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APPLICATION OF THE QUANTITY THEORY OF MONEY TO BARTER EXCHANGE MANAGEMENT

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The purpose of this paper is to present a concept that may assist trade exchanges to determine the proper amount of trade dollars in their system to finance a given volume of trade. It may also be useful for judging the effectiveness of trade broker operations, and improving the quality of clients by enhancing their propensity to trade.

QUANTITY THEORY OF MONEY

In monetary economics, the expression MV-PQ is a formula of major significance. The formula expresses "the quantity theory of money," which has enjoyed widespread acceptance for 200 years and is still taught in economics courses today.

The formula states the truism that the volume of trade, PQ (price times quantity, measured in dollars per year or some other unit of time) is equal to the money supply (M) times its velocity of turnover (V). V is the number of times a unit of M must turn over during the year in order to finance the volume of trade, PQ.

In the formula:

M = money supply

V = velocity of turnover, i.e., the number of times M turns over during a year in order to finance a given volume of trade

P = average price of goods and services

Q = number of units (physical quantity) of goods and services sold

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Applied to the national economy, PQ is another way of expressing GNP, the total volume of all final goods and services produced and sold during the year; M is what the Federal Reserve calls M1, the amount or currency in circulation plus demand, deposits of commercial banks; and V is the velocity of circulation of M1, a variable that is regularly measured by the Federal Reserve.

Applied to a barter economy:

M = number of trade dollars in circulation, i.e., the total amount of positive balances in clients accounts and any house accounts used regularly in trading

V = velocity of turnover of trade dollars, a figure that depends on the clients' propensity to trade and how effective trade brokers are in stimulating trades

PQ = total volume of trade per time period, measured as total sales or total purchases on the exchange, not the sum of total sales and purchases.

For example, say the total volume of trade for a barter exchange was $6 million. The exchange measures its money supply, M, as the average amount of positive balances in the hands of its members and in the exchange's house accounts used regularly in trading during the year, and finds this amount to be $2 million trade dollars. Then the formula tells us that the velocity of circulation (V) for this exchange is 3, i.e., each trade dollar turned over an average of 3 times during the year.

Suppose the same trade exchange sets $9 million as its trading goal for the following year, a 50 percent increase over the prior year. Knowing that its velocity of circulation is 3, and anticipating no significant change in velocity due to increase in the number or skill of trade brokers, or increase in the client's propensity to trade, it knows that the number of trade dollars in circulation should increase to $3 million ($9 million divided by 3). Given a velocity of 3, the only way a trade volume of $9 million per year can be achieved is with a money supply equal to $3 million.

MONETARY EXPANSION AND TRADE GROWTH

The process by which trade volume grows in a barter system starts with the growing needs of the buyers. Clients who want to increase their purchases of things they need will seek ways of acquiring additional trade dollars. The demand for trade dollars to finance larger purchases results in clients' seeking additional sales and/or additional credit.

As buyers seek to acquire more trade dollars to fulfill their needs, much of the increased demand for trade dollars will be satisfied by credit expansion, which puts additional trade dollars (M) into circulation. Prudent credit expansion in the barter economy is the vehicle by which buyers obtain additional trade dollars to make their demand effective. Trade volume will then rise as buyers increase their spending to satisfy their growing needs.

In sum, the money supply in a barter system increases through credit expansion in response to buyers' growing demand for trade dollars to spend. More total spending causes trade volume to rise. As total trade grows, the money supply in the system rises to finance the increased trade volume. Increased money supply (M) is a consequence of growing trade volume and not the other way around.

The principal way of stimulating trade growth is by stimulating buyers' needs. Buyers' needs increase the demand for trade dollars and cause M to expand through expansion of credit.

To illustrate, the barter exchange in our example expects to increase its total trade volume by 50 percent, from $6 to $9 million, for the current year. Assume for purposes of discussion that each client desires to increase its total spending by 50 percent. Further that during the year Client A made $50,000 in trade sales (which are the purchases of others) and $50,000 in trade purchases (which are the sales of others) in the system. (A "one sided" analysis of client A's trade volume is then $50,000 for the year, as opposed to $100,000 as is sometimes done that actually double-counts the transactions.)

Let us assume that Client A intends to raise its total purchases to $75,000. Where will it get the trade dollars to finance these purchases if M remains constant? First, it can increase its sales to other clients. But with a fixed supply of trade dollars, the other clients will have fewer trade dollars with which to increase their spending. The only thing that will allow total trade volume to grow, if M is fixed, is for A to spend its trade dollars faster, thus putting trade dollars back into the hands of other clients who are just as eager as A to raise their sales and spending. Faster spending means increased velocity of circulation.

