵

The empirical research on the effects of inflation expectations on consumption yields substantially more ambiguous conclusions than typically assumed in the New Keynesian framework. While Ito and Kaihatsu (2016), D'Acunto et al. (2018), Duca-Radu et al. (2023), Andrade et al. (2023) and Marenčak (2023)⁶ report results consistent with the conventional narrative, Bachman et al. (2015), Burke and Ozdagli (2023), Kostyshyna and Petersen (2024), and Coibion et al. (2023) find no, negligible, or even negative effects. This latter group of studies often stresses the negative income effect associated with changes in inflation expectations. Importantly, Coibion et al. (2023) employ a Randomized Control Trial (RCT) methodology, unlike the other articles. Relatedly, also using an RCT, Hajdini et al. (2023) show that U.S. consumers propagate expected increases in inflation to their nominal wages only up to 20 percent; that is, they expect real income to fall when inflation expectations rise. Similarly, Aprigliano and Di Nino (2024) compute passthrough to range between 25 and 60 percent across euro area countries. Georgarakos et al. (2024) distinguish between the effects of the first and second moments of inflation expectations, showing the former to be positive

⁵ Ascari et al. (2023) study the effects of shocks to inflation expectations in a medium-scale DSGE model extended with firm heterogeneity and endogenous entry and exit in the intermediate sector. In their setting, the supply side and uncertainty plays a substantial role. The purpose of my article is different: I concentrate exclusively on the consumption response to changes in households' inflation expectations, leaving aside the effects of firms' expectations, entry-exit dynamics, and uncertainty related to it. Hajdini et al. (2023) study the implications of their empirical results about incomplete passthrough in a search and matching model of the Mortensen and Pissarides (1994) type. Their analysis therefore does not focus on the standard NK framework. In addition, they calibrate the model to generate a given level of passthrough from economy-wide inflation expectations and do not explicitly examine how the real income effect shapes the consumption response. In contrast, my analysis isolates a change in households' inflation expectations, without mixing it with expectations of other agents in the model, and places particular emphasis on the role of the negative real income channel for consumption, emphasizing the importance of profits income effect. Potuzak (2018) investigates the interplay between the EIS effect and the income effect stemming from the perceived real future labour income decline. The author uses the Fisher two-period optimal consumption problem; i.e., the representative household receives an endowment income in both periods and does not supply labour.

⁶ The latter two articles emphasize the importance of distinguishing between the extensive and intensive margins. Other contributions also highlight state-dependent features in the consumption response. Candia (2025) discusses the state-dependent nature of the consumption response extensively.

and the latter negative. The negative effects of inflation uncertainty on both inflation expectations and the consumption response are also documented in the experimental evidence of Kostyshyna and Petersen (2024).

My paper differs from these empirical contributions by providing a theoretical framework that explains why the consumption response to inflation expectations may vary in sign. By explicitly incorporating limited passthrough into nominal wages and considering alternative income channels, I show how mechanisms absent from standard NK models can reconcile the empirical evidence with theory.

The paper continues as follows. Section 2 establishes the benchmark by decomposing the consumption response into the real income effect and the intertemporal substitution effect in the standard RANK model. I then incorporate incomplete passthrough and show in Section 3 that the distribution of profits can play an important role in shaping the total consumption response. Section 4 presents several extensions, and Section 6 concludes.

2. Decomposition in the Representative Agent NK Model

This section establishes the benchmark by showing how a standard New Keynesian model with a representative household behaves when inflation expectations shift. It formalizes the decomposition of the consumption response into its two underlying mechanisms: the intertemporal substitution effect and the real income effect. Under the standard assumptions of full passthrough and complete general equilibrium reasoning, the total response is unambiguously positive. This benchmark serves as the reference point against which all subsequent modifications and departures from the representative rational agent setting are evaluated.

2.1 Benchmark RANK Model

I begin by disentangling the consumption response to inflation expectations into the intertemporal elasticity and the real income effect in the standard New Keynesian framework with a representative household. I then examine this decomposition under the empirically supported assumption of low passthrough from inflation expectations to nominal wage expectations.

Model outline. I consider a standard New Keynesian model, which structure closely follows Galí (2015) and Woodford (2003). A representative household maximizes utility over an infinite horizon, with preferences given by $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t U(C_t, N_t)$, where $U(C_t, N_t) = \frac{C_t^{1-\sigma} - 1}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi}$. The notation is standard: C_t denotes consumption, N_t labor supply, and the parameters σ , φ , and β represent the inverse of the elasticity of intertemporal substitution, the inverse Frisch elasticity of labor supply, and the discount factor, respectively. The household faces a flow budget constraint: $C_t + B_t = \frac{(1+i_{t-1})}{1+\pi_t} B_{t-1} + W_t N_t + D_t$, where W_t is the real wage, D_t denotes dividends or profits from firm ownership, $1 + \pi_t = \frac{P_t}{P_{t-1}}$ is the gross inflation rate with P_t denoting the price level, and B_t are bond holdings. Households receive the real return on their bond holdings where i_t is the nominal interest rate.

On the supply side, the economy features a Dixit-Stiglitz continuum of firms subject to Rotemberg price adjustment costs. Since the focus of the analysis is on the demand-side response to changes in inflation expectations, a detailed description of the supply block is relegated to the Appendix.

Monetary policy follows a standard Taylor-type rule (Taylor, 1993), in which the central bank responds solely to inflation π_t . I abstract from the output gap term, which does not affect the qualitative results, in order to streamline the exposition.⁷ The policy rule, in levels, is given by:

$$i_t = \left(\frac{1}{\beta} - 1\right) + \phi\pi_t.$$

News shock to inflation expectations. Studying the effects of households' inflation expectations on expected real income and consumption is non-trivial, since expectations are an endogenous equilibrium object. Their co-movement with real activity depends on the nature of the underlying disturbance (e.g., demand versus supply shocks), which does not isolate the causal channel of interest here. The question I address is whether the empirically documented low pass-through from inflation expectations to nominal wage expectations (Hajdini et al., 2023; Aprigliano and Di Nino, 2024; Jain et al., 2024; Granziera et al., 2025) can also arise within the New Keynesian framework, and how this alters the consumption response.

To construct an analogous experiment to these empirical studies, I introduce a news (belief) shock that moves households' inflation expectations orthogonally to fundamentals. Conceptually, this follows Ascari et al. (2023), who study shocks to inflation expectations, although their focus is more on firm dynamics and they adopt a different specification, whereas I concentrate on the household side and, in particular, the real income channel.⁸ I assume that households observe a signal about next-period inflation equal to the rational-expectations (RE) forecast plus an orthogonal innovation:

$$\mathbb{E}_t \pi_{t+1} = \pi_{t+1}^e + \varepsilon_{t+1}^\pi, \quad (1)$$

where π_{t+1}^e denotes inflation expectations under RE. I normalize the shock such that one standard deviation corresponds to a one percentage-point increase in expected inflation at time t about $t + 1$, and the exogenous disturbance is orthogonal to fundamentals (\mathcal{F}_t):

$$\mathbb{E}[\varepsilon_{t+1}^\pi | \mathcal{F}_t] = 0, \quad \text{Var}(\varepsilon_{t+1}^\pi) = 1, \quad \varepsilon_{t+1}^\pi \perp\!\!\!\perp \mathcal{F}_t.$$

As it turns out to be useful across the text, using the identity $\mathbb{E}_t \pi_{t+1} \equiv \mathbb{E}_t p_{t+1} - p_t$, this is equivalently:

$$\mathbb{E}_t p_{t+1} - p_t = p_{t+1}^e + \varepsilon_{t+1}^\pi - p_t \quad (2)$$

Now the effect of a belief shock to inflation expectations on expected real income, and thus on consumption, can be neatly identified within the model. In what follows, for any variable x_t , if I write $\frac{\partial x_t}{\partial \mathbb{E}_t \pi_{t+1}}$, the following relationship holds:

$$\frac{\partial x_t}{\partial \varepsilon_{t+1}^\pi} = \frac{\partial x_t}{\partial \mathbb{E}_t \pi_{t+1}} \frac{\partial \mathbb{E}_t \pi_{t+1}}{\partial \varepsilon_{t+1}^\pi} = \frac{\partial x_t}{\partial \mathbb{E}_t \pi_{t+1}}, \quad (3)$$

⁷ Including the output gap in the Taylor rule would not alter the qualitative conclusions. Therefore, it is omitted for simplicity.

⁸ Introducing a belief shock can be motivated by the noisy-information tradition (e.g., Lorenzoni, 2009; Angeletos and La'O, 2013). In that framework, agents receive a signal about future inflation that equals the RE forecast plus a noise component. The projection theorem implies that the innovation in this signal is orthogonal to fundamentals, and normalizing the signal's gain factor to one makes a one-unit belief shock correspond exactly to a one-unit shift in expected inflation. This orthogonality-based formulation has become standard in the literature studying news and belief shocks.

although I avoid writing it in this explicit form each time.⁹ This belief-shock specification is applied consistently throughout the analysis, including beyond the RANK framework.

Household sector equilibrium conditions. Dynamic optimization yields the standard equilibrium conditions for the household sector, log-linearized around a non-stochastic steady state. The consumption Euler equation takes the familiar form:

$$c_t = \mathbb{E}_t c_{t+1} - \frac{1}{\sigma} (i_t - \mathbb{E}_t \pi_{t+1} - \rho), \quad (4)$$

where \mathbb{E}_t denotes the rational expectations operator if used for any other variable than inflation or price level, for which we explicitly allow for a belief shock as specified above, and ρ is the subjective discount rate. The intratemporal optimality condition equates the real wage to the marginal rate of substitution between consumption and leisure:

$$w_t = w_t^n - p_t = \varphi n_t + \sigma c_t, \quad (5)$$

where w_t^n is the nominal wage.

Assuming zero net supply of bonds, the log-linearized aggregate resource constraint, derived from the household budget constraint, takes the form $c_t = w_t + n_t + d_t$.¹⁰ Imposing an optimal subsidy to eliminate monopolistic distortions implies marginal cost pricing, leading to $d_t = -w_t$.¹¹ Substituting this expression yields the familiar result: $c_t = n_t$.

Decomposition of the total effect. Substituting $c_t = n_t$ into the labor supply condition and expressing it one period ahead yields:

$$\mathbb{E}_t c_{t+1} = \frac{\mathbb{E}_t w_{t+1}}{\sigma + \varphi} = \frac{\mathbb{E}_t w_{t+1}^n - \mathbb{E}_t p_{t+1}}{\sigma + \varphi} \quad (6)$$

Using the definition of inflation, the Euler equation can then be rewritten as:¹²

$$c_t = \frac{\mathbb{E}_t w_{t+1}^n - \mathbb{E}_t p_{t+1}}{\sigma + \varphi} - \frac{i_t - \rho + p_t}{\sigma} + \frac{\mathbb{E}_t p_{t+1}}{\sigma} \quad (7)$$

In what follows, I remain agnostic about the precise functional form of $\mathbb{E}_t w_{t+1}^n$, but assume that it depends on the expected price level; that is, $\mathbb{E}_t w_{t+1}^n = f(\mathbb{E}_t p_{t+1})$.¹³ Hence, one can write the

⁹ Equivalently, one may write: $\frac{\partial x_t}{\partial \varepsilon_{t+1|t}^p} = \frac{\partial x_t}{\partial \mathbb{E}_t p_{t+1}} \frac{\partial \mathbb{E}_t p_{t+1}}{\partial \varepsilon_{t+1|t}^p} = \frac{\partial x_t}{\partial \mathbb{E}_t p_{t+1}}$.

¹⁰ Profits are defined as $d_t = \frac{D_t - D}{C}$, so that I can work with zero steady state share of profits due to the optimal subsidy.

¹¹ See the Appendix for derivation.

¹² Note that I could obtain the Euler equation to be explicitly written depending on the future income flow by starting from primitives and not imposing any assumption on the expectations formation, in line with Preston (2005) and Angeletos and Huo (2021).

¹³ The model is closed with the New Keynesian Phillips Curve in the subsequent paragraphs. For now, I aim to present a general decomposition of the total effect. However, the PC is already taken into account in the monetary policy scaling factor in equation 8. Following Bilbiie (2024), I consider the static version of the NK PC, as I elaborate in the following paragraphs below.

decomposition of the total consumption response to changes in inflation expectations into: (i) the real income channel and (ii) the intertemporal substitution channel. We have:¹⁴

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left\{ \underbrace{\frac{\partial c_t}{\partial \mathbb{E}_t w_{t+1}^n} \frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}} - \frac{1}{\sigma + \varphi}}_{\text{real income effect}} + \overbrace{\frac{1}{\sigma}}^{\text{EIS}} \right\} \quad (8)$$

where $\Theta = \frac{\sigma}{\sigma + \phi_\pi \lambda (\sigma + \varphi)}$ is a monetary policy scaling factor capturing the strength of the monetary policy response to the total consumption reaction.

It is straightforward to see that $\frac{\partial c_t}{\partial \mathbb{E}_t w_{t+1}^n} = \frac{1}{\sigma + \varphi}$. The key question is then how expected nominal wages respond to expected future prices, i.e., what is the value of $\frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}}$. To recover the benchmark partial equilibrium result, one must assume that households expect their nominal income to adjust one-for-one with expected prices. In other words: $\frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}} = 1$. Under this assumption and constant policy rate ($\Theta = 1$), the consumption response to inflation expectations simplifies to the familiar expression: $\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \frac{1}{\sigma}$.¹⁵

Sticky prices NK model. In the standard New Keynesian framework, general equilibrium effects substantially amplify the consumption response to changes in inflation expectations. This is equivalent to higher than one-to-one propagation from inflation expectations to expectations of nominal wages growth.

To show this, I close the model with the usual New Keynesian Phillips Curve (NKPC), $\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \lambda w_t$, and follow Bilbiie (2024) by considering a setting in which monopolistic firms face Rotemberg price adjustment costs relative to the past average price level rather than to their own prices. That is, firms do not internalize the impact of today's pricing decisions on future profits. This simplification leads to a static Phillips curve, $\pi_t = \lambda w_t$. This assumption does not alter the qualitative results but significantly simplifies the algebra.¹⁶

Substituting the Taylor rule into the Euler equation, using the static Phillips curve, and applying the labor supply condition yields:

$$c_t = \frac{\mathbb{E}_t \pi_{t+1}}{\lambda (\sigma + \varphi)} - \frac{\phi_\pi \lambda (\sigma + \varphi)}{\sigma} c_t + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma} \quad (9)$$

¹⁴ I normalize $p_t = 0$ for expositional clarity in the decomposition. This entails no qualitative loss of generality: in the standard benchmark New Keynesian model only relative prices (i.e. inflation) are determinate, so the absolute price level can be normalized without affecting real allocations. Even in my decomposition, p_t component merely affects the scaling factor, which becomes $\Theta = \frac{\sigma}{\sigma + (1 + \phi_\pi) \lambda (\sigma + \varphi)}$, without altering the qualitative results.

¹⁵ Note that I abstract from any wealth effects arising from changes in the real interest rate on bonds, which would be present in the case of a positive net bond supply. Such effects could, in principle, even reverse the sign of the consumption response to inflation expectations. However, to isolate the real income and substitution channels, I first assume zero net bond supply. Thus, if we keep expected consumption fixed, the Euler equation gives both the consumption path and the consumption response. I discuss the wealth effect later in the text in Section 4.

¹⁶ My analysis focuses on households' inflation expectations and thus on the demand-side effects of changes in inflation expectations. I do not examine firms' inflation expectations. I show that adopting a static Phillips Curve does not alter the results qualitatively by having the forward-looking specification presented in Appendix D.

which implies that consumption can be expressed as a function of expected inflation:

$$c_t = \frac{\sigma}{\sigma + \phi\pi\lambda(\sigma + \varphi)} \left[\frac{1}{\lambda(\sigma + \varphi)} + \frac{1}{\sigma} \right] \mathbb{E}_t \pi_{t+1} = \Theta \cdot \frac{\sigma + \lambda(\sigma + \varphi)}{\sigma\lambda(\sigma + \varphi)} \mathbb{E}_t \pi_{t+1} \quad (10)$$

where $\Theta = \frac{\sigma}{\sigma + \phi\pi\lambda(\sigma + \varphi)}$ is again the monetary policy scaling factor.

Hence, the total effect of a change in expected inflation on current consumption can be decomposed as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \underbrace{\frac{\Theta}{(\sigma + \varphi)\lambda}}_{\text{real income effect}} + \underbrace{\frac{\Theta}{\sigma}}_{\text{EIS}} = \Theta \cdot \underbrace{\frac{\sigma + \lambda(\sigma + \varphi)}{\sigma\lambda(\sigma + \varphi)}}_{\text{total effect}} \quad (11)$$

It is clear that the total consumption response is positive, reflecting both the real income effect and the EIS channel. Monetary policy can partially offset this response when it is active. Since Θ is merely a scaling parameter and has no substantial qualitative consequences, I focus on the case of the effective lower bound (ELB). To capture this environment, I impose an interest rate peg ($\phi\pi = 0$), which yields:¹⁷

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \underbrace{\frac{1}{(\sigma + \varphi)\lambda}}_{\text{real income effect}} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} \quad (12)$$

Equations (11) and (12) show that general equilibrium effects magnify the positive partial equilibrium response of consumption. Returning to the core mechanism behind the real income channel, the transmission from expected inflation to expected nominal wages is more than one-to-one, i.e., $\frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}} > 1$. This stands in contrast to the empirical findings of Hajdini et al. (2023) and Aprigliano and Di Nino (2024). In the model, households anticipate stronger aggregate demand and therefore expect nominal wages to rise more than proportionally, which reinforces the consumption response. Hence, raising inflation expectations constitutes a powerful policy instrument in ELB scenarios within New Keynesian models.

