Chapter 2 Credit: T-account perspective

'T' represents a style of balance sheet for accounting purposes.[1] The structure of the T-account (i.e., socially combined balance-sheet) consists of a parallel of one dimensional lines with debit and credit. The T-account has been a central tool for monetary economics. In this chapter, the T-account perspective is fully utilized for the analysis of money and other credit instruments.

2.1 Critique of monetary theories up to now

It has traditionally been recognized that the functions of money could be classified into three major categories: money as a means of payment—or medium of exchange, money as a store of value, and money as a unit of account—or measure of value (Hicks, 1967b, pp. 1-16).[2] Based on these categories of monetary functions, the ideal styles of monetary theories can be classified roughly into the following four approaches: (a) traditional approach, (b) liquidity approach, (c) portfolio approach, and (d) credit risk approach.

2.1.1 Traditional approach

The neo-classical theories of money can be classified as the traditional approach, in which money is postulated only as a veil. The quantity theory of money represents the essence of the traditional approach. It is characterized as "in the first instance, a

[1] To give a clearer picture of the credit and debit position both in general and in relation to specific persons, the double-entry bookkeeping system was invented at the beginning of the fourteenth century, and first described in detail by a Venetian, Lucas Pacioli, in his "Summa de Arithmetica, Geometrica, Proportioni, et Proportionalita" (1494).

[2] Some contemporary scholars add a fourth function of 'money as a standard for deferred payment' as a derivative of its function as a unit of account. See Scott, 1995, pp. 88-89.

theory of the *demand* for money" (M. Friedman, 1969, p. 52). As shown below in the "Fisher" quantity equation, the traditional approach assumes that the velocity of circulation (V) would be constant and stable. It regards the general price level (P) as determined directly by changes in the quantity of money (M) and as moving in strict proportion to the quantity of money. In short, the demand for money becomes a constant proportion of the total volume of transactions (T). This is the so-called transaction version of the quantity equation (2.1), where:

$$M \cdot V = P \cdot T. \quad (2.1)$$

However, Keynes criticized this transaction version, arguing that "P is not the Purchasing Power of Money and T is not the Volume of Output. Professor Fisher has not, indeed, been oblivious to these defects, but he has not, I [i.e., Keynes] think, rated them as high as he should. Nor do the approximations which he has employed for their evaluation command confidence" (Keynes, 1953, p. 235). The emergence of national income accounting in recent decades has led to the substitution of an income version of the quantity equation (2.2), where:

$$M \cdot V = P \cdot Y. \quad (2.2)$$

In this equation, Y represents national income in constant prices (the total value at fixed prices of all final goods and services, including additions to the stock of capital), P is a price index, and V is the average number of times that the money stock is used to make income transactions (i.e., payments for final goods and services, or alternatively, for final productive services—services of labor, land, and so forth).

With regard to the relationship between the demand for money and the rate of interest, James Tobin illustrated the traditional approach as follows:

> One traditionally recognized source of demand for cash holdings is the need for [either total or income] transaction balances, to bridge the gaps in time between the receipts and the expenditures of economic units. By virtually common consent, this transaction demand for cash has been taken to be independent of the rate of interest. The relationship, if any, between the demand for cash holdings and the rate of interest has been sought elsewhere—in inelasticities or uncertainties of expectations of future interest rates. . . . In traditional explanations of the velocity of active money, the amount of cash holdings needed for a given volume of transactions is taken as determined by the institutions and conventions governing the degree of synchronization of receipts and expenditures. (Tobin, 1987d, p. 229)

The traditional approach "regarded the rate of interest as the factor which brings the demand for investment and the willingness to save into equilibrium with one another. Investment represents the demand for investible resources and saving represents the supply, whilst the rate of interest is the "price" of investible resources at which the two are equated" (Keynes, 1964, p. 175). When Alfred Marshall expressed his position on the rate of interest, he encapsulated the traditional approach as follows: "Interest, being the price paid for the use of capital in any market, tends towards an equilibrium level such that the aggregate demand for capital in that market, at that rate of interest, is equal to the aggregate stock forthcoming there at that rate" (qtd. in Keynes, 1964, p. 186).

The traditional approach introduced a fundamental framework and analytical tools for theories on money. However, this approach was shown to be flawed at the time of the Great Depression, because it only recognizes money as a veil and so eventually gave way to the liquidity approach.

2.1.2 Liquidity approach

2.1.2.1 Means of payment

Ever since Keynes placed the concept of liquidity preference at the center of his theory on money, the means of payment function has been accepted as the most important of all the monetary functions in general. The term 'liquidity' could be defined, here, as the ability of an asset to discharge debt by canceling out both sides of the T-account.[3] The degree of liquidity has become the criterion to identify what is money and what is not. Individuals must monitor on a daily basis "the difference between the size of assets and liabilities, and the discrepancies between their maturities" (Bessis, 1998, p. 119), because the validity of a payment to discharge a debt totally depends on it. Once they fall short of liquidity sufficient for daily transactions, they would go bankrupt immediately. This is called the 'liquidity risk.'[4]

Liquidity is now the central concept in the analyses of modern monetary economics. Money supply is classified into the following measures in accordance with the degree of liquidity: M1, currency in circulation plus adjusted demand deposits; M2, equal to M1 plus time, savings, and foreign currency deposits; M3, consisting of M2 plus some other private-sector liquidity; Liquid Assets (L), M3 plus short-term government and private securities; and Debt Measures (Debt).[5] The "Financial Programs," which have long been adopted by the IMF, represent the

[3] A definition of the term 'liquidity,' which is generally accepted, is as follows: the ability of an asset that can be quickly traded for money without loss of value. To be more precise, the last words 'without loss of value' could be replaced by the words 'with little transaction cost.' See Sachs & Larrain, 1996, p. 265; Scott, p. 88.

[4] 'Liquidity risk' is generated by the liquidity gap, which is identical to the difference between the size of assets and liabilities, and the discrepancies between their maturities. See Bessis, p. 119.

[5] These are the style of data dissemination by the Federal Reserve.

liquidity approach to money (see Schadler, 1996, pp. 14-17). Targeting a specific growth rate of money supply and inflation, the typical structure of financial programs—ceilings on the net domestic assets of the monetary authority or banking system and floors on the net international reserves of the monetary authority—has been sophisticated enough to achieve targets for reserve money (monetary base) and money creation. Financial Programs specified benchmarks for an appropriate monetary aggregate, which is classified by the degree of liquidity.

Moreover, the monetarists, who argued against the Keynesians, are also dependent upon the common concept of liquidity (and liquidity preference) for their analytical framework (Snowdon & Vane, 1997, pp. 192-222). It is said that the monetarists revived the quantity theory of money, at least for its long-term effects. Their main contribution to that theory was a much more detailed and sophisticated analysis of short-term effects, and a more detailed set of empirical generalizations about these very effects. Nevertheless, the monetarists' demand function for money includes several rates of interest as determinant variables, which indicates that they are still under the influence of the theory of liquidity preference. For instance, Milton Friedman's demand function for money is set out as follows (2.3):

$$M = f\left(P, r_b - \frac{1}{r_b}\frac{dr_b}{dt}, r_e + \frac{1}{P}\frac{dP}{dt} - \frac{1}{r_e}\frac{dr_e}{dt}, \frac{1}{P}\frac{dP}{dt}, w, \frac{Y}{r}, u\right) \quad (2.3)$$

where, demand for money (M); price level (P); total flow of income (Y); "the" interest rate (r); coupon rate of bonds (r_b); market interest rate on equities (r_e); ratio of non-human to human wealth (w); any such variables that can be expected to affect tastes and preferences (u) (M. Friedman, 1969, pp. 52-58).

2.1.2.2 Liquidity preference

Keynes brought a new approach. According to his theory of liquidity preference, the public holds money for three purposes: to have to hand for ordinary transactions, to keep as a precaution against extraordinary expenses, and to use for speculative purposes (Keynes, 1964, pp. 170, 195-97). He framed the hypothesis that the amount held for the last purpose would move inversely to the rate of interest as follows:

> For the demand for money to satisfy the former motives [Income-, Business- and Precautionary-motives] is generally irresponsive to any influence except the actual occurrence of a change in the general economic activity and the level of incomes; whereas experience indicates that the aggregate demand for money to satisfy the speculative-motive usually shows a continuous response to gradual changes in the rate of interest, i.e. there is a continuous curve relating changes in the demand for money to satisfy the speculative motive and changes in the rate of interest as given by changes in the prices of bonds and debts of various maturities. (Keynes, 1964, p. 197)

In short, Keynes stated that "As a rule, we can suppose that the schedule of liquidity-preference relating the quantity of money to the rate of interest is given by a smooth curve which shows the rate of interest falling as the quantity of money is increased" (1964, p. 171).

Based on these assumptions, Keynes separated the quantity equation into two demand-for-money functions as in the equations (2.4) and (2.5): (1964, pp. 199-201)

> Let the amount of cash held to satisfy the transactions- and precautionary-motives be M_1, and the amount held to satisfy the speculative-motives be M_2. Corresponding to these two compartments of cash, we then have two liquidity functions L_1 and L_2. L_1 mainly depends on the level of income, whilst L_2 mainly depends on the relation between the current rate of interest and the state of expectation. Thus:
>
> $$M = M_1 + M_2 = L_1(Y) + L_2(r). \quad (2.4)$$
>
> where L_1 is the liquidity function corresponding to an income Y, which determines M_1, and L_2 is the liquidity function of the rate of interest r, which determines M_2.
>
> Thus if V is income velocity of money. . . . if we have a short period of time in view and can safely assume no material changes in any of these factors, we can treat V as nearly enough constant [for M_1 and L_1]:

$$L_1(Y) = \frac{Y}{V} = M_1 .(2.5)$$

On the other hand, with reference to M_2 and L_2, Keynes suggested a different interpretation. In the quantity equation (2.2), i.e., $M \cdot V = P \cdot Y$, P is largely an institutional datum, linked to customary nominal rates of wages that were very resistant to change, or at least to decline. Real income or output Y is determined by the aggregate demand, which depended primarily on the amount of 'autonomous spending,' i.e., spending that was not linked directly to current income and that consisted mostly of investment expenditures by enterprises and spending by government. The rest of aggregate demand consists primarily of consumption, which is linked closely to current income. From this perspective, the key factor determining the level of real income and output, and thereby the level of nominal income, is the strength of investment and government spending. As a result, V is postulated to be so pliable that it would adjust to keep the two sides of the equation equal.

The liquidity premium is the reward for taking liquidity risk. Keynes expressed it thus: "the rate of interest is the reward for parting with liquidity for a specified period" (1964, p. 167). He continued as follows:

> Thus the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. The rate of interest is not the "price" which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the "price" which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash;—which implies that if the rate of interest were lower, i.e., if the reward for parting with cash were diminished, the aggregate amount of cash which the public would wish to hold would exceed the available supply, and that if the rate of interest were raised, there would be a surplus of cash which no one would be willing to hold. (Keynes, 1964, p. 167)

The liquidity approach is of great value in that it did not follow the traditional view that "money is only a veil," and that it proved that "money matters." On the other hand, its weakness is to be found in the proposition that the degree of liquidity totally depends upon that of market friction, the efficiency and scale of the market in liquidizing financial assets. That is, liquidity is the relative notion that the range of its meaning changes as financial markets evolve further. In addition, although it is not a real defect of the liquidity approach, Keynes did limit the scope of the theory of liquidity preference to flow variables such as income, price level of current outputs and so on. Stock variables are beyond its scope, but they now have more and more impact on the economy as a whole.

