A Study on Patinkin's Monetary Theory

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Ⅰ. Introduction

We have been considering how money affects spending and how an excess demand for or excess supply of money weakens or strengthens demand relative to supply on the markets for individual goods and services and securities. All this reconciles with Patinkin's(1965) superficially rather different exposition of the strict or rigid quantity theory. Going beyond mere mechanics and algebraic tautologies, his work explains the role of the real-balance effect in the logic of the theory. It builds bridges between macroeconomics and microeconomics, tracing macro phenomena of prices and incomes back to the decisions of individual economic units. Along with presenting his positive analysis, Patinkin clears up some inconsistencies in earlier monetary theory.

Patinkin shows that several assumptions apparently necessary for the strict quantity theory are not in fact necessary. For example, omission of the interest rate form Fisher's equation of exchange seems to presuppose that that rate does not affect the demand for or velocity of money. Actually,

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the theory requires no such assumption. The conditions that are necessary are not fully met in the real world. which helps explain why the quantity theory does not hold rigidly true. Yet the forces Patinkin describes, notably the real-balance effect, do indeed operate in reality.

Ⅱ. Comparative Statics and Real Balance

At one stage of his exposition, Patinkin(1954, pp.132-134) presents a comparative-static analysis of the equilibriums corresponding to two different nominal quantities of fiat money. Following that exposition, and postponing review of the necessary assumptions, we write equations for equilibrium in the markets for the four groups into which all exchangeable items are aggregated-commodities(including services), labor, bonds, and money. Besides symbols for the demand and supply functions, the following symbols appear :

Y_0 = full-employment output of commodities (that is, full-employment real income).

P = price level.

W = money wage rate.

r = interest rate

M_0 = exogenously given initial nominal quantity of money.

The following are the equations :

$$F(Y_0, M/P, r) = Y_0 \quad \text{Commodity equilibrium} \tag{1}$$

$$N^d(W/P) = N^s(W/P) \quad \text{Labor equilibrium} \tag{2}$$

$$B^d(Y_0, M/P, r) = B^s(Y_0, M/P, r) \quad \text{Bond equilibrium} \tag{3}$$

$$PL(Y_0, M/P, r) = M_0 \quad \text{Money equilibrium} \tag{4}$$

Equation (1) shows full-employment output equal to full-employment demand for commodities, which depends on full-employment real income, real money balances and the interest rate. Equation (2) shows labor equilibrium, demand and supply and demand functions would not affect the analysis. Equation(3) expresses equilibrium between demand for and supply of bonds, each expressed in real terms and depending on full-employment real income, real money balances, and the interest

rate. Equation(4) shows that real money balances demanded depend, according to the L(·) function, on real income, real balances themselves and the interest rate. Nominal balances demanded are real balances demanded multiplied by the price level. They are equal in equilibrium to the nominal money supply.

By Walras's Law, if supply and demand are in equilibrium for any three of the four markets, then they must be in equilibrium for the fourth market also. If any three of the equilibrium conditions are written in explicit functional form, complete with numerical coefficients, then they together already imply the fourth one in complete detail; and writing it explicitly would add no new information. Writing all four equations does no harm provided we remember that only three of them are mathematically independent.

If the four equations are satisfied for quantity of money M_0, price level P_0, wage rate W_0, and interest rate r_0, then, when the quantity of money is multiplied by k and becomes kM_0, the equations are satisfied at price level, wage rate and interest rate of kP_0, kW_0 and r_0. This result is obvious from inspecting the equations after making the indicated substitutions. In the new equilibrium, prices and wages have changed in the same proportion as the quantity of money and the interest rate is unchanged.

Patinkin(1965) assumes perfect competition throughout his analysis. The economy starts in 'general equilibrium', which implies that all markets are clearing. After a change in the money supply, it again winds up in general equilibrium. Only prices change during the adjustment process, with output held constant at its full-employment level. Since Patinkin is mainly concerned with the forces at work that restore the economy to its general-equilibrium level, he is able to avoid the complications that arise in discussing the disequilibrium of depression. For example, he need not worry about the distinction between stocks and flows, which is so crucial in understanding the depths of depression. Similarly, he need not distinguish between output and supply, since the economy remains at full-employment output.[1)]

The M_0/P_0 term appearing in the commodity, bond and money equations(and, after the money supply change, kM_0/kP_0, which has the same value)is the real value of money balances held. Patinkin's 'real-balance effect' is the dependence of demands and supplies in the markets for

1) Patinkin departs from his focus on general equilibrium when he discusses involuntary unemployment in Chapters 13 and 14. He distinguishes between output and supply in Chapter 13. In his 'Introduction to second edition, abridged', Patinkin(1989) further elaborates on his disequilibrium approach to macroeconomics.

commodities, bonds and money itself on this term, the purchasing power size of the money supply. If some exogenous disturbance were to shrink real balances, then people being poorer than before on that account would be inclined to economize on purchases of commodities and even on real money holdings themselves and would probably desire smaller creditor and larger debtor positions in real size.