Sticky wages NK model. While the reasoning above was based on a model with sticky prices and flexible wages, it is straightforward to show that an isomorphic result holds if the nominal rigidity is instead in wages.¹⁸

Assuming flexible prices and sticky wages, and focusing again on the static wage Phillips curve, we obtain:

$$\pi_t^w = \pi_t = \lambda_w(\sigma + \varphi)c_t,$$

¹⁷ The interest rate peg can be interpreted as capturing an effective lower bound (ELB) environment, in which the central bank seeks to stimulate demand by raising inflation expectations and deliberately refrains from offsetting their effects. For instance, this may correspond to an announced shift in the monetary policy regime toward price-level targeting, whereby the central bank commits to overshooting inflation to compensate for previous undershooting. Alternatively, it may represent the announcement of forward guidance, quantitative easing, or other tools that are pledged to remain in place until the price level reaches a desired target. This logic is consistent with the policy frameworks discussed in Eggertsson (2006) and Krugman (1998).

¹⁸ I assume the standard labor packer framework, with labor fully demand-determined. Consequently, the labor supply condition (5) is replaced by the wage Phillips curve. See Galí (2015) for a detailed derivation.

where $w_t = w_t^n - p_t = 0$ and $\pi_t^w = \pi_t$ by consistency.

The resulting total consumption response to expected inflation is then:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \underbrace{\frac{\Theta_w}{(\sigma + \varphi)\lambda_w}}_{\text{real income effect}} + \underbrace{\frac{\Theta_w}{\sigma}}_{\text{EIS}}, \quad (13)$$

which mirrors equation (11).¹⁹ The difference between (13) and (11) is purely quantitative and stems from differences in the slopes of the respective Phillips curves.²⁰

This result is consistent with the equivalence result of Bilbiie and Trabandt (2025), which shows that for any demand-driven shock, such as a shift in households' inflation expectations (i.e., a decline in the real interest rate), the qualitative structure of the consumption response remains the same, irrespective of whether nominal rigidities are in prices or in wages.

2.2 Incomplete Passthrough in the RANK Model

This subsection introduces empirically motivated frictions into households' expectations by dampening their perception of general equilibrium effects, modeled through cognitive discounting of Gabaix (2020). It explores how incomplete passthrough from inflation expectations to nominal wage expectations alters the standard result. The analysis highlights the central role of profits. In a representative agent world, any expected decline in real wages is offset by higher expected profits, preventing the total consumption response from turning negative. The discussion builds the intuition that dampening this profits income channel is key to reconciling theoretical predictions with the empirical evidence.

Dampening expected GE effects. To highlight the implications of the empirical findings in Hajdini et al. (2023), Aprigliano and Di Nino (2024), Jain et al. (2024), and Granziera et al. (2025) regarding the limited passthrough from inflation expectations to nominal wage expectations for the behavior of a standard New Keynesian model, I impose two assumptions.

First, I dampen general equilibrium (GE) reasoning in the formation of nominal wage expectations by assuming that households struggle to comprehend the impact of higher aggregate demand, induced by rising inflation expectations, on labor market conditions and hence on a stronger labor demand. Second, I assume that households do not associate changes in inflation expectations with corresponding changes in their nominal wage expectations.

These two aspects, however, may be viewed as a joint problem. The degree of propagation from inflation expectations to expected nominal wages is inherently linked to the strength of GE forces. If GE effects are sufficiently strong, the passthrough is not only complete but may even display a higher than unit value. Conversely, an incomplete passthrough can be interpreted as reflecting a dampened expectations of GE effects on nominal wages. When expected GE effects are sufficiently attenuated, the implied propagation may fall below one.

¹⁹ Note that $\Theta_w = \frac{\sigma}{\sigma + \varphi \pi \lambda_w (\sigma + \varphi)}$ is defined analogously to Θ .

²⁰ Note that the sticky wages NK model tends to imply an even stronger general equilibrium effect, as it is standard in the literature to assume $\lambda_w < \lambda$; see, e.g., Christiano et al. (2005) and Smets and Wouters (2007). This is because, holding expected inflation constant, more pronounced nominal rigidities necessitate a stronger increase in expected labour demand.

To outline this, I again consider the sticky prices NK model from above. However, now I disentangle the role of GE effects on nominal income expectations. Equation (11) can be rearranged as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left(\underbrace{\frac{\partial c_t}{\partial w_{t+1}^n} \frac{\partial w_{t+1}^n}{\partial p_{t+1}} - \frac{1}{\sigma + \varphi}}_{\text{real income effect}} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} \right) = \Theta \left\{ \underbrace{\frac{1}{\sigma + \varphi} \left(\overbrace{\frac{1 + \lambda}{\lambda}}^{\text{GE effects}} \right)}_{\text{real income effect}} - \frac{1}{\sigma + \varphi} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} \right\} \quad (14)$$

Hence, it is clear that the total consumption response is positive, driven by both the real income effect and the EIS channel, for any empirically plausible calibration within the standard New Keynesian framework, as discussed in the preceding paragraphs.

To simulate the scenario of incomplete propagation, I focus on a minor deviation from the previous framework. As discussed above, obtaining less-than-unit propagation is equivalent to discounting the expected general equilibrium effects on nominal wage expectations. I assume that households are myopic in line with the cognitive discounting framework of Gabaix (2020), where myopia is applied specifically to nominal wage expectations. This assumption automatically dampens the expected GE effects on nominal wages.²¹ Denoting $\bar{m} \in (0, 1]$ as the cognitive discounting parameter, equation 14 can be rewritten as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left\{ \underbrace{\frac{\bar{m}}{\sigma + \varphi} \left(\overbrace{\frac{1 + \lambda}{\lambda}}^{\text{GE effects}} \right)}_{\text{real income effect}} - \frac{1}{\sigma + \varphi} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} \right\} \quad (15)$$

To make the following point as sharp as possible, I purposefully assume that households are not able to consider the expected GE effects at all.²² Thus, I set $\bar{m} = 0$, which means that they do not expect any change in their nominal salaries as the consequence of the inflation expectations change (i.e., $\mathbb{E}_t^{\bar{m}} w_{t+1}^n = 0$).²³ This transforms equation (15) into:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left(-\frac{1}{\sigma + \varphi} + \frac{1}{\sigma} \right) \quad (16)$$

One can see that equation (16) clearly states that the total consumption response cannot be negative. As Proposition 1 says:

²¹ Households perfectly understand some given default state of the world (assumed here to be the steady state), but they cognitively discount deviations from this default value. A detailed description of cognitive discounting is provided in the Appendix. Note that I use the cognitive discounting parameter in the sense that Gabaix (2020) refers to as the "intercept of attention", rather than the more commonly used "slope of attention". See Gabaix (2020) for a clear distinction between these concepts.

²² An alternative way to generate incomplete passthrough of this kind is to use an NK model with both sticky prices and sticky wages, where wages are perfectly rigid; i.e., the wage Phillips Curve is flat. I adopt the interpretation based on cognitive discounting of general equilibrium effects on nominal wage expectations, since a completely flat wage Phillips Curve represents an extreme assumption, whereas the myopia framework allows for varying degrees of passthrough through different values of \bar{m} . By contrast, any positive slope of the wage Phillips Curve would no longer produce the same qualitative outcome. The flat-wage-PC version of the NK model is derived in Appendix F.

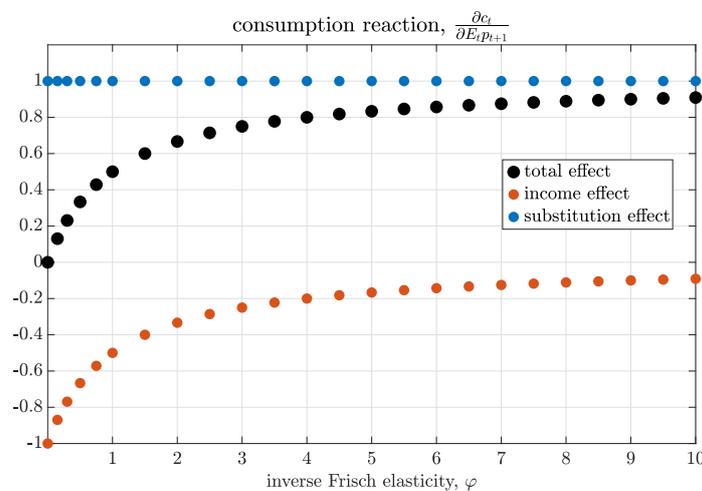
²³ I denote $\mathbb{E}_t^{\bar{m}} = \bar{m} \mathbb{E}_t$ the myopic expectations operator.

Proposition 1. *The negative real income channel can never overturn the positive intertemporal elasticity substitution for any plausible parameterization. We can write:*

$$-\frac{1}{\sigma + \varphi} + \frac{1}{\sigma} > 0 \quad \forall \varphi > 0, \quad \sigma > 0$$

The key role of profits. I plot the total consumption response and its decomposition into the income effect and the intertemporal substitution effect under the assumption that $\mathbb{E}_t^m w_{t+1}^n = 0$, which follows from setting $\bar{m} = 0$, in Figure 1. I fix $\sigma = 1$ and allow φ to vary. I simplify the exposition by assuming the ELB case; i.e. $\Theta = 1$.²⁴

Figure 1: Total Consumption Response and Its Decomposition



Note: The total consumption response and decomposition into the intertemporal substitution effect and the income effect as a function of the Frisch elasticity parameter φ . The risk aversion parameter σ is kept at unity. I assume $\mathbb{E}_t^m w_{t+1}^n = 0$ due to $\bar{m} = 0$.

The first key takeaway, already emphasized in Proposition 1, is that the consumption response in the RANK framework never turns negative. The lowest possible value approaches zero only in the limit as the Frisch elasticity tends to infinity.²⁵

The reason is that labor income and dividends accrue to the same representative household. Thus, when the household expects its real wage to fall due to higher expected inflation, it simultaneously anticipates an increase in dividend income, which offsets the negative effect on labor earnings.

One can relate expected consumption to expected dividends by utilizing the profits equation $d_t = c_t - \frac{w_t + n_t}{\mathcal{M}}$, where \mathcal{M} denotes the gross post-subsidy markup. Here, d_t is defined as the deviation of profits from their steady state, expressed relative to the steady state level of output/consumption.²⁶

²⁴ Assume again the scenario in which the central bank seeks to use inflation expectations as a policy tool. Note also that Θ is merely a scaling factor and thus has no qualitative impact.

²⁵ Bear in mind that realistic values of the inverse Frisch elasticity, $1/\varphi$, are below 1, as shown in Chetty (2012), Chetty et al. (2013), Whalen and Reichling (2017), and more recently in Elminejad et al. (2024). For empirically plausible values of labor supply elasticity, the total effect of higher expected inflation on current consumption remains comfortably above zero. Extremely low values of φ , which would imply a near-zero consumption response in Figure 1, are not empirically relevant.

²⁶ As noted earlier, this normalization accommodates the fact that the steady-state profit share is zero due to the optimal subsidy. That is, $d_t = \frac{D_t - D}{C} = (1 - \frac{1}{\mathcal{M}}) \frac{D_t - D}{D} = \frac{D}{C} \cdot \frac{D_t - D}{D}$.

By combining this profits equation with the labor supply condition and the resource constraint, all expressed at time $t + 1$, we obtain:

$$\mathbb{E}_t c_{t+1} = \frac{1 + \varphi}{\sigma + \mathcal{M}\varphi} \mathbb{E}_t w_{t+1} + \frac{\mathcal{M}\varphi}{\sigma + \mathcal{M}\varphi} \mathbb{E}_t d_{t+1}, \quad (17)$$

or to simplify for the case of the optimal subsidy and King et al. (1988) preferences:

$$\mathbb{E}_t c_{t+1} = w_{t+1} + \frac{\varphi}{1 + \varphi} \mathbb{E}_t d_{t+1} \quad (18)$$

We observe that restricting households from adjusting their nominal wage expectations reduces the magnitude of the positive relationship between a higher expected inflation and current consumption. The difference compared to the benchmark case above is primarily driven by the Frisch elasticity parameter. Interestingly, a lower Frisch elasticity leads to a stronger consumption response to changes in the expected inflation.²⁷

The labour supply response. The importance of profits for expected consumption depends on the Frisch elasticity. When the elasticity is high (i.e., φ is low), households strongly reduce their expected future labour supply in response to the expected decline in the real wage. This reduction in expected labour supply depresses expected consumption more significantly when the Frisch elasticity is higher; in other words, the contribution of profits to expected consumption is dampened by the labour income channel.

However, even in this case, the decline in expected consumption, which is driven by falling labour income, is never strong enough to overturn the positive intertemporal substitution effect. As a result, the total consumption response remains positive.

Conversely, when φ is high (i.e., the Frisch elasticity is low), households respond less to the expected fall in real wages by adjusting their expected labour supply. The resulting decline in expected labour income is therefore weaker, making the relative contribution of expected profits to expected consumption larger in the overall decomposition.

The labour supply profits income channel. The mechanism described in the previous paragraph also holds when $\sigma = 1$. In this case, even though the substitution and income effects on labour supply offset each other, expected consumption still declines more for lower values of φ . This adjustment operates through the labour supply profits income channel, as described in Broer et al. (2020). When the expected real wage falls, implying an increase in expected dividends, the household chooses to reduce future labour supply due to the income effect arising from higher anticipated profits.²⁸

²⁷ Formally, we can write:

$$\frac{\partial \left(\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} \right)}{\partial \varphi} = \frac{1}{(\sigma + \varphi)^2} > 0 \quad (19)$$

²⁸ Broer et al. (2020) highlight the implausibility of the transmission mechanism of monetary policy shocks in the standard textbook RANK model, which relies on labour supply responses driven by wealth and income effects in the presence of profits. In my setting, changes in expected labour supply are similarly shaped by changes in expected profit income.

The role of profits in shaping labour supply can be illustrated by revisiting the profits and labour supply equations. By combining these two, we obtain:

$$n_t = \frac{\mathcal{M} - \sigma}{\sigma + \mathcal{M}\varphi} w_t - \frac{\mathcal{M}\sigma}{\sigma + \mathcal{M}\varphi} d_t \quad (20)$$

I focus on the case with an optimal subsidy that ensures marginal cost pricing.²⁹ To isolate the effect of profits, I adopt the balanced-growth path consistent preferences of King et al. (1988).³⁰ Under these assumptions, the combination of the optimal subsidy and balanced-growth preferences simplifies equation (20) to:

$$n_t = -\frac{d_t}{1 + \varphi} \quad (21)$$

Given that, under King et al. (1988) preferences, the substitution and income effects of a real wage change exactly offset each other, labour supply is influenced solely by changes in profits.³¹

As mentioned, my results relate closely to Broer et al. (2020), who emphasize the central role of profits in the transmission mechanism of monetary policy shocks in the textbook New Keynesian model with sticky prices and flexible wages. Under King et al. (1988) preferences, it is the income effect from rising profits, following a policy rate hike, that induces a reduction in labour supply, thereby driving the decline in employment and output.

I show that a similar mechanism also determines the magnitude of the total consumption response to an increase in expected inflation when households do not translate higher price level expectations into equivalent increases in their expected nominal wages. In this setting, the presence and dynamics of profit income play a decisive role in shaping the consumption response. However, using data from the Federal Reserve Bank of New York, I show that exposure to profits income does not influence the passthrough from inflation expectations to nominal income for US households. The results are discussed in Appendix K.

3. Heterogeneity

The analysis now turns to frameworks with heterogeneous households. By distinguishing between households that receive profits and those that rely primarily on labor income, the model introduces

²⁹ Imposing the optimal subsidy has no qualitative consequences but simplifies the algebra.

³⁰ It is not necessary to assume King et al. (1988) preferences to demonstrate the central role of profits. Equation (20) reduces to $n_t = \frac{w_t}{\sigma + \varphi}$ if we use $d_t = -w_t$, which follows from the optimal subsidy. Put differently, the income effect on labour supply arising from changes in the real wage is offset by the profit income channel, regardless of the value of σ . The presence of profits implies that the substitution effect dominates.

³¹ Evaluating equation (21) at $t + 1$ and using $d_t = -w_t$, which follows from the optimal subsidy, yields:

$$\mathbb{E}_t n_{t+1} = \frac{\mathbb{E}_t w_{t+1}'' - \mathbb{E}_t p_{t+1}}{1 + \varphi} \quad (22)$$

If I again assume $\frac{\partial \mathbb{E}_t w_{t+1}''}{\partial \mathbb{E}_t p_{t+1}} = 0$, we obtain $\frac{\partial \mathbb{E}_t n_{t+1}}{\partial \mathbb{E}_t p_{t+1}} = -\frac{1}{1 + \varphi}$, which corresponds to the first component of the expression for $\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}}$ in equation (16), under the assumption of King et al. (1988) preferences.

a more realistic income composition while keeping preferences unchanged. The goal is to demonstrate that such heterogeneity in income sources can by itself overturn the always positive consumption response of the representative agent model once the passthrough from inflation to nominal wages is incomplete.

3.1 Standard TANK and (T)HANK Models

The mechanism described above has been demonstrated within the representative agent (RANK) framework. However, given the central role of profits in shaping the consumption response, the results may change in models that incorporate agent heterogeneity, such as the Two-Agent New Keynesian (TANK) and the Tractable Heterogeneous Agents New Keynesian (THANK) models (see, e.g., Bilbiie, 2008; Bilbiie, 2024).³² In the following analysis, I show that in the heterogeneous agent setup of Bilbiie (2008) and Bilbiie (2024), it is the distribution of profits between constrained and unconstrained households that determines the direction of the consumption response to changes in inflation expectations when the passthrough to nominal wages is incomplete.

Model outline. There is a unit mass of households (indexed by j) who live over an infinite horizon and maximize the same utility function as in the RANK model: $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t U(C_{jt}, N_{jt})$, where $U(C_{jt}, N_{jt}) = \frac{C_{jt}^{1-\sigma} - 1}{1-\sigma} - \frac{N_{jt}^{1+\varphi}}{1+\varphi}$. Unlike in the representative agent setup, households participate in financial markets only infrequently. Specifically, they are subject to an idiosyncratic shock to their type, and we consider two types: unconstrained (U), who optimize intertemporally via an Euler equation, and constrained or hand-to-mouth (H), who consume all their current income.

The idiosyncratic shock follows a two-state Markov process, with the probability of remaining unconstrained equal to u , and the probability of remaining constrained equal to h . Transition probabilities to the other type are then $1-u$ and $1-h$, respectively. The model is log-linearized around the ergodic distribution, with $\lambda^H = \frac{1-u}{2-u-h}$ denoting the steady-state share of constrained (hand-to-mouth) households; thus, we work with a stationary equilibrium.

