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Deposit spreads and the welfare cost of inflation☆

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ABSTRACT

High nominal interest rates are associated with high deposit spreads, which is consistent with a model where banks have monopoly power and currency and deposits are substitutes. Therefore, higher interest rates raise the implicit price of banking services, increase bank profits and attract entry into the banking sector. Taking these effects into account, a one percentage point increase in inflation has a welfare cost of 0.083% of GDP, 6.7 times higher than traditional estimates.

1. Introduction

The welfare cost of inflation is a longstanding concern of monetary economics, and the recent debate about raising the inflation target lends it renewed relevance. One reason that inflation is costly is that, other things being equal, higher inflation induces households to reduce their money balances, forgoing some of the convenience of carrying money to conduct transactions. A standard method for measuring the magnitude of this cost, proposed by Bailey (1956) and pursued by Lucas (2000) and Ireland (2009) among others, is to measure the area under the money demand curve. This is valid as long as money does not pay interest and is costless to create. This paper proposes and quantifies a model that makes it possible to extend this calculation to the case where bank-created money pays interest, there are fixed costs to operating a bank, and the banking industry equilibrium responds to changes in interest rates.

The model is a variant of Drechsler et al. (2017). Households value the transaction services of currency and several types of bank deposits, which are imperfect substitutes. The opportunity cost of holding currency is the nominal interest rate; the opportunity cost of holding a bank deposit is the deposit spread: the difference between the market interest rate and the deposit interest rate. Banks have a fixed cost of operating but zero marginal cost of issuing deposits, and have some degree of monopoly power to set deposit spreads. Under constant elasticity of substitution, equilibrium spreads depend positively and linearly on the nominal interest rate.

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The key assumption is that there is free entry into the banking industry. An increase in deposit spreads raises bank profits, attracting entry until profits are diluted back to equal fixed costs. The increase in real resources dedicated to fixed costs is part of the welfare cost of higher inflation.

The parameters of the model are estimated using using a detailed database on deposit rates. Time-series variation confirms that the relationship between the interest rate and deposit rates is indeed positive and close to linear, with composite-deposit spreads approximately equal to 0.75 times the market interest rate. The elasticity of demand for deposits is estimated by taking advantage of geographic variation in market shares of the largest banks, and found to be around −0.2. Together with data on monetary aggregates, these estimates make it possible to construct a model-consistent measure of aggregate money. A simple log-log money-demand curve fits the data for this aggregate remarkably well, with a money-demand elasticity of −0.11. Finally, the elasticity of deposit spreads with respect to bank concentration is estimated using geographic variation in the exposure of local markets to bank mergers. Spreads respond quite strongly to concentration, with an elasticity of 1.38. Together, these estimates make it possible to quantify the model.

The model is then used to measure the welfare cost of a permanent increase in the inflation rate by one percentage point (raising nominal interest rates from 3% to 4%), which is found to be 0.083% of GDP. This is 6.7 times higher than one finds using the approach in Lucas (2000) and Ireland (2009). A factor of 1.8 results from constructing a monetary aggregate in the way the model suggests, while the rest of the difference comes from taking into account the resources dedicated to additional bank costs. If there is no entry response, total welfare costs are much smaller but one percentage point of inflation redistributes around 0.2% of GDP towards banks.

2. The model

The model is based on Drechsler et al. (2017). There is a representative household and imperfectly competitive banks that provide a single service: facilitating payments by offering households deposit accounts.

2.1. Environment

The representative household has preferences:

$$u(y,m) = y + \frac{\eta}{\eta-1}\beta^{\frac{1}{\eta}} m^{\frac{\eta-1}{\eta}} \tag{1}$$

where y is consumption and m is transaction services from money holdings. Money includes both currency c and deposits d, aggregated with constant elasticity of substitution ϵ:

$$m = \left[\alpha^{\frac{1}{\epsilon}} c^{\frac{\epsilon-1}{\epsilon}} + (1-\alpha)^{\frac{1}{\epsilon}} d^{\frac{\epsilon-1}{\epsilon}}\right]^{\frac{\epsilon}{\epsilon-1}} \tag{2}$$

Deposits are a CES aggregate of deposits d_n from N different banks, with elasticity of substitution σ:

$$d = \left(\sum_{n=1}^{N} \mu_n^{\frac{1}{\sigma}} d_n^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}} \tag{3}$$

Deposits at bank n are themselves a CES aggregate of J different types of deposits d_{jn}, with elasticity of substitution ϵ_d:

$$d_n \equiv \left[\sum_{j=1}^{J} \alpha_j^{\frac{1}{\epsilon_d}} d_{jn}^{\frac{\epsilon_d-1}{\epsilon_d}}\right]^{\frac{\epsilon_d}{\epsilon_d-1}} \tag{4}$$

When quantifying the model, the baseline is $J = 2$; d_{1n} represents checking accounts and d_{2n} represents savings accounts at bank n, both of which provide some amount of transaction services. An alternative calculation has $J = 3$, where d_{3n} represents small time deposits. The nested structure embodies the assumption that bank customers purchase banking services in bundles and competition across banks takes place at the level of the bundle rather than at the level of the individual deposit type.[1]

The government sets a nominal interest rate i and costlessly supplies as much currency c as households demand. Deposits are supplied by banks; they have a fixed cost κ of operating but can supply unlimited amounts of deposits at zero marginal cost. Since they have monopoly power over their particular variety of deposit, they have to decide what interest rate they will pay. Denote by i_{jn} the interest rate paid by bank n on deposits of type j and let $s_{jn} \equiv i - i_{jn}$ be the deposit spread.

[1] Amel and Starr-McCluer (2002) and Amel et al. (2008) report that about 73% and 60% of checking and savings deposit accounts respectively are held by households at their primary institution.