The real-balance term could have been left out of the commodity or bond or money equation without upsetting the comparative-static proposition about proportionality of prices and wages to the money supply. We did leave that term out of the labor equation, although we could have included it. Empirically, it is highly plausible that a real-balance effect operates in the commodity market. Its operation there is not strictly necessary, however, for the quantity theory result. An increase in the nominal quantity of money not yet matched by price increases could conceivably stimulate the demand for bonds relative to the supply, temporarily depressing the and so stimulating spending on commodities until prices had risen in proportion to the quantity of money after all and real balances were no longer larger than originally.

The real-balance effect must operate in some market if the quantity theory is to hold. If it operated nowhere - neither directly in the commodity or labor market nor indirectly there through the bond market and the interest rate - then an increase in the nominal quantity of money would leave the initial equilibrium undisturbed in each market. No pressures would be working to change the price and wage levels or the interest rate. To reflect this absence, the money equation would be written to show a plastic and passive demand for real balances, that is, a demand for nominal balances accommodating itself to the actual nominal quantity regardless of the price and wage level. Under those conditions, furthermore, even apart from any change in the quantity of money, the price level would be indeterminate, in neutral equilibrium. Any arbitrary or accidental fall or rise, spelling a rise or fall in real balances, would leave behavior unaffected on all markets and so would exert no pressure for its own reversal. Such a total absence of the real-balance effect is empirically unbelievable.

If the real-balance effect operates anywhere, as empirically it must, then it must operate in the markets for at least two things. Equilibrium cannot be disrupted at the old price in one market alone. Walras's Law provides the reason. Market transactions are two-sided : one thing exchanges for another.

This point about at least two markets may seem to require one qualification. Patinkin(1965, p. 514) imagines a far-fetched case in which 'the real-balance effect is dissipated entirely in increasing

the demand for money balances'. The real-balance effect 'operates exclusively in the market for money', assuring continuous monetary equilibrium. Patinkin's exceptional case is the Keynesian liquidity trap. All additions to wealth through increments to real balances are devoted to nothing else than acquiring those additional real balances. But is it correct to say that the real-balance effect is operating even when it is dissipated as Patinkin says by being confined to the market for money? The issue is purely semantic. Although the case in question is empirically unbelievable, it is worth mentioning because it illuminates reality by the contrast it presents.

Ⅲ. The Process Underlying the Quantity Theory

By now we have gone beyond comparative statics. Patinkin examines the process of response to a changed quantity of money. He assumes that output remains at the full-employment level, leaving prices as the variable that responds. Figure 1 represents the real aggregate demand for commodities as depending on real balances and other variables. Line 0, as well as the similar lines in shifted positions, slopes upward from left to right to represent the real demand for output as demanding partly on real income itself. Line 0 represents the aggregate demand function for the initial nominal and real money balances. A vertical line at Y_0 reflects the assumption of full-employment output. Point A portrays initial equilibrium between aggregate demand and output.

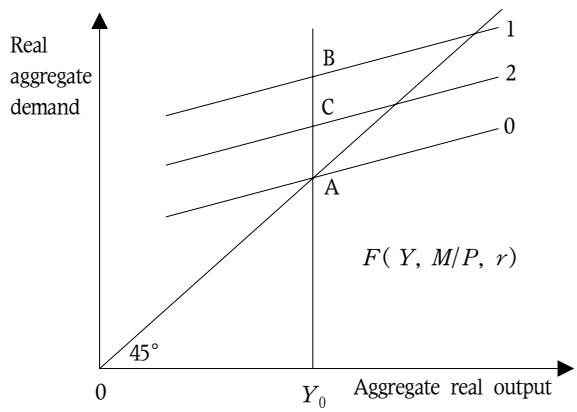

Figure 1. Aggregate real output and alternative demands for commodities

Now the government engages in deficit spending financed by issuing new money. The shift of the F(·) function line to position 1 represent the strengthening of real aggregate demand. Distance AB represents excess demand in the commodity market. Next the government discontinues its deficit spending, and aggregate demand falls to position 2. It does not yet fall all the way back to position 0, since the already issued new money remains in circulation; and since prices have not yet risen fully in proportion, real balances are larger and are making the demand for commodities stronger than in the initial situation. Excess demand of AC remains and exerts continuing upward pressure on prices. Eventually, though, prices rise enough to reduce real money balances to their initial level, and commodity demand is back in position 0. So precise an outcome is and oversimplification, of course; but the points being made about the nature of the process remain qualitatively valid. In actuality, the government deficit spending would itself be a change in the realities of the situation, and it would cause distribution effects.