Unconstrained households receive dividends d from firm ownership, and a redistribution scheme can be introduced depending on the parameter τ^d . The standard TANK model of Bilbiie (2008) arises as a special case of this framework with $u = h = 1$, in which case λ^H becomes a free parameter. The supply side of the economy and the conduct of monetary policy remain identical to the RANK model.

Household sector equilibrium conditions. Following the islands framework of Bilbiie (2024), and denoting by c_t^U and n_t^U the consumption and labor supply of unconstrained households, and by c_t^H the consumption of hand-to-mouth households, the log-linearized equilibrium conditions for the unconstrained households are given by:³³

$$c_t^U = u\mathbb{E}_t c_{t+1}^U + (1-u)\mathbb{E}_t c_{t+1}^H - \frac{1}{\sigma}(i_t - \mathbb{E}_t \pi_{t+1} - \rho), \quad (23)$$

$$w_t = \varphi n_t^U + \sigma c_t^U \quad (24)$$

³² Since the THANK framework of Bilbiie (2024) offers a closed-form solution for HANK models with a non-degenerate distribution of households, the conclusions extend to this class of HANK models as well.

³³ See Bilbiie (2024) for detailed derivations.

The market clearing condition for the unconstrained households is given by:

$$c_t^U = n_t^U + w_t + \frac{1 - \tau^d}{1 - \lambda^H} d_t \quad (25)$$

The crucial parameter governing redistribution of profits is denoted as τ^d . It determines the share of firm profits transferred from unconstrained to constrained households. For constrained households (type H), consumption is entirely determined by current income due to their inability to smooth consumption intertemporally. Their equilibrium conditions are:

$$w_t = \varphi n_t^H + \sigma c_t^H \quad (26)$$

$$c_t^H = n_t^H + w_t + \frac{\tau^d}{\lambda^H} d_t \quad (27)$$

The second equation reflects hand-to-mouth behavior, whereby consumption equals disposable income, which includes labor income and redistributed profits. The former equation is the labor supply condition, which follows directly from utility maximization under the assumption that constrained households do not optimize intertemporally but still choose labor supply optimally each period.

By substituting the same market clearing condition as in the RANK case into the labour supply condition one period ahead, it is possible to write expected consumption of unconstrained households as follows:

$$\mathbb{E}_t c_{t+1}^U = \left\{ u \left[\frac{(1 + \varphi)(1 - \lambda^H) - \varphi(1 - \tau^d)}{(\sigma + \varphi)(1 - \lambda^H)} \right] + (1 - u) \left[\frac{(1 + \varphi)\lambda^H - \varphi\tau^d}{(\sigma + \varphi)\lambda^H} \right] \right\} \mathbb{E}_t w_{t+1}, \quad (28)$$

and hence the consumption Euler equation of unconstrained households can be written as:

$$c_t^U = \left\{ u \left[\frac{(1 + \varphi)(1 - \lambda^H) - \varphi(1 - \tau^d)}{(\sigma + \varphi)(1 - \lambda^H)} \right] + (1 - u) \left[\frac{(1 + \varphi)\lambda^H - \varphi\tau^d}{(\sigma + \varphi)\lambda^H} \right] \right\} \mathbb{E}_t (w_{t+1}^n - p_{t+1}) - \frac{(i_t - \mathbb{E}_t \pi_{t+1})}{\sigma} \quad (29)$$

After substituting the same Taylor rule as used in the RANK case, we obtain:

$$c_t^U = \Theta \left[\Psi \mathbb{E}_t (w_{t+1}^n - p_{t+1}) + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma} \right], \quad (30)$$

where $\Psi = u \left[\frac{(1 + \varphi)(1 - \lambda^H) - \varphi(1 - \tau^d)}{(\sigma + \varphi)(1 - \lambda^H)} \right] + (1 - u) \left[\frac{(1 + \varphi)\lambda^H - \varphi\tau^d}{(\sigma + \varphi)\lambda^H} \right]$ and Θ is the monetary policy scaling factor as defined before. After normalizing $p_t = 0$, the resulting consumption response to a change in expected inflation is:

$$\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} = \underbrace{\Theta \Psi \left(\frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}} - 1 \right)}_{\text{real income effect}} + \underbrace{\frac{\Theta}{\sigma}}_{\text{EIS}} \quad (31)$$

Further, I follow the same derivation steps as in the RANK case. I assume $\frac{\partial \mathbb{E}_t w_{t+1}^n}{\partial \mathbb{E}_t p_{t+1}^n} = 0$ due to $\bar{m} = 0$, which yields the following consumption response:

$$\frac{\partial c_t^U}{\partial \mathbb{E}_t \mathbb{E}_t p_{t+1}} = \Theta \left(-\Psi + \frac{1}{\sigma} \right) \quad (32)$$

The goal is to show how the direction of the consumption response depends on the redistribution of profits. I assume $u = 1$, which reduces the model to the TANK setup of Bilbiie (2008) for a cleaner exposition.³⁴ Under this assumption, we can write the expected consumption of unconstrained households as:

$$\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left\{ \underbrace{\left[-\frac{(1+\varphi)(1-\lambda^H) - \varphi(1-\tau^d)}{(\sigma+\varphi)(1-\lambda^H)} \right]}_{\text{real income effect}} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} \right\} \quad (33)$$

The dependence of the results on the redistribution parameter τ^d appears inside of the income effect. Note that if utilizing King et al. (1988) preferences and assuming zero redistribution from unconstrained households - firms' owners - towards constrained household ($\tau^d = 0$), the RANK result is just scaled up:

$$\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} = \Theta \underbrace{\frac{\varphi}{1+\varphi}}_{\text{RANK}} \frac{1}{1-\lambda^H}, \quad (34)$$

Otherwise, it is not difficult to show that $\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} > 0$ as long as the following condition holds:

$$\frac{(1-\tau^d)}{(1-\lambda^H)} > 1 - \frac{1}{\sigma} \quad (35)$$

Put differently, the redistribution scheme must not be too strong relative to the fraction of unconstrained households, given the chosen value of the intertemporal elasticity of substitution (or, equivalently, the income effect on labor supply). Under King et al. (1988) preferences, the consumption response remains positive unless profits are fully redistributed ($\tau^d = 1$). As long as at least some portion of profits accrues to unconstrained households, their consumption increases.

When we assume $\sigma \neq 1$, we can derive the following threshold value of τ^d , below which the consumption response remains positive:

$$\tau_d < \frac{1 - \lambda^H(1 - \sigma)}{\sigma} \quad (36)$$

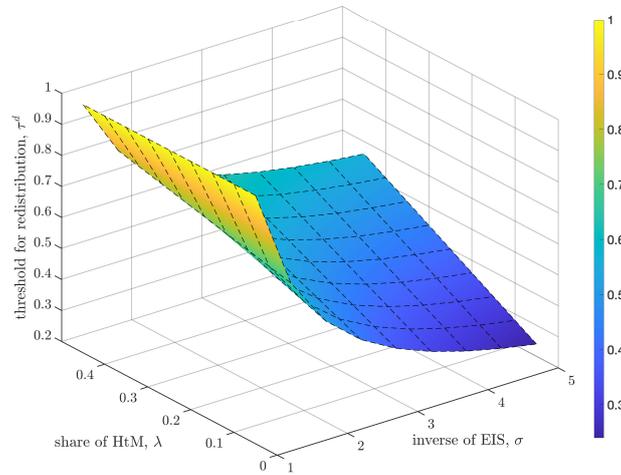
Hence, whenever τ^d exceeds the fraction determined by the share of hand-to-mouth households and the intertemporal elasticity of substitution (the income effect on labor supply), the consumption of unconstrained households decreases in response to higher inflation expectations.

³⁴ This simplification has no qualitative consequences but makes the interpretation more straightforward. The consumption response depends on the redistribution parameter in both the TANK and THANK cases, so the qualitative results are unchanged, as shown in Appendix G.

Figure 2 illustrates the combinations of λ^H and σ that generate threshold values separating positive from negative consumption responses. I focus on the case $\sigma > 1$, since $\sigma < 1$ implies an always positive consumption response. Therefore, redistribution from unconstrained to hand-to-mouth households affects the sign of the consumption response only for $EIS < 1$, which is also the empirically relevant case, as discussed in the following sections.

We observe that the threshold increases with the share of hand-to-mouth households λ^H and with the intertemporal elasticity of substitution (i.e., decreases with σ). Empirically relevant estimates of λ^H (see, e.g., Kaplan et al., 2014) and σ (see, e.g., Havranek, 2015, and other sources discussed in the sections below) imply a maximum threshold for a positive consumption response of approximately 0.5.

Figure 2: Maximum Threshold Values of τ^d Ensuring $\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} > 0$



Note: Maximum possible values of the redistribution parameter τ^d that still satisfy $\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} > 0$ in the Bilbiie (2008) model. The threshold depends on the values of the parameters λ^H and σ .

However, the core purpose of this analysis is not to identify the quantitative values of the redistribution parameter τ^d for which the consumption response remains positive. Rather, the aim is to emphasize the decisive role of the profits income channel in shaping the response of consumption to higher inflation expectations.

In the following subsection, I fully shut down the profits income effect to illustrate how the results change in its absence. This could be implemented either by adopting Bilbiie (2008) with an extreme profits redistribution scheme $\tau^d = 1$, or by framing the experiment in the spirit of Broer et al. (2020). I choose the latter approach in the next paragraphs, noting that the resulting consumption response is equivalent under both setups.

Fully turning off the profits income channel. Given that the results presented in the RANK section resemble the profits-driven mechanism highlighted in Broer et al. (2020), I next study the effect of higher inflation expectations on consumption under imperfect passthrough to nominal income in their stylized *workers* and *capitalists* version of a HANK model.³⁵

³⁵ Equivalently, the model can be viewed as isomorphic to a TANK structure with *workers* facing no idiosyncratic income risk and *capitalists* choosing not to participate in the bond market, as in the first version of the working paper by Broer et al. (2020).

This model abstracts from the role of profits in households' labor supply.³⁶ Crucially for my analysis, in the Broer et al. (2020) setup, profits do not affect the expected income or consumption of the households that are on their Euler equation, effectively shutting down the profits income channel described in the RANK case.

Moreover, the *workers–capitalists* model of Broer et al. (2020) yields the same consumption response to changes in inflation expectations as the TANK model of Bilbiie (2008) under an extreme redistribution scheme where all profits are transferred from unconstrained to constrained households. I elaborate on this equivalence in the Appendix.

3.2 Capitalists-Workers Model

Here, the analysis abstracts entirely from the profits income channel, following Broer et al. (2020). By assigning all profits to capitalists and letting only workers be on their Euler equation, the model isolates the pure real labour income channel. The key insight is that once profits no longer offset the expected decline in real wages, the total effect of higher inflation expectations depends critically on the intertemporal elasticity of substitution (EIS). Consumption increases only if $EIS > 1$; it turns negative for empirically relevant values ($EIS < 1$), providing a theoretical reconciliation with observed data.

Model outline. There is a unit mass of *workers* and a continuum of *capitalists* on the interval $(1, 1 + m_c]$, where m_c is assumed to be very small. Both types of households (indexed by j) live over an infinite horizon and maximize the same utility function as in the previous models, but now we introduce a fixed cost of working v . Hence, their lifetime utility is $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t U(C_{jt}, N_{jt})$, where

$$U(C_{jt}, N_{jt}) = \frac{C_{jt}^{1-\sigma} - 1}{1-\sigma} - \frac{N_{jt}^{1+\varphi}}{1+\varphi} - v \cdot \mathbf{1}_{\{N_{jt} > 0\}}.$$

Workers are subject to an idiosyncratic labour productivity shock and must satisfy the flow budget constraint $C_{jt} + B_{jt} = \frac{1+i_t-1}{1+\pi_t} B_{jt-1} + W_{jt} N_{jt}$; i.e., they do not own firms. In addition, we impose a stringent borrowing constraint $B_{jt} \geq 0$. Combined with the zero net supply assumption, this leads to a degenerate equilibrium bond wealth distribution and autarkic consumption. We assume that v is sufficiently small so that *workers* choose to supply labour.

Capitalists differ from *workers* in their budget constraint: $C_{jt} + B_{jt} = \frac{1+i_t-1}{1+\pi_t} B_{jt-1} + D_{jt}$. They own intermediate-good firms (each holding a share $\frac{1}{m_c}$) and choose not to supply labour because we take m_c to be sufficiently small.³⁷

The capitalists' budget constraint together with the zero net bond supply condition implies $C_t^C = D_t^C$; i.e., *capitalists* behave as hand-to-mouth agents, consuming profits each period. The supply side of the model is identical to that in the RANK framework, and monetary policy operates in the same way as well.

³⁶ Another model where implausible profit-induced income effects on labor supply are absent is Cantore and Freund (2021). However, my results would differ in that case because *capitalists* are still on their Euler equation in Cantore and Freund (2021), even though they do not supply labor. Consequently, an expected higher price level would translate into expected higher profits for *capitalists*, generating a positive consumption response. The total consumption response would then combine the reactions of both *capitalists* and *workers*.

³⁷ A sufficiently small m_c guarantees that $\log\left(\frac{D_t}{m_c}\right) > \log\left(\frac{D_t}{m_c} + W_{jt} N_{jt}^*\right) - \frac{N_{jt}^{*1+\varphi}}{1+\varphi} - v$. Here, N_{jt}^* denotes the labour supply disregarding v . Since we focus on small fluctuations of D_t (small aggregate shocks), we assume m_c always satisfies $m_c < m_c^*(D_t)$, where $m_c^*(D_t)$ is the threshold for which the inequality holds.

Workers equilibrium conditions. Given that *capitalists* are perfectly insured against idiosyncratic shocks, unlike *workers*, it is the latter type of agent that generates a higher precautionary demand for assets. Consequently, *workers* are the marginal participants in the bond market. Hence, the *workers*' optimization problem yields the following equilibrium conditions, which are mathematically equivalent to those of the RANK model:

$$c_t^W = \mathbb{E}_t c_{t+1}^W - \frac{1}{\sigma} (i_t - \mathbb{E}_t \pi_{t+1} - \rho^*), \quad (37)$$

$$w_t = \varphi n_t^W + \sigma c_t^W, \quad (38)$$

where the variables now denote the weighted averages over the *workers* population. Note that $\rho^* < \rho$ due to the precautionary asset demand generated by the presence of idiosyncratic shocks. Since *capitalists* do not supply labor, we obtain $n_t^W = n_t$. Moreover, because *workers* do not receive any profits, the market-clearing condition differs from that in the RANK model:³⁸

$$c_t^W = w_t + n_t \quad (39)$$

As already anticipated, we can obtain isomorphic household-sector conditions by using the TANK model of Bilbiie (2008) under an extreme profits redistribution scheme with $\tau^d = 1$.³⁹ In this case, the unconstrained households receive no profits, resulting in the same equilibrium conditions as in equations 37, 38, and 39 (with $\rho > \rho^*$). However, the two models are equivalent only in terms of the expression for $\frac{\partial c_t^{C/U}}{\partial \mathbb{E}_t p_{t+1}}$. They otherwise differ, because in the model of Bilbiie (2008) profits still enter the resource constraint of the constrained households, who also supply labor.

If we follow the same steps as in the RANK example to derive the expression for $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}}$, we obtain:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left\{ \underbrace{\frac{(1+\varphi)}{\sigma+\varphi} \bar{m} \left(\frac{1+\lambda}{\lambda} \right)}_{\text{real income effect}} - \frac{(1+\varphi)}{\sigma+\varphi} + \frac{1}{\sigma} \right\} \quad (40)$$

As in the RANK model, I assume $\bar{m} = 0$, which yields the following total consumption response:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left(-\frac{1+\varphi}{\sigma+\varphi} + \frac{1}{\sigma} \right), \quad (41)$$

which naturally leads to Proposition 2.

Proposition 2. *The consumption response under the stylized HANK framework is always lower than in the RANK setup. Formally, we have:*

$$-\frac{1+\varphi}{\sigma+\varphi} + \frac{1}{\sigma} < -\frac{1}{\sigma+\varphi} + \frac{1}{\sigma} \quad \forall \varphi > 0, \quad \sigma > 0$$

³⁸ In the RANK model, we have $c_t = \frac{WN}{C}(w_t + n_t) + \frac{D}{C} \hat{d}_t = \frac{WN}{C}(w_t + n_t) + d_t = \frac{w_t + n_t}{\mathcal{M}} + d_t$, where we utilize the aforementioned definition of d_t (with \hat{d}_t denoting the log-linear approximation around its steady state). Because the definition of d_t allows us to accommodate a zero steady-state profit share, we can write the equation, after imposing the optimal subsidy, as $c_t = w_t + n_t + d_t$. Note that in both the RANK and the stylized HANK market-clearing conditions, we assume zero net supply of zero-coupon bonds.

³⁹ See the Appendix for a detailed discussion.

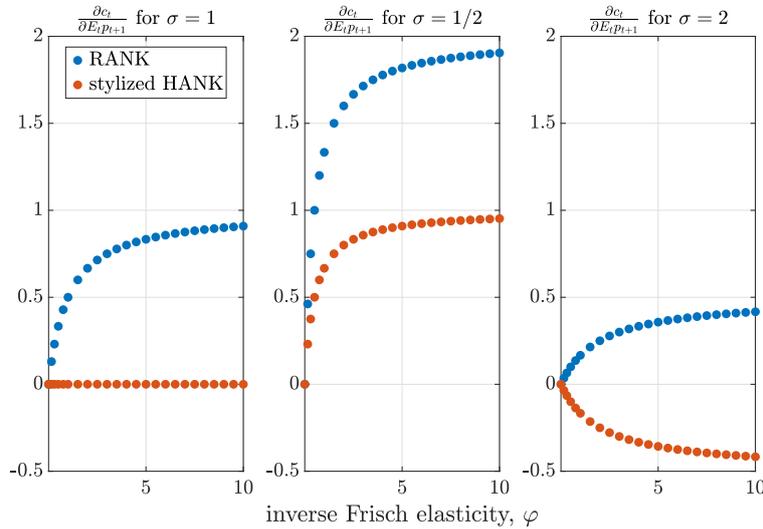
Overall, the qualitative results differ substantially from the RANK case, as summarized in Proposition 3.

