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A Tentative Behavioral Approach to Real Income Targeting

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Abstract. This is a paper based on cognitive psychology's view of "curvilinear" optimism-pessimism and hence, with a flavor of behavioral macroeconomics. The substructure of a real overlapping-generations business cycle model is assumed to be underlined by the long-term character of the rational expectations of the big socioeconomic elite. This model is combined with the general-public's view of the economy, which is assumed to be an extrapolation of the changing psychology of the community about the banking system. An exogenous shock will be propagated through this mass psychology. Policy-wise, the public sector is assumed away and the only purpose of the monetary authority is to secure the efficiency of intergenerational income distribution in a business environment with zero steady-state profit. Within this context, monetary policy is found to be in the spirit of the Old Chicago quantity theory from the viewpoint that it should be subject to a full-employment-wage standard in a gold-standard fashion. It is a countercyclical policy and not a version of the modern revival of inflation targeting, which is of the sort held responsible for the 1929 Crash.

Keywords: mood; bank rating; economic activity; monetary expansion; Old Chicago quantity theory; full-employment-wage standard.

Предварительный поведенческий подход к таргетированию реальных доходов

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Аннотация. В основу данного исследования положен тезис когнитивной психологии о криволинейности настроений оптимизма и пессимизма в контексте поведенческой макроэкономики. Предполагается, что реальная субструктура модели перекрывающихся поколений экономического цикла обусловлена долговременным характером рациональных ожиданий больших социально-экономических элит. Далее модель соединяется с обобщенным взглядом широких масс населения на экономику, что, как предполагается, позволяет экстраполировать меняющуюся психологию населения относительно банковской системы. Именно экзогенный шок будет распространяться путем влияния на массовую психологию. При этом авторы абстрагируются от наличия какого-либо рационально управляемого публичного сектора, а единственной целью монетарной власти является обеспечение эффективности распределения доходов между когортами населения с постоянным нулевым результатом для предпринимательской среды. В этом смысле монетарная политика ведется в духе старой Чикагской количественной школы, т.е. опирается на принцип равновесия «полная занятость — заработная плата» в духе эры золотого стандарта. Это антициклическая политика, а не современное воскрешение таргетирования инфляции, что явилось одной из причин краха 1929 г.

Ключевые слова: настроение; банковский рейтинг; экономическая активность; монетарная экспансия; старая чикагская количественная теория; принцип равновесия «полная занятость — заработная плата».

1. INTRODUCTION

One thing that has slipped the attention of the economics profession is that the mixed-economy Old, pre-1950, Chicago School and Keynesian theories and policy prescriptions were sort of “general-public economics” as opposed to post-1980 neo-liberalism (the new classical economics of monetarism plus supply side economics plus rational expectations), which has been kind of the “elite economics” of large market players. Figure 1, adapted from Piketty and Saez (2014), is quite instructive as to the dramatic consequences this shift of agent emphasis had on socioeconomic order (see e.g. Söllner 2014). What Old Chicago and Keynesians had in mind was moderate socioeconomic inequality and market power, which when either desideratum was disturbed, the state should intervene to restore order. The free market economy is there to promote the common interest, the welfare of the many, and not the private interest of the strong and well-to-do: “Henry Simons had preached a form of laissez-faire in his famous 1934 pamphlet *A Positive Program for Laissez Faire*, but what a form!... almost as harmonious with socialism as with private-enterprise capitalism” (Stigler 1988, p. 149). This weak rather than strong Pareto efficiency view of the socioeconomic being is one reason having prevented mixed-economy macroeconomics from developing a thorough microeconomic background; thorough, from the viewpoint of encompassing utility and profit maximization beyond the general equilibrium mechanics acknowledged by neoclassical synthesis.

