VALUE OF TRANSACTIONS TIME AND RECENT DEVELOPMENTS IN THE THEORY OF DEMAND FOR MONEY

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Ever since Keynes postulated that money is primarily demanded for transactions, precautionary and speculative purposes, several developments have taken place in the theory of demand for money. The main innovation on the part of Keynesian theory was, however, the demand for speculative balances which therefore remained the centre of attraction for the economists and researchers in the field of monetary economics all along. It is only in recent years that even the 'transactions motive' behind the demand for money has been subject to a reappraisal by the monetary economists. In particular, some researchers have expressed the view that the value of transactions time must be formally incorporated as an additional determinant in the traditional demand function for money if the transaction demand for the money is to have any relevance in the field of conetemporary monetary economics. The recognition of value of time as an added factor affecting the transactions demand for money in turn yields far-reaching theoretical, empirical and policy implications. The purpose of the present paper is to critically review the emerging literature relating to the influence of value of transactions time on the demand for money and analyse the implications thereof.

INTRODUCTION

The demand for money is the keystone of the arch of monetary theory. Ever since Keynes put forward the 'threefold classification' of motives behind holding money viz. transactions, precautionary and speculative motives, the theory of demand for money has greatly advanced. But the transactions demand for money remained the least researched area as it was the demand for speculative balances that held the centre of the stage all along.

Nevertheless, some developments did take place with regard to the transactions motive as for instance in the early fifties, Baumol (1952) and Tobin (1956), basing their analysis on inventory theory, tried to provide a behavioural content to the theory of transactions demand for money. The Baumol-Tobin theory essentially regarded the problem of transactions demand for money as one of minimising the total cost of financing transactions.

If in a given time period, the value of transactions is T while cash is withdrawn in lots of C, then this cost under the Baumol-Tobin approach consists of ic/2 i.e. the interest foregone on the average of cash balances held and bT/C which is simply the fixed cost of cash withdrawl. Thus the minimisation of the total cost of financing transactions yields the most economical

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value of C as $\sqrt{2bT/i}$ which implies that $C/2 = \sqrt{b/2}\ T^{0.5}\ i^{-0.5}$ meaning thereby that *the optimum level of transactions cash increases with the total value of transactions* T *to be made during the period while varies inversely with the rate of interest* i.

But all the transactions costs as visualised by Baumol and Tobin were essentially of the nature of resource costs like brokerage fees involved in moving in and out of non-money financial assets etc. In reality, however, apart from saving such resource costs, the holding of money also saves the time costs of transacting. The transactions cost models of Baumol and Tobin on the demand for money seemed to ignore this apparent though crucial factor.

It was only in the early seventies that some studies like Dutton and Gramm (1973) and Karni (1974) concentrated on the potential importance of the time factor in determining how much money people hold and suggested the possibility that the consumer's valuation of time i.e. the wage rate could act as an additional determinant of the demand for money. In recent years, this issue has again gained prominence in the field of monetary economics largely owing to the path-breaking research work carried out by Dowd (1990) who reexamined the hypothesis that the wage rate influences the demand for money as a proxy for the value of transactions time.

The purpose of the present paper is to critically evaluate various studies concerning the impact of the value of time on the transactions demand for money bringing out their important theoretical as well as empirical bearings in different spheres of macroeconomic theory.

THE NEED FOR A BROADER TRANSACTIONS COST MODEL INCORPORATING THE ROLE OF THE VALUE OF TIME : THEORETICAL UNDERPINNINGS

All the studies in question point towards a possible misspecification in the conventional transactions models of the demand for money due to the total neglect of the crucial role that the value of time could play in this respect. However the theoretical reasons advanced in theses studies with a view to establishing the relevance of value of time in the given context are significantly distinct.

For instance, Dutton and Gramm (1973) begin their analysis with the basic premise that *the use of money reduces transactions time which is a widely held view and is quite in various works especially Saving* (1971) *and Niehans* (1971). While developing the demand for money from a foundation of money's use in reducing transaction cost, Saving essentially concentrated on the transaction time saving aspect of using money. This is quite evident from the assumptions underlying his model viz. barter transactions take time, that the consumer's time is limited and valuable to him and money reduces exchange time for the members of the community. In this connection, Saving explicitly contends that money is used until the marginal cost of using it is equal to the marginal value of time saved through its use. Similarly, on the basis of transactions costs, Niehans built a theory of money valid for economic equilibrium in which all transactions costs were expressed in terms of work measuring the time in making transactions. The theory so developed by Niehans was able to explain the emergence of different exchange arrangements ranging from barter to full monetisation, depending upon the varying assumptions about the time costs of transacting.