The formula MV-PQ confirms this result, for it tells us that, if M remains constant, the only way that trade volume PQ will rise by 50 percent is if velocity (V) rises by 50 percent.

There is another way that total trade volume can rise: M can expand while V remains constant. If A wishes to make $75,000 in purchases, it can expand its sales to $75,000, or failing that, it can borrow the difference. If A succeeds in raising its sales to $75,000, others will be short the trade dollars required to expand their own purchases, and they will have to borrow. Such borrowing by A and other clients increases M, the supply of trade dollars in the system, by the full amount of the borrowing. Thus, the demand for trade dollars by clients to finance their growing purchases leads to expansion of M through the lending power of the members who comprise the exchange, and the larger M finances a larger volume of trade.

Note: Exchanges should create a credit line matrix that provides a prudent guideline for credit extension to their members, based on the history of sales, payment history, credit score of each member and other factors. Also, see IRTA's March 28, 2012 Advisory Memo titled "Guidelines & Recommendations for Barter Exchange Deficits" attached hereto as Addendum "A" for more detail on the types of deficits that may arise and proper fiscal management of them.

If velocity of circulation (V) is essentially stable, since it depends on the number and quality of trade brokers and the client's propensity to trade, normally M should expand if trade volume is to rise. Holding M constant could frustrate the desire of buyers as a group to increase their total spending, for whereas a few clients may be able to increase their spending through greater sales to others, all buyers collectively will be unable to do so, since they cannot obtain the trade dollars needed to increase their spending.

In theory, because the lending power of a barter system is based upon contract (clients grant administration of their lending power to the exchange and limit any borrowing by the exchange itself), the supply of credit to the exchange's clients is capable of expanding to fully satisfy the demand at whatever interest rate is set. In practice, however, the supply of credit must be governed by the normal canons of creditworthiness, or else an excessive number of problem loans to the clients will endanger the health of the system. (If too many clients borrow from the exchange and then go bankrupt, they leave the system with a large unsecured deficit, ie., a "System Deficit." The remaining clients hold positive balances with reduced opportunities for exchanging them, and trade may consequently fall or stop altogether.) This creates what is known as a "System Deficit." The prudent administration of the lending power is one of the strictest duties of management.

Credit expansion in the barter system does not require that loans be increased to each and every client. It requires only that additional credit be extended to the most creditworthy clients. The spending of these clients will put trade dollars into the hands of other clients, thereby increasing the total supply of trade dollars (M) in circulation.

PUMP PRIMING AND DEFICIT SPENDING

There is another way of increasing M, the number of trade dollars in circulation, and that is by the exchange's making a loan to itself, rather than to its clients.

CAUTION: Unlimited access to the credit window by the exchange is a source of potential abuse that can destroy a barter system.

In principle, just as many additional trade dollars are put in circulation if the exchange purchases a certain amount of Client A's products instead of loaning A the same amount. Where does the exchange get the trade dollars to spend? One of its options is to create them by lending to itself. It is true that all trade exchanges have significant trade dollar earnings, but they also have significant trade dollar expenses; the result is that unless management exercises prudence and maintains strict budgetary controls, more trade dollars will be spent than are earned. That is, the exchange or its owners will have recourse to the credit window. This is known as an Exchange Deficit."

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When a client requires a loan, he must apply to the exchange for approval; hence, his access to credit is limited. When the exchange requires a loan it applies, as it were, to itself, hence its access to credit is restrained by no effective power other than stipulations of the client agreement, the laws governing fraud, IRTA's Advisory Memo on Barter Exchange Deficits, or moral self-restraint itself.

IRTA recommends that provisions be inserted in each client/member contract obligating an exchange to keep its borrowing, (ie., its "Exchange Deficit") within prudent limits. IRTA defines "prudent limits" as no more than 2.5 to 3.0 times the monthly annual averaged trade volume of the exchange, (calculated on one side only).

Example: XYZ Exchange averages 120,000 of trading volume per month for the year. XYZ's maximum acceptable exchange deficit would be is 360,000, (120,000 x 3).

If managed properly, an exchange's deficit spending can be exercised to benefit, rather than cause damage to, the barter system.

As with loans to clients, the exchange's own borrowing and spending adds new trade dollars to the quantity in circulation. To prevent excessive supply of trade dollars, the exchange's deficit spending must be rigorously controlled. As with other loans, the exchange's borrowing must be repaid.