2.1.3 Portfolio approach

2.1.3.1 Store of value

In the historical development of monetary economics, it took a relatively long time to reach a proper understanding of the function of money as a store of value. In the early development of the Keynesian model, the store of value function was much less important as a monetary function than the other two. Hicks initially suggested that "a money that could not be stored might still be used as a unit of account; it might still be used as a means of payment; if it had these other functions (even if it had only one of these other functions) it might still be reckoned as a money of a sort" (1967c, pp. 17-18).

However, not long afterwards, Hicks arrived at his own view that was new and a step forward from the theory of liquidity preference. As already described, Hicks proposed "marginal revolution" in the theory of money (1967a, p. 62), and came to recognize money as an item of portfolio selection for the store of value. Tobin

developed this hypothesis further, arguing that "the crucial property of "money" in this role is being a store of value, an alternative to reproducible productive capital in satisfying the desires of the community to accumulate wealth" (1987g, p.146). Eventually, he came to recognize money as a store of value that led to the optimum portfolio selection of financial assets.

Throughout the 1970s and 1980s, the financial industry made much progress with deregulation, the growing role of the financial markets, and the increase in competition. It has elaborated the portfolio theory to keep pace with the waves of change. The modern portfolio theory teaches that there is an inevitable trade-off between risk and return. The Capital Asset Pricing Model (CAPM) illustrates the interrelationship between profitability and risk, and above all, it gives priority to the measurement of 'market risk' (Dobbins, Witt, & Fielding, 1994, pp.1-20; Watsham, 1993, pp. 43-85).[6] The basic formula of the CAPM states that the expected return of a portfolio is made up of R_F, the risk-free reward for time (delayed consumption), plus a premium for accepting market risk as in the following equation (2.6): (Dobbins et al., p. 5)

$$E(R_P) = R_F + \beta_P [E(R_M) - R_F] \quad (2.6)$$

where $E(R_p)$ is the expected return of the portfolio, R_F is the risk-free rate of interest, β_P is the portfolio β (market sensitivity index), $E(R_M)$ is the expected return of the market portfolio and $[E(R_M) - R_F]$ is the market risk premium.

[6] 'Market risk' is the risk of adverse deviations of the mark-to-market value of the trading portfolio during the period required to liquidate the transactions. See Bessis, p. 9.

2.1.3.2 Portfolio preference

Post-Keynesian analysis, in which the classification of liquid assets has been broadened, has tended to relate the demand for money to a wider array of variables. These include wealth and the various forms in which it is held, the yields of these different forms, and the level of income, as well as the interest rate.

The portfolio approach focuses on the store of value function of money. It tries to find the optimum portfolio between cash holdings and other financial assets with higher yields. Tobin considered it from the viewpoint of the 'inventory theory' of demand for cash, which focuses attention on the management of the temporary and fluctuating balances that people hold to bridge gaps between their receipts and their outlays (1987d, pp. 229-241). The simplest form of the demand-for-money function is shown in the Baumol-Tobin type of inventory model as follows (2.7): (Sachs & Larrain, 1996, pp. 273-280)

$$\frac{M^D}{P} = \frac{M^*_0}{2P} = \left(\frac{1}{2}\right)\cdot\left(\frac{2bQ}{i}\right)^{1/2} \quad (2.7)$$

where P is price level, M^D is demand for cash, M^* is cash holding, b is transaction cost between cash and alternative assets such as bonds, Q is output (or the income which the individual receives), and i is the interest rate per time period. This model tells us that the interest elasticity of the transaction demand for cash ($\partial M^D / P\partial i$) should be – (1/2). It shows that the transactions-motive, i.e., the need for cash for the current transaction of personal and business exchanges, depends not only on the level of money income but also inversely on the interest rate. Thus, in the portfolio approach, it could be formulated that "the demand for money depends not only on the volume of transactions but also on the yield of capital" (Tobin, 1987f, p. 222).

The portfolio approach scrutinized the concept of risk, and illustrated an inevitable trade-off between risk and return as we saw in the equation (2.6) of the CAPM. Currently, financial institutions employ a wide range of techniques to measure and manage their exposure to market risks, including value-at-risk (VAR) methodologies (Jorion, 1997, pp. 85-102), duration or gap analysis, and scenario analysis. In particular, a large number of financial institutions are now measuring and managing their market risk exposure based on a VAR approach, which comprises the assessment of potential losses due to adverse movements in market rates and prices of a specified probability over a defined holding period (see BIS & International Organization of Securities Commissions [IOSCO], 1996, pp. 6-7).

The Brainard-Tobin type of general equilibrium approach focuses on the capital accounts of economic units, of sectors of the economy, and of the economy as a whole. Table 2.1 shows the general accounting framework of the model, which is constructed "by (a) assigning to each asset a rate of return r_i, (i = 1, 2, . . . n) and (b) imagining each sector j (j = 1, 2, . . . m) to have a net demand for each asset, f_{ij}, which is a [demand-for-asset] function of the vector r_i [for each asset (i) by sector (j)] and possibly of other variables as well" (Tobin, 1987c, p. 324). Tobin explains this model as follows:

> Each sector is, at any moment of time, constrained by its own net worth. Its members are free to choose their balance sheets — the entries in the columns of Table [2.1] — but not to choose their net worth — the sum of the column entries. This is determined by their past accumulations of assets and by current asset prices. The individual economic unit can neither change the legacy of the past nor, it is assumed, affect by its portfolio choices the current market valuations of his assets. Of course, as time passes the individual may save and may make capital gains or losses. A year later his net worth will be different, but it will be once again a constraint on his portfolio behavior. (Tobin, 1987c, p. 325)

As the most simplistic style of money-capital model, we take an economy with only one private sector and only two assets: money stock (M) issued by the government to

finance its budget deficits, and homogeneous physical capital stock (K) at replacement cost. Let p be the price of currently produced goods, both consumer goods and capital goods. Let q be the market valuation of equities, i.e., the replacement value of the physical assets (i.e., existing capital goods), to which the equities give title is taken to be 1 and serves as the numeraire of the system. Together, qp means the market price of existing capital goods. Let r_M and r_K be the real rates of return available from holding money and capital respectively. Let p^e be the expected rate of change in commodity prices, let r'_M be the nominal rate of interest on money (generally zero), and let R be the marginal efficiency of capital relative to its reproduction cost. Let W be total wealth and Y national income, both measured in goods. The equations (2.8-2.12) represent the general equilibrium model of "A Money-Capital Economy" as follows: (Tobin, 1987c, p. 326)

Wealth definition equation (2.8):

$$W = qK + M/p. \quad (2.8)$$

where the total wealth (W) of the economy (the left side) can be defined to be equal to the total values of assets (the right side), i.e., physical capital (qK) and money stock (M/p).

Balance equations (2.9-2.10) of the demand for and supply of assets:

$$f_1(r_K, r_M, Y/W)W = qK. \quad (2.9)$$

$$f_2(r_K, r_M, Y/W)W = M/p. \quad (2.10)$$

where the functions f_1 and f_2 on the left side represent the net demand for each asset, i.e., physical capital and money stock, by all sectors. On the right side, qK and M/p represent the supply of each asset that is exogenously limited in the economy by the equation (2.8).

Rate-of-return equations (2.11-2.12):

$$r_K q = R \quad (2.11)$$

$$r_M = r'_M - p^e_p \quad (2.12)$$

which represent the entire structure of the rate-of-return in the economy. This rate-of-return structure will affect the demand for each asset through the equation (2.9-2.10), and consequently, it will have reflexive (self-perpetuating but converging) repercussions on total wealth distribution as in the equation (2.8).

As Tobin stated in his "Money, capital, and other store of value" (1987f, pp. 217-228), the portfolio approach could be regarded as the stock version of the traditional approach, meaning that the former focuses on portfolio selection, i.e., the optimum composition of wealth (stock assets), whereas the latter gives priority to optimum resource allocation for production (flow output). The great advantage of the portfolio approach is that it expanded its scope from liquidity preference to portfolio preference, which enabled it to deal with the entire spectrum of financial assets. It also contributed to the elaboration of the concepts of risks for their measurement and management. However, the weakness of the portfolio approach can be found in the fact that it narrows its own scope in decision-making regarding the composition of wealth, and it does not cover decisions determining aggregative wealth and their reflexive repercussions on the whole economy.

2.1.4 Credit risk approach

2.1.4.1 Stability of value

The method of Asset Liability Management (ALM) is aimed at restructuring optimal asset selection from the perspective of the corresponding liability side of the T-account (Nishida S., 1995, pp. 9-27). If one tries to redefine 'liability,' its description might differ from the normal definition of the term.[7] Here, from the perspective of the financial accounting structure of the T-account, the term 'liability' is defined to be—as the token that indicates the financing resources to purchase collateral assets against it. As one sees from this definition, the liability itself is just a token in the form of a banknote, deposits, bonds, equities or loans, but whatever the name is, it is normally just a piece of paper printed with numbers that denote a certain value. One may also notice that every liability of an economic unit is conversely the financial asset of the other who financed credit to the former unit. Thus, in the exchange economy, liability is transferred in the form of circulating media from one to another who purchased it in exchange for a paper that represents a certain value. This is exactly the same for money, which is the liability of a central bank or commercial banks in the modern monetary system.

However, what if the stability of value were lost or at least fluctuated? What if the purchasing power[8] of money varied widely and frequently? The value of a liability, i.e., the value of a financial asset owned by someone else, totally depends upon the

[7] The definition of 'liability' that is generally accepted is an obligation to transfer economic benefits (generally money) as a result of past transactions (e.g., the purchase of a fixed asset or a circulating asset).

[8] Keynes explained 'purchasing power' as "[w]e mean by the Purchasing Power of Money the power of money to buy the goods and services on the purchase of which for purposes of consumption a given community of individuals expend their money income." See Keynes, 1953, p. 54; Schumpeter, 1977, pp. 133-135.

degree to which the value of collateral assets could cover the denoted value of the liability. This is the 'credit risk'[9] of money itself. The function of money as a unit of account—or measure of value—is of importance and even more fundamental than the other two functions. The stability of value is essential in both domestic and international exchange economies, of which the former is jeopardized by inflation (or its opposite, deflation), and the latter is daily recognized in foreign exchange markets. This study might become meaningful if it could further explore the function of money as a unit of account—or measure of value—, particularly in terms of the degree of stability of value.

2.1.4.2 Collateral preference

'Risk'[10] arises when future events cannot be predicted with certainty. However, a range of possible outcomes enables an estimate of their probability to be calculated, together with the rate of return on financial assets which should relate proportionately to the level of risk (in other words, the higher the risk, the higher the return). For instance, the liquidity premium is the reward for taking a liquidity risk, and it is the same as the market risk premium for the portfolio holdings. These two kinds of risks are closely related to the liquidity approach and the portfolio approach respectively.

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[9] 'Credit risk' is the risk that a counterparty will not settle an obligation at full value, when due or at any time thereafter. It represents the losses in the event of default of the borrower, or in the event of a deterioration of the borrower's credit quality. See BIS, 1994; Basle Committee on Banking Supervision, BIS, 1998, p. 11; Bessis, p. 81.

[10] In terms of risk management in the banking sector, the Basle Committee on Banking Supervision systematically identified risks in banking organization by categorizing broad risks into specific categories such as: interest rate risk, exchange rate risk, market risk, credit risk, liquidity risk, operational risk and legal risk. See BIS, 1994; 1997b; BIS & IOSCO, 1996; Basle Committee on Banking Supervision, BIS.

