Macro Micro Model with a Post-Keynesian Perspective in the banking industry

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Abstract

This article introduces the *cascaded individual model* of Post-keynesian economics. This differs from the representative agent model of the old-keynesian model mathematically and methodologically. The model builds from five assumptions containing original concepts: cascaded individuals, a social planner vs a regulator, aggregate deposits (stock) vs pyroclastic deposits (flow). Mainly, this Macro-Micro approach of Post-keynesian concepts suggests the regulation of the money flow. Then, this paper articulates fundamental concepts to solve problems of a sudden "micro" financial shock in the short run with the long run "macro" stabilization with a balanced perspective between macroeconomics and microeconomics.

Keywords: macro micro model, Post-keynesian, banking industy, general equilibrium, endogenous money creation, representative agents, cascaded individuals, aggregate deposits, pyroclastic deposits, social planner, regulator, moral hazard problem [2014] 23-05

1. Introduction

Can the general equilibrium be realized in the banking area? Do we expect the price vector including prices on all markets meeting the mathematical solution at the banking problem? It implies the macroeconomic balance: the

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equilibrium of public budgets, the balance of payments, full employment and no inflation. At the balance, we can assume if there are two markets, the equilibrium in the one (net excess demand=zero) means the equilibrium in the other one (net excess supply=zero). Walras generalized this logic in n-markets. This is so-called the general equilibrium. Indeed, how we can get the equilbilibrium that we can figure it out and use for the solution of banking regulation?

General equilibrium looks naive that it can make multiple equilibria with more than one variable and even more. "Economy as a whole" is taken into consideration in the general equilibrium. So we puzzle how we can get the banking model limited in the specific banking industry by a general equilibrium pointing out the economy as a whole.

Hence, we need the model is based on the assumption that various sectors are mutually interdependent. Therefore, by the methodology method using the general equilibrium, the main point is how we can figure out dependency among factors selected in the economy for the model by using the general equilibrium.

How can we prove the fact that all dependancies of economic factors are explained in the banking model? If we exactly know which money should be debated, we guess that the flow of moeny is well explained. The summation of all dependable variables can be understandable. In monetary economics, the quantity theory of money states that money supply has a direct, proportional relationship with the price level. Otherwise, economists Alfred Marshall, A. C. Pigou and John Keynes associated Cambridge University, focused on money demand instead of money supply. What matter is if we can assume a portion of money circulated in the economic model, the total circulated money can prove that the price vector is exactly calculated. In other words, grasping a solution of a price vector implies that people know prices of all products matching to their quantities at the equilibrium. Hence, mapping of a price

vector (start of transactions) should be fulfiled by the money value (money supply), theoretically.

It is evidently matter of duration recognized in the model (long-run or short-run). Especially, under the fractional reserve banking, if money supply can portrait the economy as a whole in the short-run, we easily can get the summation of money and money circulation by the central bank. However, in reality, because of money multiplication by the financial market and the change of demand deposit by households and firms, the economy which is produced by firms, shared to households and consumed for the government in the long run growth is not enough to explain short movements of commercial banks and regulative policy of central banks.

In detail, debated on money amount, we can expand to debate whose money is. Legally, the deposit of a commercial bank is no longer the property of the customer. This becomes the property of the commercial bank and the customer in turn receives an asset named a deposit account. The deposit account is a liability of the commercial bank on the balance sheet. Then, the commercial bank can multiple its reserves by creation of credits as a commercial bank can obligate to pay its demand deposits among deposits. These deposits of central bank money MB (Monetary Base) is no longer counted as part of M1 money even though the commercial bank money is divided into the M1-M3 components. Simultaneously, an equal amount of new commecial bank money is created as bank deposits. Shortly, the deposit of central bank money, removed from circulation and added to the commercial banks reserves, is not money supply but expanded by the size of the loan. Hence, the amount of money regulated and reflected by the policy is not the M1 size because of a multiple of reserves.

There are two money creation processes in the banking area. One is the central bank money creation that money can be created regardless of its form: banknotes, coins and certificates of commodity. The central bank chooses its

form of money and then, it is denoted as money. Secondly, commecial banks creat money by demand deposits. Whenever a bank gives out a loan in a fractioanl reserve banking system, new sum of money is created. In this framework, fiat money (paper currency and coins) makes up a small part of money supply. A much greater part of demand deposits is near money: checking accounts, transaction by a check or debit card, savings accounts, certificate of deposits (CDs) and money market mutual funds.

For example, assuming a 20% reserve ratio and a 100 euros initial deposit, when 100 euros are deposited in the individual bank A, reserves are 20 euros and 80 are lent out. When 80 euros are deposited in the individual bank B, reserves are 16 euros and 64 euros. Through this re-lending process, we get 180 euros for total amount of deposits, 144 euros for total amount lent out and 36 euros for total reserves.

Upon on the H6 money stock measures of the US reserve bank data, on January 2014, the M1 composition is currency 1165.4, 43% of total M1 (billion of dollars), travelers checks 3.4, 0.12% of total M1 Demand Deposit 1041.9, 39% of total M1 Other chekable deposits 472.4, 18% of total M1 (259, 10% of total M1 at commercial banks 213.4, 8% of total M1 at thrift institutions). Total M1 amount is 2683.1 euros.

Otherwise, non-M1 and M2 is savings deposits 7167.1, 86% of total non-M1 and M2 (6134.8, 74% of total non-M1 and M2 at commercial banks, 1032.4, 12% of total non-M1 and M2 at thrift institutions) small-denomination time deposit 533.2, 7% of total non-M1 and M2 (393.4, 5% of total non-M1 and M2 at commercial banks, 139.8, 2% of total non-M1 and M2 at thrift institutions) retail money funds 628.3, 7.5% of total non-M1 and M2. Total non-M1 and M2 is 8328.7 euros. This is why we should not calculate that the money supply is currency plus demand deposits. Ratio analysis and total amount assumption should support the calculation of money supply.

In this empirical data, currency is 40% and demand deposit is also almost 40%

among M1. Another logic about non-M1 and M2 should be added to the analysis of M1 to figure out money supply.

The demand of money is the desired holding of financial assets in the form of money like M1 or M2, M3 in the broader sense. The money supply is the total amount of monetary assets available in an economy at a specific time. Data of money supply is published by the government or the central bank of country because it influences on the price level, inflation, the exchange rate and the business cycle.

2. Goals and Tools

Through the money creation process, considerable money expands much more than given recognition. In addition, we trade our goods and services in the financial market. The decision about trading is mainly selected by the state of belief containing uncertainty.
Liquidity preference theory (Keynes, 1936) refers to the demand for money. It explains why individuals or groups want to move money in the market. In other words, demand for liquidity is determined by three motives: the transaction motive: the higher income rises, the more money is demanded to meet increased spending, the precautionary motive: unusual costs are needed regardless of income, the speculative motive: the lower interest rates go down, the more money is demanded.