To have such a comprehensive background, rational expectations on the part of the agents have to be postulated to be compatible with the standard neoclassical utility and profit maximization. Indeed, some elite can form such expectations and act accordingly by employing the appropriate personnel, which for neo-liberalism is enough invoking on the leading role of these elite. But, the most the majority of the citizenry can afford to develop to minimize animal spirits is casual or bounded rational ones, which is what Keynesians acknowledge, while no expectations concept the short-lived star of Old Chicago had the time to elaborate. Of course, one might argue that allowing new-neoclassical synthesis the presence of rational expectations, this theory does have sound micro-foundation; but critics say that this new synthesis is far from reality, much more so from Keynesian theorizing (see e.g. Landmann 2014). At the other end, post-Keynesian economics dismisses even general equilibrium workings having thus placed itself outside mainstream economics (see e.g. Harcourt 2006).

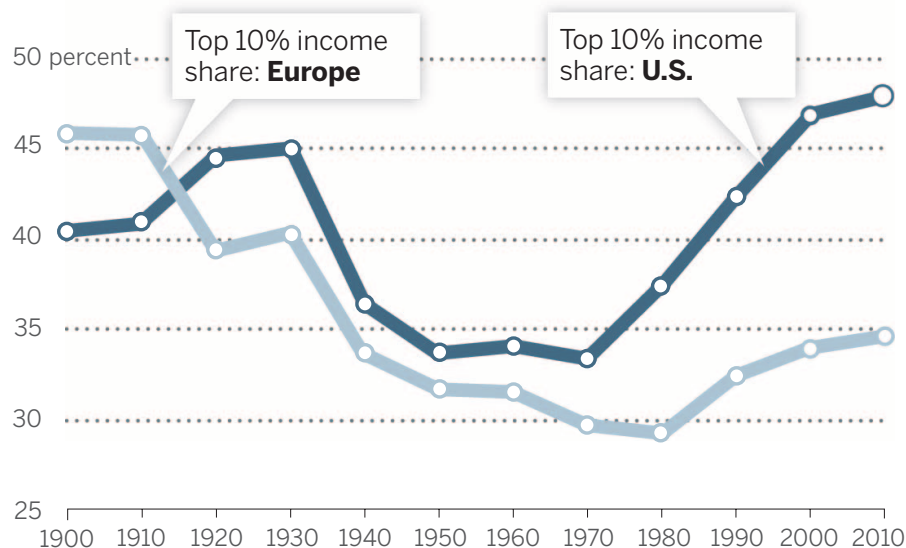


Figure 1. The Evolution of the Top 10% Pre-tax Income Share in the U.S. and Europe between 1900 and 2010

Note. The share of total income accruing to top decile income holders was higher in Europe than in the United States from 1900 to 1910; it was substantially higher in the United States than in Europe from 2000 to 2010. The series report decennial averages (1900 = 1900 to 1909, etc.) constructed using income tax returns and national accounts. See T. Piketty, *Capital in the Twenty-first Century*. Harvard Univ. Press, Cambridge, MA, 2014, chapter 9, Fig. 9.8. Series available online at piketty.pse.ens.fr/capital21c.

Source: Piketty and Saez (2014, p. 838).

According to this paper, either the new classical economics of neo-liberalism or the new-neoclassical synthesis should be complemented with a variable describing the general-public's mood about the state of the free market system. Large market players do exist and they do act based ideally on rational expectations; the order of magnitude of largeness is immaterial because the standard of comparison is the socioeconomic status of the majority of the people. And, they do lead the engine of the economy so that rational expectations can be safely assumed throughout a model description of it. But, this model has to account somehow for the mood, for the psychology of the general public as well, which immediately reminds one of Keynes' animal spirits, because their origin is the discipline of psychology of his times (see e.g. Safire 2009). This is not to say that incorporating the psychological element in a macroeconomic discussion makes it Keynesian as, for instance, may be realized through Geiger's (2016) work.

Nevertheless, such a discussion does obtain some Keynesian flavor to the extent the psychological element is founded on psychology; a so to speak, behavioral-economics viewpoint of the Keynesian approach (see e.g. Driscoll and Holden 2014). For example, modern cognitive psychology does rationalize the basic for economics psychological element, namely optimism-pessimism (see e.g. Croom and Bono 2015), and hence, the mood of the public might be captured through some concept related to these findings. But, in economics, optimism-pessimism has been related to the concept of expectation as, for instance, expectations are shaped by the news (Avdjiev 2016), rationally or casually (Beaudry et al. 2012 and 2014). So, the expectations approach would be compatible with the psychological one only if the new information shapes casual only expectations, bad or good *a la* Croom and Bono (2015) rather than only good as the "mood swings" view postulates (Schmitt-Grohe and Uribe 2012).

