What is buffer stock money? Does it give a satisfactory basis from which to model the demand for mon

When trying to establish a Demand for Money (Md) function, there are two main -clearly interrelated- stages: first specifying its long-run specification and then its short-run form, behaviour and adjustment. The Buffer Stock Money (BSM) theory refers to the second stage of short run adjustment and was developed partly as a reaction to the disappointing performance of "conventional" Md functions from the 70's onwards and as an attempt to explain the "long and variable lags" identified. As we will see BSM theory(ies) are generally compatible with almost all "long-run" theories of Md (Keynesian and Monetarist) and can be thought as an amalgam of many different approaches.

The BSM approach has also been referred to as shock absorber money and disequilibrium money, though as we will see the latter term is rather unfortunate and misleading. In very few words, BSM argues that money acts as a stock absorber, enabling people to fulfil their plans even in the presence of unanticipated shocks so that the quantity of money at any moment may diverge from its target amount. The BSM approach claims that by assuming that the desired Md is always and at every moment realised, the conventional theories leave out important factors which then reduces their empirical success.

The BSM theory is in fact based on the traditional transactionary Md : given that there are costs in selling assets when money is needed, agents may keep money balances in spite of their lower returns. BSM arises because the cost of transitory money holdings (foregone interest) are less than costs of adjustment for other monetary assets and certainly less than for real assets (eg stocks of goods) or real flows such as consumption (for households) and altering the production (for firms). In fact, an interesting note is that as money becomes a substitute for information, the very existence of a monetary system will cause the agent to be more prone to surprises. Thus, as Laidler argues, "fluctuations in holdings of money around their target value are of the very essence of economic activity co-ordinated by monetary exchange". As Laidler argued, the "quantity of money demanded" should refer to an amount people wish to hold on average over some period rather than at each and every moment.

The target value itself may fluctuate. It is determined by the traditional transactionary and precautionary demand considerations (e.g. frequency of receipts, the variance of receipts and payments etc.). In a simple transaction Md model, for example, individuals minimise Total Costs which are equal to the foregone interest by holding money balances and the brokerage costs for having to withdraw money.

$$TC = b(T/K) + r(K/2)$$

T : payment per period; b : brokerage fee; K : amount of money to withdraw.

so $Md = K/2 = (bT/2r)^{1/3}$

The BSM theory goes further and argues that agents will restore their money holdings at regular intervals unless their money holdings fall below some floor value or rise above some ceiling value. The greater the (expected) variance of payments and receipts and the greater the costs of quickly transforming other assets to money, the greater will the margin between the two intervention values will be. A simple diagram showing a possible behaviour of money balances under a BSM model is shown below.

Furthermore, whether the agents adjust their money balances to an unexpected change also depends on whether they expect it to be permanent or not. Clearly agents will be much more willing to adjust their money holdings for a permanent change than for a transient one which will reverse itself any time now. We can see here some similarities with Friedman's analysis of transitory income's effect on consumption.

An important point here is that these transitory balances are willingly held in short-run because this distinguishes BSM from the other disequilibrium money theories. In one respect, the BSM is simply a special case of the disequilibrium approach since while both agree that Ms 1 Md (when Ms changes exogenously), the BSM theory goes further and specifies that in fact $Ms = Md^* + Md_{transitory}$. This, however, hides an important qualitative difference since given that these transitory balances are willingly held in a sense we are still in "equilibrium" : markets are free to vary and reconcile any inconsistencies between all agents ex ante plans and all agents plans are satisfied. As Howit argued, when we have inventories, the difference between saying that markets clear or do not clear is largely semantic.

The speed of adjustment now depends on a number of factors including the initial money holdings, the width of the allowed band, the review period of decisions, whether they are

transitory or permanent and the source of the change in money balances: for e.g. if the change in buffer money is concentrated narrowly, then even if each individual adjusts quickly, the system may not as buffer money is passed on to different agents. The width of the band and the review period are, as we 've said before, themselves determined by the TC of moving into other assets, goods, altering production.

An obvious question is of what money does BSM refer to. Since it refers to money needed for transactionary purposes it is generally assumed that it refers to quite narrow definitions of money but this in fact depends on the relative transaction costs and may well be different for different groups of agents. For individuals the cost of moving out of both real and financial assets is big enough so they would keep most of their buffer stocks in narrow money. Large firms, on the other hand, who often have access to automatic overdrafts and for which transactions with financial assets are less costly are more likely to hold buffer stocks in more illiquid assets as well. Differences may also exist between countries depending on the access of individuals and firms on automatic overdrafts for example. In fact Purvis saw the discrepancies between Ms and Md is just a special case of a more general asset disequilibrium effect.