If the rise of prices were at one stage to overshoot the mark, then real balances would be lower than initially, and negative excess demand for commodities would bring the overshot prices down to their new equilibrium level.

In principle, the interest rate enters into the adjustment process. Before prices have caught up with the expanded money supply, people want to unload their excessive real balances not only in buying commodities but also in buying bonds. Their actions depress the interest rate, which further stimulates the demand for commodities in accordance with the F(·) function. But as the rise in prices continues to erode real balances, it also reverses the strengthening of demand for bonds that had temporarily depressed the interest rate, which now recovers.

A stage in the adjustment process is barely conceivable at which prices have not yet fully responded to the increased nominal money supply but at which the increased real balances are being fully demanded, quite in accordance with the demand-for-money function, because the interest rate is depressed(temporarily). With the demand for and supply of money again in equilibrium, why doesn't the process simply come to a halt? The answer is that the monetary equilibrium is merely a partial equilibrium. The bond and commodity markets remain out of equilibrium. In particular the depressed interest rate continues causing excess demand in the commodity market. Princes and the rate undergo further change, disrupting the temporary and partial monetary equilibrium. Monetary equilibrium in this model cannot be fully restored except as part of a general equilibrium of all markets.

As noted on pages 102-107, an excess demand for commodities matched solely by an excess

supply of bonds but of money as in the above partial monetary equilibrium, is paradoxical. If such a situation did occur, the flexibility of bond prices and interest rates would tend to come into play, eliminating any excess supply of bonds unaccompanied by an excess supply of money. Moreover, the situation is implausible for another reason : how can a low interest rate stimulate the demand for commodities if people are frustrated in getting all the loans they want at that rate? Ordinarily we think that a low rate is stimulatory because it indicates cheap availability of credit, but things are different if the low rate is a disequilibrium rate and credit is in short supply. Realistically, any excess demand for goods would be accompanied by at least some excess supply of money, even if along with an excess supply of bonds as well.

Ⅳ. Patinkin's Diagrammatics

Figure 2 Includes lines(not necessarily straight ones) representing pairs of price level and interest rate that equate supply and demand for each of the three composite goods into which we now aggregate all the goods of the economy. These composites are commodities-and-labor (hereafter called

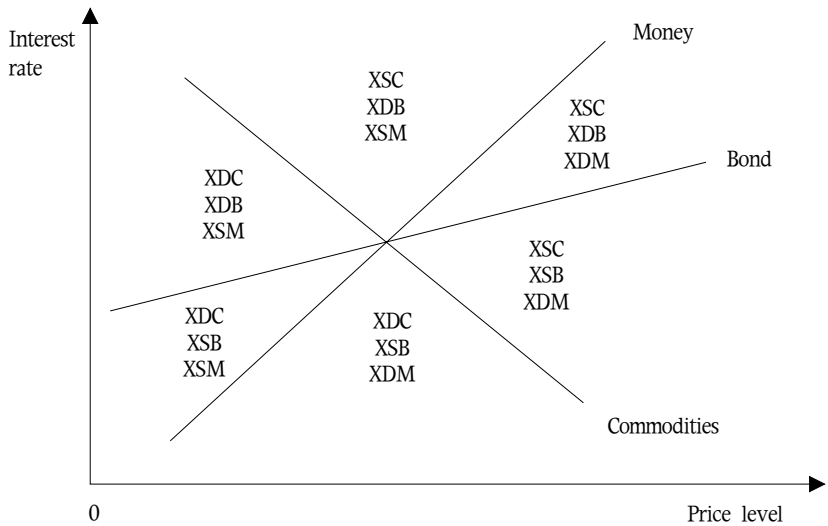

Figure 2. Conditions of equilibrium

simply commodities), bonds and money.[2)]

A point on one line alone represents partial equilibrium in its market. The intersection of all three lines represents general equilibrium. Regions of excess demand are labeled XDC, XDB and XDM for commodities, bonds and money, respectively; XSC, XSB and XSM indicate excess supplies. The diagram presupposes a fixed nominal quantity of money (as well as given real conditions affecting the supply of commodities); changes in the quantity of money must be represented by shifts in the lines, as will be explained.

