Endogenous choice of bank liquidity: the role of fire sales

Summary of Working Paper no. 376 Viral V Acharya, Hyun Song Shin and Tanju Yorulmazer

A central difficulty during banking crises is one of finding ready buyers of distressed assets. If a bank needs to restructure its balance sheet during a crisis, the potential buyers of its assets are other banks that may have also been severely affected and thus may not have enough equity capital or debt capacity to purchase assets. Hence, during crisis periods, asset prices fall below their fundamental value, giving rise to 'cash-in-the-market' (or fire-sale) pricing. Surviving banks that do have enough liquidity during such states stand to make windfall profits from purchasing assets at fire-sale prices. Even if crises arrive infrequently, the potential gains from acquisitions at fire sales could be large. This gives banks incentives to hold liquid assets, not merely to increase the chances of surviving the crisis, but also so that in the event that they survive the crisis, they will have resources to take advantage of fire sales.

We present a model of banks' choice of *ex-ante* liquidity that is driven by such strategic considerations. We examine the portfolio choice of banks maximising their profits in the presence of fire sales that are endogenously derived in an equilibrium setup of the banking industry. While risky assets are attractive to banks given their limited liability, cash flows of risky assets are illiquid and have limited pledgeability (that is, financing capacity) compared to cash flows of safe assets. This limited pledgeability of risky cash flows, coupled with the potential for future acquisitions at fire-sale prices, induces banks to hold liquid assets in their portfolios.

In this setting, we show that banks' equilibrium holding of liquid assets is decreasing in the pledgeability of risky cash flows. In turn, bank liquidity is also decreasing in the health of the economy. During economic upturns, expected profits from risky assets are high and so is their pledgeability. An important implication of this result is that adverse asset-side shocks that follow good times result in deeper fire-sale discounts since bank balance sheets feature low liquidity in such times, whereby conditional on adverse shocks, there is lower aggregate liquidity to clear the market for assets.

We also compare the privately optimal levels of bank liquidity with benchmark levels that maximise the overall banking sector output. The pledgeability of risky cash flows turns out to be the critical determinant of whether banks hold too little or too high liquidity relative to the socially optimal level. When pledgeability is high, banks hold less liquidity than is socially optimal due to the preference for risk induced by limited liability; otherwise, banks may hold even more liquidity than is socially optimal in order to capitalise on fire sales. This latter result may seem surprising but is explained simply. Fire sales result in transfers of value among banks but do not lead to any aggregate welfare gains or costs, and thus, liquidity hoarded to capitalise on fire sales may in some cases be excessive from the standpoint of maximising banking sector output. In particular, inefficiently high levels of bank liquidity and by implication inefficiently low levels of intermediation arise when pledgeability of risky cash flows is sufficiently low, for example, during crises or in banking sectors of emerging markets.

We present descriptive cross-country evidence on the asset liquidity of banks across countries. This evidence suggests that banks' choice of liquidity seems to vary along dimensions that would be correlated with difficulty in raising external finance and the severity of financial distress. We show that banks hold more liquid assets in those countries that have (i) less developed accounting standards; (ii) lower total market capitalisation relative to GDP; and, (iii) lower liquidity in stock markets. We discuss how our model's implications on management of liquidity by banks over the business cycle square up with existing evidence and the recently documented facts concerning leverage targeting by banks.

We also analyse the effect of entry by outsiders (to the banking sector) for acquisition of assets during crises. Since outsiders may lack expertise relative to surviving banks, they may enter only when fire sales are sufficiently deep. Once they enter, they increase the aggregate pool of liquidity and stabilise prices. This reduces *ex-ante* returns to liquidity for banks and they hold lower levels of liquid assets in their portfolios. This implies that even when outsiders are second-best users of assets, their entry can potentially unlock liquid hoardings of banks in emerging markets and lead to greater intermediation by their banking sectors.

Finally, we consider the effect of various resolution policies on banks' choices. Bailouts in our model result in lower equilibrium bank liquidity holdings only if they are excessive. In contrast, liquidity grants to surviving banks that are not contingent on banks' liquidity holdings always lower equilibrium liquidity holdings. However, if the amount of liquidity provided is increasing in liquid holdings of surviving banks, then incentives for banks to hold liquid assets are strengthened. These results illustrate that the resolution policies can have subtle effects on bank liquidity depending on whether these policies are optimal or excessively forbearing, and whether they are unconditional or contingent on quality of bank balance sheets at the time of resolution.

International spillover effects and monetary policy activism

Summary of Working Paper no. 377 Anna Lipińska, Morten Spange and Misa Tanaka

When several countries are hit by the same global shock, how do other central banks' reactions to that shock affect the trade-off between inflation and output stabilisation faced by a central bank of a small open economy? This is very pertinent in the United Kingdom's case, a relatively small country with some large trading partners.