This, exactly, viewpoint of the general-public mood is adopted herein in connection with an elementary real business cycle model, without of course purporting to claim that new classical economics would become subsequently a variant of Keynesian economics, but they would do obtain some Keynesian flavor behaviorally, while the new-neoclassical synthesis would certainly become "more Keynesian" in character. Thus, the next section works out a bank-health rating index by the general public, an index tied to an economy-wise index, with both of them being

defined psychologically rather than based on some expectations notion. The idea is that what the general public sees to rate first banks and then the economy, are its pocket and employment status. First, the banks, because in an overlapping-generations general-equilibrium model, the worker's current income is found to depend directly on how much the employer had borrowed from the bank in the previous period; borrowing of which the worker is aware. It is a relationship which determines current consumption demand and current bank rating, and can propagate would-be instability.

This is more or less the novelty of the present paper from the viewpoint of modeling; one, in line with cognitive psychology and hence, with behavioral macroeconomics. Contrary to the behavioral macro-model of De Grauwe and Macchiarelli (2015), optimism-pessimism is not self-fulfilling, does not come out of the use of a "best" forecasting rule among many such rules, and is not associated with the concept of animal spirits on the part of investors. It is associated with the consumer-laborer and not without recourse to the discipline of psychology. Also, herein, there are no heterogeneous expectations, some rational and some "parsimonious forecasting models that are, in equilibrium, optimal within a restricted class" (Branch and McGough 2011, p. 395). The model *per se* captures the rationality of businessmen expectations, which in turn is compromised with consumer-labor psychology, analytically rather than by incorporating explicitly a second class of agents. We want to see here how the policy conclusions of standard new classical macroeconomics are qualified when the psychology of the general public is acknowledged, and not when the model population is divided into two socioeconomic classes.

Policy-wise in Section 3, the public sector is assumed away and the only purpose of the monetary authority is to secure the efficiency of intergenerational income distribution in a business environment with zero steady-state profit. Within this context, our money creation conclusion is in the spirit of Old Chicago School about money creation as the primary tool against recession. Money supply should be adjusted to the imperatives of wage stability at its full employment level just as under a gold standard. Following (Bordo et al. 2004), using such a wage index or in general, an index of input prices as a nominal anchor is expected to render monetary expansion endogenous, serving exclusively the imperatives of labor-money convertibility. In effect, monetary expansion emerges to be a panacea against any disturbance of the intergenerational income distribution implied by general-equilibrium, *ceteris paribus*. Although the particular content of Old Chicago thinking postulated here, becomes clear as the paper proceeds, the concluding Section 4 expands further on it and on the nature of the policy implication of the following elementary real business cycle model.

2. AN OVERLAPPING GENERATIONS MODEL AND THE BANK

Suppose that individuals live for two time periods so that at time t the economy consists of a contemporary young generation and one old generation, young at time $t-1$. Individuals are alike regardless generation, the overall population does not change, and so it may be assumed that there is always in the economy one typical young and one typical old persons.

The Consumer and Bank Deposits

One young at time t individual works to earn income, W_t , for current consumption, Q_t^y , and to consume when old, Q_{t+1}^o , based on its savings, S_t , having first deposited them with a bank, $S_t \equiv D_t$ to benefit also from the interest rate $r_{D,t}$. The time superscript is used presumably as a generation index. That is, the typical young at t and old at $t+1$ individual is representative of the t th generation and is called upon to maximize utility, U , of the following form:

$$U(Q_t^y, Q_{t+1}^o) = \ln(Q_t^y) + \ln(Q_{t+1}^o) \quad (1)$$

subject to the constraints:

$$W_t = Q_t' + S_t \equiv Q_t' + D_t.$$

And

$$Q_{t+1}' = (1 + r_{D,t})S_t \equiv (1 + r_{D,t})D_t$$

with regard to Q_t' , Q_{t+1}' , and $S_t \equiv D_t$. According to (1): (i) Intertemporal risk aversion measuring how risks at different times interact is zero; (ii) Consumption at one date does not affect the utility realized from consumption at other dates; (iii) There is complete neutrality over the timing of the resolution of risk. That is, the utility function contemplated is quite simple, but suffices for the purposes of this paper.