Why the disequilibrium regions are as they are and why the line slope as they do may be explained together. Starting from a position of equilibrium on the commodity line, consider a horizontal move, representing an arbitrary increase in the price level with no change (yet) in the interest rate. The attendant fall in the real value of the given nominal money supply dampens the demand for commodities, leaving them in excess supply. Since the demand for commodities responds to the interest rate also - inversely - a sufficient fall in that rate would restore commodity equilibrium, a partial equilibrium, at a new point an the line southeast of the original point.

Next consider a rightward move from a point on the bond line. The decline in real balances thus represented is supposed to dampen the demand for bonds in real terms, and the squeeze on real liquidity might also increase desired borrowings. Bonds would thus be in excess supply unless a rise in the interest rate achieved a new (partial) equilibrium at a point on the bond line northeast of the initial point.

While excess supplies appear to the right and excess demands to the left of both the commodity and bond lines, the reverse is true of the money line. To the right of it, the shrinkage of real balances has caused an excess demand for money. It could be removed by a sufficient rise in the opportunity cost of holding money, the interest rate; thus the line slopes northeastward.

We may see in two ways why the money line slopes upward more steeply than the bond line. First, it is reasonable that equilibrium or disequilibrium in a given market should depend more sensitively on the price prevailing there than on the price in another market. The diagram represents this condition by the bond line's being more nearly perpendicular to the interest rate axis and the money line's being more nearly perpendicular to the price level axis. Staring from the general-equilibrium intersection, consider a rightward move, representing a rise in the price level

2) Patinkin avoids explicitly considering labor by assuming enough flexibility of nominal and real wage rates to keep its market always in equilibrium. We prefer getting rid of a separate labor market by aggregating labor with commodities, which also include services as mentioned above.

that causes disequilibrium for boths and money (as well as for commodities). Now, the rise in the interest rate required to re-equilibrate the bond market is smaller than the rise required to re-equilibrate money. Relative to the influence of the price level, the interest rate evokes a more sensitive response in the bond market than in the money market, which is eminently reasonable.

The second explanation notes that if the relation were the reverse of the one shown, it would violate Walras's Law. If the bond line sloped upward more steeply than the money line, then the diagram would contain a sector of commodities, bonds and money all being in excess demand and a sector of all three being in excess supply.

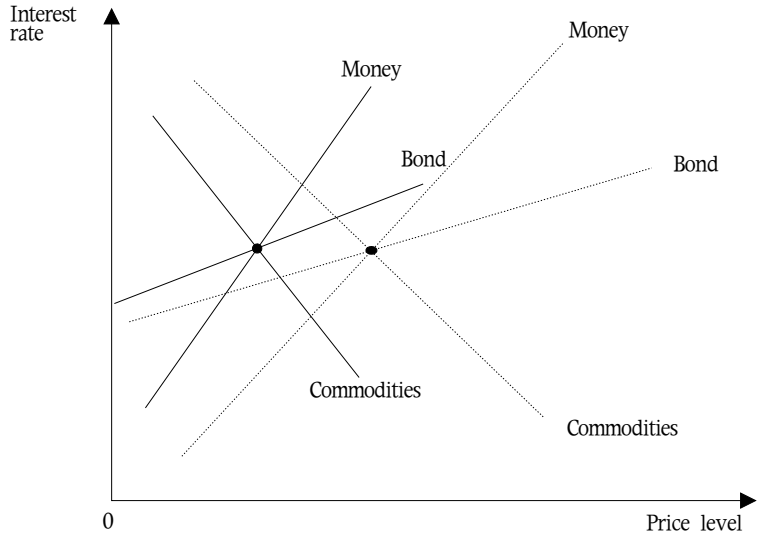

Figure 3. Equilibrium conditions for an original and a doubled nominal quantity of money

The solid and the dashed lines in Figure 3 represent equilibrium conditions for an original and a doubled nominal quantity of money. At each level of the interest rate, the horizontal distance out to each new line is twice the distance to the corresponding old line. This construction reflects the absence of money illusion and of distribution effects. If a particular market was initially in equilibrium at a rate r_0, nominal money supply M_0, and price level P_0, then that market is again in equilibrium at r_0, $2M_0$ and $2P_0$, for the rate and real balances are both the same as before. The new general-equilibrium point occurs at the initial interest rate and a doubled price level. The diagram illustrates the comparative statics of the strict quantity theory under the assumptions necessary for it.