This assumption of a given money supply had been evoluated by the Post-Keynesians like Paul Davidson (1972), Hyman Minsky (1975), Victoria Chick (1983), Basil Moore (1998) and Sheila Dow (1996). By concentrating the money flow, we can ponder why money flows and how much we need to recognize to decide as individuals. The endogenous money supply theory emphasizes the role of banks in controlling the amount of money in circulation. Regardless of these origin of problem, concerning circulation of money, transaction and uncertainty should be considered.

Indeed, theoretical application about transaction (finance) and uncertainty (the state of belief) startes from the question how previous mathematical models are possible to calculate with exact numbers even though we are in the situation of transaction and uncertainty.

2.1. Things can not be defined easily: Price vectors, Stock or flow equilibrium, Multifactor Productivity (MFP)

Firstly, The price is composed of vectors, not simply defined by numbers. Specifically, the price is the quantity of payment or compensation given by one party to another in return for goods or services. The price should be detected by the formula that explains the "stock" and "flow". Further, precisely as below, we can check how the "real" price combines the prive level to explain the "prevailing" price mathematically.

Given a set C of goods and services, the total value of transaction in C at time t is $\sum_{c \in C}(p_{c,t} \times q_{c,t}) = \sum_{c \in C}[(P_t \times p'_{c,t}) \times q_{c,t}] = P_t \times \sum_{c \in C}(p'_{c,t} \times q_{c,t})$
where $q_{c,t}$ represents the quantity of c at time t
$p_{c,t}$ represents the prevailing price of c at time t
$p'_{c,t}$ represents the "real" price of c at time t
P_t is the price level at time t

Indeed, the inflation rate could be measured as $\frac{P_{t1}-P_{t0}}{t1-t0}$
real economic growth could be measured as $\frac{(GDP)_{t1}}{P_{t1}} - \frac{(GDP)_{t0}}{P_{t0}}$

Secondly, the confusion about "stock" and "flow" did not be arranged. The Walras model (1874) should ensure a general equilibrium in a single period -a so-called flow equilibrium (full employement model-no involuntary unemployment). The solow-swan model (1956) assumes to converge towards stock equilibrium (stationary state equilibrium) from the flow equilibrium. The solow-swan model is assumed that an increased number of production factors automatically create growth and saving in the Walras model. Then, it is automatically converted to real investment. An eventual growth should be

contributed to either technological progress or expansion of population. From flow equilibrium to stock equilibrium, changable variables like security have been ignored because of volumy volatility. In addition, The matter on whether the "capital" is belongs to stock capital or flow capital has been not emphasized sufficiently.

Thirdly, Multifactor Productivity (MFP) is the puzzled part because of calculation and also the clue part for the new model. It's impossible to clarify whether the system of endogenous money supply or exogenous money supply is in the Solow-Swan model because it is set in continous-time world with no government or international trade so the concern about money ruling body like a government, a central bank, commercial banks or others is out-scope. However, that ambiguity makes sense to suggest new potentiality of enhanced new model.

We can choose the way to define the MFP. One is to calculate the Multifactor Productivity (MFP) measurement as below.

$MFP_i = Y_i - \psi_i$

where Y_i denotes actual output and ψ_i denotes predicted output,

$log_e(Y) = \alpha_0 + \beta_i log_e(K_i) + \gamma_i log_e(L_i)$

so we get,

$MFP = \frac{\Delta(lnf)}{\Delta t} = \frac{\Delta(lnY)}{\Delta t} - \frac{s_L \times \Delta(lnL)}{\Delta t} - \frac{s_K \times \Delta(lnK)}{\Delta t}$

where f is the global production function

Y is output

t is time

S_L is the share of input costs attributable to labor expenses

S_K is the share of input costs attributable to capital expenses

L is a dollar quantity of labor

K is a dollar quantity of capital

M is a dolloar quantity of materials

S is a dollar quantity of (business) services

E is energy or exergy, only used in some models.

Otherwise, we can indirectly establish the model to find the determinants of MFP. Neoclassical economics started with classical factors of production of land, labor and capital. Further distinctions are from classical economics to neoclassical microeconmics: capital-the result of investment, fixed capital, working capital, financial capital, technological progress. Additionally, entrepreneuship, human capital, intellectual capital, social capital, natural resources and energy can be considered.

In the paper, accounted items in the balance sheet of factors like firms, banks, households and federal reserve banks (central banks) are considered and selected. Hence, if we deduce the financial capital after balancing with the labor expense, even though we have population effect, we can use the capital K to be presented as "Deposits", "Borrowing", "Currency" in the general equilibrium without the labor L.

Methodology about Factors of Production

Input: Three Factors of Production
Classical economics of Adam Smith, David Ricard: Labor, Capital Stock, Land (Natural Resource) **Marxism**: Labor, The subject of labor, The instruments of labor **Neoclassical microeconomics**-different format: Capital, Fixed Capital, Working Capital, Financial Capital, Technological progress
+add: Entrepreneurs (Frank Knight), Human Capital, Intellectual Capital, Social Capital (Pierre Bourdieu), Natural resources (Ayres-Warr), Energy
Output: Finished Goods (National Income)
Factor Payments: Rent, Wage, Interest, Profit

(ref: author)

To emphasis on the population effect, the moral hazard problem of demand deposit insurance will be detected. Mainly, the insurance of demand deposit is

insuring fixed amount per person. Hence, regulators face the insurance expansion according to the growth of population. Even though the banking model does not present labor factors, it is considered in the capital factor circulating in financial markets. Capital is potential ability to induce the employment and deduced after calculation of wages.

From Classical Three Factors of Production
to Only One Factor: Capital Stock

Labor	Capital Stock Capital Stock	Land

To build the production function, major factors of production should be arranged. Capital K, labor L are important factors. To explain the banking industry, how residual part of capital and labor can be arranged? We need to arrange transaction (finance) and uncertatiy (the state of belief). Even though we are not sure whether we know everything of banking information and financial markets, the balance sheet has been written and this reporting mehthod is reflected by the "stock" and "flow" concept. The balance sheet is the status of business entities but periodical information about profit and loss is contained. The goal is that a regulator knows $(n-1)$ equilibrium prices and excess demand functions are well functioned, then Walrasian tatonnement process will establish equilibrium in the nth market where the general equilibrium is ensured.

In detail, the balance sheet of banks is special that "deposits" are liabilities of commercial bank and "loans" are assets of commercial banks. In addition, transaction of commercial banks and a central bank should be recognized seperately. Therefore, the balance sheet of banks, both of commercial banks and central banks, should be explored efficiently as given information in the banking model.