Logically proceeding on this clue, Dutton and Gramm further contend that by saving on transactions time, the use of money increases the amount of leisure implying thereby that rather than reducing work, a unit of a leisure time can be alternatively purchased through an increase in money balances. Consequently, an increase in the wage-rate will result in an increase in the relative price of purchasing leisure via decreasing work, which would in turn provide an incentive to instead purchase leisure by increasing the holding of money.

In this way, through the operation of this effect of valuation of leisure time on the part of the consumer, an increase in the wage-rate leads to an increased demand for money independent of any increase in transactions. In sharp contrast, under the traditional transactions costs models, given the opportunity cost of holding money, an increased demand for money balances could only be associated with an increase in transactions.

As opposed to Dutton and Gramm's elaborate approach, Karni (1974) does not go into theoretical details and simply proposes the hypothesis that ceteris paribus, the demand for real money holdings is positively related to the real value of time, reflecting the attempts on the part of households and business firms to save on this resource in conducting their transactions. The rationale underlying this contention, though not formally spelled out, appears to be the fact that by reducing transactions time, at least at the margin, the holding of money saves the time of households and firms which is constrained and hence commands some positive value.

The empirical results of Karni's study revealed that the regressions in which the currency held by the public plus demand deposits of the public i.e. M_1 is the dependent variable, conform perfectly well to the value-of-time hypothesis. Furthermore, even when time deposits in commercial banks are also included in the definition of money, the value-of-time hypothesis is still supported by the empirical evidence under consideration. But in practice, what shall be the precise measure of the value of time remains an issue that has not been seriously pursued in Karni's study which is its main lacuna.

This gap is however sought to be bridged by Dowd (1990) who, explicitly focussing only on the households, refers to the experimental results of Deacon and Sonstelie (1985) which have established that some kind of an after-tax hourly earning series is a reasonably good proxy for the household's value of time. On this basis, Dowd carries Karni's study one step further to suggest that *the wage-rate influences the demand for money as a proxy for the value of transactions time.*

Accordingly, it follows that while retaining the standard predictions of the transactions model that money demand should rise with expenditure and fall with the rate of interest, we need a more general tranactions cost model which incorporates the value-of-time hypothesis thereby making the additional prediction that *an increase in the wage-rate will lead to an increased demand for money.*

EMPIRICAL SUPPORT TO THE SIGNIFICANCE OF WAGE-RATE IN DEMAND FOR MONEY EQUATIONS

In their empirical study of the demand for money, Dutton and Gramm found the coefficients on real wages to be positive and satistically significant at the 1 percent level. In fact, Dutton and Gramm carried out the relevant estimations using U.S. annual data for the period 1919-58

employing three different interest and four different real wealth variables while only one monetary variable and one real wage rate series. Their empirical results revealed that regardless of the definition of the interest rate and real assets employed, the coefficient on real wages were everywhere positive and statistically significant at the 1 percent level.

Likewise, while estimating their respective models, Khan (1973) Karni (1974), Diewert (1974), Phlips (1978) and Dotsey (1988) also confirmed a significant effect of wage-rate on money demand.

But, as Dowd (1990) has rightly hinted, from the perspective of transactions time saving aspect of money holding, what is more important to verify here is whether a *genuine value-of-time effect* is indeed at the root of this observed influence of wage-rate on the demand for money. Towards this end, Dowd has developed a special framework constituting three cases viz. pure value-of-time, non-value-of-time and general value-of-time models respectively. Among them the non-value-of-time model is characterised by the absence of the wage term despite the fact that the other conventional wage-rate effects on the demand for money such as the income effect were not ruled out in its construction. Against this backdrop, Dowd carried out the estimation of the relevant money demand equation for the United Kingdom during the peirod starting from the thrid quarter of 1975 and ending in the fourth quarter of 1984. These estimations clearly revealed that the predictions of the conventional non-value-of-time transactions models could be outrightly rejected while those of the value-of-time model could not easily be rejected. On this basis, it can be reliably inferred that Dowd's empirical results lend further support to the value-of-time effect of a wage-rate change on the transactions demand for money.