Now, inserting the constraints into the objective function, the following optimization problem obtains:

$$\max_{S_t = D_t} \left[\ln(W_t - S_t) + \ln(1 + r_{D,t})S_t \right]$$

with the first-order condition:

$$\frac{1}{W_t - S_t} = \frac{1}{S_t}$$

and hence,

$$S_t = \frac{W_t}{2} = D_t \quad (2)$$

regardless the value of the deposit interest rate $r_{D,t}$, since under logarithmic preferences, wealth and substitution effects cancel. To introduce the bank-health rating index by the typical individual just described, the following connection with bank activities is postulated.

The Bank

Suppose that there is a single bank free from any required reserves regulation. Instead, define a bank-health rating index, $h \in (0,1)$, related directly to the ratio of loans, L , to deposits, D : $l \equiv L / D$, through

$$h = \sqrt{l/2} \Rightarrow l = 2h^2, \quad (3)$$

and tied to an economy-wise confidence index as reflected through the cash-drain ratio, $c \equiv C / D \in (0,1)$, as follows: When $h = 0$, the bank-health rate by the public is nil and hence, cash drain is full: $c = 1$; when $h = 1$, the rating is perfect, the cash held is nil, and $c = 0$:

$$c = 1 - h^2. \quad (4)$$

Expression (3) is just a conventional way of capturing a trend according to which bank rating increases with l but in a decreasing fashion as credit over-expands. Yet, according to (4), this over-expansion does not take away the confidence to the performance of the economy. The healthiness of the financial system is tied to the confidence about the economy, and (4) reflects the fact that this confidence is restored with difficulty after a recession, but it is strengthened rapidly once the public realizes that credit expanding steadily. Both of the contemplated indexes reflect psychological trends as documented, for example, by Croom and Bono (2015); trends that

as the next subsection shows, influence eventually consumer behavior in its role as an income earner.

To describe h better, let M be the money stock:

$$M = C + D = (1+c)D \quad (5)$$

and B stand for the monetary base:

$$B = C + L$$

so that:

$$\frac{M}{B} = \frac{C+D}{C+L} = \frac{\frac{C}{D}+1}{\frac{C}{D}+\frac{L}{D}} = \frac{1+c}{c+l} \equiv m \quad (6)$$

or, from (3) and (4):

$$m = \frac{2-h^2}{1+h^2}. \quad (6')$$

That is, the money multiplier is completely determined by the public's rating of the banking system. Now, from (5) and (6):

$$(1+c)D = \frac{1+c}{c+l}B \Rightarrow D = \frac{1}{c+l}B,$$

which when inserted in $L = lD$ gives that:

$$L = \frac{l}{c+l}B,$$

compared from (3) and (4) to D as follows:

$$D = \frac{1}{1+h^2}B < L = \frac{2h^2}{1+h^2}B \quad \text{iff} \quad h > \frac{1}{\sqrt{2}} \Leftrightarrow l > 1.$$

So, $h = 1/\sqrt{2}$ might be taken to be the critical value of p above which we have “over-rating” of the bank as a lending institution. Letting $r_{L,t}$ be the lending rate, below $h = 1/\sqrt{2}$, the public sees $r_{L,t} < r_{D,t}$, wanting the bank to attract more borrowing to get rid of excess reserves; the bank operates at a loss. At $h = 1/2$, the “glass is halfway full”. Any further losses beyond those associated with the midpoint prompt pessimism about the bank at an increasing rate towards $h = 0$. At the other end, if $h < 1/2$, and losses are declining, pessimism is alleviated and turns to optimism once $h > 1/2$ and until $h = 1/\sqrt{2}$ when the two interest rates become equal and the bank breaks even. Beyond $h = 1/\sqrt{2}$, lending ceases to be backed by deposits, $r_{L,t} > r_{D,t}$ to ration it, the bank becomes profitable and this causes its over-rating.