2.2. MACRO: Money flow chart

Money Flow Chart

Government (g)	Banks (i)	Households (j) and Firms (f)
		$\sum C_{j\cup f}$
	$\sum R_i$	
G_g		
$-B_g$	$-\sum B_i$	
$-T_g$	ϕT_i	$\sigma(T_j \& T_f)$
	$\sum A_i$	$-\sum A_{j\cup f}$
	$-\frac{1}{\phi}(\sum D_i)$	$\sum D_{j\cup f}$
	$\sum L_i$	$-\sum L_{j\cup f}$

(ref: author)

Money Flow shows the economy operated by economic subjects of government (g), banks (i), households (j) and firms (f), where C Currency, R Reserve Deposit, G Government Deposits, B Loan, T Government Bond and investment, σ share parameter without money multiplier effect, ϕ share parameter with money multiplier effect, A Assets in the financial market, D Deposits, L Loans

This chart aims to figure out that money supply in economy is endogenous. The money flow in this chart is operated by economic subjects of government, banks, households and firms except for the central bank. Liabilities and assets are as below:

· Liabilities: $-B_g - \sum B_i - T_g - \frac{1}{\phi}(\sum D_i) - \sum L_{j\cup f} - \sum A_{j\cup f}$

· Assets: $\sum C_{j\cup f} + \sum R_i + G_g + \phi T_i + \sigma(T_j \& T_f) + \sum A_i + \sum D_{j\cup f} + \sum L_i$

The offset of pairs can be eliminated. $(\sum L_i - \sum L_{j\cup f}, \sum A_i + \sum A_{j\cup f})$.
so we get as below:

[The summation of money flow after elimination of offsets]

$$\sum B_i + B_g + T_g - \phi T_i - \sigma(T_j \& T_f) + \frac{1}{\phi}(\sum D_i) = \sum R_i + \sum C_{j\cup f} + G_g + \sum D_{j\cup f}$$

Comparison to the the balance structure of central bank as below,
Central Bank: $\sum B_i + B_g + T_g - \phi T_i - \sigma(T_j \& T_f) = \sum R_i + \sum C_{j \cup f} + G_g$
The left part of formula is Credit of Central Bank Balancesheet (Banks loan+Government loan+Government bond holdings+Reserve Deposits). The right part of formula is Debit of Central Bank Balancesheet (Reserve+Currency+Government Deposit+household deposits)
$\frac{\phi-1}{\phi} \sum D_i$ is added to the summation of money flow.

If we assume the financial efficiency of government, the flow of government bond by every factor fulfills $T_g = [\phi T_i + \sigma(T_j \& T_f)]$ and we can get as below:
[Considering financial efficiency of government]
$\sum B_i + B_g = \sum R_i + \sum C_j + G_g + \frac{\phi-1}{\phi} \sum D_i$
The left part of formula is loans of banks and government. The right part of formula is deposited money per facters (banks, households, government) and deposits of banks with the money multiplier effect.

If we ignore the firm's money and money multiplier effect, we can get as below:
[Exogenous Money Supply fomula]
$\sum B_i + B_g + T_g - T_i - \sigma(T_j \& T_f) = \sum R_i + \sum C_{j \cup f} + G_g$
In addition, after eliminating the inside money of households, outside money of reserve market is left in the short-term financial market. Hence, the central bank is a dominant supplier of outside money.

However, if we consider the money multiplication effect as below, the formular of the endogenous money supply should be detected.
[Required Reserve Effect] $\sum D_{j \cup f} > \frac{1}{\phi} \sum D_i$: Deposits of households is larger than liabilities of banks with the multiplier effect supposed that all money are circulated through banks. All deposits of households, after reserved partly in banks, can be redistributed to households and firms without banks.
[Government Bond, With The Multiplier Effect] If T_i from $D_{j \cup f}$, ϕT_i is considered with the multiplier effect.
[Government Bond, Without The Multiplier Effect] If T_j, T_f from $D_{j \cup f}$,

$\sigma(T_j \& T_f)$ is considered without the multiplier effect. $\sigma(T_j \& T_f)$ is less than $D_{j \cup f}$.

2.3. [M&M model advocating the Endogenous Money Supply]

[M&M model advocating the Endogenous Money Supply]

$\sum B_i + B_g = \sum R_i + \sum C_{j \cup f} + G_g + \frac{\phi - 1}{\phi} \sum D_i$

To conclude, beyond loans and deposits, as going out and in the markets, the multiplier effect of money is created inside the market. Therefore, money suppliers can be any deposit decision makers of firms, government, banks and households, not only by the central bank. In other words, the exogenous money supply opinion is that central bank expands the money supply but endogenous money supply opinion expands the credit. Especially, in the M&M model, to respond to pyroclastic demands, being different from aggregate demand, credits make a regulator of banks to operate the money flow.

Therefore, to start the equilibrium model, we can grouping $\sum B_i + B_g$ or $\sum R_i + \sum C_{j \cup f} + G_g + \frac{\phi - 1}{\phi} \sum D_i$. If we want to use $\sum B_i + B_g$, we should add C_r for residuals containing Gold and Coin and Bank premises of central banks. If we want to use $\sum R_i + \sum C_{j \cup f} + G_g + \frac{\phi - 1}{\phi} \sum D_i$, we need to add E_r for residuals containing Equities and etc. In addtion, if we choose Credits among either of them, by balancesheet logic, the summation is given by one. As a matter of interest rate affecting bonds and securities inside the central bank, we can summery up as Securities for our convenience to simplify the notation. Finally, we have the equilibrium of the central bank firstly as below.

the central bank status at the equilibrium

Assets	Liabilites
Claims to corporate L_{fr}	Securities B_{fr}
Claims to banks $B_{fr} - L_{fr}$	
Currency C_r	

the commercial bank status at the equilibrium

Assets	Liabilites
Claims to corporate $D_h + B_{fr} - L_{fr}$	Deposits D_h
	Borrowings $B_{fr} - L_{fr}$

2.4. General Equilibrium

General equilibrium is characterized by a vector of interest rates (r, r_D, r_h, r_f, $r_{L^{Bank}}$, $r_{L^{fr}}$) and three vectors of demand and supply levels (C_1, C_2, $\sum_{s\in\Omega} P_s B_s^h$, D^h) for the consumer, (I, $\sum_{s\in\Omega} P_s B_s^h$, D_h, L_{fr}) for the firm, (L_{fr}, $\sum_{s\in\Omega} P_s B_s^h$, D_h, L_{fr}, $\sum_{s\in\Omega} P_s B_s^{fr}$) for the bank, and ($D_h$, $\sum_{s\in\Omega} P_s B_s^h$, L_{fr}) for central banks

