[MoNK: Mortgages in a New-Keynesian Model](#)

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Central banks use the short-term nominal interest rate as their instrument to achieve the goals of inflation and macroeconomic stability. A key task of macroeconomists is therefore to understand the channels through which monetary policy achieves these objectives. In the standard model used for monetary policy analysis---the New Keynesian model---the channel of transmission operates through short-term (one-period) loans in conjunction with nominal price rigidities in product markets (sticky prices). Many investment decisions, such as buying a house, however, are facilitated by long-term loans, not short-term debt.

Long-term loans specify nominal contractual cash flows that the borrow needs to meet over the life of the loan. Because the loans are long-term, investors who provide funds for such loans need to be compensated for the forgone sequence of short-term interest rates they would otherwise obtain, had they invested in a sequence of short-term loans. As a result, the contractual cash-flows of long-term loans depend on future short-term interest rates. To the extent that monetary policy affects the short-term policy rate (its instrument), in a persistent manner, it affects the cash flows of long-term loans. Two streams of empirical research suggest this to be the case. First, high-frequency studies in finance, using daily or intra-day data, show that unexpected changes in monetary policy contain a dimension that affects the policy rate persistently. This dimension of monetary policy surprises is typically prescribed to statements (``Fed speak'') about the likely future path of the policy rate, which often accompany actions, the actual changes in the policy rate. Second, lower-frequency studies, working with monthly or quarterly data, use yield curve data to try to understand the driving forces behind interest rate dynamics over time. These studies have documented that

nominal interest rates, including the short rate, contain a highly persistent latent factor that affects the expectations of future policy rates (as opposed to risk premia).

In light of these observations, we propose a tractable framework for monetary policy analysis that takes the explicit role of long-term debt in the economy into account, in addition to the standard New-Keynesian channel. Such framework can be used to address questions related to both dimensions of monetary policy, actions and statements. To make the notion of long-term debt specific, we focus on mortgage debt. There are a number of reasons why this is a sensible starting point. First, mortgages have one of the longest terms among the loans in the economy, 15-30 years in most countries. Second, mortgages are the main financial liability of the household sector and the purchase of a house, the main asset for most households, is highly dependent on mortgage financing. Third, mortgage payments (cash flows), consisting of interest and amortization, are sizable, equivalent to 15-30% of household disposable income, depending on the country and time period. And finally, the macro literature is increasingly turning attention to middle-class households, a segment of the population significantly exposed to mortgage debt.

In the model, a segment of the population, which we refer to as `homeowners', buys housing, financing a fraction of the purchase with long-term nominal mortgage loans, which can have either a fixed or an adjustable rate (FRM vs. ARM). The homeowners are a stand-in for the middle classes in the economy, for whom housing is the main asset and a mortgage is the main liability. The counterparty that provides the funds for mortgages in the model represents the richest segment of the population. We refer to this segment as `capital owners', to capture the observation that the richest quintile of the wealth distribution owns essentially the entire productive capital in the economy. An important assumption of the model, which has empirical support, is that asset markets are incomplete and that it is more costly to access a short-term loan market for homeowners than for capital owners. The cost is captured by a premium over the short rate. An implication of this assumption is that the two types of agents have different valuations of future cash flows of long-term debt and that their marginal propensities to consume (MPC) differ. In particular, the MPC of homeowners is higher than that of capital owners. The model is then calibrated to be consistent with both aggregate and cross-sectional data, as well as with the responses of the economy to `standard' policy surprises ---the unexpected changes in the policy instrument, as uncovered by vector autoregression (VAR) models.

The main findings can be summarised as follows. The New-Keynesian channel is the dominating channel of monetary policy transmission for policy shocks that affect the short-term nominal interest rate only temporarily, such as the traditional temporary action shocks uncovered by VARs. In contrast, the mortgage debt channel is dominating for policy surprises that have a persistent effect on the policy rate, as revealed, for instance, in unexpected changes in policy statements. The New-Keynesian channel generates short-lived aggregate effects that are essentially the same under ARM and FRM, with the exception of homeowners' consumption. In contrast, the long-term debt channel generates prolonged redistributive effects, which are markedly different across ARM and FRM. Therefore, as a first pass, there is a decoupling between the two channels of monetary policy transmission, each transmitting different types of policy surprises, with different consequences for the economy. As the persistence of the policy shock increases, the New-Keynesian channel becomes muted and the mortgage debt channel gains prominence. In this way, the economy moves from aggregate to purely redistributive effects of monetary policy. The two channels, however, interact in affecting homeowners' consumption under ARM and a temporary policy shock, making homeowners more exposed to monetary policy than in an economy with FRM or no mortgage debt. Nonetheless, homeowners are always more affected by monetary policy than capital owners.