From the viewpoint of the T-account, the 'credit risk' could be depicted—as the variance of probability that a debtor's liabilities end in not being covered by collateral assets, in other words, to become non-performing loans. Compared with the other types of risks, it is distinctive because it is applicable to all types of credit instruments, i.e., from the reserve money of a central bank, deposit money of commercial banks, and credit securities[11]—government bonds, corporate bonds, or loans to the public. We would like to refer to this as the credit risk approach. The credit risk could be the central concept for the analyses of deflationary phenomena such as the non-performing loans of a banking system. The lender must judge each loan he makes on the basis of the character of the borrower (his intention to repay), his capacity to repay (based on his potential for earning income), and his collateral (property pledged in case of default on the loan). In every business and economic transaction, we all have to take into account the credit quality of our counterparty as well as the availability of collateral and guarantees. The credit risk will lead to the systemic risk of the whole financial system, which will also spread the contagion effects from one country to the others in the region.

While financial intermediaries have in recent years designed increasingly sophisticated systems for the measurement and management of market risk, those of credit risk are less developed, resting primarily on arbitrary counterparty exposure and concentration limits, separately capitalized special-purpose vehicles, securitization, secondary market trading and, more recently, credit derivatives (BIS, 1997c, p. 32;

[11] The definition of 'credit securities' overlaps with that of 'primary securities' (see Gurley & Shaw, p. 59), except for the treatment of capital, which includes all liabilities of nonfinancial spending units, that is of spending units whose principal function is to produce and purchase current output, and to buy one type of security by issuing another. Credit securities include corporate bonds, accounts payable, short-term business debt to banks, consumer debt, mortgages, federal and state and local government debt, foreign securities, and all the varieties of each of these main types.

Sudo, 1997, pp. 1-19). The new models, i.e., Credit Metrics™ or CreditRisk+,[12] use value-at-risk (VAR) methodology to caluculate the amount of capital required to cushion a portfolio against a given level of losses (Jorion, pp. 247-267). They allow credit risk to be measured across assets and enable intermediaries to evaluate the change in the value of portfolios caused by credit events such as downgrades and defaults.

The concept of credit risk applies to the whole gamut of credit instruments, and ranges from the most liquid ones, i.e., money, to the less liquid ones with longer-term maturities and even net worth. Hence, in the credit risk approach, the demand-for-money function must be expanded and modified into the 'credit-demand function' (similar to the 'asset-demand function' in the general-equilibrium portfolio approach). Corresponding to the expansion of the demand side, the 'credit-supply function' must be enlarged as well. The balance equations of credit- demand and supply function are as follows in (2.13a) and (2.14):

$$C^d = kPY + CS^d + R. \quad (2.13a)$$

$$C^s = M + CS^s + W. \quad (2.14)$$

where C^d represents the aggregate credit demand, which consists of kPY[13] (demand for money), CS^d (total amount of issue of credit securities), and R (total value of real assets). On the other hand, C^s represents the aggregate credit supply to finance the

[12] Following the introduction by JP Morgan of Credit Metrics™ in April 1997, Credit Suisse Financial Products (CSFP) joined the fray with the launch of CreditRisk+.

[13] The so-called "Marshall's k" is the ratio of money stock to income, being numerically equal to the reciprocal of V (velocity of circulation). P is the price level.

corresponding credit demand, which consists of M (money supply), CS^s (total credit allowance by the purchase of credit securites), and W (total value of net worth, i.e., the national wealth).

Furthermore, being based upon the assumptions that CS^d depends on r_S (rate of return on credit securities holding), and that R depends on r_K (real rates of return on physical assets), the equation (2.13a) could be rewritten as follows (2.13b):

$$C^d = kPY + CS^d(r_S) + R(r_K). \quad (2.13b)$$

Even small changes in each term on the right side have reflexive (self-perpetuating but converging) repercussions on each other, which will lead to the spiral reflexivity of the knock-on effects. In the simple model of the credit-demand equation (2.13b), comprising money (kPY), credit securities (CS^d), and real assets (R), these credit instruments are convertible among each other irrespective of their form within the exogenous limit of total credit-supply determined by the equation (2.14). Thus, government bonds can be monetized by the purchase of the central bank, corporate equities can be liquidized into deposit money by the purchase of commercial banks, and land and the other property can be liquidized into cash or deposit as well as by mortgage loan. The credit-demand function (2.13b) represents the mechanism whereby the first term kPY (demand for money) depends not only on Y (income) but also on r_S (rate of return on credit securities holding) and r_K (real rates of return on physical assets) through the reflexive correlation among the three terms on the right side of the equation. Moreover, it is found that kPY (demand for money) depends on R (total real assets) itself.

In the credit risk approach, we assume that the degree of collateral preference correlates to the stability of value of credit instruments. That is, the higher the confidence in the stability of value of credit instruments, the higher their acceptability, and the greater the preference to hold them. The credit risk premium is to be paid as the reward for taking credit risk. We would like to employ this credit risk approach to examine the credit-flows mechanism of both economic development and the bubble economy. The advantage of the credit risk approach is that it enables us to deal with the entire spectrum of financial assets, and it gives us a macro-financial perspective from which to understand the dynamism and interdependence of financial intermediaries. In general terms, it may safely be said that the credit risk approach can be the stock version of liquidity (i.e., the Keynesian) approach, meaning that the former focuses on the accumulation of total wealth (stock assets), whereas the latter gives priority to the aggregate income generated by total production (flow output).

2.2 *Conceptual framework of monetary stages*

2.2.1 Monetary stages in the T-account

We can define 'monetary stages' as the classification of financial liabilities, which include not only monies but also other credit instruments as a whole, according to the degree of stability of value, or inversely, to the degree of credit risk. Monetary stages constitute the general equilibrium model based upon the credit risk approach, specifying financial liabilities by sectors. The main analytical framework of the theory is the T-account matrix analysis, which is the multi-dimensional version of the credit risk approach. It will make clear the dynamism of the credit-flows mechanism for both economic development and the bubble economy, and the reflexive interaction between foreign exchange and domestic financial markets. To sum up the characteristics, the monetary stages of the T-account are expected to construct the "general multi-equation equilibrium of the entire spectrum of assets and debts; all financial markets, and all financial institutions replace the narrower traditional concentration on the quantity of money and the commercial banking system" (Tobin, 1987e, p. xiii).

2.2.1.1 Reserve money (monetary base)

'Monetary authorities' comprise central banks and, to the extent that they perform monetary authorities' functions, currency boards, exchange stabilization funds, and treasuries. Hence, the 'reserve money' of monetary authorities (or in other words, the 'monetary base') is defined as the liabilities of monetary authorities, which are comprised of currency in circulation, deposits of the commercial banks, and deposits of other residents, apart from the central government, with the monetary authorities (IMF, 1997a, p. xv). Although the other liquid liabilities of monetary authorities are

not included in the strict definition of reserve money, they will equally function as the latter does in the credit-flow mechanism. So, they should also be included within the broad category of reserve money. It should also be noted that the capital and reserves of monetary authorities can be better classified into the category of 'net worth assets and debts' (see below), because the equities in physical capital represent the title of proportionate ownership (and conceptually, the replacement value of physical assets).

The reserve money and liquid liabilities of monetary authorities reflect the highest stage of stability of value, because they are backed by confidence in the state that issues its own national currency in the form of reserve money. Table 2.2 is the balance sheet of the Bank of Japan. The liability items of bank notes issued (item 1) and financial institutions' deposits (item 2) constitute the reserve money. The bank notes issued (currency in circulation) amount to 77.7% of the total liability of the Bank. Government deposits, other accounts, and allowances (item 3-6) are the other liquid liabilities of monetary authorities. As mentioned above, the capital (item 7) and reserves (item 8) should be separately treated as net worth assets.

2.2.1.2 Deposit money

We refer to credit institutions (the definition given to 'banks' in the European Union)[14] or depository institutions (the definition given to 'banks' in the United States)[15] together as 'deposit money banks.' Accordingly, 'deposit money' is defined

[14] The first European Commission (EC) Banking Directive defines 'credit institution' as an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account. Hereinafter, it is unified into the category of the following 'depository institutions.'

[15] Under the Depository Deregulation and Monetary Control Act, all depository institutions, including commercial banks, saving and loan associations, mutual saving banks and credit unions, are authorized to issue demand or time deposits to individuals and non-profit organizations.

as the liabilities of commercial banks, which comprise demand deposits, time deposits, and saving deposits. In particular, demand deposits are negotiable for the settlement of transactions, meaning a high degree of liquidity. Although the other liquid liabilities of deposit money banks are not included in the strict definition of deposit money, they will equally function as the latter does in the mechanism of money creation. So, they should also be included within the broad category of deposit money. In addition, whatever the names and maturities, deposit money includes without favor the other types of interest bearing short-term deposits such as the Negotiable Orders of Withdrawal (NOW) account, the Automatic Transfer System (ATS) account and the Money Market Mutual Funds (MMMFs). It is both because they have exactly the same effects on money creation, despite the various mechanisms of these deposit substitutes, and more significantly, because in the credit risk approach we give priority to the degree of credit risk rather than that of liquidity. On the other hand, the foreign currency deposits or foreign liabilities of deposit money banks should be separately classified into the category of foreign debts, because they are denominated in foreign currencies. In addition, it should also be noted that the capital and reserves of deposit money banks can be better classified into the category of 'net worth assets and debts' (see below), because the equities in physical capital represent the title of proportionate ownership (and conceptually, the replacement value of physical assets).

In terms of the degree of stability of value, deposit money should be ranked at a lower level than reserve money. It might be safely said that deposit money has more credit risk than reserve money, because we have learned from experience that banks go into default more often than the states to which the banks belong. Table 2.3 is the combined balance sheet of Japan's domestically licensed banks. The deposits that are negotiable are the items 1 to 7. The other liquid liabilities of deposit money banks are

the items 8 to 13, and item 15. Foreign exchange is at item 14 and classified as foreign debts. The rest of the liabilities (items 16-20), which consist of capital and capital related accounts, are to be treated as the net worth assets.

2.2.1.3 Credit securities and loans

'Credit securities' are defined as all the liabilities of non-depository financial institutions and non-financial spending units, that is, of spending units whose principal function is to produce and purchase current output, and to purchase one type of security (i.e., credit supply) by issuing another type of security to finance (i.e., credit demand). Credit securities include all the types of balance-sheet liabilities of loans and credit instruments—such as corporate bonds, accounts payable, short- and long-term business debts, consumer debts, mortgage loans, federal, state and local government debts, foreign securities, and financial derivatives from them. It should also be noted that the capital and reserves of non-financial spending units, i.e., the corporate shares, can be better classified into 'net worth assets and debts' (see below). Although one may regard corporate shares as one type of credit securities due to their characteristics, equities in physical assets (i.e., existing capital goods) represent the title of proportionate ownership of corporations in both the original and legal senses. That is, corporate shares are supposed to be a metamorphosis of past accumulated savings into net worth, and to be treated properly as such.

2.2.1.3.1 Financial credit securities

'Financial credit securities' are defined as the credit securities issued by financial intermediaries, either depository or non-depository institutions, but which are not involved in the mechanism of money creation. In other words, financial credit securities are neither liquid nor sufficiently negotiable compared with deposit money.

Financial credit securities include the balance-sheet liabilities of financial intermediaries that are not liquid as deposit money—such as financial bonds issued by long-term credit banks, call money from interbank markets,[16] insurance policies, commercial papers issued by non-banks and so on.