Proposition 3. For $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} > 0$ to hold, the intertemporal elasticity of substitution must exceed 1. Whenever $\sigma > 1$, the current consumption of workers responds negatively to an expected increase in inflation. Under King et al. (1988) preferences, the response is zero.

Proof. See Appendix I. □

Focusing again on the ELB ($\Theta = 1$), I illustrate in Figure 3 the consumption response to an expected change in inflation for the stylized HANK model, compared to the RANK model, across different combinations of φ and σ .⁴⁰

Figure 3: Consumption Response in RANK and Stylized HANK Models Depending on σ



Note: Comparison of the total effect of current consumption on the expected change in inflation between the RANK and stylized HANK models.

The only difference between the models is that profits play no role in the expected consumption of the households on their Euler equation (nor in their labor supply) in the stylized HANK model. We observe a stark qualitative difference in the consumption response between the two models. In the RANK model, consumption always increases, and changes in the parameterization of σ and φ affect the response only quantitatively. By contrast, the stylized HANK model generates significant qualitative differences depending on the value of σ . As mentioned above, King et al. (1988) preferences result in a zero effect. An intertemporal elasticity of substitution greater than 1 leads to an increase in consumption (albeit scaled down relative to the RANK case), whereas an intertemporal elasticity below 1 produces a negative consumption response.

Given that for the RANK model $\varphi > 0$ is sufficient for $|\frac{1}{\sigma+\varphi}| < |\frac{1}{\sigma}|$ to hold, the intertemporal substitution effect always dominates the income effect. The situation changes in the stylized HANK

⁴⁰ Note that I depict the consumption of *workers* in the stylized HANK model. In this framework, equilibrium dynamics are determined entirely by *workers*, who are the only agents on their Euler equation and the only ones who supply labour. Therefore, the consumption object in the plots corresponds to worker consumption c_t^W , not total consumption. *Capitalists'* hand-to-mouth consumption of profits does not affect the Euler equation nor labour supply, and thus plays no role for the equilibrium dynamics.

model. Since $|\frac{1+\varphi}{\sigma+\varphi}| < |\frac{1}{\sigma}|$ is true only for $\sigma < 1$ (assuming $\varphi > 0$), the income effect exceeds the intertemporal substitution effect whenever $\sigma > 1$.

To understand the intuition behind these results, note that σ also measures the income effect on labor supply. Hence, changing σ simultaneously alters both the intertemporal elasticity of substitution (EIS) and the income effect on labor supply. For higher values of σ , the EIS is lower. At the same time, households are willing to work more in response to lower real wages, if they do not translate higher inflation expectations into higher nominal wages, because the income effect is stronger.⁴¹

The former mechanism attenuates the positive consumption response, while the latter mitigates the negative income effect. However, due to the finite elasticity of labor supply ($\varphi > 0$), any increase in σ affects the substitution effect relatively more. Put differently, raising σ reduces intertemporal substitution more than it diminishes the magnitude of the income effect.

It is worth emphasizing that the empirical evidence on the EIS points to values comfortably below 1 (i.e., $\sigma > 1$), which corresponds to the region where the direction of the consumption response becomes negative in the stylized HANK model with a low passthrough from inflation expectations into expectations of nominal wages. For a comprehensive overview of the empirical evidence on the EIS, see Havranek (2015).

3.3 Necessary Passthrough Threshold

This subsection quantifies how large the passthrough from inflation expectations to nominal wage expectations must be to recover a positive consumption response. By reintroducing partial passthrough ($\Omega < 1$) into the stylized HANK framework, it derives the critical threshold above which the intertemporal substitution channel dominates. The results show that realistic empirical passthrough levels, around 0.2, are far below what would be required under empirically supported parameterization to reach a positive consumption effect, highlighting the fragility of the conventional New Keynesian mechanism once the negative real income channel is introduced.

The case of non-zero passthrough. Until now, we have assumed that households do not adjust their expectations of nominal wages in response to an expected increase in the price level at all. In line with the empirical evidence of Hajdini et al. (2023), Aprigliano and Di Nino (2024), Jain et al. (2024) and Ito and Kaihatsu (2016), I now assume that households do propagate higher inflation expectations into higher nominal salaries - albeit not fully. I define Ω to be the passthrough (or the perceived GE effects) and write the expected nominal wages formation as follows:

$$\mathbb{E}_t w_{t+1}^n = \Omega \mathbb{E}_t p_{t+1} \quad (42)$$

⁴¹ How much they can do so depends on φ . To show this, take the derivative of the real income effect: $\frac{\partial}{\partial \varphi} \left[-\frac{1+\varphi}{\sigma+\varphi} \right] = -\frac{\sigma-1}{(\sigma+\varphi)^2}$. The derivative is positive for $\sigma < 1$ and negative for $\sigma > 1$. Thus, in the former case the income effect on labour supply is weak, and higher φ mitigates the negative real income channel, since expected income is primarily driven by the substitution effect. In contrast, when $\sigma > 1$, the income effect on labour supply is strong, causing the real income effect to become more negative as φ increases. Households would like to work more due to the income effect on labour supply, but the inelasticity of labour supply implied by higher φ prevents them from doing so, thereby amplifying the negative income effect. Appendix J considers Greenwood et al. (1988) preferences, which shut down the labour supply wealth effect. As the main qualitative conclusions are unaffected, I retain the separable utility specification to stay close to the standard New Keynesian framework.

which results in the following expression for expected real wages:

$$\mathbb{E}_t w_{t+1} = \mathbb{E}_t w_{t+1}^n - \mathbb{E}_t p_{t+1} = (\Omega - 1)\mathbb{E}_t p_{t+1}, \quad (43)$$

where for any $\Omega < 1$, an increase in the expected price level generates decreasing expected real wages.

Inserting equation 43 into the problem of the stylized HANK model from the previous subsection, the expression for $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}}$ becomes:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \left(\frac{1 + \varphi}{\sigma + \varphi} \right) (\Omega - 1) + \frac{1}{\sigma}, \quad (44)$$

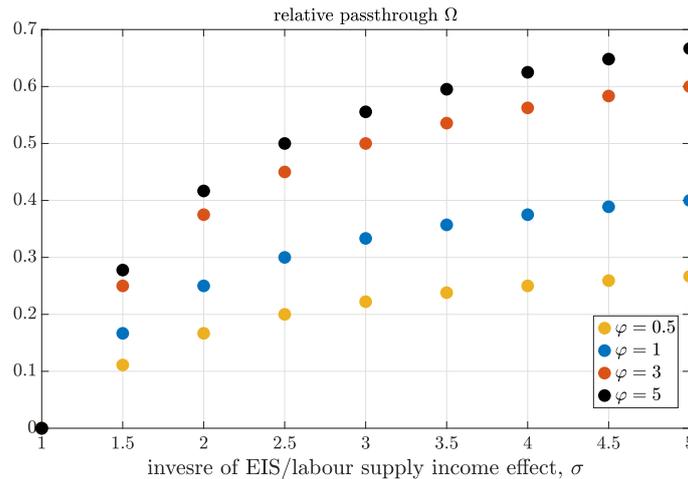
which allows us to compute the minimum necessary threshold of the passthrough to obtain $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} > 0$:

$$\Omega > 1 - \frac{1}{\sigma} \left(\frac{\sigma + \varphi}{1 + \varphi} \right) \quad (45)$$

It is straightforward to see that under King et al. (1988) preferences, any positive value of Ω is sufficient to generate a positive consumption response. When $\sigma > 1$, however, a certain degree of passthrough is required for the response to turn positive.

Figure 4 plots the necessary threshold for Ω as a function of σ . I focus exclusively on the case $\sigma > 1$, since for $\sigma < 1$ no passthrough is needed to obtain a positive consumption reaction.

Figure 4: Necessary Thresholds of Ω for $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} > 0$ if $\sigma > 1$



Note: Necessary thresholds of the passthrough parameter Ω that delivers $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} > 0$ also for $\sigma > 1$ while assuming different φ in the stylized HANK model.

We observe that the threshold increases in both σ and φ . For instance, when $\varphi = 1$, the necessary passthrough for a positive consumption response ranges between 0.16 and 0.4, depending on σ . Lower Frisch elasticities combined with lower EIS values (equivalently, stronger income effects on

labour supply), which according to Elminejad et al. (2024) lie between 2 and 4 for φ , and according to Havranek (2015) fall in the range of 2 to 3 for σ , produce threshold levels of around 0.5. It is worth emphasizing that the empirical evidence on passthrough reported by Hajdini et al. (2023) is approximately 0.2.

Higher σ increases the required passthrough threshold because it lowers the intertemporal elasticity of substitution and therefore weakens the positive substitution channel through which expected inflation stimulates current consumption. If this channel is weaker, a stronger passthrough is needed to counterbalance the negative real income effect and to maintain a positive overall consumption response. An increase in φ also raises the threshold, but through a different mechanism. Since φ determines the inverse of the Frisch elasticity, a higher value of φ implies that labor supply reacts less to expected real wage changes. When $\sigma > 1$, the income effect on labor supply is strong, meaning that households wish to work more when expected real wages decline in order to stabilize their consumption. However, a higher φ limits their ability to do so, causing a larger fall in expected labor income and amplifying the negative real income channel. As a result, an even higher degree of passthrough is necessary to offset this stronger real income effect and to keep the total consumption response positive.

4. Additional Channel: Wealth Effect

The main aim of this article is to highlight the inconsistency between the real income effect of higher inflation expectations in standard New Keynesian models and the corresponding empirical evidence. I also emphasize the role of the profits income channel in shaping the real income channel, focusing on this mechanism due to its growing relevance in the empirical literature (see Hajdini et al., 2023; Aprigliano and Di Nino, 2024; Coibion et al., 2023). At the same time, additional channels and extensions of the core framework warrant attention. In this section, I examine the wealth effect due to inflation expectations and its implications for the total consumption response and its decomposition in the New Keynesian framework.

4.1 Wealth Effect in the NK Framework

This part of the analysis introduces an inflation expectations-related negative wealth effect by relaxing the assumptions that preclude it in the standard New Keynesian framework. In the benchmark model with zero net bond supply, wealth effects are ruled out by construction, and even when positive debt is allowed, Ricardian equivalence prevents expected inflation from influencing real wealth. However, Pallotti et al. (2023) show that inflation can have substantial wealth consequences.

To generate a meaningful wealth channel, I therefore depart from Ricardian equivalence by adopting a Perpetual Youth overlapping-generations setup à la Rachel and Ravn (2025). In this environment, higher expected inflation lowers the real value of nominal government debt and thus reduces the wealth of bond-holding cohorts. The resulting negative wealth effect operates alongside the real income channel, counteracting the positive intertemporal substitution effect. This section quantifies the conditions under which this combined effect can render the total consumption response to higher inflation expectations negative.

Benchmark zero net supply NK model. In the standard NK model (see Galí, 2015) used in the previous sections, there is, by definition, no scope for wealth effects arising from an increase in expected inflation, and hence from a decrease in the real interest rate. As discussed in Section 2,

this model features zero net supply of bonds in equilibrium. Consequently, it structurally rules out any wealth effects from bond holdings.

NK model with positive net supply. Even if the zero net supply condition is relaxed and, moreover, the model is approximated around a positive-debt steady state, there is still no role for wealth effects from bond holdings due to the Ricardian equivalence property of the RANK model. Therefore, to incorporate the wealth effect arising from changes in inflation expectations, and thus in the real interest rate, into the analysis, one must depart from Ricardian equivalence.

4.2 Non-Ricardian Model

Model outline. To account for the negative wealth effect of higher inflation expectations on savings, I employ the Perpetual Youth version of the OLG model, following the logic of Yaari (1965) and Blanchard (1985).⁴² Specifically, I work with the variant of the Perpetual Youth model used in Rachel and Ravn (2025).⁴³

I assume that in each period t , a continuum of new agents is born. Households face a constant mortality risk, such that only a fraction $q \in (0, 1]$ survives to the next period. Because the total population is normalized to unity and cohort sizes are constant, the mass of newborn households must be $(1 - q)$. The mass of households from cohort $t \leq s$ that survives until period s is $(1 - q)q^{s-t}$. Non-altruistic households maximize $\mathbb{E}_0 \sum_{t=0}^{\infty} (\beta q)^t U(C_{s,t}, N_{s,t})$, where $U(C_{s,t}, N_{s,t}) = \log(C_{s,t}) - \frac{N_{s,t}^{1+\varphi}}{1+\varphi}$, with $s \leq t$ denoting the birth period of the agent (i.e., cohort).

Households can access life insurance contracts, transferring their wealth to a life insurance company at the end of each period. The company pays surviving households a premium and retains the assets of households that do not survive. The life insurance market is competitive and features free entry; thus, the premium is actuarially fair, $\frac{1}{q}$.

There is a social fund that operates in line with Sterk and Tenreyro (2018), running a balanced budget and making transfers to new households. Transfers are financed by a tax levied on previous cohorts and are set as a constant fraction of their steady-state wealth, so as to perfectly equalize wealth across households. Thus, the steady-state real interest rate is still pinned down solely by the subjective discount factor parameter, as in the RANK model.

Households maximize their utility subject to the flow budget constraint $C_{s,t} + \frac{B_{s,t}}{(1+i_t)} + \tau_t = W_t N_{s,t} + \frac{B_{s,t-1}}{q(1+\pi_t)} + Z_s + D_{s,t}$, where $B_{s,t} = \frac{B_{s,t}^n}{P_t}$ is the end-of-period t real wealth of households from cohort s , with $B_{s,t}^n$ denoting nominal wealth (government debt), τ_t lump-sum taxes, Z_s the social fund transfer, and the remaining notation as in previous cases.⁴⁴

The supply side follows the standard New Keynesian setup, as in the previous sections, and the behavior of monetary policy is likewise unchanged.

The fiscal authority issues nominal bonds, determines the economy's deficits, and manages the social fund. The real government budget constraint is given by $\frac{B_t}{1+i_t} = \frac{B_{t-1}}{1+\pi_t} - s_t$, where $s_t = -\tau_t$

⁴² Naturally, net debtors would benefit from a lower real interest rate.

⁴³ A similar version is also used in Angeletos and Huo (2021), Angeletos et al. (2025), and Farhi and Werning (2019).

⁴⁴ The social fund payments are $Z_s = v^{ss}$ if $s = t$, and $Z_s = -\frac{1-q}{q} v^{ss}$ otherwise.

denotes the real budget surplus. The surplus rule is specified as $s_t = s \left(\frac{B_{t-1}}{B} \right)^{\alpha_b} \left(\frac{Y_t}{Y} \right)^{\alpha_x}$, where the absence of a time subscript denotes the steady-state value, and $\alpha_b \in [0, 1)$ and α_x are feedback parameters.

Household sector equilibrium conditions. As shown in Rachel and Ravn (2025), aggregating individual Euler equations and consumption across cohorts yields the aggregate Euler equation for consumption:

$$c_t = \mathbb{E}_t c_{t+1} + \chi b_t - i_t + (1 - \chi\gamma)\mathbb{E}_t \pi_{t+1} - \rho, \quad (46)$$

where the equation is already written in log-linearized form. The parameters $\chi = \frac{(1-q)(1-q\beta)}{q}$ and $\gamma = \frac{B}{Y}$ denote, respectively, the finite-horizon component of the Perpetual Youth OLG model and the steady-state ratio of debt to output. The debt-related term arises because the generation benefiting from a fiscal expansion is not necessarily the same as the one that will bear its future repayment. The negative coefficient in front of expected inflation captures the wealth effect associated with changes in the real interest rate. Put differently, higher inflation erodes the real value of nominal government debt, effectively acting as a tax on bondholders. The magnitude of this effect is proportional to the outstanding stock of nominal debt, which explains the presence of γ in front of expected inflation.

The rest of the equilibrium conditions. The other aggregate household equilibrium condition equates the real wage with the marginal rate of substitution, $w_t = c_t + \varphi n_t$. The government budget constraint and surplus equations, in log-linearized form, are given by $b_t = \frac{b_{t-1} - s_t}{\beta} + \gamma \left(i_t - \frac{\pi_t}{\beta} \right)$ and $s_t = \alpha_b b_{t-1} + \alpha_x c_t$, respectively.⁴⁵ The Phillips curve is specified as before; that is, I use the static version $\pi_t = \lambda w_t$, with the same microfoundation as before, since firms ignore the effect of price changes on future profits. Monetary policy follows the Taylor rule, as in the previous models, so that i_t in levels is given by $i_t = \left(\frac{1}{\beta} - 1 \right) + \phi_\pi \pi_t$. Note that in this model, I can still write $c_t = y_t = n_t$.⁴⁶

The wealth effect. Inserting the government budget constraint and the surplus equation into the Euler equation yields

$$c_t = \mathbb{E}_t c_{t+1} + \chi \left[\frac{b_{t-1} - \alpha_b b_{t-1} - \alpha_x c_t}{\beta} + \gamma \left(i_t - \frac{\pi_t}{\beta} \right) \right] - i_t + (1 - \chi\gamma)\mathbb{E}_t \pi_{t+1} - \rho \quad (47)$$

Substituting in the monetary policy rule and the static Phillips curve gives

$$c_t = \mathbb{E}_t c_{t+1} + \frac{\chi}{\beta} (1 - \alpha_b) b_{t-1} + \left[\phi_\pi \kappa (\chi\gamma - 1) - \frac{1}{\beta} (\chi\alpha_x + \chi\gamma\kappa) \right] c_t + (1 - \chi\gamma)\mathbb{E}_t \pi_{t+1}, \quad (48)$$

or, equivalently:

$$c_t = \left[\frac{\beta}{\beta + \chi(\alpha_x + \gamma\kappa) + \beta\phi_\pi\kappa(1 - \chi\gamma)} \right] \left[\mathbb{E}_t c_{t+1} + \frac{\chi}{\beta} (1 - \alpha_b) b_{t-1} + (1 - \chi\gamma)\mathbb{E}_t \pi_{t+1} \right] \quad (49)$$

⁴⁵ In the latter equation, I use the market-clearing condition $c_t = y_t$, which also holds in this model.