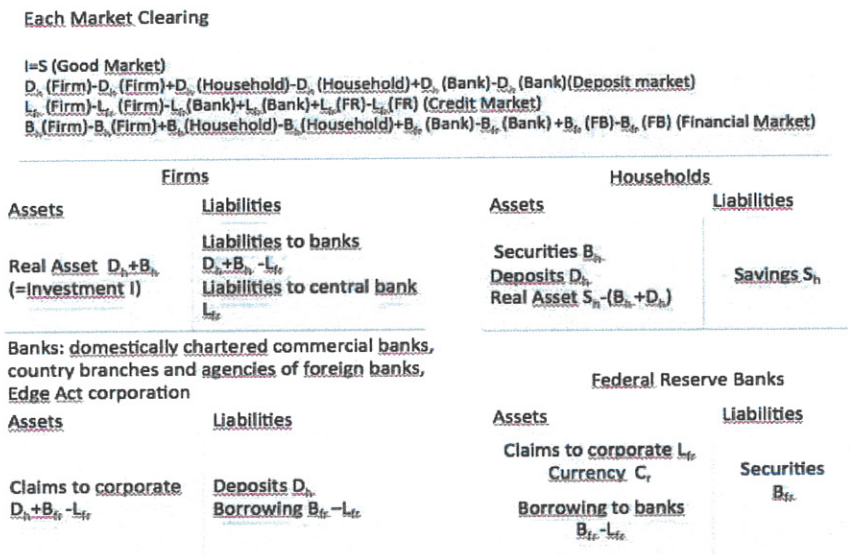
Each agent behaves optimally (i.e., his or her decisions solve P_h, P_f, or P_b respectively.

Each market clearing
I=S (Good market)
D_h(Firm)-D^h(Firm)+D_h(Household)-D_h(Household)+D_h(Bank)-D_h(Bank) (Deposit market)
L_{fr}(Firm)-L_{fr}(Firm)-L_{fr}(Bank)+L_{fr}(Firm)+L_{fr}(FR)-L_{fr}(FR) (Credit market)
B_s^h(Firm)-B_s^h(Firm)+B_s^h(Household)-B_s^h(Household)+B_s^{fr}(Bank)-B_s^{fr}(Bank)+B_s^{fr}(FR)-B_s^{fr}(FB) (Financial market)

It is clear in this model that the only possible equilibrium is such that all interest rates are equal: r=r_L=r_D

(result) Arrow (1953)
If firms and households have unrestricted access to perfect financial markets, then at the competitive equilibrium, banks make zero profit and the size and

4.2 General Equilibrium



ref : author (2014)

composition of balance sheet (banks) have no impact on other economic agents.

(result) Cho (2014)

If some accumulated variables are not negative, for example, components: Investment I, Savings S_h, Loans L_{fr} are not negative, there is the equilibrium in the economy and the existence of each factors like firms, househoulds, banks, central banks is fulfilled. The size of banks is affecting on each agent because the equity capital depends on previous deposit. Depending the change of bank size influencing on total deposit D_h, the liability of firms is affected by liabilities to banks $D_h + \sum_{s\in\Omega} P_s B_s^h - L_{fr}$, deposit of households D_h and real asset of households and firms.

3. Assumptions of the M&M model (the Macro Micro Model)

3.1. Representative agents (Neoclassical model) vs Cascaded individuals (Post-keynesian model)

Microeconomics is the branch of economics that deals with the behavior of the individual producer and consumer, particularly as decisions are made with respect to the allocation of limited resources. Otherwise, macroeconomics is the study of the total sum of economic activity, dealing issues of growth, inflation and unemployment and with national economic policies relating to these issues like the IS-LM model, the Mundell-Fleming model of Keynesian macroeconomics, and the Solow model of neoclassical growth theory.

The M&M model (the Macro Micro Model) is the model to explain from the Macro economic theory model to the Microeconomics. In the model, an individual wants to make a decision micro-economically, also, the nation experiences actions of *cascaded individuals* after recognition of macro economy. The model puzzles how the individual makes the decision with respect to the allocation of limited resources micro-economically and also how it can be aggregated up to the national level. In the financial market, especially, because of volatility of investment, uncertainty existes affecting the individaul decision and economy of countries faces crisis as a sudden shock. Hence, in the paper, the regulator in the banking area as a controller of *cascaded individuals* can be explored by Microeconomics.

In general equilibrium theory, crucial economic events are used to recognize oscillation of economy : in the short term, it's enough for us to be surprised by sudden shock, however, in the long run, the model will adjust with an equilibrium price. We have a goal of average growth rate (path-dependancy) is affected by economic cycle (cumulative causality). Both in the short and long run, each agents belong to different factors experience their wealths in their own paths and decide for their living.

Mainly, neoclassical works are based on a *Representative agent.* An agent represents a whole category of individuals. The IS/LM model (investment saving-liquidity preference money supply, John Hick, 1937) relates aggregate demand and employment to three exogenous quantities, i.e, the amount of money in circulation, the government budget and the state of business expectations.

All-in-one agents demand an entire category of consumption in a neoclassical model. However, markets are not simple: a large number of different financial mediators and a wide range of financial assets, identification of money, the mechanism of money creation and the need for control of the money supply by the central bank should explain how changes in money influence individuals.

Without explanation about individuals, speed of money is trying to be meaningful in many neoclassical models. Without "individuals", comparison of two movements like plus and minus wants to guess new meanings. Even though the value of currency can be affected by two movements: the expected growth in the money supply reducing the real purchasing power of money and the expected increase in productivity increasing the real purchasing power of money (Irving Fisher, 1930), what about numbers of heterogenous agents having the real purchasing power? Even though two interest rates - the natural rate is the return on capital and the money rate, in turn, is the loan rate where credit is perceived quite as money (Knut Wicksell, 1989, 1906), it's same that we are in the sea (a wide unmeasurable world) containing a lot of big and small waves (various interest graphs) because objects, money and money flow are not rationally connected for the explanation of their interaction.

Ironically, to connect them, an idea to model banks and others firms seperately is started by Circuitism of Post-keynesian. It's very crucial viewpoint differing from combining different people into a representative agent as in mainstream neoclassical models. The economy creates money itself (endogenously), rather than money being provided by some outside agent (exogenously). Then,

money is distinguishable between hard money: money that is exchangeable at a given rate for some commodity such as gold and credit money: created by commercial banks as primary rather than derived from central bank money. Endogenous money creation supports the money multiplier based on capital adequacy ratio, i.e. the ratio of its capital to its risk-weighted assets not based on reserve requirement-cash reserve ratio, i.e. a central bank regulation employed by most of the world's central banks, sets the minimum fraction of customer deposits and notes that each commercial bank must hold as reserves.