Such a country is potentially affected by foreign monetary policy through a demand channel as well as a supply channel. The demand channel works as follows: by stimulating global demand, an expansionary monetary policy abroad can potentially lead to higher demand for UK goods (an aggregate demand effect). But a foreign monetary expansion also tends to lead to an appreciation of sterling, which may dampen demand for UK goods (an expenditure-switching effect). The overall effect on the demand for UK goods of a foreign monetary expansion therefore depends on the strength of the aggregate demand effect relative to the expenditure-switching effect. Foreign monetary policy also affects UK supply. This is because foreign monetary policy affects the terms of trade, and shifts in the terms of trade can affect workers' incentives to work for a given real wage. On the one hand, a deterioration in the terms of trade makes workers feel poorer, thus inducing them to work harder (the 'income effect'). On the other hand, it also reduces the amount of consumption which they can obtain by working an additional hour, and this diminishes the incentives to work (the 'substitution effect'). Depending on the preferences of households either the income or substitution effect may dominate.

Thus in this paper we examine how the preferences of a large economy's central bank (such as the European Central Bank or the Federal Reserve Board) affect the trade-off between output and inflation volatility faced by a central bank of a small open economy (such as the Bank of England). We use a New Keynesian model of a small open economy (where there is a degree of price stickiness). We refer to the small open economy as 'Home', and the large open economy as 'Foreign'. To conduct this analysis, we examine the impact of a global 'cost-push shock', eg, a rise in the price of oil, raising the cost of production. This shock will generate an output-inflation trade-off both for the Home and the Foreign central bank.

The specific question which we seek to address is: does it make it harder for the Home central bank to bring down inflation without causing a large contraction of output when the Foreign central bank is 'dovish', and is hesitant to bring down inflation quickly? We demonstrate that the answer to this question is not straightforward. We find that the impact of a more dovish Foreign central bank on the trade-off faced by the Home central bank depends on two key assumptions of the model: it depends on the currency in which exports are denominated, and it depends on the substitutability between goods produced in the Home and Foreign countries. The choice of invoicing currency is important, as it determines how Foreign monetary policy affects Home's terms of trade. The substitutability between goods determines the extent to which demand switches between Home and Foreign goods following a change in relative prices, and it determines how Home labour supply responds to fluctuations in the terms of trade. When exports are denominated in the producer's currency ('producer currency pricing'), the trade-off faced by the Home economy is likely to worsen as the Foreign central bank becomes more focused on output stabilisation. But the opposite tend to be true in the case of local currency pricing.

Do supermarket prices change from week to week?

Summary of Working Paper no. 378 Colin Ellis

The object of UK monetary policy is to target inflation, as measured by the consumer prices index, the CPI, at 2% a year. In order for policymakers to keep inflation on target, they need to understand how the actual prices in the economy that underlie official inflation measures behave. One central issue is the degree of nominal rigidity in the economy, the extent to which prices and wages are 'sticky'. That follows if companies are either unable or unwilling to adjust either quickly, perhaps because of costs of adjustment. This stickiness has profound implications for inflation dynamics and therefore for the conduct of monetary policy.

As a result, a key question for policymakers is how often prices change, and by how much. Early work to investigate this phenomenon often focused on examining the behaviour of aggregate inflation rates at the macroeconomic level. But that can potentially be misleading. So recently economists have spent time examining so-called 'micro-pricing' data — the prices of individual products, which may be weighted and aggregated to construct the official price indices.

This paper adds to that exploratory effort, and examines how prices behave for around 280 products in 240 different supermarkets across Great Britain. The data cover a recent three-year period, and were kindly made available to the Bank of England by Nielsen, a market research company. In all, the data set accounts for a little under 5% of annual household expenditure. One big advantage of these data is that they are available at a relatively high frequency — Nielsen collect information on a weekly basis, as opposed to the monthly collection of price quotes often used by national statistical offices. By examining prices and volumes over shorter periods, in particular a week rather than a month, we can shed some light on whether evidence from monthly data may overstate the true degree of price stickiness in the economy — as, by construction, a monthly price series can only change a maximum of twelve times a year.

Several interesting features emerge from analysing the data. Prices change quite frequently in supermarkets — as much as 40% a week, even after trying to strip out temporary promotions and sales — and there is also evidence that monthly price observations can overstate the implied stickiness of prices. The range of different prices changes is very wide, with some very large moves but also many small ones, and there appears to be little link between how much a price changes by and how long it has been since the last time it changed. Prices and volumes — the number of goods sold — tend to move together in the data, and there is tentative evidence that consumers may be quite price sensitive, with volumes changing more than one-for-one when prices change. But, importantly, it must be borne in mind that all of these results relate to supermarket prices, rather than other prices, which may exhibit less flexibility.