With regard to the degree of stability of value, financial credit securities should be ranked at a slightly lower level than that of deposit money, because the variance of the credit risks may be broad when a large number of financial intermediaries enter this field. There is no alternative because the greater the number of financial intermediaries, the less prudential supervision and regulation they accept. Table 2.4 is the combined balance sheet of Japan's financial intermediaries as a whole. Items 5 to 12, among the variety of balance-sheet liabilities, could be classified as the financial credit securities. Table 2.Appendix 1a and 1b represent financial assets and liabilities by sub-sector of the financial intermediaries in Japan.

2.2.1.3.2 Governmental credit securities

'Governmental credit securities' are defined as all the types of balance-sheet liabilities issued by the government sector, taking the form of short- and long-term government bonds. By the definition of the System of National Accounts (SNA), 'general government' is referred to as the consolidated body that consists of central government, local government, and social security funds. For simplicity, we regard the government sector as more or less equivalent to the concept of general government in this study.

In terms of stability of value, governmental credit securities are to be given at the highest place among the whole range of credit instruments (i.e., reserve money,

[16] Although call money is liquid enough, it is operated only within the interbank market. That is, call money is out of the processes of the money-creation mechanism.

deposit money, and credit securities). Governmental credit securities are the most important collateral for reserve money after gold, and in other words, the ultimate source of monetization (i.e., reserve-money creation) by the monetary authorities. Table 2.5 is the combined balance sheet of Japan's general government. All the balance-sheet liabilities (items 1-7) except net worth (item 8), are governmental credit securities. We see from this that long-term government bonds (item 3) comprise the largest part of all balance-sheet liabilities of general government.

2.2.1.3.3 Non-financial public credit securities

'Non-financial public credit securities' are defined as the credit securities that are issued by non-financial public bodies. It is the broadest category of all credit securities, including long- and short-term bonds, commercial papers, outstanding loans granted, and all the other types of balance-sheet liabilities in any form.

With regard to the stability of value, non-financial public credit securities hold the most extensive range of credit risk variance. It varies depending on the credit-quality positions. Although there are many exceptions, non-financial public credit securities are generally positioned at the lowest level of monetary stages, due to their broader variance of credit risks. Table 2.6 is the combined balance sheet of corporate businesses in Japan. All balance-sheet liabilities (items 1-9), except corporate shares (item 11) and net worth (item 12), are non-financial public credit securities. We can see from this that the largest part of non-financial public credit securities in corporate business is in the form of loans by the private sector, which is supposed to be granted by the banking system. Furthermore, Table 2.Appendix 2a and 2b represent the detailed categories of financial assets and liabilities by major sectors.

2.2.1.4 Net worth assets and debts

'Net worth' is defined as the residue from the total amount of assets (both real and financial) less the total amount of liabilities. If net worth appears as a positive amount, it will be referred to as a 'net worth asset,' i.e., an item of balance-sheet liabilities to equalize the asset side. If net worth is a negative amount, on the contrary it will be referred to as a 'net worth debt,' i.e., an item of balance-sheet assets to fill the gap on the liability side. By the definition of the System of National Accounts (SNA), 'national wealth' means the net worth assets of a country as a whole, which numerically equals the total sum of the real assets (i.e., both the reproducible and non-reproducible tangible assets) and net external assets—such as gold and other precious metals, buildings, machinery, and land.

With regard to capital and reserves, the 'corporate shares' with mark-to-market value (conceptually, it equals the replacement value of physical assets) should be entered in the category of net worth asset (an item of balance-sheet liabilities), because they legally represent the title of ownership in the form of appropriate shares and are backed by physical assets (i.e., existing capital goods). On the other hand, we can regard 'equities in physical capital' as an item of balance-sheet assets, corresponding to corporate shares (on the liability side of balance sheet).

As for the stability of value, we can regard net worth as the exogenous determinant and ultimate numeraire of the value of all real assets and net external assets. In other words, net worth is the source of funds (i.e., credit supply) to finance (i.e., to purchase) all the real assets and net external assets, and conceptually, it represents the present value (PV) of accumulated savings from the past. However, we cannot avoid the volatile fluctuations in the pricing of net worth assets and debts themselves, and they are severely affected by the biased perception of market

participants. Even today, little is known about the mechanism of asset-pricing. There have been a series of value theories, among which we consider the Dmitriev type of matrix approach as the most effective one for exploring the comprehensive pricing mechanism (see Dmitriev, 1974), but we will not go into further detail here.[17] Table 2.7 is the combined national balance sheet of Japan. It represents the entire spectrum of real and financial assets, liabilities, and net worth.

2.2.1.5 Foreign assets and debts

'Foreign assets and debts' are a sub-category of net worth assets and debts, which are denominated in foreign currencies. Irrespective of the variety of existing forms of foreign assets and debts (whether financial or real), they are all classified into the same category of foreign assets and debts. From the perspective of the monetary stages on the T-account, foreign assets and debts are converted into the denomination of the local currency through foreign exchange cross-rates, and are expressed as specific items of net worth assets and debts.

With regard to the degree of stability of value, foreign assets and debts are positioned at the same level as net worth assets and debts. We can regard the foreign exchange market as one of the asset markets. "The most important lesson to be gleaned from recent research in international monetary economics is that the exchange rate is an asset price. Like movements in the Standard and Poor's stock price index, exchange rate fluctuations reflect investors' changing perceptions of prospective capital gains and losses. In the same way that the demand for industrial shares fluctuates with new information, so too does the demand for foreign exchange" (Eichengreen, 1994, p. 1).

[17] For reference, see Tanioka, 1992a.

At the same time, we are inclined to take foreign assets and debts for one of the financial assets and debts with variable prices, if they are liquid and sufficiently negotiable, and furthermore, for one type of the credit securities issued by foreign entities—such as monetary authorities (i.e., the issuer of foreign currency), banks, governments, and corporate businesses. However, without a universally accepted standard of value (like gold in the past), we must recognize that foreign assets and debts function in just the same way as credit securities, whose credit risks must be cautiously monitored. Thus, since the suspension of the US dollars' convertibility into gold in 1971, even the key-currency of the anchor state represents only the balance-sheet liabilities of the United States on green pieces of paper (with no interest borne either).

2.2.2 Transition among monetary stages

Each credit instrument on a T-account is not necessarily fixed permanently in its inherent monetary stage. We can observe transition between monetary stages at any time through financial transactions. For instance, the securitization of non-performing loans backed by mortgage property or that of net worth assets represents the transition among monetary stages from net worth assets to credit securities. Mortgage loans, which are collateralized by net worth assets or credit securities, represent transition into deposit money. Even more commonly, when we draw deposits in cash, it means the transition from deposit money to reserve money.

Transition between monetary stages will have reflexive effects on entire credit flows in the economy. We can explore the credit-flows mechanism—the directions and amounts of demand for and supply of credits—, to grasp the knock-on effects of reflexive (i.e., continuing but converging) processes in the dynamism of financial markets.

2.2.3 Innovation of new credit instruments

2.2.3.1 Derivatives

Facilitated by rapid advances in technology and communications, the complexity, diversity and volume of derivatives instruments are swiftly growing. Derivatives instruments have become increasingly important to the overall risk profile and profitability of banking organizations throughout the world.

Broadly defined, a 'derivatives instrument' is a financial contract whose value depends on the values of one or more underlying assets or indexes (BIS, 1994, p. 3). Derivatives transactions include a wide assortment of financial contracts, including forwards, futures, swaps and options. In addition, other traded instruments incorporate derivatives characteristics, such as those with imbedded options. While some derivatives instruments may have very complex structures, all can be divided into the basic building blocks of options, forward contracts or some combination thereof. Derivatives contracts are entered into throughout the world on organized exchanges and through over-the-counter (OTC) arrangements. Exchange-traded contracts are typically standardized with regard to maturity, contract size and delivery terms. OTC contracts are custom-tailored to an institution's needs and often specify commodities, instruments and/or maturities that are not offered on any exchange.

Despite its off-balance-sheet exposures, the cash flows resulting from derivatives transactions are identical to those from the counter combination of long/short positions of bond (in more general terms, credit securities) holdings. In that sense, we can regard derivatives instruments as the combined transactions of underlying credit securities with notional amounts, although the risk exposures are off-balance sheet (Maezono & Kasugai, 1994, pp. 14-19). With regard to the exchange-traded contracts, we can easily monitor the mark-to-market values. We can

also calculate the theoretical values of OTC contracts through the discounted cash flow (DCF) model.

2.2.3.2 Electronic money

A number of innovations are taking place in the area of retail payments known as electronic money. These innovations, which are still at a relatively early stage of development, have the potential to challenge the predominant role of cash for making small-value payments and could make retail transactions easier and cheaper for consumers and retailers alike.

We can define 'electronic money'[18] as the stored value or prepaid payment mechanisms for executing payments via point of sale terminals, direct transfers between two devices, or open computer networks such as the Internet. The electronic value is purchased by the consumer (for example, in the way that other prepaid instruments such as travelers' checks might be purchased), and is reduced whenever the consumer uses the device to make purchases.[19] In contrast to the many existing single-purpose prepaid card schemes (such as those offered by telephone companies), electronic money products are intended to be used as a general, multipurpose means of payment. Moreover, the definition covers both prepaid cards (sometimes called "electronic purses") and prepaid software products that use computer networks such as the Internet (sometimes referred to as "digital cash"). Electronic money as defined here differs from electronic banking or so-called access products, which allow consumers to use electronic means of communication to access otherwise

[18] The definition and the following discussions on electronic money owe much to the publications of Bank for International Settlement. See BIS, 1996; Basle Committee on Banking Supervision, BIS; Group of Ten, BIS, 1997.

[19] Debit cards and credit cards are retail electronic payment mechanisms, but are not considered electronic money, because they are not prepaid mechanisms.

conventional payment services (e.g., the use of a standard personal computer and a computer network such as the Internet to make a credit card payment or to transmit instructions to make fund transfers between bank accounts). The significant novel feature of these access schemes is the communication method (e.g., the use of a computer network rather than a visit to a bank branch) and so, although they are of interest, they do not raise the same concerns as electronic money schemes, and are not considered further.

Unlike existing forms of payment such as checks, direct debits, debit cards or credit cards, which allow the holder to access a bank deposit account or a credit line, the funds stored on an electronic money device typically represent a general or pooled liability of an 'issuer.'[20] From a policy point of view, the main interest in these schemes lies in who issues the prepaid value, how it is used as a means of payment and the impact on central banks' balance sheets. In addition, from the viewpoint of the monetary stages of the T-account, we can classify the possible schemes for electronic money roughly into the following four cases.

2.2.3.2.1 Case 1: electronic money in currency competition

In most schemes for electronic money currently being developed or pilot-tested, the value stored on the devices is denominated only in the national currency. However, it is theoretically possible for balances to be held and payments to be made, either in several different national currencies or even in an independent unit of account specially developed for the use of electronic money. In this case, we can regard the

[20] The term 'issuer' is used to indicate the entity or entities in a particular scheme, whose liabilities include electronic money balances outstanding, and who receive the proceeds from the sale or distribution of electronic money balances. The term 'provider' is used to include issuers and any other entities involved in implementing an electronic money scheme.

issuer of electronic money as that of a new currency, which will create the ideal situation of currency competition that Hayek advocated (1978; 1984). This case is of academic interest, but seems rather unrealistic, because it is difficult to foresee that a new issuer of electronic money, with more confidence than existing states or governments, will emerge in the near future.