IMPLICATIONS OF ACKNOWLEDGING THE VALUE OF TIME AS A FACTOR AFFECTING THE TRANSACTIONS DEMAND FOR MONEY

The recognition of the value of time as one of the determinants of transactions demand for money has important bearings on various aspects of macroeconomic theory.

First of all, in line with the approach adopted by Dutton and Gramm (1973), the realisation of the presence of *leisure time valuation effect* of a wage-rate change offers additonal insights into the demand for money. For instance, it establishes the fact that a less than unitary income elasticity of demand for money is no longer desirable for confirming economies of scale in the holding of transactions balances. In contrast, according to the earlier notion of monetary economists, reflected for example in Meltzer (1963), only an income or wealth elasticity of less than one could confirm Baumol and Tobin's models which predicted economies of scale in holding of transactions balances. This clear-cut contrast among the two cases arises on account of the *leisure time valuation effect* reinforcing the already present as well as earlier recognised *resource effect* of a rise in income on the demand for money. For example, if the resource effect elasticity is equal to one, then an income elasticity of demand for money greater than one would be implied when both resource and leisure time valuation effects are taken into account. In other words, if a rise in income with wage-rate being kept constant produces a proportionate rise in the demand for money then the total increase in the demand for money produced by an increase in the wage-rate associated with a rise in income

should be more than proportionate to the increase in income due to the leisure time valuation effect.

Moreover, the leisure time valuation effect also has very important implications in the case of quantity constrained situations in the sense that it produces adjustment towards equilibrium in the so-called disequilibrium systems characterised by an absence of the traditional adjustment mechanism. For example, the Clower's dual decision hypothesis (1965) asserts that a reduction in commodity demand produces a decline in the demand for labour with a corresponding reduction in employment. As a result of this rationing being exerienced by the households in the labour market, they in turn reduce their consumption demand in the commodity market thereby setting the same process in operation again which is continuously repeated. However if we introduce the leisure time valuation effect in this model then it helps in restoring equilibrium. This is because supposing via the operation of dual-decision hypothesis, an excess supply in the commodities market causes an excess labour supply, then consumers will find themselves over-supplied with leisure due to involuntary unemployment. Consequently, in view of the role of money in providing leisure, there would be a reduction in the demand for money. In addition, to the extent that wages fall in response to the excess supply of labour, there will be a further reduction in the demand for money by those who are still employed. This excess supply of money tends to increase commodity demand and hence labour demand so that equilibrium is restored both in commodity as also labour markets. In this way, the leisure time valuation effect of a wage-rate change provides a theoretical explanation of the spill-over effects among the money, labour and commodity markets produced by the impact of the individual's employment condition on his valuation of time.

Realising the significance of the value-of-time or some proxy like the wage-rate has the further advantage that it strengthens confidence in transactions costs models which, as the pioneering work by Kimbrough (1986) and Faig (1986) has revealed, in turn lends additional support to Friedman's optimum-quantity-of-money rule.

According to Friedman's optimum quantity of money rule (1969), the optimum rate of inflation is the negative of the real interest rate implying thereby a zero nominal rate of interest. Of late, however, this rule has come in for a severe criticism emanating principally from the theory of public finance. For instance, Phelps (1973) claimed that contrary to Friedman's rule, inflationary finance would instead be optimal in case the government's revenue requirements can only be met by levying distortinary taxes. This policy prescription in the given situation is a straightforward implication of the Ramsey rule for optimal taxation subject to the qualification that money be treated like any other consumption good.

But the transactions motive behind holding money, in contrast, throws light on the *intermediate good* nature of money in the sense that holding money indirectly frees up resources for consumption and leisure by economising on transactions costs. Thus recalling that even the Ramsey rule does not suggest taxing intermediate goods, it immediatly follows that the government's budget constraint notwithstanding, the optimum quantity of money rule proposed by Friedman is a part of the welfare-maximising tax-package in the context of transactions costs models. And since the time saved by money holding is nothing but one such transactions cost, therefore bringing in the value of time viz. wage-rate

in consideration simply reinforces the transactions function and hence intermediate good nature of money, thereby extending further support to Friedman's optimum quantity of money rule.

In the light of the aforesaid theoretical, empirical and policy implications, it can be resaonably concluded that *the value of time must be formally incorporated by introducing the wage-rate as an additional argument in the demand function for money* if the concept of transactions demand for money is to have any relevance in the field of contemporary monetary economics.

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