⁴⁶ Taking the cohort- s household budget constraint, we have $C_{s,t} + \frac{B_{s,t}}{1+i_t} + \tau_t = W_t N_{s,t} + \frac{B_{s,t-1}}{q(1+\pi_t)} + Z_s + D_{s,t}$. Denoting by μ_s the share of cohort- s households in the stationary distribution of the model, we can aggregate any variable x as $x_t = \sum_{s=0}^{\infty} \mu_s x_{s,t}$, with $\sum_s \mu_s = 1$. The aggregate budget constraint can then be written as $C_t + \frac{B_t}{1+i_t} + \tau_t = W_t N_t + \frac{\sum_{s \geq 1} \mu_s B_{s,t-1}}{q(1+\pi_t)} + Z + D_t$, or, equivalently, $C_t + \frac{B_t}{1+i_t} + \tau_t = W_t N_t + \frac{B_{t-1}}{1+\pi_t} + Z + D_t$, where we use the relationship $\mu_s = q\mu_{s-1}$, which holds for each $s \geq 1$. Substituting in the government budget constraint yields $C_t = W_t N_t + Z + D_t$, or, in log-linearized form, $c_t = w_t + n_t + d_t$. The optimal subsidy on the supply side again implies $d_t = -w_t$, leading to $c_t = n_t$. Given the linear production function of the model, we also have $y_t = n_t$.

Further, using the market-clearing condition, the labour supply equation, the Phillips curve, and denoting $\eta = \frac{\beta}{\beta + \chi(\alpha_x + \gamma\kappa) + \beta\phi_\pi\kappa(1 - \chi\gamma)}$, the consumption response can be written as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \eta \left\{ \underbrace{\frac{\bar{m}}{1 + \varphi} \left(\overbrace{\frac{1 + \lambda}{\lambda}}^{\text{GE effects}} \right)}_{\text{real income effect}} - \frac{1}{1 + \varphi} + \underbrace{1}_{\text{EIS}} - \underbrace{\chi\gamma}_{\text{wealth effect}} \right\}, \quad (50)$$

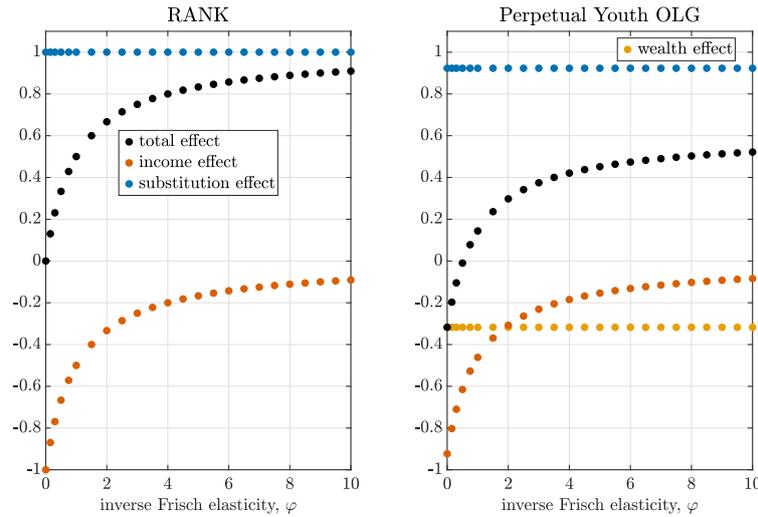
where $\frac{\partial b_{t-1}}{\partial \mathbb{E}_t p_{t+1}} = 0$ by definition. Assuming again that households do not reason in terms of general equilibrium effects on their nominal wages, and thus $\bar{m} = 0$, we obtain:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \eta \left(-\frac{1}{1 + \varphi} + 1 - \chi\gamma \right), \quad (51)$$

where η is a scaling factor that reflects not only the monetary policy response but also the fiscal policy stance. The only differences with respect to the RANK model results is a different scaling factor and the presence of the wealth effect due to the real interest rate change. The negative wealth effect is increasing in both the survival rate parameter χ and the relative level of debt in the economy γ .

The role of the wealth effect is clear from expression 51: it introduces an additional negative component alongside the real income effect, further counteracting the positive intertemporal elasticity of substitution. Given that I intentionally derive the model under a log utility function, I compare the results of the Perpetual Youth model with those of the standard RANK model in Figure 5. I again consider the ELB situation and, without any qualitative consequences, assume that automatic stabilizers are turned off; that is, $\phi_\pi = \alpha_x = 0$.⁴⁷

Figure 5: Consumption Response in RANK and OLG Models



Note: Total consumption response and its decomposition for RANK and Perpetual Youth OLG models.

⁴⁷ Following the parameterization of Rachel and Ravn (2025), this gives $\eta = \frac{\beta}{\beta + \chi\gamma\kappa} = 0.923$. These simplifications have no qualitative impact, since η is merely a scaling factor.

The wealth effect makes it possible for the total consumption response to changes in inflation expectations to be negative, unlike in the case of a decomposition including only the real income and intertemporal substitution channels. From equation 51, the condition for the total effect to remain positive is:

$$\chi\gamma < \frac{\varphi}{1 + \varphi} \quad (52)$$

In other words, the wealth effect cannot be too strong relative to the inverse of the Frisch elasticity. If the Frisch elasticity is low (i.e., φ is high), the negative real income channel is weaker, since expected consumption falls less due to a smaller decrease in expected labour supply. In this case, even a relatively strong negative wealth effect is still compatible with a positive total response. Conversely, if the Frisch elasticity is high (i.e., φ is low), the wealth effect must be very mild to avoid turning the total response negative.

A non-logarithmic utility function. Note that if $\sigma \neq 1$, the Euler equation becomes: $c_t = \mathbb{E}_t c_{t+1} + \frac{\chi}{\sigma} b_t - \frac{i_t}{\sigma} + \frac{(1-\chi\gamma)}{\sigma} \mathbb{E}_t \pi_{t+1} - \frac{\rho}{\sigma}$, and the labour supply equation is $w_t = \sigma c_t + \varphi n_t$. The rest of the equilibrium conditions remain unchanged. Under the same assumptions and simplifications as before, the total consumption response is:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \zeta \left(-\frac{1}{\sigma + \varphi} + \frac{1 - \chi\gamma}{\sigma} \right), \quad (53)$$

where $\zeta = \frac{\sigma\beta}{\sigma\beta + \chi(\alpha_x + \gamma\kappa) + \beta\phi_\pi\kappa(1-\chi\gamma)}$. For the total consumption reaction to remain positive, the condition becomes:

$$\chi\gamma < \frac{\varphi}{\sigma + \varphi} \quad (54)$$

A lower intertemporal elasticity of substitution implies that the wealth effect must be even weaker, as the positive EIS channel is smaller, and vice versa. The core qualitative interpretation of the previous decomposition, however, remains unchanged.

5. Discussion: Extensions, Limitations, and Future Research

My analysis is the first attempt to incorporate the negative real income effect of higher inflation expectations into standard NK models and to discuss its importance and implications. For this purpose, I rely on highly stylized versions of RANK and HANK frameworks. It is therefore natural that several important avenues in the literature on the effects of inflation expectations on consumption remain outside the scope of this article and constitute promising directions for further research. In the paragraphs below, I discuss some of these areas.

5.1 Habit Formation in Consumption

Further, I study the decomposition between the negative real income effect (due to low passthrough) and the positive EIS effect when the utility function incorporates habit formation, a feature commonly used in medium scale DSGE models (Smets and Wouters, 2007; Christiano et al., 2005). The qualitative consequences of my analysis do not change, so I relegate the habit formation section to Appendix M and proceed with a discussion of additional topics.

5.2 Durable Goods NK Models

Although empirical evidence documenting the importance of the negative real income channel for the consumption responses to higher inflation expectations is present mainly for durable goods (Coibion et al., 2023; Candia, 2025), the analysis in this paper is conducted within a standard one good non-durable New Keynesian framework to keep the exposition as standard and transparent as possible. Nevertheless, the same two structural channels, the negative real income effect that arises when nominal wage expectations do not adjust and the positive intertemporal substitution effect that reflects the response to expected real interest rates, also operate in the durable goods models used in the literature (see Erceg and Levin, 2006; Monacelli, 2009; Barsky et al., 2016). What can differ for durables is not the sheer presence or signs of these forces, but rather their relative strength. Durable expenditures are more elastic to the real interest rate because the expected inflation of the durable price lowers the user cost of holding the durable stock, which strengthens the positive substitution effect. At the same time, durable purchases are large and adjustable, so when households expect lower future real income, they may delay or reduce these expenditures more sharply, which strengthens the negative real income effect. Thus, while durables introduce additional amplification on both margins, the negative real income effect and the positive substitution effect, their relative strength will depend on the passthrough level from inflation to nominal wage expectations and on the role of profits in the same way as in my analysis.

A full extension of my framework to a two good New Keynesian model with durables is left for future research, as it would require modelling relative prices, user costs, and stock flow dynamics in detail. However, existing durable goods New Keynesian models, such as Barsky et al. (2016), share the same fundamental household structure. They feature an Euler equation that governs intertemporal trade offs, a labour supply condition that links expected real wages to consumption, and in the durable case an additional user cost channel that scales the strength of substitution. For this reason, even though the exposition in the paper is built on the nondurable case, the qualitative predictions extend naturally to environments with durables.

Further, it is important to stress that the empirical findings on the effect of inflation expectations on non-durable consumption also diverge from the conclusions of the standard NK model. Although households do not reduce nondurable consumption when they expect higher inflation, they do not appear to increase it either. In other words, the response of non-durable consumption is typically negligible and statistically insignificant (Bachman et al., 2015; Burke and Ozdagli, 2023; Coibion et al., 2023). Consistent with this evidence, I obtain a close to zero consumption response for a realistic set of passthrough and EIS parameters when the offsetting role of profits in the real income channel is shut down, as shown in my theoretical investigations in subsections 3.2 and 3.3.

5.3 State Dependence and Symmetric Response

My theoretical investigation of the negative real income channel is purposefully conducted within standard NK models, given their central role in the analysis of monetary policy and in the literature on the use of inflation expectations as a policy instrument. For reasons of clarity, I remain within a linearized framework. As a result, I cannot study the state dependent nature of the consumption response to changes in inflation expectations when conditioning on the level of inflation, as discussed in Candia (2025).⁴⁸ The paper shows that consumption of durables goods decreases with higher inflation expectations when households are in a low-inflation environment, but increases in a high-inflation situation. I stress that this result is very relevant to my theoretical analysis, given that I often discuss the case of using inflation expectations as a policy tool. Candia (2025) shows

⁴⁸ Other articles studying the state-dependent effects are Marencak (2023) and Andrade et al. (2023).

that increasing them in a low-inflation environment leads to a fall of consumption, yet it is exactly the low-inflation environment in which the literature about the ELB suggests to invoke a higher inflation expectations due to its positive effect on households consumption and aggregate spending (Coibion et al., 2020). My analysis provides a theoretical cautionary tale for this reasoning. It underscores the importance of communicating not only the intention to achieve higher future inflation while relying on the intertemporal elasticity of substitution channel, but thoroughly conveying also the full mechanism through which higher expected inflation is intended to raise household income.

The same limitation due to the linear nature of my analysis applies to the question of whether the effects are symmetric or asymmetric when comparing increases and decreases in inflation expectations. A theoretical analysis of these issues requires a fully nonlinear framework, which I leave as a suggestion for future research.

5.4 Uncertainty

Another important feature that is inherently set aside in my analysis due to the linear nature of the models I use is the role of uncertainty. Georgarakos et al. (2024) show that the effects of inflation expectations on consumption differ across statistical moments. They find a positive effect at the first moment and a negative effect at the second, with the latter dominating and therefore generating a negative total effect.

From a broader perspective, the mechanism through which higher inflation expectations raise inflation uncertainty and thereby overall macroeconomic uncertainty is closely linked to the mechanism I study. Greater uncertainty about inflation is associated with weaker macroeconomic conditions and thus with more pessimistic expectations about household income, which implies a very low passthrough to nominal wage expectations. In this sense, these mechanisms are not unrelated.⁴⁹ However, my analysis cannot address the role of uncertainty explicitly, since the linear structure of my framework does not allow me to do so.

6. Concluding Remarks

I disentangle the underlying assumptions behind a positive response of current consumption to changes in households' inflation expectations (belief shock) within the New Keynesian framework. I begin by outlining the key mechanisms in the Representative Agent New Keynesian (RANK) model. Subsequently, I explore extensions that introduce household heterogeneity or bounded rationality, showing that these modifications generate sharp qualitative differences compared to the RANK benchmark.

I show that when profits no longer play a decisive role in the expected consumption of households on their Euler equation, a positive consumption response to changes in inflation expectations relies critically on the ability of households to propagate higher expected inflation into higher expected nominal wages. When this passthrough is incomplete, the total consumption response can be decomposed into two components: the intertemporal substitution effect and the real income effect.

I stress the importance of profits in RANK models. Because labour income and dividends accrue to the same representative household, the model rules out the dominance of a negative real income channel when inflation expectations are not accompanied by expected nominal wage growth. In

⁴⁹ Andre et al. (2022); D'Acunto et al. (2022); Burke and Ozdagli (2023); Kamdar and Ray (2025) discuss association of higher inflation expectations with worse macroeconomic conditions.

other words, even if the household anticipates a decline in real wages due to higher expected inflation, the corresponding expected increase in profits offsets this effect. Consequently, the negative income channel, documented as empirically relevant in the literature (e.g., Hajdini et al., 2023; Coibion et al., 2023; Aprigliano and Di Nino, 2024), is by construction not important in the RANK framework. This result holds even when habit formation is incorporated into the utility function.

The results are compared to tractable versions of HANK models in which the profits income channel is either attenuated or completely shut down. In this framework, the total consumption effect may be zero, positive, or negative, depending on the chosen profits redistribution scheme and the value of the intertemporal elasticity of substitution (EIS). In the absence of passthrough and with a dampened profits income channel, the total effect remains positive only if $EIS > 1$. Under King et al. (1988) preferences, the response is zero, while for $EIS < 1$ the reaction can even turn negative. Finally, I compute the necessary passthrough of expected higher inflation into expected nominal wages that restores a positive consumption response in the HANK environment for the case $EIS < 1$. The presence of habit formation further narrows the set of EIS values for which the consumption response is positive and raises the necessary passthrough threshold required to reach a positive response.

I also discuss the role of the wealth effect arising from changes in inflation expectations and, consequently, in the real interest rate. In a Perpetual Youth model that incorporates the wealth effect, I show that its presence strengthens the case for a negative total consumption response, as it adds an additional negative channel alongside the real income effect under incomplete passthrough of expected inflation into expected nominal wages.

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Appendix

Appendix A: Supply Side

Rotemberg Pricing. The production side of the model consists of a unit mass of monopolistically competitive intermediate goods producers indexed by $k \in [0, 1]$. Each firm produces a differentiated variety using labour as the only input according to a linear technology $Y_t(k) = N_t(k)$. The final good is a Dixit–Stiglitz aggregate of intermediate goods:

$$Y_t = \left[\int_0^1 Y_t(k)^{\frac{\varepsilon-1}{\varepsilon}} dk \right]^{\frac{\varepsilon}{\varepsilon-1}} \quad (55)$$

implying the demand function:

$$Y_t(k) = \left(\frac{P_t(k)}{P_t} \right)^{-\varepsilon} Y_t \quad (56)$$

and the aggregate price index:

$$P_t = \left[\int_0^1 P_t(k)^{1-\varepsilon} dk \right]^{\frac{1}{1-\varepsilon}}. \quad (57)$$

Markets clear for each variety k , so that $C_t(k) = Y_t(k)$.

Firms set prices subject to Rotemberg (1982) quadratic adjustment costs:

$$\frac{\phi}{2} \left(\frac{P_t(k)}{P_{t-1}(k)} - \pi^* \right)^2 Y_t, \quad (58)$$

where π^* is the gross steady-state inflation target and $\phi > 0$ measures price rigidity. Firm k chooses $\{P_t(k), N_t(k)\}$ to maximise the expected discounted stream of real profits:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} Q_t \left[\frac{P_t(k)}{P_t} Y_t(k) - W_t N_t(k) - \frac{\phi}{2} \left(\frac{P_t(k)}{P_{t-1}(k)} - \pi^* \right)^2 Y_t \right], \quad (59)$$

subject to the demand function, where Q_t is the stochastic discount factor and $MC_t = W_t/P_t$ is real marginal cost.

In a symmetric equilibrium ($P_t(k) = P_t$, $Y_t(k) = Y_t$), the first-order condition for price setting is:

$$(1 - \varepsilon) + \varepsilon MC_t - \phi(\pi_t - \pi^*)\pi_t + \beta \phi \mathbb{E}_t \left[\frac{Y_{t+1}}{Y_t} (\pi_{t+1} - \pi^*)\pi_{t+1} \right] = 0, \quad (60)$$

with $\pi_t = P_t/P_{t-1}$ denoting gross inflation. Log-linearizing around a zero-inflation steady state ($\pi^* = 1$) yields the New Keynesian Phillips Curve:

$$\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \lambda mc_t, \quad \lambda = \frac{\varepsilon - 1}{\phi}, \quad (61)$$

where mc_t denotes log-linearized real marginal cost from steady state. Using the household labour supply condition $w_t = \varphi n_t + \sigma c_t$ and the market clearing condition $c_t = n_t$, real marginal cost can be written as $mc_t = (\sigma + \varphi)c_t$. Substituting this into the NKPC gives:

$$\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \lambda(\sigma + \varphi)c_t = \beta \mathbb{E}_t \pi_{t+1} + \kappa c_t \quad (62)$$

Appendix B: Static Phillips Curve

An alternative specification of Rotemberg price adjustment costs yields a static, rather than forward-looking, Phillips curve. In particular, suppose the quadratic price adjustment cost is defined relative to the lagged aggregate price level rather than to the firm's own past price. The rest of the supply-side structure is identical to the baseline in the previous section.

The price adjustment cost now takes the form:

$$\frac{\phi}{2} \left(\frac{P_t(k)}{P_{t-1}} - 1 \right)^2 Y_t, \quad (63)$$

where $\phi > 0$ measures the intensity of nominal rigidity and P_{t-1} is the lagged aggregate price index. Here, each intermediate good producer $k \in [0, 1]$ takes P_t as given when setting its price. Output of variety k is produced using only labour, $Y_t(k) = N_t(k)$, and is sold under monopolistic competition. The final good is a CES composite of these varieties, and market clearing holds for each one: $C_t(k) = Y_t(k)$.