2.2.3.2.2 Case 2: electronic money as reserve money

If monetary authorities (in particular, central banks) monopolize the issue of electronic money, it will have exactly the same function and confidence as cash, i.e., reserve money. Alternatively, it might be possible for central banks to issue electronic money without actually operating schemes themselves. However, this option may not seem desirable, because this could limit competition and even reduce incentives to innovate in both technology and commercial activity.

2.2.3.2.3 Case 3: electronic money as deposit money

Should commercial banks be allowed to issue electronic money denominated in a national currency, we can regard this as a specific type of deposit money which will feature many technological innovations. In the European Union, a 1994 report by the European Monetary Institute[21] concluded that only credit institutions should be allowed to issue multipurpose prepaid cards, although the implementation of this decision lies with national authorities.

2.2.3.2.4 Case 4: electronic money as credit securities

If other regulated non-bank financial institutions or non-financial institutions are allowed to issue electronic money denominated in a national currency, it will become

[21] The European Monetary Institute (EMI) became a part of the European Central Bank (ECB) after the latter's establishment on June 1, 1998.

an innovative type of credit security with more liquidity and many similar functions to cash. In the United States, it appears that under current state and federal laws, entities other than depository institutions may issue electronic money. Also in Japan, a 1997 report by the Financial System Research Council propounded the following:

> For issuers of electronic money, a high degree of financial soundness and adequate technical and operational capabilities are necessary. But that does not mean issuers should be limited to existing deposit-taking financial institutions with licenses secured under the Banking Law or other laws. It would be appropriate to put in place measures which allow entities other than existing deposit-taking financial institutions to issue electronic money, with an eye to encouraging new entrants and developing electronic money through competition among various entities in the market. (Ministry of Finance [MOF], Japan, 1997a, chap. 5.2).

2.2.3.2.5 Implications for monetary policy

Since bank notes in circulation represent non-interest-bearing bank liabilities, the substitution of electronic money for cash would lead to a corresponding decline in central asset holdings and the interest earned on these assets that constitutes central bank 'seigniorage'[22] revenue.

In addition, the introduction of electronic money could potentially have an effect on the demand for monetary aggregates, and on the formulation of monetary policy. Electronic money could lead to shifts in the velocity of money, which might temporarily reduce the usefulness of monetary aggregates. The effects of electronic money on the implementation of monetary policy will depend upon whether its primary impact is on the demand for bank reserves or on the central bank's capacity to supply these reserves. Any change in demand would result from the substitution of electronic money for reservable deposits or from a substantial reduction in banks'

[22] The term 'seigniorage' refers to "the gain accruing to the issuer (a central bank in many cases) from issuing currency" (MOF, Japan, 1999, References, p. 13). More details on signiorage will be discussed in Chapter 3 afterward.

demand for settlement balances. Any change in supply would result from the impact of electronic money on the size of central bank balance sheets, which will depend on the extent to which electronic money replaces cash. Since cash is a large or the largest component of central bank liabilities in many countries, a very extensive spread of electronic money could shrink central bank balance sheets significantly.

2.3 General equilibrium model of the T-account

2.3.1 Model 1: Singular standard regime

Table 2.8 is the combined balance sheet of a 'singular standard regime,' which is referred to as an economy with only one currency unit of account. In such a regime, we do not have to worry about the valuation of foreign assets and debts or the foreign exchange cross-rates that vary all the time.

In the table, there are parallel lines of assets and liabilities classified by six sectors (i.e., central bank, banks, non-monetary financial intermediaries, government, corporate business, and individuals). Each sector issues its particular 'monetary-staged liabilities' in the forms of reserve money, deposit money, credit securities, and net worth assets and debts, which represent the issuer's demand for credit to finance asset holdings. From the perspective of asset holdings, each sector holds mixed 'monetary-staged assets,' which were issued as monetary-staged liabilities by sectors, representing the supply of credit to hold these assets. In short, monetary-staged liabilities and monetary-staged assets are identical, the only difference being the perspectives of liability issuers and asset holders.

Based on the methodologies of the Brainard-Tobin type of general equilibrium approach, we can construct a general equilibrium model by making use of the monetary stages on the T-account (i.e., combined balance sheet). The equations (2.15a-2.19) will demonstrate the general equilibrium model, by using the following symbols: W = the nominal value of total wealth, i.e., the replacement value of total assets (both financial and real) in an economy, f_i = the function of the vector **r**, which represents net demand for each monetary-staged asset, by all sectors, and **r** = the

vector of the nominal rates of return on each monetary-staged asset, which represents the rate-of-return structure of the whole economy.

Wealth definition equation (2.15a):

$$W = \textit{Reserve money} + \textit{Deposit money} + \textit{Credit securities} + \textit{Net worth assets.} \quad (2.15a)$$

where the total wealth (nominal; W) of the economy (the left side) can be defined to be equal to the total value of all monetary-stage liabilities (nominal), i.e., the aggregate value of reserve money, deposit money, credit securities, and net worth assets (the right side). It should be noted that the equation (2.15a) itself represents the structure of the T-account of a singular standard regime as expressed in the table 2.8. That is, the left side represents the replacement value of all assets (both financial and real) in the economy, while the right side represents the financing resources that are classified by four monetary stages.

Balance equations of the demand for and supply of monetary-staged assets (2.16-2.19):

$$f_1(\mathbf{r})\cdot W = \textit{Reserve money.} \quad (2.16)$$

$$f_2(\mathbf{r})\cdot W = \textit{Deposit money.} \quad (2.17)$$

$$f_3(\mathbf{r})\cdot W = \textit{Credit securities.} \quad (2.18)$$

$$f_4(\mathbf{r})\cdot W = \textit{Net worth assets.} \quad (2.19)$$

where, on the left side, $f_i(\mathbf{r})\cdot W$, which are the functions of rate-of-return structure ($\mathbf{r}$), represent the demand for each monetary-staged asset i by all sectors, and on the right

side, reserve money, deposit money, credit securities, and net worth assets represent the supply of each monetary-staged assets, which are exogenously limited in the economy by the equation (2.15a).

The five equilibrium conditions (2.15a-2.19) will fully describe the general equilibrium of the system determined under the assumptions of a singular standard regime.

2.3.2 Model 2: Pluralist regime

Table 2.9 is the combined balance sheet of a 'pluralist regime,' which comprises an economy with at least two or more currency units of account, i.e., an economy open to the rest of the world. It consists of the T-accounts of countries A and B, the latter representing the rest of the world. In this regime, we have to monitor the changes in valuation of foreign assets and debts, and the foreign exchange cross-rates as we do at all the times in the stock market.

Model building of the general equilibrium conditions for the pluralist regime might seem much more complex than that for a singular standard regime. However, according to the conceptual framework of monetary stages, foreign assets and debts can be classified into the sub-category of net worth assets and debts. It enables us to deal with foreign assets and debts as if they were net worth assets and debts with variable prices. Hence, we can construct a general equilibrium model of the T-account with a relatively small modification to that of a singular standard regime.

First, we have a wealth definition equation (2.15b), which is modified by the addition of net foreign assets as an item of monetary-staged assets on the right side of the equation (2.15a), as follows:

$$W = \textit{Reserve money} + \textit{Deposit money} + \textit{Credit securities} + \textit{Net worth assets} + \textit{Net foreign assets.} \quad (2.15b)$$

where the total wealth (nominal; W) of the economy (the left side) can be defined to be equal to the total value of monetary-staged liabilities (nominal), i.e., the aggregate value of reserve money, deposit money, credit securities, net worth assets and net foreign assets (the right side). The equation (2.15b) represents the structure of the T-account of a pluralist regime as in the Table 2.9, where the left side stands for the replacement value of all assets (both domestic and external) in the economy, while the right side stands for the financing resources (both from domestic and external sources) that are classified by five monetary stages.

Next, the balance equations of the demand for and supply of monetary-staged assets (2.16-2.19) are the same as in the singular standard regime. But in addition, in the pluralist regime, the balance equation of the demand for and supply of foreign assets and debts (2.20) must be included as follows:

$$f_3(\mathbf{r}) \cdot W = \textit{Net foreign assets.} \quad (2.20)$$

where, on the left side, $f_3(\mathbf{r}) \cdot W$, which is also the function of the rate-of-return structure ($\mathbf{r}$), represents the demand for net foreign assets (as an item of monetary-staged asset i) by all sectors, and the right side represents the supply of net foreign assets that are exogenously limited in the economy by the equation (2.15b).

The six equilibrium conditions (2.15b-2.20) will fully describe the general equilibrium of the system determined under the assumptions of a pluralist regime.

Table 2.1
General Accounting Framework

Assets (i)	Sectors (j) of the Economy 1 2 3 . . m	Central government	Net total holdings =Exogenous supply
1 2 3 . . n			
Net worth	Total private wealth (= National wealth less government net worth)	Government net worth	National wealth

Source: Tobin, James, "A General Equilibrium Approach to Monetary Theory," *Essays in Economics: Macroeconomics*, Ed. James Tobin, Vol. 1, Cambridge, Massachusetts: The MIT Press, 1987, p. 324.

Table 2.2
Balance Sheet
Bank of Japan Accounts

(October 1997, JPY Billion)

Assets		Liabilities and Capital Accounts		(item)
Gold	215.6	Bank Notes Issued	45,204.3	1
Cash	346.6	Financial Institutions' Deposits	3,442.7	2
Loans & Discounts	834.2			
- Commercial Bills Discounted	17.3	Government Deposits	446.0	3
		Other Deposits	7.3	4
- Loans	816.8	Other Accounts	4,403.3	5
Bills Purchased	3,882.3	Allowances	2,533.8	6
Japanese Government Bonds	48,106.0			
		Capital	0.1	7
- Financing Bills	20,520.9	Reserves	2,084.8	8
Foreign Assets	3,310.8			
Loans to Deposit Insurance Corporation	291.7			
Deposits with Agencies	358.5			
Other Accounts	796.6			
Total Assets	58,142.7	Total Liabilities and Capital Accounts	58,142.7	

Source: Bank of Japan (BOJ, Research and Statistics Department), *Economic Statistics Monthly* 608 (November 1997), p. 26.

Table 2.3
Combined Balance Sheet
Banking Accounts of Domestically Licensed Banks

(September 1997, JPY Billion)

Assets		Liabilities and Net Worth		(item)
Cash	11,183.8	Deposits	473,822.6	1
- Checks & Bills	7,879.3	- Current Deposits	19,832.0	2
Deposits	25,045.1	- Ordinary Deposits	82,719.1	3
- Certificates of Deposits	1,448.7	- Saving Deposits	12,455.0	4
Call Loans	8,549.5	- Time Deposits	302,483.3	5
Bills Purchased	579.7	Certificates of Deposits	32,247.7	6
Monetary Claims Purchased	1,312.1	Bank Debentures Issued	47,314.0	7
- Commercial Paper	367.6	Call Money	33,352.9	8
Trading Account Bonds	432.0	Bills Sold	4,280.1	9
Entrustment of Money	6,259.2	Borrowed Money	19,735.1	10
Securities	124,491.1	- Bills Rediscounted	12.8	11
- Government Bonds	29,119.1	- From the Bank of Japan	514.5	12
- Local Government Bonds	9,907.5	- From Other Financial Inst.	11,403.5	13
- Corporate Bonds	18,914.9	Foreign Exchange	517.8	14
- Stock & Shares	45,307.4	Convertible Bonds	898.8	15
- Foreign Securities	17,369.0	Reserves for Possible Loan Losses	12,966.7	16
- Securities Lent	494.8	Capital		17
Bills Discounted	15,256.8	- Capital	9,200.3	18
Loans	462,683.3	- Capital Reserves	6,179.0	19
- Loans to Bills	91,652.5	Profits and Losses for the Term	-61.6	20
- Loans on Deeds	283,070.4			
- Overdrafts	87,960.2			
Foreign Exchange	3,396.6			
(Others)	-----	(Others)	-----	21
Total Assets	747,274.3	Total Liabilities and Net Worth	747,274.3	

Source: Bank of Japan (BOJ, Research and Statistics Department), *Economic Statistics Monthly* 608 (November 1997), pp. 28-31.