Ⅴ. Uniform Unitary Elasticity of Demand for Money

Many neoclassical writers, Patinkin notes, believed that the demand for nominal money as a function of the inverse of the price level had uniform unitary elasticity, an elasticity of 1; the curve was a rectangular hyperbola, as in Figure 4. Evidently they envisaged alternative vertical money supply curves intersecting it for equilibrium price levels. This issue of elasticity is not important in its own right, but it serves as a vehicle for exposing and resolving some confusions that also spawned the homogeneity postulate and the invalid dichotomy.

Actually, the demand curve for nominal money is steeper than a rectangular hyperbola; its elasticity is less than 1 in absolute value. Doubling the price level makes the individual holder want a nominal cash balance less than twice as large as before, and halving the price level makes him want a nominal cash balance more than half as large as before. Doubling or halving the price level reduces or increases the desired real balance. The reason for this result in the individual experiment is that doubling the price level reduces the purchasing power of a nominal cash balance; and being thus slightly impoverished in real terms, its holder must economize on various uses of his income or wealth, including even the holding of real cash balances. Halving the price level makes a money-holder wealthier and able to afford somewhat larger allocations of wealth in various directions, including a larger allocation to his real cash balance.

So far we have been considering an individual holder's demand for money. The market demand function is conceptually generated by totaling the quantities of money that all holders would desire at each of the different conceivable price levels. In addition, this function generally depends upon not only relative prices and total real income and wealth (including real cash balances), but also the distribution of income and wealth among members of the community. Anyway, for reasons already explained, the market demand curve for nominal cash balances, like the individual demand curve, presumably has an elasticity less than 1 in absolute value with respect to the purchasing power of the money unit.

This point about elasticity helps clarify and emphasize the distinction already introduced between individual experiments and market experiments. The less- than-unit-elastic money demand curve describes and individual experiment.

Quite distinct from it is a market-equilibrium curve, which portrays the strict quantity theory and does have unit elasticity. In Figure 5 the market-equilibrium curve EE joins the points of

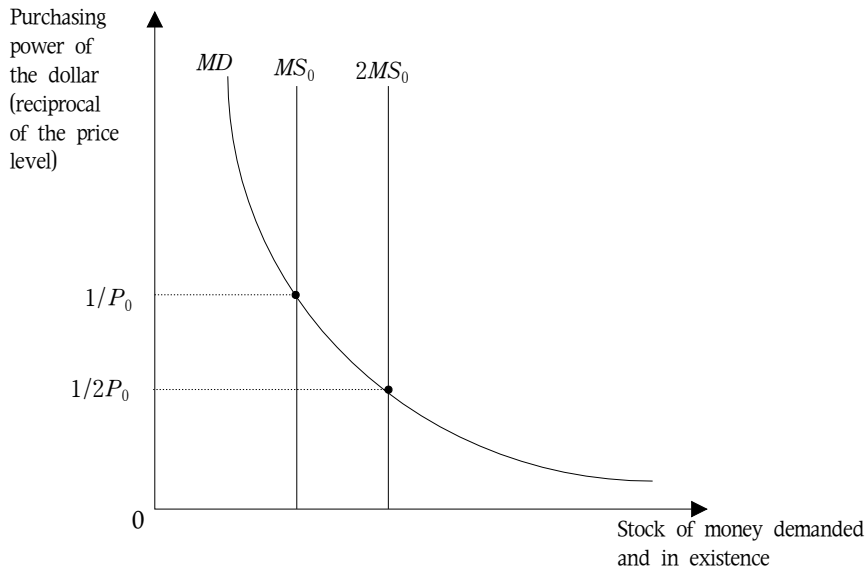

Figure 4. Uniform unitary elasticity of the demand for money

equilibrium of alternative supplies of money and their corresponding demands. Awkwardly enough, the position of each money demand curve depends in part on the actual money suppl y : the larger the supply the further to the right the demand curve appears. Although desirable in principle, it is not always possible to keep supply factors and demand factors in separate categories. In the present case, the stock of actual cash balances does enter into the real wealth of economic units at each price level and does affect their demands for various things, even including cash balances.