A popular type of BSM models are single equation ones such as that by Darby : He argued that transitory (unexpected) real money balances M_{Tt} would increase if unexpected (transitory) real savings are positive : $DMtransitory_t = b_1 Strans.t + b_2 Mtrans.t-1$, $1>b_1>0$, $b_2<0$. He found that transitory income has a powerful effect, increasing the Md by about 40% of the increase in income. Such one equation models, however, are restricted to only one argument as the dependent variable. Thus, complete models have been developed which allow BSM to affect a wide range of real and nominal variables and incorporate all the real balance effects. Forward looking buffer stock models have also been developed which allow agents decide on their planned money holdings by their expected level of transactions.

Here we can also explain the position of the BSM theory in relation to the two broad approaches to Md and monetary economics in general, the Keynesian and the Monetarist ones. The BSM theory is clearly very close to the "Keynesian" views, since it largely follows the "Keynesian practice" of viewing the Md through specific motives for holding money. In fact, as we saw before BSM is closely related to the transactionary Md theory while in many ways it is difficult to distinguish it from the precautionary Md literature at all, especially the target-threshold precautionary Md models which argue that when money balances hit the upper threshold, they are restored to their return value. In the Miller-Orr precautionary Md model the individual only switches between "bonds" and "money" when upper and lower bounds for money balances are reached!

Perhaps a difference between the precautionary demand and the BSM theories is that the former was interested primarily in estimating the long-run quantity demanded and its interest and income sensitivity while the BSM is mainly concerned with short-run adjustment paths and speed. Moreover, the BSM explicitly argues that Md may not equal Md. Laidler argued that this is particularly important because it highlights the difference between the loanable funds and the liquidity preference theories. Furthermore,

precautionary Md theories explicitly analyse only the increased money holdings in the first round of the process unlike the buffer stock model which should also include real balance effects.

The BSM approach, however, is not incompatible with the monetarist view of the transmission mechanism or the long-run Md function. In fact, in a monetarist world it probably is even more plausible since moving from money to real assets is generally more costly than moving to financial assets while a steep or vertical LM curve does not allow Ms and Md to be equalised through interest rate changes either. As we saw however, BSM is largely expressed in terms of money's motives unlike the monetarist approach which considers money just another asset whose quantity and price is determined by normal value theory. Still, it is possible to construct BSM models without reference to such motives while as we saw BSM is (or can be) compatible with rational expectations and optimising agents. Moreover, it is a way to explain these notorious "long and variable lags" and allow them to claim that the instability comes from a inadequately modelled short-run adjustment process rather than from instability of the parameters of the desired Md.

Still, classically oriented economists may feel uncomfortable with the disequilibrium overtones of BSM and the New Classicals tend to argue that the operation of the real balance effect will ensure that these transitory balances do not persist for any interesting time interval. It should be noted here that the importance of the BSM theory hinges on the speed of adjustment of the transitory money balances since otherwise it is little else than a tautology : a monetary shock will cause a momentary disequilibrium between Ms and Md.

The fact that in the BSM model Ms does not have to always equal Md means that a change in Md does not needs to result to a change in the short-run Ms, or Y or P or r as buffer stocks of other agents may fall and similarly, an exogenous change in Ms need not lead to large (if any) changes in either nominal income or interest rate (especially if it is thought to be temporary). Furthermore, BSM provides a rationalisation for the inclusion of the highly statistically significant lagged dependent variable. This is in sharp contrast to the "conventional" models which could not handle exogenous changes in Ms without requiring for interest rate (or nominal income) overshooting.

These conventional models had to rationalise the inclusion of the lagged dependent variable which they did by assuming either adaptive expectations or partial

adjustment.

In more detail, the real partial adj. model will result in (interest rate) overshooting when Ms changes exogenously except if the Ms changes were anticipated -and we have fully flexible prices- (Carr and Darby). The extent of overshooting is moderated the more prices and income are allowed to respond in the short-run. Laidler criticises the logical validity of the overshooting when the lagged dependent variable is representing

individual adjustment costs since such adj. costs mean a smaller increase in demand but this smaller increased is said to change the price level by more.

Another implication of the BSM is that, as we have said, the adjustment process is different between anticipated and unanticipated changes in Ms. Furthermore, the short-run income elasticity of Md may be lower than in conventional theories because higher income usually means higher savings and hence higher transitory money balances; this may mean that buffer money may go over its margins more often, leading to more frequent intervention by agents to bring their buffer money to its return level so we may even have a perverse income elasticity.

Laidler said that the BSM allows the authorities to change the Ms through open mkt operations even if Md completely interest inelastic provided that the demand for credit is interest elastic: If the public wants to move from bonds to real assets it will have to buy money as an intermediate step by selling bonds to the authorities.

Concluding, the BSM appears to be a plausible explanation of the short-run adjustment of the Md function which was missing from money demand theory. Besides being appealing theoretically, it also seems to improve the results of the Md equations so even from a Friedmanite methodological perspective it is a positive development. However, given the complexity of the financial system and the lack of easily measurable variables for many aspects of the BSM, the approach may degenerate on equations very close to the "conventional" ones with simply a better theoretical explanation for the presence lagged dependent variable.