The Firm and Bank Borrowing

To complete the description of index h , the firm from the borrowing side has to be examined as well. There is one only but zero-profit firm, producing its output in a constant returns Cobb-Douglas fashion, based fully on the previous borrowing from the bank, L_{t-1} , and on labor, N_t ,

supplied by the consumer-laborer always at $N = 1$. Its profit maximization problem is consequently:

$$\max_{N_t, L_{t-1}} \left(N_t^a L_{t-1}^{1-a} - W_t N_t - r_{L,t} L_{t-1} \right)$$

with first-order conditions:

$$W_t = a N_t^{a-1} L_{t-1}^{1-a} \quad (7)$$

And

$$r_{L,t} = (1-a) N_t^a L_{t-1}^{-a} \quad (8)$$

or, under full employment in the labor market:

$$W_t = a L_{t-1}^{1-a} \quad (7')$$

and:

$$r_{L,t} = (1-a) L_{t-1}^{-a} \quad (8')$$

where presumably $a \in [0,1]$. Indeed, if the firm is financed wholly by the bank, part of the loan is used to pay wages according to the parameter a . Combining (7) with (2), obtains that:

$$S_t = \frac{a L_{t-1}^{1-a}}{2} = D_t \quad (9)$$

which when inserted in (3) gives that:

$$h = \sqrt{L_t / D_t / 2} = \sqrt{L_t / a L_{t-1}^{1-a}} \quad (3')$$

These two last expressions plus the one regarding goods-market equilibrium:

$$Q_t' + Q_t'^{-1} + D_t = L_{t-1}^{1-a}$$

—all three expressions holding under full employment conditions— describe completely the full-employment general-equilibrium benchmark case of discussion under which $h = 1/\sqrt{2}$. Equating this value of h with (3'), one obtains that at steady state where L does not change:

$$\bar{L} = \left(\frac{a}{2} \right)^{1/a},$$

which, since at steady state $L_t = D_t$ too, i.e. $\bar{D} = \bar{L}$, gives along with (9) and (2) that:

$$\bar{W} = 2 \left(\frac{a}{2} \right)^{1/a}.$$

Also, $r_L = r_D$, but the consumer-laborer does not care about the interest rates anyway, because the preferences are logarithmic. To complete the description of the bank rating index in connection with this optimum state of affairs, $h = 1/\sqrt{2}$, the consumer-laborer, without having to worry about job security, is primarily concerned with its pocket, and being aware that the wage comes out of previous lending, compares current to last period's lending to rate the bank in the way described by (3') just to make sure that the current optimal state of the economy will not change.

3. ECONOMIC ACTIVITY AND POLICYMAKING

Letting $t-1$ be the last time there was steady state, with $L_{t-1} = D_{t-1}$ and full employment, $N=1$, the following types of disturbances may be identified: First, suppose that $h_t > 1/\sqrt{2}$ and $L_t > \bar{L} = \bar{D} = D_t$, since D cannot become greater than \bar{D} . In this case, W will increase above \bar{W} ; an increase that may be only nominal to restore goods-market equilibrium at a higher price level. To illustrate the accompanying increase in M , let $\bar{M} = 1$ and since,

$$L = \frac{2h^2}{1+h^2} B = \frac{2mh^2}{1+h^2} M = \frac{2h^2(2-h^2)}{(1+h^2)^2} M \Rightarrow \bar{L} = \frac{56}{25} \bar{M} = \frac{56}{25},$$

an increased h to $h_t = 3/4 > 1/\sqrt{2}$, gives $L_t = 414(M)/625$, which when equated to $\bar{L} = 56/25$, results in $M \cong 3.38$. This is how much M must increase to give a nominal L_t equal to \bar{L} . Should M be reduced below to $\bar{M} = 1$ to fight inflation? The answer is clearly negative as it may be seen by multiplying the fraction $414/625$ with some decimal number: The reduction will be recessionary; stagflation might set in. The expansion of money supply in conjunction perhaps with a policy aiming at decreasing in nominal terms the discrepancy $r_L - r_D > 0$, and even restoring the equality between the two rates, serve as means that would finally remove excess demands and supplies associated with $h_t > 1/\sqrt{2}$.