The theory of pump-priming holds that, in order to stimulate a growing volume of trade, M should be expanded through deficit spending by the exchange. The idea is that placing more trade dollars in the hands of the members will encourage them to spend and trade volume will grow. This sometimes works at first, but it quickly leads the unwary exchange manager down the path of excessive deficit spending and oversupply of money to the system. This eventually causes trade volume to decline, because once their need for liquid balances is satisfied, members will accept no further trade business until they can first spend the balances they have accumulated. When all members of the system hold excess balances no one will sell, and trade volume falls to zero.

It should also be noted that excessive deficit spending normally consists of uncollateralized borrowing by the exchange, so the trade dollars in the hands of members are doubly worthless: they have no transaction value, and the exchange has no assets with which to redeem them.

The pump-priming theory has been responsible for excessive deficit spending by some barter exchanges, resulting in large trade dollar balances held by clients. Instead of stimulating trade, this situation has resulted in rapidly declining trade and eventual trade gridlock, that is, existing clients unwilling to accept further trade dollar balances. This results in cessation of trade, collapse of the exchange, and total loss of the value of balances held by clients.

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The proper way to stimulate trade is through advertising and marketing of products available on trade, and an effective cadre of trade brokers. Placing more trade dollars, M, in the hands of clients, must be done prudently in concert with fiscally sound credit extension policies. There must be opportunities for increased sales of the products and services members have, and opportunities for increased purchases of the products and services they need.

APPLICATION OF THE QUANTITY THEORY TO BARTER EXCHANGE MANAGEMENT

The quantity theory of money not only brings valuable insight to the ebb and flow of trade in the barter economy, but it also has valuable management uses. These applications may be described under two general headings: monetary management and velocity management.

Monetary management helps the barter exchange to answer the question: "What is the optimum supply of trade dollars I should have in the system to finance the trade volume I expect?" In order to answer this question, the exchange should study its trading records and make the best possible estimates, based on past experience, of the velocity of circulation, V. (The methods of estimating and Projecting V are discussed below.) Since expected trade volume PQ is known, and V is known, the optimum M can then be computed by the formula:

$$M = PQ / V$$

This M is the required average amount of trade dollars to be in circulation over a year's time. In practice, it cannot be expected to remain constant over the entire year, or be subject to precise control. Volumes have been written about the Federal Reserve's inability to precisely control M1, the money supply of the national economy.

To approximate the optimum M in the barter economy, the trade exchange should average the M for the beginning of the year with the M for the end of the year. Thus,

$$^{M}\text{Optimum} = \frac{^{M}\text{Begin} + ^{M}\text{End}}{2}$$

Since ^{M}optimum and ^{M}begin are known, the target M for the end of the year can be computed. The exchange should use this target M for the year-end as a guide to control the supply of credit to clients during the year. Any increase or decrease in the supply of credit will change M by the same amount. That is,

$$\Delta C = \Delta M$$

where C is the total volume of outstanding loans to the exchange and its clients.

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Most credit extension in a barter system occurs by allowing clients to “spend into the negative” (that is, their accounts will show negative balances) against a pre-established line of credit. This client deficit spending adds to the supply of trade dollars in circulation. A basic principle is that credit extension increases the supply of money, and loan repayments reduce the supply of money, in the barter economy.

Thus, by regulating the amount of credit (C) extended during any time period, the total number of trade dollars in circulation at the end of the time period, i.e., the target M, can be approximated.

Velocity management helps the trade exchange answer the question, "Are my trade broker operations efficiently moving the supply of trade dollars to finance a growing trade volume through spending down the high-balance accounts, bringing the deficit accounts back to surplus, and similar trade management policies?"

Sound velocity management is a precondition to sound management of the trade dollar money supply, as an accurate estimate of V is essential before the optimum M can be calculated. Even when historical V is accurately computed, what V will be in the year ahead in light of the projected number, training, skill, and experience of the trade broker staff, and in light of the trading propensities of the clients, should be projected as realistically as possible in management’s best judgment.

To compute the average velocity (V) for any time period, the trade volume (PQ) for the period should first be determined. The average number of trade dollars in circulation, M (positive balances in Clients’ accounts and house accounts used regularly in trading) should then be estimated, either at a single point during the period or as the average of the money supply for the beginning and the ending dates of the period, that is:

$$^{M}\text{Average} = \frac{^{M}\text{Begin} + ^{M}\text{End}}{2}$$

The average velocity during the period should then be computed using the following formula:

$$V = \frac{PQ}{M}$$

It is desirable to make several estimates of V over different time periods to gain an idea of the variance of this factor. This will assist in arriving at the best possible estimate of V. The exchange’s estimate of its own particular velocity of circulation is one of the most important estimates it can arrive at, as the figure can be used as a guide to expanding the volume of trade by improving trade operations and increasing clients’ propensities to trade. It is also crucial for accurately estimating the optimum supply of trade dollars (M) for the exchange, which serves as a guide for the exchange’s credit policies.