Table 2.4
Combined Balance Sheet
Financial Intermediaries

(End of 1996, JPY Billion)

Assets		Liabilities and Net Worth		(item)
Net fixed assets	21,612.6	Liabilities, except corporate shares	1,840,407.4	1
Land	49,462.9	- Currency	46,750.9	2
		- Transferable deposits	162,039.9	3
Financial assets	1,906,233.3	- Other deposits	842,542.3	4
- Transferable deposits	3,462.7	- bonds, long-term	154,508.1	5
- Bills and bonds, short-term	21,471.8	- Loans by Bank of Japan	1,983.4	6
- Bonds, long-term	424,028.1	- Call money, etc	56,333.7	7
- Corporate shares	163,609.8	- Commercial papers	189.5	7
- Loans to Bank of Japan	1,983.4	- Loans by public sector	1,789.3	8
- Call loans, etc	56,333.7	- Net equity on life insurance reserves and pension funds	298,530.7	9
- Commercial papers	9,531.9			
- Loans to private sector	718,339.9	- Transfers from general government	3,668.6	10
- Loans to public sector	310,968.0			
- Other financial assets	196,504.0	- Trade credit and advances	0.0	11
		- Other liabilities	272,071.0	12
		Corporate shares and net worth	136,901.4	13
		Corporate shares	90,376.5	14
		Net worth	46,524.9	15
Total Assets	1,977,308.8	Total Liabilities and Net Worth	1,977,308.8	

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute), *Annual Report on National Accounts* (1998), p. 325.

Table 2.5
Combined Balance Sheet
General Government

(End of 1996, JPY Billion)

Assets		Liabilities and Net Worth		(item)
Net fixed assets	381,903.6	Liabilities	470,888.4	1
Non-reproducible tangible assets	118,937.5	- Bills and bonds, short-term	26,538.0	2
- Land	110,315.3	- Bonds, long-term	279,217.0	3
- Timber tracts	8,622.2	- Loans by private sector	9,889.5	4
		- Loans by public sector	148,951.5	5
Financial assets	393,987.4	- Trade credit and advances	209.7	6
- Currency and Transferable deposits	2,914.0	- Other liabilities	6,082.7	7
- Other deposits	93,889.9	Net worth	423,940.1	8
- Bills and bonds, short-term	3,845.6			
- Bonds, long-term	23,747.1			
- Corporate shares	774.5			
- Loans to public sector	36,452.8			
- Net equity on life insurance reserves and on pension funds	25,388.6			
- Transfers to general gov't	3,988.5			
- Trade credit and advances	0.0			
- Other financial assets	202,986.4			
Total Assets	894,828.5	Total Liabilities and Net Worth	894,828.5	

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute), *Annual Report on National Accounts* (1998), p. 327.

Table 2.6
Combined Balance Sheet
Corporate Business

(End of 1996, JPY Billion)

Assets		Liabilities and Net Worth		(item)
Stocks	67,582.7	Liabilities, except corporate shares	979,398.3	1
Net fixed assets	546,568.8			
Non-reproducible tangible assets	492,204.7	- Bills and bonds, short-term	0.0	2
- Land	481,358.4	- Bonds, long-term	120,711.3	3
- Timber tracts	10,183.0	- Commercial papers	10,655.3	4
- Sub-soil assets	663.3	- Loans by private sector	470,971.0	5
		- Loans by public sector	101,345.7	6
Financial assets	731,025.2	- Transfers from general government	319.9	7
- Currency	4,677.2			
- Transferable deposits	62,460.5	- Trade credit and advances	210,497.7	8
- Other deposits	137,973.8	- Other liabilities	64,897.4	9
- Bills and bonds, short-term	297.1			
- Bonds, long-term	22,162.3	Corporate shares and net worth	857,983.1	10
- Corporate shares	152,688.8	- Corporate shares	371,135.5	11
- Commercial papers	1,312.9	- Net worth	486,847.6	12
- Loans to public sector	43.9			
- Trade credit and advances	271,607.0			
- Other financial assets	77,801.7			
Total Assets	1,837,381.4	Total Liabilities and Net Worth	1,837,381.4	

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute), *Annual Report on National Accounts* (1998), p. 323.

Table 2.7
Combined National Balance Sheet

(End of 1996, JPY Billion)

Assets		Liabilities and Net Worth	
Tangible assets	3,139,861.2	Liabilities (except corporate shares)	3,692,623.2
- Stocks	76,728.7	- Currency	46,750.9
Finished goods	18,320.8	- Transferable deposits	162,039.9
Work in progress	15,181.0	- Other deposits	842,542.3
Materials and supplies	11,296.6	- Short-term gov't securities	26,538.0
Wholesale and retail trade	32,235.6	- Bonds, long-term	554,436.4
Less: Consumption tax refund	305.3	- Loans to Bank of Japan	1,983.4
- Net fixed assets	1,250,569.8	- Call money and bills sold	56,333.7
Residential buildings	262,907.2	- Commercial papers	10,844.8
Non-residential buildings	305,841.5	- Loans by private sector	724,946.0
Other structures	488,617.7	- Loans by public sector	347,464.7
Transport equipment	28,579.7	- Life insurance	298,530.7
Machinery, equipment and etc	180,077.1	- Transfers from general gov't	3,988.5
Less: Consumption tax refund	15,453.4	- Trade credit and advances	272,915.9
- Non-reproducible tangible assets	1,812,562.7	- Other liabilities	343,308.0
		Corporate shares and net worth	3,698,024.7
Land	1,740,113.4	- Corporate shares	461,512.0
Timber tracts	70,759.5	- Net worth	3,236,512.7
Subsoil assets	663.3		
Fisheries	1,026.5		
Financial assets	4,250,786.7		
- Currency	46,750.9		
- Transferable deposits	162,039.9		
- Other deposits	840,616.3		
- Short-term gov't securities	25,614.5		
- Bonds, long-term	527,664.7		
- Corporate shares	429,023.1		
- Loans by Bank of Japan	1,983.4		
- Call loans and bills bought	56,333.7		
- Commercial papers	10,844.8		
- Loans to private sector	724,946.0		
- Loans to public sector	347,464.7		
- Life insurance	298,530.7		
- Transfers to general gov't	3,988.5		
- Trade credit and advances	272,915.9		
- Other financial assets	502,069.6		
Total Assets	7,390,647.9	Total Liabilities and Net Worth	7,390,647.9

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute), *Annual Report on National Accounts* (1998), p. 337.

Table 2.8

Singular Standard Regime

Sector	Assets	Liabilities
Central bank	- Gold - Government bonds - Loans & discounts to banks and financial intermediaries	- Reserve money (bank notes and reserves)
Banks	- Cash - Reserves - Securities (government bonds, corporate bonds and shares) - Loans to public	- Deposits from public - Loans from other financial intermediaries
Public		
Financial intermediaries (non-monetary)	- Deposits to banks - Securities (government bonds, corporate bonds and shares) - Loans to public	- Bonds - Loans from banks and other financial intermediaries
Government	- Deposits to central bank	- Government bonds - Loans from central bank
Corporate business	- Real assets (land and equipment) - Cash - Deposits to banks	- Bonds - Loans from banks and financial intermediaries - Equities
Personal	- Real assets (land and residential buildings) - Deposits to banks - Securities (government bonds and corporate shares)	- Loans from banks and financial intermediaries - Accumulated savings

Table 2.9

Pluralist Regime

Sector	Assets	Liabilities
Country A		
Central bank	- Gold - Government bonds - Loans & discounts to banks and financial intermediaries ☺ Foreign exchange reserves ☺ Deposits to foreign banks ☺ Foreign government bonds	- Reserve money (bank notes and reserves)
Banks	- Cash - Reserves - Securities (government bonds, corporate bonds and shares) - Loans to public ☺ Deposits to foreign banks ☺ Foreign securities (government bonds, corporate bonds and shares) ☺ Loans to foreign banks and public	- Deposits from public - Loans from other banks and financial intermediaries ☺ Deposits from foreign banks and bublic ☺ Foreign bonds ☺ Loans from foreign banks and financial intermediaries
Public		
Financial intermediaries (non-monetary)	- Deposits to banks - Securities (government bonds, corporate bonds and shares) - Loans to public ☺ Deposits to foreign banks ☺ Foreign securities (government bonds, corporate bonds and shares) ☺ Loans to foreign banks and public	- Bonds - Loans from banks and other financial intermediaries ☺ Foreign bonds ☺ Loans from foreign banks and financial intermediaries
Government	- Deposits to central bank	- Government bonds - Loans from central bank ☺ Foreign government bonds ☺ Grants and loans from foreign governments and multilateral financial institutions
Corporate business	- Real assets (land and equipment) - Cash - Deposits to banks ☺ Foreign real assets (land and equipment) ☺ Foreign currencies ☺ Deposits to foreign banks ☺ Foreign securities (government bonds, corporate bonds and shares)	- Bonds and equities - Loans from banks and financial intermediaries ☺ Foreign bonds and equities ☺ Loans from foreign banks and financial intermediaries

Personal	- Real assets (land and residential buildings) - Deposits to banks - Securities (government bonds and corporate shares) ☺ Foreign real assets (land and residential buildings) ☺ Foreign currencies ☺ Deposits to foreign banks ☺ Foreign securities (government bonds and corporate shares)	- Loans from banks and financial intermediaries - Accumulated savings ☺ Loans from foreign banks and financial intermediaries
Country B (Rest of the world)		
All sectors	☺ External credit supply = Total foreign liabilities of country A	☺ External credit demand = Total foreign assets of country A

Note: Items with (-) are denominated in the national currency of country A. The other items with ☺ marks are denominated in foreign currencies, here, the national currency of country B.

