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The interaction between money and asset markets: A spillover index approach

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ABSTRACT

We employ Diebold and Yilmaz's (2009, 2012) spillover approach to study the relationship between US money and financial assets since 2000. We find that sizeable spillovers arise during periods of economic and financial turbulence (after the 11 September 2001 terrorist attacks, the post-Lehman Brothers bankruptcy period, and in the second half of 2011 when there were concerns about sovereign market developments). Households readjusting their portfolios between holdings of risky financial assets and nominal-certain money may have been the dominant factor at play in explaining this. The interaction of the monetary base with the financial assets in recent years is less than that of M2 with them, a perhaps surprising feature given the balance sheet policies pursued by the Federal Reserve during this time.

1. Introduction

Following the collapse of Lehman Brothers in September 2008 and the ensuing turbulence experienced in financial markets, the Federal Reserve and other central banks chose to pursue what Borio and Disyatat (2010) refer to as "balance sheet policies" alongside standard monetary policy, which focuses on the setting of short-term interest rates. These unconventional policies essentially involve central banks using their balance sheets to influence market prices and conditions directly rather than through the indirect interest rate channel. Such actions affect the composition of private sector balance sheets as well as those of the central banks. This approach appears to be in keeping with Brainard and Tobin's (1968) view that monetary policy works through a "portfolio balance effect" which sees changes in the relative supply of assets held by the private sector leading to changes in their relative yields.

The Federal Reserve initially chose to undertake sizeable purchases of financial assets in late 2008. This involved it acquiring, inter alia, government bonds from banks in exchange for reserve balances at the Reserve. The monetary base has expanded considerably since then following various rounds of so-called quantitative easing. The immediate price effect of the policies on government securities was to alter the yield on them but its effect was expected, and intended, to work beyond that asset market alone and may have had the desired effect. The reduction in the yield on government securities could, for example, have forced fund managers to invest in commodities in a search for yield (Koo, 2011) and to have altered prices in that market. A similar effect might be expected to be at play in stock and currency markets.

As well as the interaction between the monetary base and financial assets, the financial and economic turbulence of recent years may also have affected the dynamic between broad money, specifically M2, and assets. The economics literature

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in this area has mainly focussed on the broad money–equities relationship. Friedman (1988) argues that there are two conflicting influences on the nature of that relationship. The first is a wealth effect – that is a rise in stock prices increases demand for money both as a transaction medium and as a store of value.[1] The other factor is a substitution effect and works in the opposite direction to the wealth effect with an expected rise in the return in equities leading to a substitution out of money and into stocks. Friedman acknowledges that which factor dominates the other is an empirical issue. His own assessment is that the wealth effect dictates the money-stocks relationship. More recently, Dow and Elmendorf (1998) and Carlson and Schwartz (1999) have found evidence of a link between stocks and money (specifically, M2) in the United States in households' management of their wealth portfolios over time. M2 acts as a gateway for redirecting and rebalancing funds in household portfolios. The gateway will tend to be utilised when there are both rises and falls in stock prices. Browne and Cronin (2012) argue that financial innovation over the last 20 years or so has led to the substitution effect now dominating the wealth effect among the two broad factors identified by Friedman as dictating the relationship between stocks and money. Households will re-orientate their wealth holdings from stocks to money when uncertainty in the economy rises and will reverse this flow when the economic climate is perceived to have improved. If modern financial markets allow agents to switch their wealth holdings more easily between nominal-certain money and risky financial assets in response to the level of uncertainty in the economy then the period since 2008 seems likely to have been one when such substitution would have been quite substantial.

While the literature may have focussed primarily on the money-stock price relationship, linkages between money and other asset classes also arise. Friedman acknowledges that the public will undertake general portfolio adjustment, affecting money, stock and other asset holdings. The link between money growth and commodity prices has received renewed attention in recent years. Commodity prices have been shown to overshoot new equilibrium values in response to money shocks as a result of sluggishness in consumer prices (Frankel, 2008; Browne and Cronin, 2010). Variability in money growth rates then may effect considerable volatility in commodity markets due to the overshooting dynamic.

A link between bond markets and monetary base is a standard feature of the monetary policy transmission mechanism. It has been brought back into the spotlight of late by central banks pursuing policies which alter the composition of government debt held by the private sector. These can alter the yield on government securities and can also have effects on returns in other asset classes. A feature of monetary policy in recent years (from 2008) has been the practice of the Federal Reserve announcing details of its programs of quantitative easing, outlining specific asset purchase targets. Announcements on money supply targets in the past (following the 1979 decision by the Federal Reserve to target money growth) had effect on both foreign exchange futures and spot prices. Mussa (1979) indicates that the efficient markets hypothesis would lead one to expect exchange rate movements in response to any such announcements or "news". Sheehan and Wohar (1995) find that expected money growth leads to a depreciation of the US dollar, but that unexpected changes in money supply have insignificant effect. Neely and Dey (2010) conclude from a survey of the literature that macroeconomic announcements in general have effect on exchange rate returns.

This paper then uses an econometric method owing to Diebold and Yilmaz (2009, 2012) to examine, in the first instance, the interaction between money (both monetary base and M2) and the returns on four classes of financial asset (stocks, commodities, currency index, and government bonds) since 2000. This approach allows the user to quantify the extent to which shocks in different variables spillover to one another. It may then shed some light on whether the particular monetary policy of recent years has a noticeable impact on financial asset return behaviour. A successful balance sheet policy would be expected to see greater spillover between the monetary base and asset returns. Likewise, if the gateway/substitution effect is active then one should see greater spillover between broad money (M2) and financial asset returns occurring during periods of financial and economic uncertainty.[2]

The relationship between money and asset market volatility is addressed in a second set of econometric estimations herein where the changes in the two money aggregates used in the first set of estimations are combined with measures of the volatility in stock, commodity, currency and government bond markets. This is a natural extension of the study as money growth on asset returns could also affect the variability of the asset price, as already alluded to above. Bailey (1988) finds that unanticipated changes in money supply affects the volatility of asset prices, including the four asset classes being considered here. Roley (1983) notes the increased responsiveness of asset prices to money surprises after the Federal Reserve's policy of targeting monetary aggregates, adopted in October 1979. In particular, it explains a large fraction of the increase in the average volatility of interest rates following that policy change. It remains to be seen whether the adoption of unconventional monetary policies in recent years may also have resulted in money having greater effect on asset volatility through increased spillover.

Asset price volatility can also affect money aggregates. Slovin and Sushka (1983), for instance, show that greater interest rate variability increases money demand. Tatom (1984) notes the two-way causal effects between money growth and interest rate variability. Among the possible effects that might be observed in recent times, and with the particular policies being utilised by the Federal Reserve, is that when there is a volatility shock in a financial market, a substantial change in the monetary base, but not in M2, will be observed. This would occur because the Federal Reserve has responded to such a financial event by altering the monetary base, with little impact on M2.[3] This effect, if correct, could be expected to manifest itself in a noticeable rise in the spillover between financial markets and the monetary base.

[1] In a cross-country assessment, Caruso (2001) finds that wealth effects in stock markets do impact the demand for money.

[2] The focus in this paper is on the relationship between the financial and money variables, and between the money aggregates themselves. We do, however, pass brief comment on the bilateral spillover relationships between the four asset classes.

[3] This hypothesis was suggested by a referee.