Given the demand for its variety, firm k chooses $P_t(k)$ and $N_t(k)$ to maximise:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} Q_t \left[\frac{P_t(k)}{P_t} Y_t(k) - W_t N_t(k) - \frac{\phi}{2} \left(\frac{P_t(k)}{P_{t-1}} - 1 \right)^2 Y_t \right], \quad (64)$$

where Q_t is the stochastic discount factor and $MC_t = W_t/P_t$ is real marginal cost.

In a symmetric equilibrium ($P_t(k) = P_t$, $Y_t(k) = Y_t$), the first-order condition for price setting reduces to:

$$(1 - \varepsilon) + \varepsilon MC_t - \phi(\pi_t - 1)\pi_t = 0, \quad (65)$$

where $\pi_t = P_t/P_{t-1}$ is gross inflation. The forward-looking term from the baseline case disappears because a firm's current price choice does not affect future adjustment costs when they are defined relative to the aggregate price level.

Linearizing around a zero-inflation steady state ($\pi_t = 1$) delivers the static New Keynesian Phillips Curve:

$$\pi_t = \lambda mc_t, \quad (66)$$

Utilizing once again the household labour supply condition $w_t = \varphi n_t + \sigma c_t$ together with market clearing $c_t = n_t$, real marginal cost can be expressed as $mc_t = (\sigma + \varphi)c_t$. Substituting this into the Phillips curve yields:

$$\pi_t = \lambda(\sigma + \varphi)c_t = \kappa c_t, \quad (67)$$

which links inflation directly to the real economic activity without any expectations term.

Appendix C: Optimal Subsidy

The case of the optimal subsidy. In what follows, I utilize assumptions from Bilbiie (2024) for the ease of exposition. The profit function of firms is: $D_t(k) = (1 + \tau^S) \frac{P_t(k)Y_t(k)}{P_t} - W_t N_t(k) - T_t^F$ with τ^S being the optimal subsidy invoking marginal costs pricing and T_t^F tax on firms' profits. Hence, defining $\tau^S = \frac{1}{\varepsilon - 1}$ and financing the subsidy by firms tax yields in $D_t = Y_t - W_t N_t$. Steady state profits are zero while writing $d_t = \frac{D_t - D}{Y}$ with D and Y standing for profits and output steady state value gives us $d_t = -w_t$.

The case without the optimal subsidy. Note that $d_t = -w_t$ results from the market clearing condition of $c_t = w_t + n_t + d_t$ when applying the constant returns to scale production function and the optimal subsidy. Not assuming the optimal subsidy would lead to a different market clearing condition $c_t = \frac{w_t + n_t}{\mathcal{M}} + d_t$ where again $d_t = \frac{D_t - D}{Y}$ and \mathcal{M} stands for the gross markup. Put differently, the profits equation is $d_t = c_t - \frac{w_t + n_t}{\mathcal{M}} = (1 - \frac{1}{\mathcal{M}})c_t - \frac{w_t}{\mathcal{M}}$.

Appendix D: The Case of the Forward-Looking Phillips Curve

In this section, I formally show that working with a forward-looking rather than a static Phillips curve does not qualitatively alter the positive consumption response shown in the main text. The model remains the standard New Keynesian framework following Galí (2015), as in Section 2. The only difference is that I now employ the forward-looking NK Phillips curve: $\pi_t = \beta \mathbb{E}_t \pi_{t+1}^f + \lambda w_t$.

At this stage, I differentiate between firms' and households' inflation expectations. The notation used for households in the main text already includes the belief-shock component, which does not apply to firms' expectations, since the analysis focuses on the pure effect of households' inflation expectations.

Repeating the same steps as in the main text yields:

$$c_t = \frac{\mathbb{E}_t \pi_{t+1}}{\lambda(\sigma + \varphi)} - \frac{\beta}{\lambda(\sigma + \varphi)} \mathbb{E}_t \pi_{t+2}^f - \frac{\phi \pi \beta}{\sigma} \mathbb{E}_t \pi_{t+1}^f - \frac{\phi \pi \lambda (\sigma + \varphi)}{\sigma} c_t + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma}, \quad (68)$$

where the firms' side inflation expectations terms capture the forward-looking pricing channel through which a household belief shock today influences the expected inflation path that households will later face. Rearranging gives:

$$c_t = \Theta \left\{ \frac{\mathbb{E}_t \pi_{t+1}}{\lambda(\sigma + \varphi)} - \frac{\beta}{\lambda(\sigma + \varphi)} \mathbb{E}_t \pi_{t+2}^f - \frac{\phi \pi \beta}{\sigma} \mathbb{E}_t \pi_{t+1}^f + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma} \right\}, \quad (69)$$

where $\Theta = \frac{\sigma}{\sigma + \phi \pi \lambda (\sigma + \varphi)}$ is again the same monetary-policy scaling factor as in the main text. Hence, the consumption response can be decomposed as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t \pi_{t+1}} = \Theta \left\{ \underbrace{\frac{1}{\lambda(\sigma + \varphi)}}_{\text{real income effect}} + \underbrace{\frac{1}{\sigma}}_{\text{EIS}} - \frac{\beta}{\lambda(\sigma + \varphi)} \frac{\partial \mathbb{E}_t \pi_{t+2}^f}{\partial \mathbb{E}_t \pi_{t+1}} \right\}, \quad (70)$$

where I assume an informational hierarchy such that households receive an idiosyncratic inflation signal (the belief shock) that is not observed by firms at time t . Given that the analysis focuses

exclusively on the effect of households' inflation expectations, the belief shock is not applied on the firms' side, implying $\frac{\partial \mathbb{E}_t \pi_{t+1}^f}{\partial \mathbb{E}_t \pi_{t+1}} = 0$. However, the increase in inflation at $t + 1$ after positive consumption response pushes endogenous firms' inflation expectations at $t + 2$ upward, thereby partially crowding out the positive general equilibrium effects.

Nevertheless, the qualitative conclusion of an always-positive effect of a change in households' inflation expectations is not altered. One can show that equation 70 is positive if and only if:

$$\frac{\partial \mathbb{E}_t \pi_{t+2}^f}{\partial \mathbb{E}_t \pi_{t+1}} < \frac{1}{\beta} + \frac{\lambda(\sigma + \varphi)}{\beta \sigma} \quad (71)$$

This condition is clearly satisfied for any standard, determinate New Keynesian parameterization.

Appendix E: Bounded Rationality

In the following paragraphs, I elaborate on the cognitive discounting of Gabaix (2020) that I use in the sections related to myopia. Consider a state vector X_t (including also shock innovations and announced policies). The state vector can be in equilibrium defined as follows:

$$X_{t+1} = G^X(X_t, \varepsilon_{t+1}), \quad (72)$$

with G^X denoting an equilibrium transition function and ε_{t+1} standing for zero mean innovations. Assuming that X_t has been demeaned and linearizing, we can write:

$$X_{t+1} = \Gamma X_t + \varepsilon_{t+1}, \quad (73)$$

where Γ is a matrix and ε_{t+1} might have been renormalized. This can be in accordance with Gabaix (2020) called the objective reality.

We assume that agents can see the reality differently, though. Specifically, agents do not understand the objective reality perfectly. What is more, their understanding of future events is decaying over time. Thus, it is more difficult to see what happens far in the future. Formally, agents perceive the following law of motion for the state vector:

$$X_{t+1} = \bar{m} G^X(X_t, \varepsilon_{t+1}), \quad (74)$$

where one can think about \bar{m} as a parameter measuring attention that agents pay the future events. Thus, $\bar{m} \in (0, 1]$ holds. For value $m = 1$ it boils down back to the fully rational case. Linearizing gives:

$$X_{t+1} = \bar{m}(\Gamma X_t + \varepsilon_{t+1}) \quad (75)$$

Equations 73 and 75 reveal a difference between the expectations of the fully rational agent and the myopic agent. While the former agent expects $\mathbb{E}_t[X_{t+1}] = \Gamma X_t$, the myopic one $\mathbb{E}_t^{BR}[X_{t+1}] = \bar{m}\Gamma X_t$, where \mathbb{E}_t^{BR} stands for "boundedly rational" expectation. Reshuffle it iteratively for k period yields $\mathbb{E}_t[X_{t+k}] = \Gamma^k X_t$ and $\mathbb{E}_t^{BR}[X_{t+k}] = \bar{m}^k \Gamma^k X_t$. These two expectations can be connected as follows:

$$\mathbb{E}_t^{BR}[X_{t+k}] = \bar{m}^k \mathbb{E}_t[X_{t+k}], \quad (76)$$

with $\mathbb{E}_t^{BR}[X_{t+k}]$ denoting the subjective expectation while $\mathbb{E}_t[X_{t+k}]$ the rational expectation.

The discounting of the state vector means that all perceived variables incorporate some cognitive discounting. For any variable $z(X_t)$ with $z(0) = 0$ and a given row vector b_X^z , linearization results in $z(X) = b_X^z X$. Hence, the following equivalence holds:

$$\mathbb{E}_t^{BR}[z(X_{t+k})] = \mathbb{E}_t^{BR}[b_X^z X_{t+k}] = b_X^z \mathbb{E}_t^{BR}[X_{t+k}] \quad (77)$$

and by deploying the definition of boundedly rational expectation:

$$b_X^z \mathbb{E}_t^{BR}[X_{t+k}] = b_X^z \bar{m}^k \mathbb{E}_t[X_{t+k}] = \bar{m}^k \mathbb{E}_t[b_X^z X_{t+k}] = \bar{m}^k \mathbb{E}_t[z(X_{t+k})], \quad (78)$$

whence we establish Lemma 1 in Gabaix (2020):

$$b_X^z \mathbb{E}_t^{BR}[X_{t+k}] = \bar{m}^k \mathbb{E}_t[z(X_{t+k})] \quad (79)$$

Appendix F: NK Model with Sticky Prices and Perfectly Sticky Wages

In this section, I show that the results presented in the main text for the RANK model with cognitive discounting in Gabaix (2020) of $\bar{m} = 0$ can also be replicated in a New Keynesian model featuring both sticky prices and fully sticky wages. The key assumption is that the slope of the wage PC is flat.

Here, I work with both PCs, again in static form. In a standard model with both nominal rigidities, one can write:

$$\pi_t = \lambda w_t, \quad \pi_t^w = \lambda_w [-w_t + (\sigma + \varphi)c_t]$$

Further, the accounting identity $w_t = w_{t-1} + \pi_t^w - \pi_t$ must hold. It is straightforward to show that an NK model with both rigidities once again generates a positive consumption response, just as in the separate cases of price or wage stickiness.

Utilizing the three equations above, normalizing $\pi_{t-1} = 0$, and moving one period ahead, we obtain:

$$\mathbb{E}_t c_{t+1} = \left(\frac{1 + \lambda + \lambda_w}{\lambda} \right) \left[\frac{1}{\lambda_w(\sigma + \varphi)} \right] \mathbb{E}_t \pi_{t+1} \quad (80)$$

Hence, the Euler equation can be written as:

$$c_t = \Theta \left\{ \left(\frac{1 + \lambda + \lambda_w}{\lambda} \right) \left[\frac{1}{\lambda_w(\sigma + \varphi)} \right] \mathbb{E}_t \pi_{t+1} + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma} \right\}, \quad (81)$$

which implies the following consumption response:

$$\frac{\partial c_t}{\partial \mathbb{E}_t \pi_{t+1}} = \Theta \left\{ \left(\frac{1 + \lambda + \lambda_w}{\lambda} \right) \left[\frac{1}{\lambda_w(\sigma + \varphi)} \right] + \frac{1}{\sigma} \right\} \quad (82)$$

As before, the total effect is always positive.

Next, I consider the limiting case in which wages are completely rigid in every period; that is, $w_t^n = 0$ for all t . This directly implies $\pi_t^w = 0$, and since $w_t = -p_t$ for all t , it follows that:

$$\mathbb{E}_t c_{t+1} = -\frac{\mathbb{E}_t p_{t+1}}{\sigma + \varphi} \quad (83)$$

The Euler equation becomes:

$$c_t = \Theta \left\{ -\frac{\mathbb{E}_t p_{t+1}}{\sigma + \varphi} + \frac{\mathbb{E}_t \pi_{t+1}}{\sigma} \right\}, \quad (84)$$

which, after treating the current price level as given, yields the consumption response:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left\{ -\frac{1}{\sigma + \varphi} + \frac{1}{\sigma} \right\} \quad (85)$$

This expression exactly matches the result obtained in the main text for the case of cognitive discounting with $\bar{m} = 0$.

Appendix G: Threshold for a Negative Consumption Response in Bilbiie (2024)

Starting from expression 30, the total consumption response is positive if and only if:

$$\frac{1}{\sigma} > u \left[\frac{(1 + \varphi)(1 - \lambda^H) - \varphi(1 - \tau^d)}{(\sigma + \varphi)(1 - \lambda^H)} \right] + (1 - u) \left[\frac{(1 + \varphi)\lambda^H - \varphi\tau^d}{(\sigma + \varphi)\lambda^H} \right], \quad (86)$$

this inequality can be rearranged as:

$$\tau^d \left[\frac{\varphi\sigma u}{(1 - \lambda)} - \frac{\varphi(1 - u)\sigma}{\lambda} \right] < (\sigma + \varphi) - \frac{\sigma(1 + \varphi)(1 - \lambda)u}{(1 - \lambda)} + \frac{\varphi\sigma u}{(1 - \lambda)} - \frac{\sigma(1 + \varphi)\lambda(1 - u)}{\lambda} \quad (87)$$

Hence, the threshold value of the redistribution parameter above which profits no longer offset the expected negative real income effect enough to keep the total consumption response positive is:

$$\tau^d < \alpha \left[(\sigma + \varphi) - \sigma(1 + \varphi) + \frac{\varphi\sigma u}{(1 - \lambda)} \right], \quad (88)$$

where

$$\alpha = \left[\frac{\varphi\sigma u}{(1 - \lambda)} - \frac{\varphi(1 - u)\sigma}{\lambda} \right]^{-1}$$

This inequality must hold for the consumption response to remain positive. Note that setting $u = 1$ collapses the expression to the threshold equation 36 reported in the main text.

Appendix H: Comparison of Bilbiie (2008) to Broer et al. (2020)

In what follows, I show that the TANK model of Bilbiie (2008) with $\tau^d = 1$ yields the same result for $\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}}$ as the stylized HANK model of Broer et al. (2020). Following Bilbiie (2008), the equilibrium conditions for the unconstrained type of households are:

$$c_t^U = \mathbb{E}_t c_{t+1}^U - \frac{1}{\sigma} (i_t - \mathbb{E}_t \pi_{t+1} - \rho), \quad (89)$$

$$w_t = \varphi n_t^U + \sigma c_t^U, \quad (90)$$

while the market clearing is as follows:

$$c_t^U = w_t + n_t^U + \frac{1 - \tau^d}{1 - \lambda^H} d_t, \quad (91)$$

and for specific value of $\tau^d = 1$ results in:

$$c_t^U = w_t + n_t^U \quad (92)$$

Given that equations 89, 90, and 92 are equivalent to equations 37, 38, and 39 from the main text, the consumption response of the unconstrained households to higher expected inflation while assuming the absence of propagation into nominal wages in the model of Bilbiie (2008) is the same as the response of *workers* in the model of Broer et al. (2020).

However, the models behave the same only in terms of the equivalence of $\frac{\partial c_t^U}{\partial \mathbb{E}_t p_{t+1}} = \frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}}$. Otherwise, the models differ because the profits enter the market clearing of hand-to-mouth households in the TANK of Bilbiie (2008): $c_t^H = w_t + n_t^H + \frac{\tau^d}{\lambda^H} d_t = w_t + n_t^H + \frac{1}{\lambda^H} d_t$. Consequentially, the reaction on monetary policy shock exposition between the standard RANK and the model of Broer et al. (2020) holds also for the TANK model as changes in profits will alter labour supply of hand-to-mouth households. Nevertheless, I focus only on the consumption response on expected inflation and refrain from any other channels.

Appendix I: Consumption Response in the Stylized HANK Model

In the main text, we derive that the total consumption response in the stylized HANK model follows:

$$-\frac{1 + \varphi}{\sigma + \varphi} + \frac{1}{\sigma},$$

which straightforwardly results in zero if $\sigma = 0$:

$$-\frac{1 + \varphi}{1 + \varphi} + 1 = 0 \quad (93)$$

On the other hand, to obtain a positive consumption response, it is simple to show that $\sigma < 1$ must hold:

$$-\frac{1+\varphi}{\sigma+\varphi} + \frac{1}{\sigma} > 0 \quad (94)$$

$$\frac{1+\varphi}{\sigma+\varphi} < \frac{1}{\sigma} \quad (95)$$

$$(1+\varphi)\sigma < \sigma+\varphi \quad (96)$$

$$\varphi\sigma < \varphi \quad (97)$$

$$\sigma < 1, \quad (98)$$

while, by the same token, the opposite is true for the negative consumption response, which prevails if $\sigma > 1$:

$$-\frac{1+\varphi}{\sigma+\varphi} + \frac{1}{\sigma} < 0 \quad (99)$$

$$\sigma > 1 \quad (100)$$

Appendix J: Consumption Decomposition Under Greenwood et al. (1988) Preferences

This appendix extends the consumption decomposition in the main text by replacing the separable CRRA utility specification with Greenwood et al. (1988) preferences. The structure of the model is otherwise unchanged, both in the representative-agent benchmark and in the stylized workers-capitalists HANK framework. However, households are assumed to have preferences of the form $U(C_{jt}, N_{jt}) = \frac{1}{1-\sigma} \left(C_t - \frac{N_t^{1+\varphi}}{1+\varphi} \right)^{1-\sigma}$. The reason for doing so is to redo the decomposition while abstracting from the fact that, under CRRA preferences, σ affects not only the EIS but also the wealth effect on labour supply. This analysis therefore entirely shuts down the labour supply wealth effect by adopting the preferences of Greenwood et al. (1988).