Table 2 Appendix 1a
Closing Stocks of Financial Assets by Sub-sectors
Sub-sectors of Private Financial Institutions
End of Fiscal Year
(Thousand million Yen)

(1996)Stocks of financial assets

Item□^Sector	All banks	Financial institutions for small-business	Financial institutions for agriculture forestry,fishery	Foreign banks in Japan	Insurance	Trusts	Securities companies	Others	Total
1. Gold and IMF special drawing rights	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Currency and transferable deposits	7,142.2	2,040.8	958.1	96.9	2,508.0	4.6	884.9	22.5	9,045.5
(1) Currency	3,701.2	1,257.1	394.1	5.6	37.2	4.6	0.0	0.0	5,399.8
(2) Deposits on demand	0.0	707.8	475.4	62.9	2,470.8	0.0	884.9	22.5	0.0
(3) Deposits to The Bank of Japan	3,441.0	75.9	88.6	28.4	0.0	0.0	0.0	0.0	3,645.7
(4) Government current deposits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Other deposits	6,730.9	5,067.5	4,440.9	986.0	16,148.1	5,131.3	2,502.8	113.0	0.0
(1) Time deposits	0.0	536.4	360.3	478.1	3,316.4	0.0	1,641.7	43.9	0.0
(2) Non-resident Yen deposits and foreign currency deposits	0.0	1,363.6	916.1	368.9	4,664.6	0.0	102.3	21.7	0.0
(3) Trust	6,730.9	2,013.5	2,545.6	2.0	7,245.9	0.0	0.0	0.0	0.0
(4) Certificates of deposit	0.0	1,154.0	618.9	137.0	921.2	5,131.3	758.8	47.4	0.0
4. Short-term government securities	963.2	181.2	78.0	86.4	0.0	0.7	195.4	17.9	1,522.6
5. Bonds, long term	59,257.6	23,014.0	19,983.5	1,954.9	64,954.4	57,146.1	10,495.7	320.3	237,116.5
(1) Government bonds	26,968.3	6,114.9	10,164.1	1,297.7	32,644.6	27,007.3	6,787.5	174.3	111,150.7
(2) Local government bonds	10,267.3	2,066.2	1,450.5	174.5	7,472.9	4,415.9	577.8	0.0	26,425.1
(3) Public corporation bonds	5,688.3	2,551.8	1,746.0	116.3	4,222.8	5,860.7	187.0	0.1	20,373.0
(4) Bank debentures	8,370.8	5,327.0	3,616.5	116.0	12,274.0	9,124.8	1,126.3	144.4	40,099.8
(5) Industrial bonds	5,811.2	4,900.9	1,759.4	250.4	5,484.8	10,737.4	1,583.8	0.8	30,528.7
(6) Securities of investment trust	2,151.7	2,053.2	1,247.0	0.0	2,855.3	0.0	233.3	0.7	8,541.2
(7) External bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6. Corporate shares	54,068.7	1,015.1	1,149.0	33.2	44,561.9	45,630.9	4,871.3	400.7	151,730.8
7. Loans	485,030.6	116,917.0	49,565.9	14,697.6	76,099.7	42,427.3	3,120.8	13,881.0	763,042.0
(1) The Bank of Japan loans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Call money	8,923.3	4,581.8	5,786.1	1,470.2	6,576.8	14,529.2	1,129.1	122.3	43,118.8
(3) Bills bought and sold	1,881.5	244.3	10.0	3,396.6	139.8	143.8	124.9	0.0	5,935.2
(4) Commercial papers	445.0	1,178.4	900.7	65.5	333.4	3,310.6	112.0	11.5	6,357.1
(5) Loans by private sector	473,780.8	110,912.5	42,869.1	9,765.3	69,049.7	24,443.7	1,754.8	13,747.2	707,630.9
(6) Loans by public sector	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. Life insurance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9. Transfers from general government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10. Trade credit and advances	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11. Other financial assets and liabilities	109,737.5	6,331.7	8,334.4	0.0	38,972.0	56,131.1	0.0	3,377.1	184,996.1
(1) Deposits with trust fund bureau	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.4
(2) Investments by government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Non-life insurance	224.2	24.9	0.0	0.0	0.0	0.0	0.0	0.0	249.1
(4) Foreign exchange reserves (except gold and IMF special drawing rights)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(5) Foreign direct investments	5,226.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,226.5
(6) Foreign trade credits, long term	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7) Foreign loans	66,774.4	0.0	0.0	0.0	6,483.0	0.0	0.0	0.0	75,257.4
(8) Foreign securities	16,958.3	6,306.8	5,383.5	0.0	24,197.4	22,982.0	0.0	0.0	75,828.0
(9) Other foreign claims and debts	18,554.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18,554.1
(10) Others	0.0	0.0	2,950.9	0.0	8,291.6	33,149.1	0.0	3,377.1	9,840.6
Total	722,930.7	154,567.3	84,509.8	17,855.0	243,244.1	206,472.0	22,070.9	18,132.5	1,347,457.7

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute)
Annual Report on National Accounts (1996), p. 374

Table 2 Appendix 1b
Closing Stocks of Financial Liabilities by Sub-sectors
Sub-sectors of Private Financial Institutions
End of Fiscal Year
(Thousand million Yen)

(1996)Stocks of liabilities

Item/Sector	All banks	Financial institutions for small-business	Financial institutions for agriculture forestry fishery	Foreign banks in Japan	Insurance	Trusts	Securities companies	Others	Total
1. Gold and IMF special drawing rights	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Currency and transferable deposits	124,411.6	22,967.8	13,854.8	528.2	0.0	0.0	0.0	0.0	159,115.7
(1) Currency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Deposits on demand	124,411.6	22,967.8	13,854.8	528.2	0.0	0.0	0.0	0.0	159,115.7
(3) Deposits to The Bank of Japan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(4) Government current deposits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Other deposits	332,453.9	108,909.4	60,590.1	2,727.6	0.0	156,179.2	0.0	0.0	618,312.7
(1) Time deposits	280,089.7	107,139.1	60,402.0	480.6	0.0	0.0	0.0	0.0	445,027.2
(2) Non-resident Yen deposits and foreign currency deposits	18,623.6	1,414.0	0.0	2,200.1	0.0	0.0	0.0	0.0	10,060.9
(3) Trust	0.0	0.0	0.0	0.0	0.0	156,179.2	0.0	0.0	137,641.3
(4) Certificates of deposit	33,760.6	356.3	188.1	46.9	0.0	0.0	0.0	0.0	25,583.3
4. Short-term government securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5. Bonds, long term	52,139.3	14,164.4	8,893.2	0.0	379.6	47,820.4	837.5	0.0	124,234.4
(1) Government bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Local government bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Public corporation bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(4) Bank debentures	51,312.0	14,164.4	8,893.2	0.0	0.0	0.0	0.0	0.0	74,369.6
(5) Industrial bonds	175.2	0.0	0.0	0.0	379.6	0.0	837.4	0.0	1,392.2
(6) Securities of investment trust	0.0	0.0	0.0	0.0	0.0	47,820.4	0.0	0.0	47,820.4
(7) External bonds	652.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	652.2
6. Corporate shares	56,243.3	0.0	0.0	0.0	5,993.7	0.0	9,306.9	3,895.4	77,439.3
7. Loans	60,258.9	1,772.3	1,171.7	5,304.7	805.4	921.2	3,989.3	13,959.5	48,966.1
(1) The Bank of Japan loans	630.4	199.9	0.0	37.0	0.0	0.0	0.0	219.9	1,087.2
(2) Call money	37,195.8	574.7	612.5	2,856.5	0.0	105.0	216.2	1,082.8	43,118.8
(3) Bills bought and sold	4,866.9	188.4	559.2	31.1	0.0	0.0	0.0	0.0	5,645.6
(4) Commercial papers	0.0	0.0	0.0	0.0	114.5	0.0	0.0	0.0	114.5
(5) Loans by private sector	17,565.8	809.3	0.0	2,380.1	690.9	816.2	3,773.1	12,656.8	0.0
(6) Loans by public sector	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. Life insurance	0.0	0.0	0.0	0.0	200,797.6	0.0	0.0	0.0	200,797.6
9. Transfers from general government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10. Trade credit and advances	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11. Other financial assets and liabilities	95,423.7	6,753.4	0.0	9,294.5	35,267.8	1,551.2	7,937.2	277.6	117,591.9
(1) Deposits with trust fund bureau	0.0	0.0	0.0	0.0	0.0	0.0	0.0	277.6	668.1
(2) Investments by government	0.0	390.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3) Non-life insurance	0.0	0.0	0.0	0.0	35,267.8	0.0	0.0	0.0	35,267.8
(4) Foreign exchange reserves (except gold and IMF special drawing rights)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(5) Foreign direct investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(6) Foreign trade credits, long term	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7) Foreign loans	55,062.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55,062.0
(8) Foreign securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(9) Other foreign claims and debts	19,945.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19,945.3
(10) Others	20,416.4	6,362.9	0.0	9,294.5	0.0	1,551.2	7,937.2	0.0	6,648.7
Total	722,930.7	154,567.3	84,509.8	17,855.0	243,244.1	206,472.0	22,070.9	18,132.5	1,347,457.7

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute).
Annual Report on National Accounts (1996), p. 375

Table 2.Appendix 2a
Closing Stocks of Financial Assets by Sub-sectors
All Main Sectors
End of Fiscal Year
(Thousand million Yen)