Once an historical estimate of V is made, the caliber of trade operations and the average propensity to trade of the clients during that period should be considered. As previously mentioned, trade operations can be evaluated in terms of the number, training, and experience of trade brokers. Client propensities to trade can be evaluated by a simple scaling technique, by having trade brokers rate clients on their trading initiative on a scale of one to ten. The average trading propensity for all clients can then be computed. Some exchanges periodically purge their client lists, dropping from membership those that show low trading volume or low inclination to trade. Such exercises generally serve to raise the propensity to trade in the system.

The marginal propensity to trade is a measure of the clients' tendency to spend trade dollars, rather than maintain trade dollar reserves and idle balances. Trade dollars have value principally as a medium of exchange; they have limited use as a store of value. Nevertheless, either from lack of opportunity to obtain what is needed, or from lack of initiative, idle balances are carried while time is spent waiting to consummate trades. This obviously reduces velocity of circulation and trade volume.

If average idle balances and waiting time can be measured, these factors can be taken into account in estimating the velocity of circulation. The marginal propensity to trade is defined as the fraction of each new trade dollar that is spent within some time period, say 3, 6, 9, or 12 months. The more time that elapses, the larger the fraction that will be spent. MPT's can be estimated for individual clients and for the exchange as a whole. The average propensity to trade is the fraction of total trade dollars in one's account that will be spent in a given time period. APT's may also be computed for both individual clients and the exchange as a whole.

Management actions to raise the average and marginal propensity to trade of each client will increase V and stimulate greater trade volume and profits for the exchange. Other things being equal, clients with high MPT's are good candidates for trade credit loans and for referral of new business. Clients with low MPT's should be worked with, educated, and provided more trading opportunities to meet their needs and raise their propensity to trade.

A higher velocity also reduces loan exposure, as a smaller amount of lending is required to achieve the optimum money supply. A high velocity means less M is needed, and a low velocity means more M is needed. If more M is needed, loan exposure is greater, because more lending is required to create the larger M.

The average Velocity (V) should be adjusted judgmentally to take into account any significant changes in trade operations and/or trading propensities anticipated in the next time period. If no significant changes are anticipated, the historical figure for average velocity should be used.

Once V is estimated, the question for management is whether it is "right" for the exchange. The best way to determine this is to compare the figure with the V's for other exchanges. If Trade Exchange A is financing $5 million annually in trade with M of $5 million, and Trade Exchange B is financing the same trade volume with an M of $1 million, A's velocity is 1 and B's is 5. A could well question why its velocity is so low, and its loan exposure is so high. If industry averages were available, analysis could further pinpoint why differences in velocity occur and what management actions are dictated.

In sum, the quantity theory of money helps exchanges to better understand and manage their trade operations. It generalizes into a single formula the myriad trading activity that goes on in an exchange, and identifies relationships that might otherwise be obscured. The variables have important management applications when measured on a systematic basis and compared to similar data for other exchanges or to industry-wide averages.

Addendum A

IRTA advisory memo

Guidelines & recommendations for barter exchange deficits

March 28, 2012 revision

I. Preamble

In 1995 IRTA commissioned the top ten international accounting and advisory firm, Horwath & Horwath, (now Crowe Horwath International) to examine whether the creation of exchange deficits represented a sound financial practice and whether the IRTA recommended guidelines restricting exchange deficits was reasonable and prudent. The 1995 Horwath report titled "Deficit Spending Limits of Reciprocal Trade Exchanges" concluded that reasonable deficit spending, within IRTA's pre-determined guidelines, represented "sound commercial practice and is desirable because of the benefits to trade exchange members."

The purpose of this memo is to define the parameters of reasonable deficit spending so as to provide a clear standard for trade exchange owners to follow.

II. Monetary Management Responsibilities of a Trade Exchange

The barter exchange must have the authority to assure adequate liquidity exists in the barter system by regulating the supply of trade dollars (money supply) needed to finance the smooth turnover of products and services being offered in the exchange. Simply put, there needs to be enough trade dollars in the system for members to be able to buy goods and services they wish to purchase. To perform this function, the barter exchange issues credit lines to credit worthy members which represents the main source of the money supply when the credits are spent in to the trade exchange. Exchanges will typically reserve the right to borrow trade dollars from the exchange via a permission clause in their membership agreement. When a barter exchange borrows trade dollars from the exchange and spends those trade dollars within the system it also increases the supply of trade dollars in circulation.

