



Evaluating monetary policy under preferences with zero wealth effect: A Bayesian approach



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ABSTRACT

Both real and monetary macro models have *parallelly* exploited the potential for various preferences in accounting for empirical facts. This paper brings the two literatures together by estimating time non-separable preferences with habit formation in consumption that nests several commonly used preferences. In the absence of wealth effects and external habits, these preferences fail to generate observed inflation inertia and output persistence after a monetary policy shock. Furthermore, the data strongly rejects these preferences in favor of preferences with external habits. An alternative solution is to include *habit adjusted* intermediate wealth effect preferences which are able to simultaneously generate sluggish responses of the variables to a monetary policy shock and fit the data better.

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1. Introduction

Macroeconomic models have simultaneously explored the potential of various preference structures in generating fluctuations and comovement amongst major macroeconomic aggregates which is consistent with the empirical evidence. For example, [Christiano et al. \(2005\)](#) find that preferences with habit formation in consumption can generate inflation inertia and output persistence after a monetary policy shock, which is consistent with their identified VAR estimates. In another study, [Fisher \(2006\)](#) empirically identifies investment-specific technology shocks that generate positive comovement between output, consumption, investment and labor on impact. While standard preferences fail to account for this positive comovement, preference specifications with zero wealth effect on hours as given by [Greenwood et al. \(1988, GHH hereafter\)](#) successfully resolve the comovement problem. This paper has two objectives. First, it brings the two literatures together by estimating generalized time non-separable preferences that allow the simultaneous parameterization of the strength of wealth elasticity on labor supply and external habit formation in consumption. Second, it compares and contrasts the overall performance of these preferences in explaining US data with other variants of these preferences, such as preference with habit formation, GHH, and [King et al. \(1988, KPR hereafter\)](#) preferences.

My estimated model suggests the presence of intermediate wealth effect and habit persistence in consumption. The out-of-sample forecasts indicate that while the data strongly supports preferences with external habit formation in

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consumption over all other preferences, GHH preferences perform the worst. The reason for this disparity is that in the absence of intertemporal consumption-saving choice on labor supply, GHH preferences counterfactually generate highly volatile responses of output and inflation to a monetary policy shock, offsetting any inertial effect present in the model. In addition, these preferences provide an internal amplification mechanism, making monetary policy shocks important drivers of output fluctuations at all horizons, which sits oddly with the conventional wisdom. Finally, the time non-separable preferences with external habits simultaneously induce inertial responses in the aggregates following a monetary policy shock and improve the overall explanatory power of the model compared to GHH preferences.

GHH preference specifications have been widely used recently to resolve famous puzzles in US and international data. [Raffo \(2009\)](#) identifies the potential for these preferences along with investment-specific technology shocks in resolving the international risk-sharing puzzle. Similarly, [Raffo \(2007\)](#) calibrates a two-country model featuring these preferences, which can successfully generate high volatility in consumption and countercyclical net real exports as in the data. [Monacelli and Perotti \(2008\)](#) show that these preferences can bring a rise in consumption and real wage following a positive government spending shock that is consistent with their VAR estimates. In another work, [Jaimovich and Rebelo \(2009\)](#) introduce generalized GHH preferences that generate positive comovement amongst major macroeconomic aggregates after a positive news shock to future productivity. However, the implications of these preferences for monetary policy analysis seem to be missing in the literature.

This paper *bridges the gap* by quantitatively assessing the responses of output and inflation to a monetary policy shock when the economy is characterized by GHH preferences. To accomplish this task, I estimate an augmented version of the [Smets and Wouters \(2007\)](#) model with preference structure specified by [Schmitt-Grohé and Uribe \(2012\)](#), which allows for varying wealth elasticity of labor supply and external habit formation in consumption. The advantage of considering these preferences in my context is that it nests as special cases the standard KPR preferences, GHH preferences and preferences with habit formation in consumption. The model features several nominal rigidities such as sticky price and wage setting along with backward inflation indexation, and real rigidities such as [Kimball \(1995\)](#) demand, fixed costs in production, variable capacity utilization and investment adjustment costs.

My estimated model has several findings. First, I find evidence of intermediate short-run wealth elasticity on labor hours and intermediate external habit persistence in the baseline preferences. Second, the variance decomposition exercise shows that in the absence of external habit persistence and wealth effect on labor supply, these preferences induce a strong transmission mechanism for monetary policy shocks, making them important driving forces of output, consumption, interest rate and hours at all horizons, which is in conflict with widely cited structural VAR literature.¹ Third, GHH preferences fail to generate substantial inflation inertia and output persistence. Hence, the forward-looking behavior under zero wealth effect on labor hours is so strong that it more than offsets any inertial effects due to backward indexation, wage stickiness and variable capital utilization. Finally, using log marginal likelihood and cross-correlation function comparison exercises, I evaluate the baseline model's explanatory power compared to the alternative preference specifications. I find that while the data strongly favors the model with external habit persistence over all other alternative specifications, GHH preferences give the worst fit. Furthermore, the data indicates that *habit adjusted* intermediate preferences in the baseline model induce endogenous hump-shaped dynamics that simultaneously alleviate the problem of poor dynamics in inflation and output after monetary policy shock and outperform GHH preference specifications in fitting the data.

To further investigate, I study the impact of a monetary policy shock on inflation and output under GHH and KPR preference specifications using a simple New-Keynesian model framework with no capital or saving. Following a contractionary monetary policy shock, households decrease consumption due to a rise in the real interest rate. Under constant returns to scale, marginal cost equals marginal rate of substitution. Hence, the shift in labor supply has implications for the extent to which firms need to change their pricing decisions in response to a transitory shock. Standard KPR preferences imply a cancellation of the positive substitution effect and the negative wealth effect which leads hours to be stationary in response to the shock. Log non-separable GHH preferences imply the absence of a wealth effect on labor supply, which leads to strong positive responses of hours on impact. This drives up the marginal cost and inflation responses following the shock. On the production side, nominal rigidities in price setting by monopolistically competitive firms cause labor demand to shift downwards along a constant labor supply curve implied by the GHH preferences, making the equilibrium responses of hours and output quite volatile under these preferences.

Furthermore, I consider several degrees of nominal rigidity that have observationally equivalent implications for the first-order dynamics of aggregate inflation under GHH and KPR preferences. I find that the average duration of a price contract rises from three quarters to almost two years for the inflation responses under GHH specification to exactly match those under KPR specification. This is because GHH preferences imply much higher *aggregate* interest elasticity in the consumption Euler equation, driving up the marginal cost and the sensitivity of pricing decisions at any given degree of nominal rigidity.

Although preferences with variable wealth elasticity on labor supply have been theoretically exploited in explaining some stylized facts in the data, little work has been undertaken on their estimation. [Schmitt-Grohé and Uribe \(2008, 2012\)](#) were the first to estimate these preferences in a general equilibrium model with only real rigidities. Their estimated model with near-zero wealth effect is favored by data over preferences with habit formation.² However, in the presence of nominal

¹ [Christiano et al. \(2005\)](#) and [Altig et al. \(2011\)](#) identified monetary policy shock using a vector autoregression approach with recursive short-run restrictions and found hump-shaped impulse responses of inflation and output to the shock. In addition, the former found that monetary policy shocks contribute to only a small fraction of fluctuation in output.

² Please see [Schmitt-Grohé and Uribe \(2008\)](#) for details.

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