Then, what is different between representative agents and cascaded individuals about supply and demand equation? Firstly, in macroeconomics, aggregate demand (AD) is the total demand for final goods and services in the economy at a given time and price level. The AD curve is downward sloping because at lower price levels a greater quantity is demanded by representative agents. If the bank were to reduce the amount of money in circulatoin, the deduction is regard as reducing money supply. Then, demand decreases.

$AD = C + I + G + (X - M)$
where
C is consumption, I is investment, G is Government Spending and
$X - M = NX$ is Net export

In Keynesian economics, not all of gross private domestic investment counts as part of aggregate demand. Much or most of the investment in inventories can be due to a short-fall in demand. Hence, only the planned or intended or desired part of investment (I_p) is counted as part of aggregate demand.

In Post-keynesian economics, macro movements are not same as micro movements. Merely, there is money flow. Hence, effective pressure to maintain portfolios of investment is detected. Cascaded demand (CD) denotes as the desired demand for final goods and services in the economy at a given time and price level induced by effective pressure by cascaded individuals.

3.2. Comparison of a social planner and a regulator

Comparison of a Social Planner and a Regulator

	a Social Planner	a Regulator in the Banking industry
Goal of Decision	Maximization of a Social Welfare Function	Rational Behaviour
Method	Pareto Optimality	Path-dependency
Uniqueness of Optimal Solution	NO 2nd Fundamental Theorem of Welfare Economics	YES Endogenous Money Supply
Macro & Micro	Macro= $\sum$Micro	Macro$\neq$ $\sum$Micro
Income Distribution	Main Factors of Production Land, Labor, Capital	Non-Neutrality of Money
Cause of Redistribution	Policy ineffectiveness	Uncertainty
Decision Timing	Adaptive Expectation	Dynamic Method
	Real Business Cycle	Effective Demand
Remedy about Exogenous Change	Maximizing Expected Utility	Solving Constaints in a different market

(ref: author)

The question is what is difference if we start from the Macro economic theory model to Microeconomics? The general equilibrium, inflation curve and growth model figure out the economy at the big frame. After the Macroeconomic approach at the country level, individuals should decide with given information to improve their welfare. Through comparison with a social planner and a regulator in the banking industry, the M&M moodel is much more understandable.

3.3. Aggregate deposits (stock) or pyroclastic deposits (flow) - Moral hazard problem: why the bank needs to borrow much more money if regulated?

Considering the aggregate of deposits, related to the moral hazard, we can simply start with the static model with only two period $t = 0$ and $t = 1$. The

bank want to take a risk because the fundamental money source is secured by a government. At $t = 1$, the deposit insurance premium is paid by the bank. At $t = 1$, the bank is liquidated, and depositors are compensated whenever the bank's assets are insufficient. For simplicity, the riskless rate (and the deposit rate) is normalized to zero. The balance sheet of the banks is as below:

Assets ($t = 0$)	Liabilities ($t = 0$)
Loans L	Deposits D
Insurance premium P	Equity F

Assets ($t = 1$)	Liabilities ($t = 1$)
Loan Repayments $\tilde{L}$	Deposits D
Insurance Payment $\tilde{S}$	Liquidation Value $\tilde{V}$

At date 1, stockholders receive the liquidation value of the bank:
$\tilde{V} = BankAsset - Deposits + RecoveredDeposits = \tilde{L} - D + \tilde{S}$
where $\tilde{S}$ is the payment received from deposit insurance:
$\tilde{S} = max(0, D - \tilde{L})$
using the balance sheet at date 0 to replace D, $\tilde{V}$ can also been written as
$\tilde{V} = F + (\tilde{L} - L) + [max(0, D - \tilde{L}) - P]$

thus the value of equity will be the sum of its initial value, the increase in the value of loans, and the net subsidy (positive or negative) from the deposit insurance.

Suppose, for instance, that $\tilde{L}$ can take only two values: X with probability θ (success) and 0 with probability $(1 - \theta)$ (failure).

$$E(\tilde{V} - F) = E(\tilde{L} - L + \tilde{S} - P)$$
$$= E(\tilde{L} + \tilde{S}) - (L + P)$$
$$= E(\tilde{L}) + E(max(0, D - \tilde{L})) - (L + P)$$
$$= \theta X + [P(\tilde{L} = X)max(0, D - X) + P(\tilde{L} = 0)max(0, D)] - (L + P)$$
$$= \theta X + \theta max(0, D - X) + (1 - \theta)D - (L + P)$$

The expected profit for the bank's stockholders will be
$\pi := E(\tilde{V} - F) = (\theta X - L) + ((1-\theta)D - P) + \theta max(0, D - X)$

where the first term represents the Net Present Value (NPV) of the loans and the second term is the net subsidy from the deposit insurance system. If deposit insurance is fairly priced, this term is nil ($P = (1-\theta)D$), and the strong form of the Modigliani-Miller result obtains: the market value of firm, $E(\tilde{V}) + D$, is independent of its liability structure.

The moral hazard problem is easily captured from this formula. Suppose that P is fixed and that banks are free to determine the characteristic (θ, X) of the projects they finance in a given feasible set. Then, within a class of projects with the same NPV ($\theta X - L =$ constant), banks will choose those with the lowest probability of success θ (or the highest risk). This comes from the fact that the premium rate $\frac{P}{D}$ is given, and does not depend on the risk taken by the bank. Such a "flat" rate deposit insurance pricing was in place in the United States until December 1991, when Congress legislated a new system involving risk-rated insurance premiums.

If the regulation body push a commercial bank to raise F, at the expected profit for the bank's stockholders, it can be negative effect on profit. At the formula of $\pi := E(\tilde{V} - F) = (\theta X - L) + ((1-\theta)D - P) + \theta max(0, D - X)$, the bank should consider the strategy to raise its NPV ($=\theta X - L$). $\frac{P}{D}$ is given and F is restricted over the regulated level. In the first term, to meet the balance of asset-liability, the bank is required to raise L. However, the goal of profit is to raise its NPV ($=\theta X - L$). Hence, the bank consider to rearrange the loan plan $\tilde{L}$ considering θX.

3.4. The object, should be regulated: Banks, households and firms

Now, we will look the specific case to puzzle the object regulated by the banking regulatory body.

Required Reserves of Deposits

Assets	Liabilities
Cash C 2.5	Deposits D 60
Deposit with the central bank D_c 12.5	Borrowings B 28
Loans and Securities L, S 85	Equity F 12

If required reserves of a bank is 10% of deposits 60, then a bank must keep 6 in cashs or the deposit with the central bank. Its cash plus deposits with the central bank currently equal to 15 (= C 2.5 + D_c 12.5), so the bank can still loan out 9. This 9 is called as excess reserves.