Representative agent benchmark. In the RANK model, the households' first-order conditions, already expressed in log-linearized form, are given by:

$$x_t = \mathbb{E}_t x_{t+1} - \frac{1}{\sigma} (i_t - \mathbb{E}_t \pi_{t+1}) \quad (101)$$

$$w_t = \varphi n_t \quad (102)$$

The first condition follows from the Euler equation expressed in terms of the GHH composite, $X_t \equiv C_t - \frac{N_t^{1+\varphi}}{1+\varphi}$, while the second condition reflects the absence of a wealth effect on labour supply implied by Greenwood et al. (1988) preferences.

Utilizing the log-linearized composite index, $x_t = \frac{C}{\bar{X}} c_t - \frac{N^{1+\varphi}}{\bar{X}} n_t$, and goods market clearing, $c_t = n_t$, enables to write the consumption Euler equation as:

$$c_t = \frac{\mathbb{E}_t w_{t+1}^n - \mathbb{E}_t p_{t+1}}{\varphi} - \frac{1}{\sigma_{GHH}} (i_t - \mathbb{E}_t \pi_{t+1} - \rho), \quad (103)$$

where, for notational convenience, the effective intertemporal elasticity parameter is defined as $\frac{1}{\sigma^{GHH}} \equiv \left(\frac{X}{C-N^{1+\varphi}}\right) \frac{1}{\sigma}$. Proceeding analogously to the main text regarding the rest of the model and imposing $\bar{m} = 0$ again, the resulting consumption response is given by:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left(-\frac{1}{\varphi} + \frac{1}{\sigma^{GHH}} \right), \quad (104)$$

with the monetary policy scaling factor this time defined as $\Theta = \frac{\sigma}{\sigma + \phi_\pi \lambda \varphi}$.

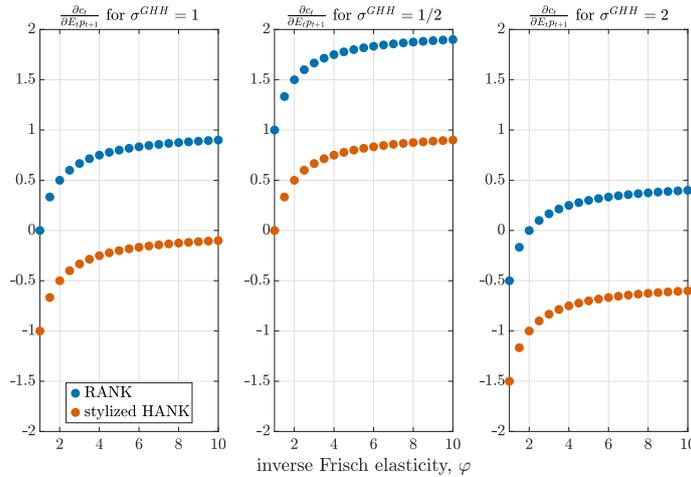
Workers-capitalists framework. The same decomposition can be derived within the workers-capitalists model of Broer et al. (2020), now assuming Greenwood et al. (1988) preferences. Workers do not receive profits and therefore, after the same steps as above, satisfy the Euler equation:

$$c_t = \frac{1 + \varphi}{\varphi} \mathbb{E}_t (w_{t+1}^n - p_{t+1}) - \frac{1}{\sigma^{GHH}} (i_t - \mathbb{E}_t \pi_{t+1} - \rho), \quad (105)$$

and hence the corresponding consumption response is:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \Theta \left(-\frac{1 + \varphi}{\varphi} + \frac{1}{\sigma^{GHH}} \right) \quad (106)$$

Figure 6: Total Consumption Response Under GHH (1988)



Note: Comparison of the total effect of current consumption on the expected change in inflation between the RANK and stylized HANK models under Greenwood et al. (1988) preferences.

Comparison. I present the comparison in a manner analogous to the main text (Figure 3). The only difference in Figure 6 is that the Greenwood et al. (1988) utility specification eliminates the wealth effect on labour supply.⁵⁰ I again normalize $\Theta = 1$ by setting $\phi_\pi = 0$. Further, I plot the consumption response for the composite σ^{GHH} , as I do not intend to form any assumptions on the steady state values of C and N for the sake of this analysis.^{51,52}

⁵⁰ In this figure, the range of the Frisch parameter φ is restricted to empirically plausible values, with $\varphi = 1$ as the lower bound, in order to avoid distortions in the scale of the plots.

⁵¹ The dependence on both σ and φ is a direct implication of preference non-separability under Greenwood et al. (1988) utility function. Note that the analysis does not aim to decompose or interpret the composite parameter σ^{GHH} itself, but uses it solely as a convenient reduced-form representation of the intertemporal consumption response under Greenwood et al. (1988) preferences. The main point of this section is only to highlight the consequences of the labour supply wealth effect absence while keeping the EIS comparable to the main text analysis.

⁵² Hence, I always vary the remaining components of σ^{GHH} to keep it constant across various values of φ .

The absence of the labour supply wealth effect reinforces the results from the main text. In the RANK model, the consumption response remains positive for all empirically plausible values of φ when $\sigma^{GHH} = 1$, while it can turn negative in the HANK model.

Moreover, for values of σ^{GHH} above one, consumption falls on impact even in the RANK framework at sufficiently high Frisch elasticities, although it remains positive for values of φ supported by the empirical evidence in Chetty (2012) and Elminejad et al. (2024).

Appendix K: Empirical (Ir)relevance of the Profits Income Channel

My theoretical analysis shows that whether households adjust their expectations of profits in response to higher expected inflation, under conditions of low passthrough into nominal wages, leads to sharp qualitative differences in New Keynesian models. The consumption response can differ substantially depending on whether the profits income channel is active or dampened. In what follows, I provide tentative empirical evidence suggesting that this channel may in fact be irrelevant for the passthrough from households' inflation expectations into their expectations of real income.

Database. I combine two datasets from the Federal Reserve Bank of New York: the Survey of Consumer Expectations (SCE) and the SCE Household Finance Survey. From the SCE core module I use one-year-ahead inflation and real income expectations, and from the finance module I take each household's share of financial wealth held in stocks. The sample covers 2016–2019, when both surveys were available and could be merged.⁵³ I restrict the sample to data up to August 2019, as the SCE Household Finance Survey ceased publicly reporting stock ownership thereafter.

Identification strategy. I estimate the effect of inflation expectations on expected real income, distinguishing between households with and without exposure to profits income, where stock ownership serves as a proxy for such exposure. The slope on inflation expectations is allowed to vary continuously with households' stock-market exposure. To address the endogeneity of inflation expectations, I instrument them using released Consumer Price Index (CPI) inflation and its interaction with stock exposure.

The instrument is constructed as the first principal component of contemporaneous and twelve-month-averaged CPI inflation, interacted with each household's stock-exposure share.⁵⁴ The estimation is carried out at the individual level with survey weights and standard errors clustered by month. I also control for demographic and socioeconomic characteristics such as age, income, education, and region.

Identification exploits common monthly inflation news interacted with the cross-sectional distribution of stock ownership, which generates within-month heterogeneity in exposure to aggregate inflation shocks. This approach tests whether the relationship between expected real income and

⁵³ The sample begins in 2016, when the SCE Household Finance Survey was first harmonized with the Core module and began reporting the share of financial wealth held in stocks in a consistent format. Earlier waves contain irregular and partially incompatible asset composition questions, making the pre-2016 data unsuitable for constructing a continuous stock-exposure measure.

⁵⁴ The use of the first principal component ensures that the instrument captures the common component of current and lagged inflation dynamics, rather than arbitrarily selecting one measure. Both contemporaneous CPI inflation and its twelve-month moving average may convey relevant information for expectation formation: the former reflects short-term price signals that households directly observe, while the latter captures persistent inflation trends that are more salient for longer-horizon expectations.

inflation expectations varies with stock exposure; i.e., whether the profits income channel is empirically relevant.

Formally, I estimate the system:

$$y_{it} = \alpha + \beta \pi_{it}^e + \theta (\pi_{it}^e \times s_i) + \gamma s_i + \mathbf{X}_{it}' \delta + \varepsilon_{it}, \quad (107)$$

$$\pi_{it}^e = \phi_0 + \phi_1 z_t + \phi_2 (z_t \times s_i) + \phi_3 s_i + \mathbf{X}_{it}' \rho + v_{it}, \quad (108)$$

$$\pi_{it}^e \times s_i = \psi_0 + \psi_1 z_t + \psi_2 (z_t \times s_i) + \psi_3 s_i + \mathbf{X}_{it}' \kappa + \eta_{it}, \quad (109)$$

where y_{it} denotes expected real income, π_{it}^e household i 's inflation expectation at time t , s_i the standardized share of wealth held in stocks (proxying for exposure to profits income), and \mathbf{X}_{it} a vector of demographic and socioeconomic controls. The excluded instruments are aggregate CPI inflation z_t and its interaction with stock exposure, $z_t \times s_i$.

In this framework, both π_{it}^e and its interaction with stock exposure are treated as endogenous and instrumented jointly. The parameter β captures the effect of inflation expectations on expected real income for households without stock exposure, while θ measures how this effect changes with greater exposure. Identification therefore comes from the interaction between aggregate inflation shocks and cross-sectional heterogeneity in financial exposure, allowing us to reveal whether expected inflation has different expected real income implications for stockholders and non-stockholders. I present the results in Table 1.

Results. The Two-Stage Least Squares (2SLS) estimates show a significantly negative response of expected real income to expected inflation for households with no stock exposure. Specifically, a one-percentage-point increase in expected inflation lowers expected real income by about 0.65 percentage points.⁵⁵ The interaction term, differentiating the group of stockholders, is statistically insignificant, indicating that the passthrough does not meaningfully differ across levels of stock ownership.

Quantitatively, a one-standard-deviation increase in stock exposure, which is roughly seven percentage points of financial wealth held in stocks, makes the slope even more negative, specifically about 0.2 percentage points. Therefore, stockholders do not perceive the relationship between inflation expectations and expected real income in a different direction from non-stockholders. In other words, both stockholders and non-stockholders perceive higher expected inflation as reducing their expected real income, suggesting that the profits income channel is empirically irrelevant regarding the passthrough from inflation expectations into income expectations.⁵⁶

Robustness. The first-stage diagnostics reveal that the instrument is considerably weaker for households without stock exposure ($F - stat. = 2.3$) than for the interaction term involving stockholders ($F - stat. = 15.5$). To verify that this limited first-stage strength does not distort the baseline inference, I re-estimate the specification using the Limited Information Maximum Likelihood (LIML) estimator, which is less biased in the presence of weak instruments. The LIML results confirm the baseline pattern, as shown in Table 1.

⁵⁵ Note that this would yield the passthrough from inflation expectations to nominal income to be 0.35. Higher than value presented in Hajdini et al. (2023), but still rather low.

⁵⁶ I also estimate the 2SLS specification using alternative definitions of stockholders. To ensure that the irrelevance of stockholder exposure is not driven by households with only negligible stock holdings, I restrict the sample to those holding at least 10% and 20% of their financial wealth in stocks. The results remain qualitatively unchanged, as shown in Appendix L.

Table 1: Effect of inflation expectations on expected real income

	Dependent variable: expected real income	
	2SLS	LIML
Inflation expectations (π^e)	−0.649** (0.250)	−0.852*** (0.038)
Interaction: $\pi^e \times$ stock exposure (s)	−0.226 (0.263)	0.041 (0.032)
Observations	2,035	2,035
Adj. R ²	0.34	–

Notes: Both columns report instrumental variable estimates using survey weights and standard errors clustered by month. Stock exposure (s) denotes each household's share of financial wealth held in stocks, standardized to mean 0 and standard deviation 1 (roughly 6.6 percentage points of financial wealth in stocks per +1 SD). *Significance:* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The estimated effect of expected inflation on expected real income for non-stockholders remains large and negative (around -0.85), while the marginal difference for stockholders is small and statistically insignificant (about $+0.04$), hence it cannot sufficiently counteract the negative component.⁵⁷ Thus, even after accounting for possible weak-instrument bias, the evidence continues to indicate that both stockholders and non-stockholders perceive higher expected inflation as reducing their expected real income. The profits income channel therefore appears empirically irrelevant in shaping the passthrough from inflation expectations to income expectations.

Appendix L: Robustness Checks of Empirical Validation

Alternative stockholder definitions. To ensure that the findings are not driven by the inclusion of households with only marginal equity exposure, I re-estimate the specification using two alternative thresholds for defining stockholders: those holding at least 10% and 20% of their financial wealth in stocks. As shown in Table 2, the results are qualitatively consistent across both definitions.

The effect of expected inflation on expected real income for non-stockholders remains negative and statistically significant, while the interaction term for stockholders is always statistically insignificant and changes sign depending on the threshold. This instability, coupled with the lack of significance, indicates that the profits-income channel is empirically weak and does not systematically alter how households perceive the real income implications of expected inflation.

Appendix M: Habit Formation in Consumption

This subsection introduces habit formation into the baseline framework to examine how it alters the consumption response to higher inflation expectations. Allowing current utility to depend on past consumption makes households smoother and less responsive to intertemporal incentives. As a result, habit formation effectively lowers the elasticity of intertemporal substitution, dampening the positive substitution effect that drives consumption in the standard model. The goal is to show that while habits modify the quantitative magnitude of the response, they do not overturn the core

⁵⁷ This result is closer to the estimate of Hajdini et al. (2023), as it gets the passthrough to be around 0.15.

Table 2: Effect of inflation expectations on expected real income: robustness to stockholder definitions

	Dependent variable: expected real income	
	≥10% stockholders	≥20% stockholders
Inflation expectations (π^e)	-0.743** (0.258)	-0.649* (0.373)
Interaction: $\pi^e \times$ stockholder dummy	0.550 (1.397)	-1.043 (3.005)
Observations	2,035	2,035
Adj. R ²	0.37	0.35

Notes: Two stage least squares estimates with survey weights and standard errors clustered by month. Each column redefines the stockholder dummy based on the share of financial wealth held in stocks: column (1) uses a 10 percent threshold and column (2) a 20 percent threshold. The interaction term captures whether the effect of inflation expectations on expected real income differs for stockholders. *Significance:* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

mechanism: with low passthrough from inflation expectations to nominal wages, the real income channel remains the decisive force shaping the direction of consumption.

External habit formation. In what follows, I return to the baseline RANK model introduced in Section 2. The only difference is that the utility function is now $U(C_t, N_t) = \frac{(C_t - hC_{t-1})^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi}$, with h denoting external habit formation (Abel, 1990; Campbell and Cochrane, 1999).

The log-linearized Euler equation takes the form:

$$c_t = \frac{\mathbb{E}_t c_{t+1}}{1+h} + \frac{h}{1+h} c_{t-1} - \frac{(1-h)}{(1+h)} \frac{1}{\sigma} (i_t - \mathbb{E}_t \pi_{t+1} - \rho). \quad (110)$$

Habit formation also modifies the labour supply condition, which is given by:

$$\varphi n_t = w_t - \frac{\sigma}{1-h} (c_t - h c_{t-1}), \quad (111)$$

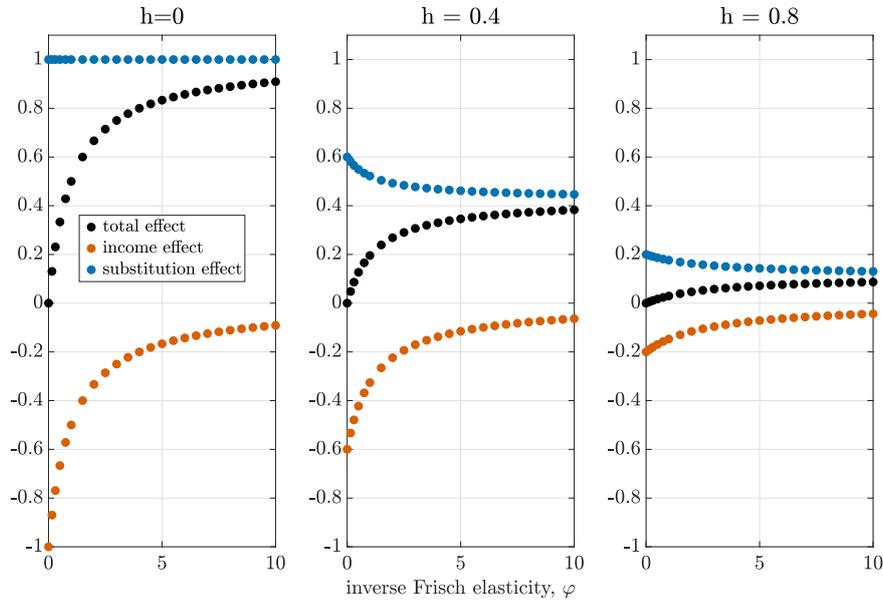
while the rest of the model is as in Section 2.

I leave the detailed derivation to Appendix N, since it does not differ from the steps in the previous sections. The total consumption response is then given by:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[\underbrace{-\frac{1-h}{[(1-h)\varphi + \sigma](1+h)}}_{\text{real income effect}} + \underbrace{\frac{1-h}{(1+h)\sigma}}_{\text{EIS}} \right] \quad (112)$$

where $\delta = \left[1 - \frac{\sigma h}{[(1-h)\varphi + \sigma](1+h)} + \frac{(1-h)}{(1+h)\sigma} \frac{\phi \pi \kappa}{\sigma} \right]^{-1}$. If I again focus on the case where the central bank uses inflation expectations as a policy tool under the ELB and plot the decomposition relative to the model without habit formation, the differences are only quantitative, as shown in Figure 7.⁵⁸

⁵⁸ In the interest rate peg case, we obtain $\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = -\frac{(1-h)}{(1-h)[\varphi(1+h)] + \sigma} + \frac{(1-h)[(1-h)\varphi + \sigma]}{\{(1-h)[\varphi(1+h)] + \sigma\} \sigma}$.

Figure 7: Consumption Response with Habit Formation

Note: Total consumption response and its decomposition for RANK with habit formation.

Stronger habit formation scales down both effects in absolute value and, overall, leads to a more muted total consumption response, even though the reaction always remains positive. Thus, incorporating habit formation, consistent with the standard medium-scale DSGE setup, does not alter the qualitative conclusions of my analysis in Section 2. As formally stated in Corollary 1:

Corollary 1. *As long as $h < 1$ and $\varphi > 0$, the EIS effect dominates the negative real income channel.*

$$\text{Hence, } \frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[-\frac{1-h}{[(1-h)\varphi + \sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right] > 0.$$

Proof. See Appendix O. □

Put differently, as in the benchmark RANK model without habit formation, the total consumption response remains positive for any reasonable parameterization of the model.