The key question is; What is the proper and prudent amount of an exchange deficit so as to provide an appropriate level of money supply elasticity and how is such a parameter defined? With too little money supply members are unable to buy, and with too much money supply members will not sell and the system will freeze-up. A properly managed deficit will provide the optimum level of liquidity in the system so as to maximize exchange member trading.

Two Types of Deficits

There are two types of deficits in a barter exchange system, exchange deficits and system deficits. The combined total of both types of deficits equals the total deficit of the system.

1) Exchange Deficits

Barter exchanges have a fundamental fiduciary duty to the members of their exchange to manage the exchange in a prudent manner. In addition to the trade exchange's role as the financial exchange manager for the system, the exchange also acts a member of the exchange itself by buying and selling within the exchange. When an exchange manager purchases more goods and services from the exchange then trade dollars that it earns, the corresponding negative trade balance is known as an exchange deficit. In such case, the barter exchange is actually borrowing from the membership of the exchange collectively, and the barter exchange becomes the debtor while the exchange members are collectively the creditor. Owner's personal accounts, employee trade accounts and/or inventory accounts in a negative position are included as part of the total exchange deficit.

IMPORTANT TAX NOTE: *Based on the accounting doctrine of "constructive receipt", an exchange deficit is viewed as taxable revenue by the IRS for the fiscal year it was incurred. The exchange's deficit created each fiscal year must be reported on the exchange's tax return as revenue for the year it was realized. If your company has an exchange deficit for the prior fiscal year, your company will owe the IRS taxes on deficit amount at a tax rate of 34 percent.*

IMPORTANT CAUTION: ***Exchange owners' who fail to report trade income from personal or family trade accounts controlled by the exchange owners', or any other trade accounts that exist whereby the exchange owners' receive a direct or indirect benefit, are subject to criminal charges based on the legal doctrine of "larceny by conversion."***

2) System Deficits

Exchange system deficits result from write-offs for bad debt, insolvency or bankruptcy of exchange member accounts and result in more positive balances (liability to members of the exchange) than negative-balances (goods and services owed to the exchange which represent an asset to the exchange).

IRTA recommends that all exchanges create a "member loan fund", (aka as a "bad debt reserve" account), to effectively save earned trade dollars to "zero-out" a member's negative balance account if such account is uncollectible or insolvent. By maintaining a proper member loan fund barter exchanges are able to minimize system deficits because uncollectible negative trade balance accounts are off-set by a corresponding entry from the member loan fund.

A portion of trade dollars earned by an exchange from new member sign-ups, monthly fees, advertising or renewals can be deposited monthly in the member loan fund. The percentage of an exchange's monthly earned trade dollars that should be deposited into the member loan fund varies based on the exchange's overall deficit. A higher deficit requires a larger percentage of the exchange's earned trade dollars to be deposited into the member loan, while a smaller deficit would require less earned trade dollars be deposited.

IMPORTANT TAX NOTE: ***System deficits are not taxable by the IRS. Therefore, of the two types of deficits; system and exchange deficits, system deficits pose the lesser risk purely from a tax liability standpoint.***

III. IRTA Recommended Parameters for Exchange and System Deficits

IRTA studied numerous deficit control models used by leading reputable barter exchanges and obtained the opinions of the top accountants in the barter industry to arrive at the recommendations contained herein.

IRTA Deficit Standard:

2.5 to 3.0 times monthly annual averaged trade volume, (calculated on one side only, either buy or sell)

Example: XYZ Exchange's annualized average trade volume is 400,000 a month.

IRTA maximum recommended exchange deficit: 1.2 million

IV. Recommended Methods to Reduce an Exchange Deficit

Exchanges that exceed the recommended maximum deficit threshold of 2.5 to 3.0 times their average monthly trade volume should reduce their deficit by implementing the following actions:

1) Spend less trade dollars as an exchange.

2) Create new avenues to earn trade dollars such as selling advertising in your newsletter or website, purchasing inventory at a discount and re-selling it at market value or charging a fee on your members' negative trade balances.

3) Maintain a healthy member loan fund to off-set the deficits created by members' account defaults.

V. Conclusion

Excessive deficit spending by a barter exchange will cause serious liquidity problems in an exchange that threaten the financial stability of the entire exchange. However, properly managed exchange deficits that fall within the recommended IRTA guideline of 2.5 to 3.0 times the annualized average monthly trade volume (calculated only on one side) can increase trade volume and revenue by providing the right level of money supply sufficient to allow members to buy and sell freely within the system.

Exchanges that do not meet the IRTA recommended deficit guideline need to immediately implement the recommended deficit reduction methods contained herein to lower their exchange deficit to the IRTA recommended standard of 2.5 to 3.0 times their average monthly trade volume.