Excess Reserves=0

Assets	Liabilities
Cash C 2.5	Deposits D 60
Deposit with the central bank D_c 3.5	Borrowings B 28
Loans and Securities L, S 94	Equity F 12

In the above example, the bank has 6 in total reserves. If the central bank requires the bank to keep 10% of deposited money, then the bank is required to keep 10% of 60. Therefore, required reserves are 6, the bank cannot make any further loans. In other words, the commercial bank's excess reserves are 0. Apparently, loan proportion is increased and the possiblity to the loan is blocked. Depending the cash and deposit with the central bank, the bank can face that it can not to use more loan.

Under the fractional reserve banking, withdrawing is assumed no more than 5 or 10% of deposits. If more than 10% of the bank's deposited amount is withdrawn on a certain day or what is all customers of a bank decided to withdraw their all deposited funds at one (a bankrun)? The bank will not have sufficient funds to meet the demand. In this serious situation, it can be under control of a central bank. The central bank can choose to loan the bank up to needed reserves, if this seems to be temporary and it can be solved. The merger with a larger and healthier bank is also a solution, if the problem is

more structural and long-lived. In the worst scenario of bankrupcy, account holders are insured. For example, in United States, 250,000 per account is insured by the FDIC.

Let's keep to assume that banks hold on to 10% of all deposits. This means that a new deposit of 1000 will allow a A bank to loan out 900. This 900 will be spent, then received by a person B, and deposited into a bank B. A bank B, in turn, can loan out 90%, or 810. Similarly, a bank C can loan out 90% of 810, or 729. Thus, the initial deposit 1000 has created demand deposits of an additional 900 plus 810, etc. By the end, total increase in the money supply of a nation amounts to 10,000 (10 times the initial deposit of 1000).

In case of required reserves of a commercial bank is 10% of deposits as below

Assets	Liabilities
Cash and Deposit with the central bank $\frac{1}{10}x$	Deposits x
Loans and Securities $A - \frac{1}{10}x$	Borrowings and Equity $A - x$
Total A	Total A

[Deposits Condition] Depending upon the principle of asset-liability balance, $A > A - x$, $x > 0$ Hence, Deposit has a postivie value.

[Liabilities Condition, except for Deposits] $A > x$, $A - x > 0$, Hence Liabilities except for Deposits (=Borrowings plus Equity)
[Equity Regulation Condition] Among Deposits x, $\frac{1}{10}x$ should be reserved in a bank.
Indeed, actual operated deposits are $\frac{9}{10}x = x(Deposits) - \frac{1}{10}x$(Reserved Deposits).
ASSETS(loans and securities)-LIABILITIES(Actual deposits) =
$A - \frac{1}{10}x - \frac{9}{10}x = A - x$ (Equity)

If we consider the money creation effect as below.
[money creation scope] $\frac{1}{10} \sim 10x$

In case of the required reserves of a bank is 10% of deposits, we get this status table as below.

Money Circulation with the money multiplier effect

Assets	Liabilities
Cash and Deposit with the central bank $10x$	Deposits x
Loans and Securities $A - \frac{1}{10}x$	Borrowings and Equity $A - x$
Total $10x + A - \frac{1}{10}x$	Total A

How we can explain about the money circulation of $10x$, not $\frac{1}{10}$? From the micro viewpoint to the macro viewpoint, by defining money of commercial banks, central banks, household or firms, "aggregate deposits" (stock) is designing to "pyroclastic deposits" (flow) by segmentation of factors. In detail, if we consider money within the micro viewpoint or aggregate deposits, money or individuals do not have characteristics. It implies that a three-factor-model of firms, households and banks is enough to present the idea with classical production factors like capital and labor.

However, to regulate on commercial banks, we need to trace of flow of $10x$. Hence, by seperating money by more specific factors, ef commercial banks and a central bank, money usage of individuals depending on the factor role in an economy is reflected to the model. This is defferent approach from the heterogenous agent model.

3.5. the Federal Reserve System Open Market Account (SOMA): Heterogenous agent model can not explain so cascaded individual model will do

In the heterogenous agent model, if the heterogenous agents instead of representative agents are allocated to the different income, the market should be incomplete markets because firms are still representative firms and a constraint function also is presented by representative factors. In other words, except for heterogenous agents in one factor, other agents in other factors are still ambigous with the "aggregate" concept in uncertainty and incomplete

markets. Like a movie camera, we follow the money flow which is defined within the model within the scope of model and we entitle characteristics in money flow by seperating factors like commercial banks and central banks.

Deposits in Household

household	
Securities **Deposits** x	savings

Deposits of Household move to Deposits of Commercial Banks

commercial banks	
monetary base $\frac{1}{10}x$ **or** $10x$ **(with the money multiplier effect)** Loans and Securities monetary base=required reserves of deposits	**Deposits** x Borrowings and Equity

Required Reserves of Deposits move to Monetary Base of a Central Bank

a cental banks	
Securities monetary base=required reserves of deposits	**monetary base** $\frac{1}{10}x$ Federal reserve notes (currency) outstanding

Indeed, in the central bank, there is $\frac{1}{10}x$ related to the deposits as a monetary base. Considering the money multiplier effect, $10x$ can be circulated.

At the liability of federal banks, the Federal Reserve System Open Market Account (SOMA) is one of the monetary policy tools used by the Federal Reserve System. It consists of the Federal Reserve's domestic and foreign portfolios. In the Macro Micro model, we consider the economy at the country level. Because of foreign portfolios of the SOMA, to reduce uncertainty of investment as we can, we suppose that the SOMA of assets offsets deposits and the SOMA of liabilities and capital. Hence, currency and loans to depository institutions as assets and capital securities.

3.6. Post-keynesian General Equilibrium (PKGE)

3.6.1. New Concept of PKGE: A Cascaded Individual j

Consider, fistly, a deterministic Walrasian exchange economy with two kinds of goods. Assume that a representative agent i has an initial endowment $e_i = (e_{i1}, e_{i2}) \gg 0$, and a cascaded individual j has an initial endowment $e_j = (e_{j1}, e_{j2}) \gg 0$ and a Cobb-Douglas utility function is as below.