M.1 Stylized HANK with Habit Formation

To merge the outcomes from the analysis of the stylized HANK model that abstracts from the profits income channel with the results of the habit formation analysis, I use the same model as in subsection 3.2, but this time with habit formation in households' utility function. Since all the steps are repeated in the same way as before, I leave the detailed derivations to Appendix P and proceed directly with the total consumption response and its decomposition, which takes the following form:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[\underbrace{-\frac{(1-h)(1+\varphi)}{[(1-h)\varphi + \sigma](1+h)}}_{\text{real income effect}} + \underbrace{\frac{1-h}{(1+h)\sigma}}_{\text{EIS}} \right] \quad (113)$$

I plot the consumption response in the RANK and HANK models with habit formation under the ELB.⁵⁹ I do so for two parameterizations of the habit formation parameter, $h = 0.4$ and $h = 0.8$. Several differences emerge compared to the earlier RANK–HANK comparison without habit formation. First, with King et al. (1988) preferences, the model without a profits income channel and with habit formation produces a negative consumption response, as the real income channel under incomplete passthrough overturns the positive EIS effect.

Figure 8: Consumption Response in RANK and Stylized HANK with $h = 0.4$

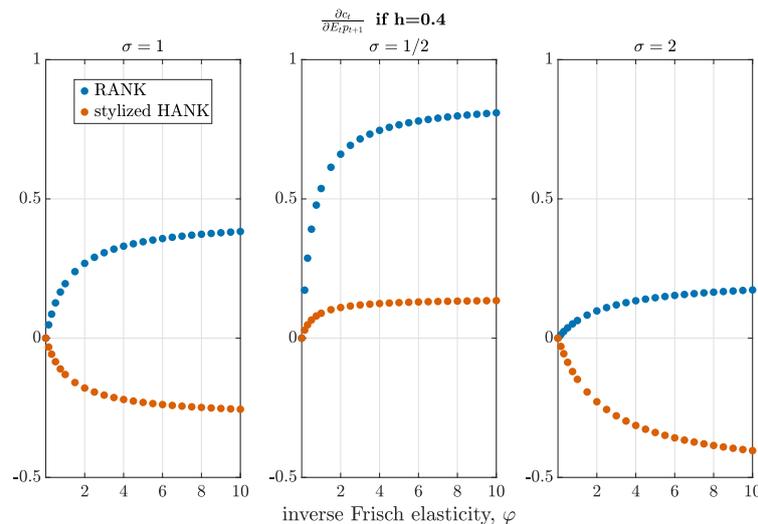
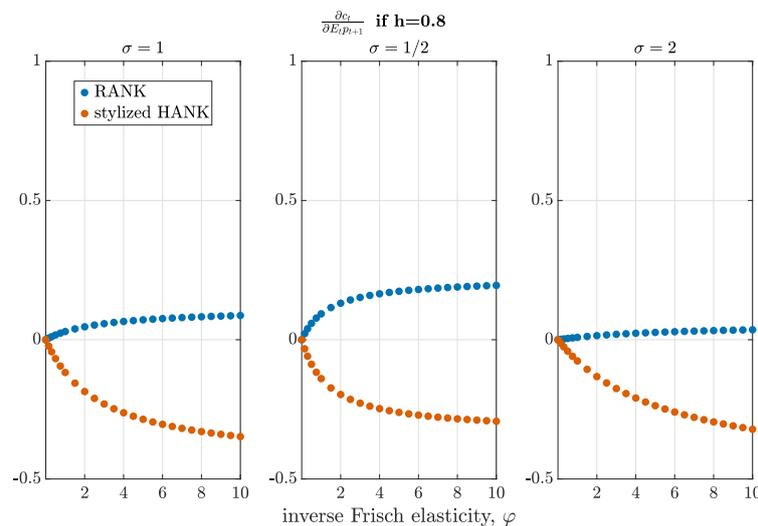


Figure 9: Consumption Response in RANK and Stylized HANK with $h = 0.8$



Note: Comparison of the total effect of consumption response in the RANK and stylized HANK models with habit formation $h = 0.4$ and $h = 0.8$, respectively.

Further, the consumption response remains positive only if the EIS is sufficiently strong relative to the degree of habit formation. Put differently, the EIS must be stronger than in the model without

⁵⁹ Under the interest rate peg assumption, equation 113 becomes $\frac{\partial c_t}{\partial E_t p_{t+1}} = -\frac{(1-h)(1+\varphi)}{(1-h)[\varphi(1+h)]+\sigma} + \frac{(1-h)[(1-h)\varphi+\sigma]}{\{(1-h)[\varphi(1+h)]+\sigma\}\sigma}$.

habit formation for the consumption response to remain positive. Considering equation 113, I can write:

Corollary 2. For $\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[-\frac{(1-h)(1+\varphi)}{[(1-h)\varphi+\sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right] > 0$ to hold, the EIS must be sufficiently strong relative to the degree of habit formation; i.e., the condition $\sigma < (1-h)$ must be satisfied.

Proof. See Appendix Q. □

Corollary 2 clearly rules out any possibility of $EIS < 1$ ($\sigma > 1$) yielding a positive consumption response. Values of the habit parameter consistent with the empirical evidence, as shown in Havranek et al. (2017), require the EIS to be significantly above one. This, however, stands in contrast to the empirical evidence on the EIS itself (see Havranek, 2015).

Therefore, when both parameters are calibrated to the data and combined with low passthrough from inflation expectations to nominal wage expectations, the stylized HANK model generates a negative total consumption response. Hence, while accounting for habit formation does not qualitatively alter the analysis in the RANK model, it becomes important in the model without a profits income channel, as it makes a negative consumption response the outcome under a broader set of EIS values.

M.2 Necessary Passthrough Threshold with Habit Formation

I relax the assumption of zero passthrough from inflation expectations to expected nominal wages and recompute the passthrough threshold required for a positive consumption response, as in subsection 3.3 for the case without habit formation. Note that I again work with the stylized HANK model that abstracts from the role of profits in expected income and consumption, and I focus on the empirically relevant case of an EIS parameterization with $\sigma > 1$.

I fully follow subsection 3.3 here. Denoting expected nominal wage by $\mathbb{E}_t w_{t+1}^n = \Omega \mathbb{E}_t p_{t+1}$ implies an expected real wage of $\mathbb{E}_t w_{t+1} = (\Omega - 1) \mathbb{E}_t p_{t+1}$. Hence, equation 113 can be rewritten as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[(\Omega - 1) \frac{(1-h)(1+\varphi)}{[(1-h)\varphi+\sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right] \quad (114)$$

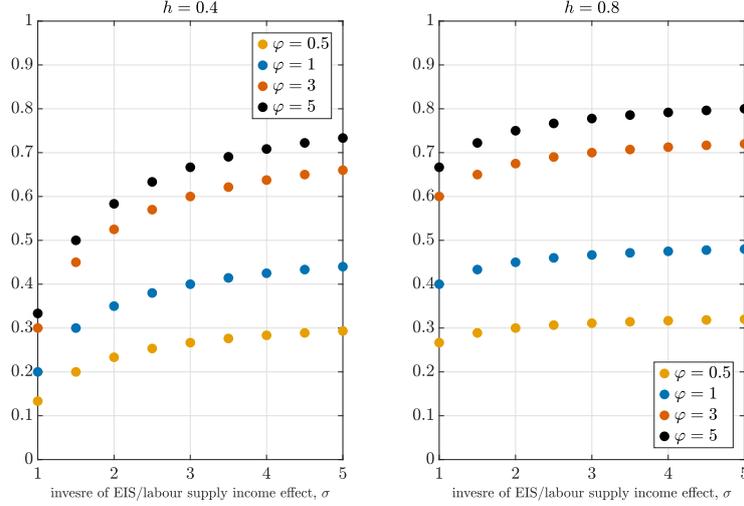
The passthrough required for a positive total consumption response is therefore:

$$\Omega > 1 - \frac{[(1-h)\varphi+\sigma]}{(1+\varphi)\sigma} \quad (115)$$

I plot the passthrough values for two cases, $h = 0.4$ and $h = 0.8$. The presence of habit formation clearly shifts the passthrough threshold upward, and the threshold increases in h .

For empirically plausible values of σ , φ , and h reported in Havranek (2015), Elminejad et al. (2024), and Havranek et al. (2017), the threshold lies substantially above the passthrough values docu-

Figure 10: Necessary Thresholds of Ω if $\sigma > 1$ and with $h = \{0.4, 0.8\}$



Note: Necessary thresholds of the passthrough parameter Ω that delivers $\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} > 0$ for $\sigma > 1$ while assuming different φ in the stylized HANK model with habit formation calibrated to $h = 0.4$ and $h = 0.8$, respectively.

mented in the empirical evidence of Hajdini et al. (2023) for the United States and Aprigliano and Di Nino (2024) for the euro area.⁶⁰⁶¹

Appendix N: Habit Formation in the RANK Model: Consumption Derivation

Using the equilibrium conditions from the main text and following the same steps as before, I obtain:

$$c_t = \left[\frac{(1-h)}{(1-h)\varphi + \sigma} \right] \frac{\mathbb{E}_t w_{t+1}}{(1+h)} + \left[\frac{\sigma h}{(1-h)\varphi + \sigma} \right] \frac{c_t}{(1+h)} \quad (116)$$

$$+ \left[\frac{h}{(1+h)} + \frac{(1-h)\phi\pi\kappa\sigma h}{(1+h)\sigma(1-h)\varphi} \right] c_{t-1} - \frac{(1-h)}{(1+h)} \frac{1}{\sigma} (\phi\pi\kappa c_t - \mathbb{E}_t \pi_{t+1}) \quad (117)$$

or equivalently:

$$c_t = \delta \left\{ \frac{(1-h)}{[(1-h)\varphi + \sigma]} \frac{\mathbb{E}_t w_{t+1}}{(1+h)} + \left[\frac{h}{(1+h)} + \frac{(1-h)\phi\pi\kappa\sigma h}{(1+h)\sigma(1-h)\varphi} \right] c_{t-1} + \frac{(1-h)}{(1+h)\sigma} \mathbb{E}_t \pi_{t+1} \right\}, \quad (118)$$

where $\delta = \left[1 - \frac{\sigma h}{[(1-h)\varphi + \sigma](1+h)} + \frac{(1-h)\phi\pi\kappa}{(1+h)\sigma} \right]^{-1}$ is a scaling factor and $\kappa = \lambda \left[\frac{(1-h)\varphi + \sigma}{(1-h)(1+\varphi)} \right]$ the NKPC slope. In line with the previous models, the total consumption response decomposition can

⁶⁰ Havranek (2015) reports σ between 2 and 3. Elminejad et al. (2024) estimate φ between 2 and 4. Havranek et al. (2017) find macro studies to yield $h = 0.6$ while micro studies give $h = 0.1$, with the overall average around $h = 0.4$. Medium-scale DSGE models, however, usually embed higher values of h , more in line with the macro estimates. Combining all these values implies a threshold between 0.5 and 0.7.

⁶¹ For some euro area countries, the passthrough values reported in Aprigliano and Di Nino (2024) are consistent with the computed threshold. For the EMU as a whole, however, the value is significantly lower, placing it in the range of a negative total consumption response, as is also the case for the US data shown in Hajdini et al. (2023).

be expressed as:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left\{ \underbrace{\left[\overbrace{\left[\bar{m} \left(\frac{1+\lambda}{\lambda} \right) - 1 \right]}^{\text{GE effects}} \right]}_{\text{real income effect}} \frac{(1-h)}{[(1-h)\varphi + \sigma](1+h)} + \underbrace{\frac{1-h}{(1+h)\sigma}}_{\text{EIS}} \right\} \quad (119)$$

Assuming again $\bar{m} = 0$ for the general equilibrium reasoning on nominal wages, the consumption response is:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[- \frac{1-h}{[(1-h)\varphi + \sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right],$$

which is what we see in the main text. One may be tempted to interpret this equation as implying that habit formation in consumption dampens the positive intertemporal elasticity of substitution effect, while amplifying the negative real income channel in the absence of passthrough. However, the latter effect holds only when monetary policy counteracts the total response. As in the previous cases, I instead focus on the ELB situation, in which the central bank uses inflation expectations as a policy tool. Hence, setting $\phi_\pi = 0$, we can write:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \left[1 - \frac{\sigma h}{[(1-h)\varphi + \sigma](1+h)} \right]^{-1} \left[- \frac{1-h}{[(1-h)\varphi + \sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right], \quad (120)$$

or equivalently:

$$\begin{aligned} \frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} &= \left[\frac{(1-h)[\varphi(1+h)] + \sigma}{[(1-h)\varphi + \sigma](1+h)} \right]^{-1} \left[\frac{-(1-h)}{[(1-h)\varphi + \sigma](1+h)} + \frac{(1-h)}{(1+h)\sigma} \right] \\ &= \underbrace{- \frac{(1-h)}{(1-h)[\varphi(1+h)] + \sigma}}_{\text{real income effect}} + \underbrace{\frac{(1-h)[(1-h)\varphi + \sigma]}{\{(1-h)[\varphi(1+h)] + \sigma\}}}_{\text{EIS}} \end{aligned}$$

Appendix O: Habit Formation Corollary in the RANK Model

Starting from the condition:

$$\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[- \frac{1-h}{[(1-h)\varphi + \sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right] > 0, \quad (121)$$

I simplify to:

$$\frac{1-h}{(1+h)\sigma} > \frac{1-h}{[(1-h)\varphi + \sigma](1+h)} \quad (122)$$

$$\frac{1}{\sigma} > \frac{1}{(1-h)\varphi + \sigma} \quad (123)$$

$$(1-h)\varphi + \sigma > \sigma \quad (124)$$

which leads to:

$$(1-h)\varphi > 0 \quad (125)$$

Clearly, only the case of $h < 1$ and $\varphi > 0$ is economically meaningful.⁶² Thus, only implausible values of φ and h would satisfy $\frac{1-h}{[(1-h)\varphi+\sigma](1+h)} > \frac{1-h}{(1+h)\sigma}$.⁶³ Therefore, the qualitative result from the standard RANK model without habit formation remains unchanged.

Appendix P: Habit Formation in the Stylized HANK: Consumption Derivation

The model completely follow the *capitalists-workers* structure from subsection 3.2. The only difference is the presence of habit formation in the utility function. Thus, after utilizing *workers* market clearing condition $c_t^W = w_t + n_t$ together with their labour supply $\varphi n_t = w_t - \frac{\sigma}{1-h}(c_t^W - hc_{t-1}^W)$, their log-linearized Euler equation can be written as:⁶⁴

$$c_t^W = \left[\frac{(1-h)(1+\varphi)}{(1-h)\varphi+\sigma} \right] \frac{\mathbb{E}_t w_{t+1}}{(1+h)} + \left[\frac{\sigma h}{(1-h)\varphi+\sigma} \right] \frac{c_t^W}{(1+h)} \quad (126)$$

$$+ \left[\frac{h}{(1+h)} + \frac{(1-h)\phi\pi\kappa\sigma h}{(1+h)\sigma(1-h)\varphi} \right] c_{t-1}^W - \frac{(1-h)}{(1+h)} \frac{1}{\sigma} (\phi\pi\kappa c_t^W - \mathbb{E}_t \pi_{t+1}) \quad (127)$$

or:

$$c_t^W = \delta \left\{ \frac{(1-h)(1+\varphi)}{[(1-h)\varphi+\sigma](1+h)} \frac{\mathbb{E}_t w_{t+1}}{(1+h)} + \left[\frac{h}{(1+h)} + \frac{(1-h)\phi\pi\kappa\sigma h}{(1+h)\sigma(1-h)\varphi} \right] c_{t-1}^W + \frac{(1-h)}{(1+h)\sigma} \mathbb{E}_t \pi_{t+1} \right\}, \quad (128)$$

where again $\delta = \left[1 - \frac{\sigma h}{[(1-h)\varphi+\sigma](1+h)} + \frac{(1-h)\phi\pi\kappa}{(1+h)\sigma} \right]^{-1}$ is a scaling factor. *Workers* total consumption response of decomposition can be expressed as:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \delta \left\{ \underbrace{\left[\overbrace{\left[\bar{m} \left(\frac{1+\lambda}{\lambda} \right) - 1 \right]}^{\text{GE effects}} \right]}_{\text{real income effect}} \frac{(1-h)(1+\varphi)}{[(1-h)\varphi+\sigma](1+h)} + \underbrace{\frac{1-h}{(1+h)\sigma}}_{\text{EIS}} \right\} \quad (129)$$

Assuming $\bar{m} = 0$ gives:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[- \frac{(1-h)(1+\varphi)}{[(1-h)\varphi+\sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right]$$

⁶² The inequality also holds for $h > 1$ and $\varphi < 0$, which is outside the permissible parameterization set consistent with economic theory.

⁶³ Either $h > 1$ and $\varphi > 0$ or $h < 1$ and $\varphi < 0$ would need to hold for $\frac{\partial c_t}{\partial \mathbb{E}_t p_{t+1}} < 0$.

⁶⁴ As before, $n_t^W = n_t$ holds.

Appendix Q: Habit Formation Corollary in the Stylized HANK Model

We have the condition:

$$\frac{\partial c_t^W}{\partial \mathbb{E}_t p_{t+1}} = \delta \left[-\frac{(1-h)(1+\varphi)}{[(1-h)\varphi + \sigma](1+h)} + \frac{1-h}{(1+h)\sigma} \right] > 0, \quad (130)$$

which can be manipulated as:

$$\frac{(1-h)}{(1+h)\sigma} > \frac{(1-h)(1+\varphi)}{[(1-h)\varphi + \sigma](1+h)} \quad (131)$$

$$\frac{1}{\sigma} > \frac{(1+\varphi)}{(1-h)\varphi + \sigma} \quad (132)$$

$$(1-h)\varphi + \sigma > \sigma + \varphi\sigma \quad (133)$$

$$\sigma < (1-h) \quad (134)$$

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