Curve EE is a rectangular hyperbola. Whatever the nominal quantity of money, its total real purchasing power is the same. This characteristic of EE simply illustrates the rigid quantity theory but does not prove it. Yet it is useful. Clarifying the distinction between a demand curve for cash balances and a market-equilibrium curve helps us see that the former curve does not have unit elasticity, even though the latter does.

In summary, the market-equilibrium curve portrays the result of a series of conceptual market experiments. It shows that the equilibrium purchasing power of the money unit is inversely related to the quantity of money; that is, it has unit elasticity. On the other hand, the demand curve for nominal money represents individual experiments : it shows how desired cash balances depend on the inverse of the price level, the total of actual nominal cash balances being one of the magnitudes held constant.

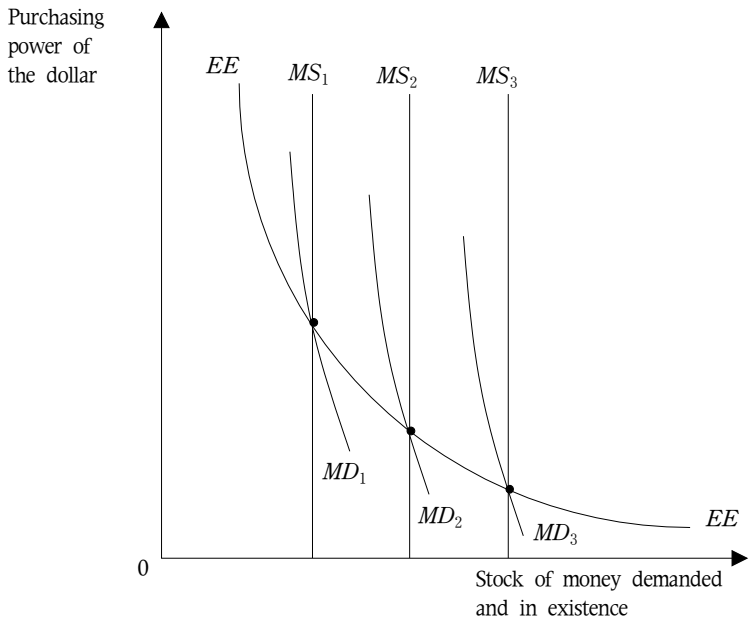

Figure 5. The market-equilibrium curve for money

VI. Conclusion

According to a broad or loose version of the quantity theory, the money supply, together with the demand for cash balances, determines the stream of spending and nominal income. The rigid or strict theory goes on to assert an exact proportionality between the nominal money supply and the price level. Patinkin explains the conditions necessary for the latter version, conditions not fully met in reality. Changes in the money supply affect output quantities and relative prices as well as the price level. The real world exhibits disequilibrium not the general equilibrium of Patinkin's book. Nevertheless, his analysis, especially of the real-balance effect, contributes greatly to understanding the real world. His diagrammatic apparatus can be applied and extended in illuminating ways(see pages 212-215 below).

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<국문초록>

A Study on Patinkin 's Monetary Theory

심 경 섭 *
이 형 석 **

파틴킨의 모형은 재화시장과 채권시장의 일반균형모형이다. 재화시장의 초과수요를 EG라 하면 EG는 이자율과 물가수준과 함수관계를 갖게 되므로 $EG = f(r, P)$가 된다. 또한 채권시장의 초과수요를 EB라 하면 EB도 이자율과 물가수준과 함수관계를 갖게 되므로 $EB = f(r, P)$이다. 파티킨의 모형에서 통화량의 증가는 채권에 대한 수요를 증가시키므로 채권에 대한 수요증가는 동일한 물가수준에서 이자율을 하락시킨다. 이자율의 하락은 투자와 소비를 증가시키고 투자와 소비의 증가는 동일한 이자율 수준에서 물가를 상승시킨다. 이에 따라 기업들은 채권의 공급을 늘리게 되는데 채권의 공급이 증가함에 따라 채권가격은 안정되고 이자율은 상승하게 된다. 이자율의 상승은 다시 투자와 소비를 본래의 수준으로 감소시키게 된다. 그러므로 통화량을 2배로 증가시키면 물가만 2배 증가할 뿐 이자율, 실질투자, 실질소비, 실질국민소득 그리고 고용량은 변하지 않는다. 따라서 화폐는 장기적으로 중립적이다 라고 하였다. 파틴킨의 커다란 공헌은 그가 처음으로 가격이론과 화폐이론을 실질잔고효과를 매개물로 하여 서로 결합시킨 것이다.

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