$u(x_{i1}, x_{i2}) = (x_{i1}^{\gamma}, x_{i2}^{1-\gamma})$, $u(x_{j1}, x_{j2}) = (x_{j1}^{\gamma}, x_{j2}^{1-\gamma})$

where $0 < \gamma < 1$ and the pair (x_{i1}, x_{i2}) denotes the quantities of goods 1 and 2 consumed by agent i. Thus a representative agent i is described by a pair $\alpha_i = (\gamma, e_i)$. In addition, the pair (x_{j1}, x_{j2}) denotes the quantities of goods 1 and 2 consumed by a cascaded individual j. Thus a cascaded individual j is described by a pair $\alpha_j = (\gamma, e_j)$

3.6.2. The Maximization Problem of a Typical Agent and a Cascaded Individual

Let $p > 0$ be the price of the first good. We normalize prices so that $(p, 1-p)$ is the vector of prices accepted by an agent and a cascaded individual. The typical agent solves the following maximization problem (P):

maximize $u(x_{i1}, x_{i2})$,

subject to the "budget constraint" defined as

$px_{i1} + (1-p)x_{i2} = w_i(p)$

In case of a cascaded individual, assume that there are $m+n$ securities available to the intermediary and not defined either Securities B_h or Deposits D_h, where the first m are assets and the last n are liabilities. The *dollar* value of the sth security operated by a cascaded individual at the beginning of the period to maintain the good 1 (resp. good 2) is denoted by x_{j1s} (resp. x_{j2s}).

maximize $u(x_{j1s}, x_{j2s})$,

subject to the "budget constraint" defined as

$p\sum_{s=1}^{m+n} x_{j1s}R_{j1s} + (1-p)\sum_{s=1}^{m+n} x_{j2s}R_{j2s} = w_j(p)$,

$Y = \sum_{s=1}^{m+n} x_{j1s}R_{j1s} + \sum_{s=1}^{m+n} x_{j2s}R_{j2s}$

where elements of the vector x fulfill:

[Three Condition of elements of the vector x]

$x_{j1s} \geq 0$, for $s = 1, ..., m$,

$x_{J1s} \leq 0$, for $s = m+1, ..., m+n$,

$\sum_{s=1}^{m+n} x_{j1s} + \sum_{s=1}^{m+n} x_{j2s} = K$

3.6.3. The Problem of an Intermediary: Avoidance of Deviation

K is abstracted by the Securities B_h+ Deposits D_h + Real Asset $S_h - (B_h + D_h)$ at the equlibrium of good, deposit, credit and financial markets. In addition, denoted by R_{j1s}, the increment in real terminal value of one dollar worth of security s purchased at the beginning of the period by a cascaded individual. The random variable R_{j1s} includes all related increments to either Securities B_h or Deposits D_h like interest payments, dividents and changes in capital value, deposit interest, changes in deposit value and tax expense of deposit.

The intermediary try to avoid the deviation at the framework, thus the vector x is selected to minimize the standard deviation of Y for any given level , K_{fr}, of expected value,

$Min_x \ \sigma^2(Y) - \lambda[E(Y) - K_{fr}]$,

s.t constraints of "Three Condition of elements of the vector x"

The distribution of the random variable R_{j1s} or R_{j2s} can be exogenously given and indepedent from the value of the vector x under the hypothesis of a perfectly competitive market.

However, a cascaded individaul has different efficient portfolios from deviation avoidance portfolios of central banks. A cascaded individual also pursues the stable efficient portfolios and captures profits above the minimized deviation level than the previous expectation. Indeed, if a cascaded individual react to the economy of nation, the reaction is occured when he/she recognizes higher or lower value than expectation. Indeed, for stable economic growth, the overall framework to the long run should be detected as the macro level, but for viewpoints of investment at the financial perspective, the individual

decision reacting to sudden shocks can be prolonged to the group action like a bankrun.

3.6.4. Dynamics of a Cascaded Individual : Raoult's Law

Raoult's law, which is a law of thermodynamics that the partial vapor pressure of each component of an ideal mixture of liquids is equal to the vapor pressure of the pure component multiplied by its mole fraction in the mixture, can be applied at the action to fulfill the expectation of desire about pyroclastic deposit.

Once the portfolio composition in the solution have reached equilibrium, the total vapor pressure ρ of the solution (changed from liquid) is:
$\rho = \rho_A^* x_A + \rho_B^* x_B + ...$ and the individual cascaded vapor pressure for each portfolio composition is $\rho_i = \rho_i^* x_i$ where x_A, x_B, x_i are quantities of good A , B and i. ρ_i is the partial vapor pressure of the portfolio composition i in the gaseous mixture, ρ_i^* is the vapor pressure of the pure portfolio composition to fulfill a cascaded individual and x_j is the mole fraction of the portfolio quantity composition i in the mixture.

3.6.5. Potential Project Decision of a Cascaded Individual: At the equilibrium

If the system is at equilibrium, then the *potential project* Pj of the quantity composition i must be the same in the liquid solution and in the vapor above it. That is, $Pj_{liq} = Pj_{vap}$
Assuming the liquid is an ideal status for a cascaded individual, and using the formula for potential portfolios, that is:

$Pj_{liq}^* + \sigma^2(Y) = Pj_{vap}^{\ominus} + \frac{f_s}{\rho^{\ominus}}$
where f_s is the fugacity - effective pressure of the vapor about the portfolio of securities s and $\ominus$ indicates the negative status in the investment affected by economy of a nation
$Pj_{liq}^* + \sigma^2(Y) = Pj_{vap}^{\oplus} + \frac{\rho^{\oplus}}{f_s}$

where f_s is the fugacity - effective pressure of the vapor about the portfolio of securities s and $\oplus$ indicates the positive status in the investment affected by economy of a nation

3.6.6. A Cascaded Individual Model at the Perspective of PKGE: Optimal Allocation

Both of them, a cascaded individual wants to take risk of portfolio deviation, even though the economy wants to go from Vapor (flow) - moving status with tendancy at the business cycle to Liquid (stock) - original optimal status.

a vector x^* which maximizes that ratio $\frac{E(Y)}{\sigma(Y)}$ and the leverage ratio when assets $\sum_{s=1}^{m} x_{j1s} + \sum_{s=1}^{m} x_{j2s}$ and liabilities $\mid \sum_{s=m+1}^{m+n} x_{j1s} + \sum_{s=m+1}^{m+n} x_{j2s} \mid$ are under the effective fugacity f_s.

4. Conclusion

The Post-keynesian's ideas of uncertainty, non-neutrality of money and endogenous money supply are attractive to adopt in the finance area. In the macro-micro model, with the Post-keynesian view, we have introduced in this regard the summation of micro actions is not same as the change of (macroeconomic) economy as a whole. The mathematical explanation to remove the ambiguity and discrepancy between macroeconomics and microfoundations should be further investigated within a Post-keynesian perspective.

5. Reference

Jespersen, J. (2009) Macroeconomic Methodology. Edward Elgar Publishing Limited.

Majumdar, M. (2009) Equilibrium, Welfare, and Uncertainty: Beyond Arrow-Debreu. Routledge.

Freixas, X., Rochet, J.C. (1999) Microeconomics of Banking. The MIT press.

Gorton, G., Winton, A. (1995) Bank Capital Regulation in General Equilibrium. Wharton School. University of Pennsylvania. Philadelphia.

Hicks, J. (19801981) IS-LM: An Explanation. Journal of Post Keynesian Economics. v. 3: 139155

Fisher, I. (1930) The Theory of Interest as determined by impatience to spend income and opportunity to invest it. The Macmillan Company, New-york.