(1995)Stocks of financial assets

Item/Sector	Financial institutions enterprises		Public enterprises	Financial institutions	Central bank	Private financial institutions	Public financial institutions	General government	Private Non-profit Institutions Serving Households	Households	Rest of the world	Total
		Private incorporated enterprises										
1. Gold and IMF special drawing rights	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Currency and transferable deposits	64,974.4	63,026.1	1,948.3	3,671.5	0.0	9,045.5	3,649.9	7,972.7	2,385.5	126,452.0	0.0	205,456.1
(1) Currency	4,231.6	4,229.2	2.4	0.0	0.0	5,399.8	1,463.6	0.2	16.9	38,045.9	0.0	42,294.6
(2) Deposits on demand	60,680.1	58,796.9	1,883.2	0.0	0.0	0.0	2,020.8	6,759.4	2,368.5	88,406.1	0.0	158,214.2
(3) Deposits to The Bank of Japan	0.0	0.0	0.0	3,671.5	0.0	3,645.7	25.8	0.0	0.0	0.0	0.0	3,671.5
(4) Government current deposits	62.7	0.0	62.7	0.0	0.0	0.0	139.7	1,213.1	0.0	0.0	0.0	1,275.8
3. Other deposits	141,995.8	136,796.9	5,198.9	0.0	0.0	0.0	785.0	95,326.5	25,532.0	577,680.3	1,900.3	842,434.9
(1) Time deposits	93,752.8	89,580.3	4,172.5	0.0	0.0	0.0	721.7	21,111.6	19,251.7	535,076.6	0.0	669,192.7
(2) Non-resident Yen deposits and foreign currency deposits	5,263.1	4,845.0	418.1	0.0	0.0	0.0	0.0	2,376.6	249.4	271.5	1,900.3	10,060.9
(3) Trust	20,203.2	20,170.2	33.0	0.0	0.0	0.0	15.3	69,464.9	5,743.1	42,214.8	0.0	137,626.0
(4) Certificates of deposit	22,776.7	22,201.4	575.3	0.0	0.0	0.0	28.0	2,373.4	287.8	117.4	0.0	25,555.3
4. Short-term government securities	1,048.4	1,048.4	0.0	22,090.5	18,810.2	1,522.8	1,757.5	6,846.6	0.0	0.0	653.5	30,639.0
5. Bonds, long term	23,686.2	23,507.7	180.5	429,563.4	25,943.9	237,118.5	166,501.0	23,736.2	5,798.4	48,109.5	23,854.3	554,750.0
(1) Government bonds	7,907.6	7,824.5	83.1	225,143.0	25,943.9	111,150.7	88,048.4	5,306.4	1,057.8	2,501.7	3,353.6	245,270.1
(2) Local government bonds			17.5	37,860.2	0.0	26,425.1	11,455.1	2,553.3	460.4	501.8	0.0	42,786.3
(3) Public corporation bonds	7,886.7	7,786.3	0.0	59,046.1	0.0	20,373.0	38,673.1	6,966.7	349.0	1,413.1	5,290.1	63,859.1
(4) Bank debentures			78.5	51,485.6	0.0	40,089.8	11,395.8	3,811.6	473.1	13,123.3	0.0	74,369.6
(5) Industrial bonds			0.0	47,457.3	0.0	30,528.7	16,928.6	3,676.4	1,870.4	2,194.5	0.0	65,434.6
(6) Securities of investment trust	7,893.9	7,893.9	0.0	8,541.2	0.0	8,541.2	0.0	1,421.8	1,587.7	28,375.1	0.7	47,820.4
(7) External bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15,209.9	15,209.9
6. Corporate shares	137,867.5	135,974.0	1,893.5	152,342.6	0.0	151,730.8	611.8	774.5	230.8	100,753.3	35,385.6	427,154.3
7. Loans	2,418.4	2,415.9	2,586.8	1,084,911.6	6,467.6	763,042.0	315,382.0	36,452.8	6,613.7	0.0	0.0	1,130,396.5
(1) The Bank of Japan loans	0.0	0.0	0.0	1,087.2	1,087.2	0.0	0.0	0.0	0.0	0.0	0.0	1,087.2
(2) Call money	0.0	0.0	0.0	43,118.8	0.0	43,118.8	0.0	0.0	0.0	0.0	0.0	43,118.8
(3) Bills bought and sold	0.0	0.0	0.0	11,335.6	5,400.4	5,935.2	0.0	0.0	0.0	0.0	0.0	11,335.6
(4) Commercial papers	2,374.5	2,374.5	0.0	6,367.1	0.0	6,357.1	10.0	0.0	0.0	0.0	0.0	8,741.6
(5) Loans by private sector	0.0	0.0	0.0	707,630.9	0.0	707,630.9	0.0	0.0	6,613.7	0.0	0.0	714,244.6
(6) Loans by public sector	43.9	41.4	2,586.8	315,372.0	0.0	0.0	315,372.0	36,452.8	0.0	0.0	0.0	351,868.7
8. Life insurance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23,701.8	0.0	276,370.8	0.0	300,072.6
9. Transfers from general government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,988.5	0.0	0.0	0.0	3,988.5
10. Trade credit and advances	280,394.3	268,691.4	11,702.9	0.0	0.0	0.0	0.0	0.0	1,320.8	0.0	0.0	281,715.1
11. Other financial assets and liabilities	82,011.4	79,635.4	2,508.7	205,409.6	10,524.2	184,998.1	30,102.5	209,256.2	1,121.3	24,259.5	129,732.1	651,790.1
(1) Deposits with trust fund bureau	185.1	46.9	142.2	42.4	0.0	42.4	0.0	152,306.0	0.0	0.0	0.0	152,537.5
(2) Investments by government	226.5	226.2	127.0	1,068.3	0.0	0.0	1,195.4	23,013.5	0.0	0.0	0.0	24,311.3
(3) Non-life insurance	14,180.2	14,180.2	0.0	249.1	0.0	249.1	0.0	156.3	360.6	22,440.0	0.0	37,386.4
(4) Foreign exchange reserves (except gold and IMF special drawing rights)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(5) Foreign direct investments	23,910.2	23,910.2	0.0	5,226.5	0.0	5,226.5	0.0	0.0	0.0	0.0	3,400.7	32,537.4
(6) Foreign trade credits, long term	4,731.0	4,731.0	0.0	891.8	0.0	0.0	891.8	206.0	0.0	0.0	1,283.7	7,112.5
(7) Foreign loans	9,365.1	9,365.1	0.0	90,175.4	2.5	75,257.4	14,915.5	29	0.0	0.0	101,597.9	201,141.3
(8) Foreign securities	16,375.6	16,375.6	0.0	83,848.9	0.0	75,828.0	8,020.9	2,219.1	760.5	1,819.5	0.0	105,023.6
(9) Other foreign claims and debts	10,791.2	10,791.2	0.0	18,554.1	0.0	18,554.1	0.0	445.8	0.0	0.0	23,449.8	53,240.9
(10) Others	2,239.5	0.0	2,239.5	5,353.1	10,521.7	9,840.6	5,078.5	30,906.6	0.0	0.0	0.0	38,499.2
Total	734,198.4	711,095.8	25,819.6	1,897,969.2	61,765.9	1,347,457.7	518,769.7	406,055.8	43,002.5	1,153,625.4	191,525.8	4,428,397.1

Source: Economic Planning Agency(EPA), Japan (Economic Research Institute).
Annual Report on National Accounts (1998), p. 356

Table 2 Appendix 2b
Closing Stocks of Financial Assets and Liabilities by Sub-sectors
All Main Sectors
End of Fiscal Year
(Thousand million Yen)

Item/Sector	(1996)Stocks of liabilities Financial institutions enterprises	Private incorporated enterprises	Public enterprises	Financial institutions	Central bank	Private financial institutions	Public financial institutions	General government	Private Non-profit Institutions Serving Households	Households	Rest of the world	Total
1. Gold and IMF special drawing rights	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	415.3	415.3
2. Currency and transferable deposits	0.0	0.0	0.0	205,456.1	54,245.0	159,115.7	1,119.3	0.0	0.0	0.0	0.0	205,456.1
(1) Currency	0.0	0.0	0.0	42,294.6	49,158.0	0.0	0.0	0.0	0.0	0.0	0.0	42,294.6
(2) Deposits on demand	0.0	0.0	0.0	158,214.2	0.0	159,115.7	1,119.3	0.0	0.0	0.0	0.0	158,214.2
(3) Deposits to The Bank of Japan	0.0	0.0	0.0	3,671.5	3,671.5	0.0	0.0	0.0	0.0	0.0	0.0	3,671.5
(4) Government current deposits	0.0	0.0	0.0	1,275.8	1,415.5	0.0	0.0	0.0	0.0	0.0	0.0	1,275.8
3. Other deposits	0.0	0.0	0.0	842,434.9	0.0	618,312.7	224,887.2	0.0	0.0	0.0	0.0	842,434.9
(1) Time deposits	0.0	0.0	0.0	669,192.7	0.0	445,027.2	224,887.2	0.0	0.0	0.0	0.0	669,192.7
(2) Non-resident Yen deposits and foreign currency deposits	0.0	0.0	0.0	10,060.9	0.0	10,060.9	0.0	0.0	0.0	0.0	0.0	10,060.9
(3) Trust	0.0	0.0	0.0	137,626.0	0.0	137,641.3	0.0	0.0	0.0	0.0	0.0	137,626.0
(4) Certificates of deposit	0.0	0.0	0.0	25,555.3	0.0	25,583.3	0.0	0.0	0.0	0.0	0.0	25,555.3
4. Short-term government securities	803.0	0.0	803.0	0.0	0.0	0.0	0.0	29,836.0	0.0	0.0	0.0	30,639.0
5. Bonds, long term	120,336.4	62,351.3	57,985.1	148,891.1	0.0	124,234.4	24,656.7	285,522.5	0.0	0.0	0.0	554,750.0
(1) Government bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	245,270.1	0.0	0.0	0.0	245,270.1
(2) Local government bonds	3,729.4	0.0	3,729.4	0.0	0.0	0.0	0.0	39,056.9	0.0	0.0	0.0	42,786.3
(3) Public corporation bonds	40,859.9	22.4	40,837.5	22,383.3	0.0	0.0	22,383.3	615.9	0.0	0.0	0.0	63,859.1
(4) Bank debentures	0.0	0.0	0.0	74,389.6	0.0	74,389.6	0.0	0.0	0.0	0.0	0.0	74,389.6
(5) Industrial bonds	64,042.4	51,006.0	13,036.4	1,382.2	0.0	1,382.2	0.0	0.0	0.0	0.0	0.0	65,434.6
(6) Securities of investment trust	0.0	0.0	0.0	47,820.4	0.0	47,820.4	0.0	0.0	0.0	0.0	0.0	47,820.4
(7) External bonds	11,704.7	11,322.9	381.8	2,925.6	0.0	652.2	2,273.4	579.6	0.0	0.0	0.0	15,209.9
6. Corporate shares	349,714.9	349,714.9	0.0	77,439.4	0.1	77,439.3	0.0	0.0	0.0	0.0	0.0	427,154.3
7. Loans	573,184.1	510,371.3	65,397.1	57,445.4	5,690.0	48,966.1	1,789.3	161,104.8	25,669.4	312,992.8	0.0	1,130,396.5
(1) The Bank of Japan loans	0.0	0.0	0.0	1,087.2	0.0	1,087.2	0.0	0.0	0.0	0.0	0.0	1,087.2
(2) Call money	0.0	0.0	0.0	43,118.8	0.0	43,118.8	0.0	0.0	0.0	0.0	0.0	43,118.8
(3) Bills bought and sold	0.0	0.0	0.0	11,335.6	5,690.0	5,645.6	0.0	0.0	0.0	0.0	0.0	11,335.6
(4) Commercial papers	8,627.1	8,627.1	0.0	114.5	0.0	114.5	0.0	0.0	0.0	0.0	0.0	8,741.6
(5) Loans by private sector	462,054.4	445,521.3	16,533.1	0.0	0.0	0.0	0.0	9,739.3	13,122.9	229,328.0	0.0	714,244.6
(6) Loans by public sector	102,502.6	56,222.9	46,864.0	1,789.3	0.0	0.0	1,789.3	151,365.5	12,546.5	83,664.8	0.0	351,868.7
8. Life insurance	0.0	0.0	0.0	300,072.6	0.0	200,797.6	99,275.0	0.0	0.0	0.0	0.0	300,072.6
9. Transfers from general government	319.9	0.0	319.9	3,668.6	0.0	0.0	3,668.6	0.0	0.0	0.0	0.0	3,988.5
10. Trade credit and advances	214,485.5	214,483.6	1.9	0.0	0.0	0.0	0.0	209.7	4,400.4	62,619.5	0.0	281,715.1
11. Other financial assets and liabilities	66,097.7	54,212.4	12,018.0	282,669.2	1,830.6	117,591.9	163,373.6	6,012.5	256.9	0.0	296,338.5	651,374.8
(1) Deposits with trust fund bureau	0.0	0.0	0.0	152,537.5	0.0	0.0	152,537.5	0.0	0.0	0.0	0.0	152,537.5
(2) Investments by government	13,217.6	1,332.3	12,018.0	7,019.0	0.0	668.1	6,478.0	516.9	256.9	0.0	3,300.9	24,311.3
(3) Non-life insurance	0.0	0.0	0.0	37,386.4	0.0	35,267.8	2,118.6	0.0	0.0	0.0	0.0	37,386.4
(4) Foreign exchange reserves (except gold and IMF special drawing rights)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23,714.0	23,714.0
(5) Foreign direct investments	3,400.7	3,400.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29,136.7	32,537.4
(6) Foreign trade credits, long term	1,283.7	1,283.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,828.8	7,112.5
(7) Foreign loans	46,535.9	46,535.9	0.0	55,062.0	0.0	55,062.0	0.0	0.0	0.0	0.0	99,543.4	201,141.3
(8) Foreign securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	105,023.6	105,023.6
(9) Other foreign claims and debts	1,656.8	1,656.8	0.0	20,614.7	669.4	19,945.3	0.0	1,175.3	0.0	0.0	29,791.1	53,240.9
(10) Others	0.0	0.0	0.0	10,049.8	1,161.4	6,648.7	2,239.5	4,320.3	0.0	0.0	0.0	14,369.9
Total	1,324,941.5	1,191,133.5	136,525.0	1,918,077.3	61,765.9	1,347,457.7	518,769.7	482,685.5	30,326.7	375,612.3	296,753.6	4,426,397.1
Net lending	-590,743.1	-480,037.7	-110,705.4	-20,068.1	0.0	0.0	0.0	-74,629.7	12,675.8	778,013.1	-105,226.0	0.0

Source: Economic Planning Agency (EPA), Japan (Economic Research Institute)
Annual Report on National Accounts (1998), p. 357