Wicksell, K. (1936) Interest and Prices - A Study of the Causes Regularing the Value of Money. Sentry Press. New-york.

Barnett, W. A. and Solow, R. (2004) An Interview with Franco Modigliani.

Tobin, J. (1963) Commercial Banks as Creators of Money. Banking and Monetary Studies: P.408-419.

Knapp, G. F. (1924) The State Theory of Money. Macmillan. London

Basil, M. (1988) Horizontalists and Verticalists: The Macroeconomics of Credit Money. Cambridge University Press.

Acemoglu, D. (2009) Introduction to Modern Economic Growth. Princeton University Press.

Friedman, M. (1970) A Theoretical Framework for Monetary Analysis. Journal of Political Economy: P.193-238.

Keen, S. (2009) The Dynamics of the Monetary Circuit. The Political Economy of Monetary Circuits: Tradition and Change in Post-Keynesian Economics.

Board of Governors of the Federal Reserve System. (2014) Money Stock Measures - H.6. retrieved from http://www.federalreserve.gov/releases/h6.

Ayres, R. U. and Warr, B. (2004) Accounting for Growth: The role of Physical Work.

Cha, H. J. (2007) Central Bank Theory. Yulgok.

Cho, H. J. (2014) Bank Capital Regulation (BCR) model. not published.

Sexton, R. and Fortura, P. (2005) Exploring Economics. Nelson College.

Wikipedians (2011) Economics. Pedia Press.

6. ANNEX

(1) Macroeconomic Methodology

Arthur Cecil Pigou	John Maynard Keynes
Old-Keynesian (Neoclassical synthesis)	Old-Keynesian (Neoclassical synthesis)
no Endogenous money creation	Endogenous money creation
John Hicks, 1937, IS/LM model (investment saving-liquidity preference money supply) relates aggregate demand and employment to three exogenous quantities, i.e., the amount of money in circulation, the government budget and the state of business expectations, understood in terms of general equilibrium theory **Wilian Philips**, 1958, Philips Curve	**Irving Fisher**, 1930 value of currency being affected by two movements-expected growth in the money supply reducing the real purchasing power of money and expected increases in productivity increasing the real purchasing power of money Knut Wicksell, 1898, 1906 two interest rates -the natural rate is the return on capital and the money rate, in turn, is the loan rate where credit is perceived quite as money
Franco Modigliani, 1979, explained how changes in the exogenously defined money supply influence nominal income. He pointed out basic changes and innovations in the financial markets, which lead to new dimensions of the relationship between money supply and nominal income. The new dimensions are conditioned by the existence of a large number of different financial mediators, a wide range of financial assets and so the identification of	**James tobin,** commercial banks as creators of money **Goerge Friedrich Knapp**, 1924 Chartalism (Modern Monetary Theory) Fiat money-governments with the power to issue thier own currency are always solvent and can afford to buy anything for sale in their domestic unit of account even though they may face inflationary and political constraints

money, the mechanism of money creation and the need for control of the money supply by the central bank. **Robert Solow**, 1956 presented the solow growth model determining total production Y as a function of labor L, capital K and labor augmenting technology or knowledge A and not mendtioned of price P or inflation.	Horizontalism **Basil Moore**, 1988 Credit money created by private banks, not managed by central banks, can be seen to be leveraging of those reserves without theguidance of a particular leverage ratio, i.e.
Monetarism	Post-keynesian I
Milton Friedman believed that if the money supply was to be centrally controlled (as by the Federal Reserve) that the preferable way to do it would be with a mechanical system that would keep the quantity of money increasing at a steady rate. however, instead of government involvement at all, he was open to a real, non-government, gold standard where money is produced by the private market. New-classical Monetarism Robert Lucas, 1969 modeled aggregate supply function that economy output is a function of money or price "surprise"	Circuitism **Steve Keen** the economy creates moneyitself (endogenously), rather than money being provided by some outside agent(exogenously). Also, it models banks andother firms seperately, rather than combining them into a representative agent as in mainstream neoclassical models Hard money-money that is exchangeable at a given rate of some commodity such as gold. Credit money-created by commercial banks as primary rather than derived from central bank money The money multiplier based on capital adequacy ratio, i.e.the ratio of its capital to its risk-weighted assets not based on reserve requirement-cash reserve ratio, i.e. a central bank regulation employed by

.....	reserve requirement-cash reserve ratio, i.e. a central bank regulation employed by most of the world's central banks, that set the minimum fraction of customer deposits and notes that each commercial bank must hold as reserves It rejects the neutrality of money, i.e. a change in the stock of money affects only nominal variables in the economy such as prices, wages, and exchange rates, with no effect on real (inflation-adjusted- variables, like employment, real GDP and real consumption

(2) Deposit Insurance Summary

FDIC Deposit Insurance Coverage

The Federal Deposit Insurance Corporation (FDIC) is an independent agency of the United States government that protects the funds depositors place in banks and savings associations. FDIC insurance is backed by the full faith and credit of the United States government. Since the FDIC was established in 1933, no depositor has ever lost a single penny of FDIC-insured funds. FDIC insurance covers all deposit accounts, including checking and savings accounts, money market deposit accounts and certificates of deposit. FDIC insurance does not cover other financial products and services that banks may offer, such as stocks, bonds, mutual fund shares, life insurance policies, annuities or securities.

The standard insurance amount is $250,000 dollar$ per depositor, per insured bank, for each account ownership category.

The FDIC provides separate coverage for deposits held in different account ownership categories. Depositors may qualify for more coverage if they have funds in different ownership categories and all FDIC requirements are met. (For details on the requirements, go to www.fdic.gov/deposit/deposits.) The following chart shows standard insurance amounts for FDIC account ownership categories. All deposits that an accountholder has in the same ownership category at the same bank are added together and insured up to the standard insurance amount.

FDIC Deposit Insurance Coverage

Single Accounts (owned by one person)	$250,000 dollar$ per owner
Joint Accounts (owned by two or more persons)	$250,000 dollar$ per co-owner
Certain Retirement Accounts	$250,000 dollar$ per owner
Revocable Trust Accounts	$250,000 dollar$ per beneficiary up to 5 beneficiaries (more coverage available with 6 or more beneficiaries subject to specific conditions and requirements)
Corporation, Partnership and Unincorporated Association Accounts	$250,000 dollar$ per corporation, partnership or unincorporated association
Irrevocable Trust Accounts	$250,000 dollar$ for the non-contingent, ascertainable interest of each beneficiary
Employee Benefit Plan Accounts	$250,000 dollar$ for the non-contingent, ascertainable interest of each plan participant
Government Accounts	$250,000 dollar$ per official custodian (more coverage available subject to specific conditions)

(ref: www.fdic.gov/deposit/deposits)

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