The mentality of such monetary policy appears to be similar to Bernanke's (1999) "constrained discretion" of "inflation-targeting" and near to nominal income targeting (Bradley and Jansen 1989) or nominal GDP targeting (Sumner 2014). But, here, it is the fears of excess demand in the labor market that lead to inflationary money creation to keep real wage at \bar{W} . The primary policy concern is full employment at general equilibrium and price stability comes up only as a by-product of the consequent policy action. And, practically, if the pressures for $W > \bar{W}$ reflect also over-investment prompting fears for recessionary future liquidations *a la* Hayek, the medium- and long-term policy target may not be price stability even as a by-product but anti-recessionary money creation in the Old Chicago way of *monetalis supra fiscus*.

"Hayek liquidations" may be characterized by Keynesian deficient demand too, if there are "many socially desirable trades between individuals remaining unexploited when the economy inherits too many capital goods" (Beaudry et al. 2014, Abstract). In this case, the mentality underlying monetary expansion is much like that underlying gold convertibility as would be the case under inflation-targeting or the same, k% rule (see e.g. Flandreau 2007), with the difference here that gold is replaced not by a k% rule but by some full employment index like $N=1$ or rather $W = \bar{W}$. That the deliberate increase of M to prompt wage-push inflation, to neutralize in turn an otherwise permanent labor market disequilibrium and maintain full employment as well as the monetary policy response in case of broader "Hayek-Keynes dynamics" are quantity theory in character, the Old Chicago version of it *a la* Douglas who is strongly influenced by under-consumption theories (see e.g. Laidler 1998). We have to see how the monetary authority reacts when $h_t < 1/\sqrt{2}$ too, to assess if this actually is the mentality characterizing the monetary authority, since the "philosophy" behind its reactions must be one.

More precisely, the second case is when $h_t < 1/\sqrt{2}$, but full employment cannot be continued through a lower W and deflation, because a deflation would not restore the equilibrium in the goods

market at a lower price level. A deflation would be recessionary if not accompanied by a policy of increasing M above $\bar{M}=1$: Letting $h_t = 2/3 < 1/\sqrt{2}$, one obtains that $L_t = 112(M)/169$ and again, that $M \cong 3.38$ if of course, one wants $L_t = \bar{L}$. This increase in M is the only way to render temporary the reduction of L and avoid a deepening recession. Moreover, steady state is restored at the original price level. Without increased M , there can still be equilibrium in the goods market, though a temporary underemployment one:

$$Q_t^t + Q_t^{t-1} + D_t = N_t^a \bar{L}^{1-a}$$

with $N < 1$, since (9) is bound to propagate the shock that led to $h_t < 1/\sqrt{2}$. That is, the spirit of anti-recessionary monetary policy here is (Old) Chicagoan in the sense that if we allowed for the presence of a government and its budget, the policy would involve a budget deficit financed by money creation as the implementation of monetary rather than fiscal policy (see e.g. Tavlas 1997, 2015). So, the overall mentality characterizing the intervention of the monetary authority, the one that should be taken to apply to the case of $h_t > 1/\sqrt{2}$ as well, is that money matters not as a companion of fiscal policy, but from the standpoint of the quantity theory (Wray 2011). And, of course, it is not the modern monetarist perspective of this theory of the k% rule in the place of gold standard, but the Old Chicago version of monetary policy that does not deny the usefulness of budget deficits in a recession. In any case, above or below steady state, the focus is always full-employment general equilibrium and hence, consistent policy-wise with a “real-wage-standard” rather than k% rule in the place of gold standard.

Now, to see how in general (9) operates, we have to look at the derivatives of consumption, $Q_t = Q_t^t + Q_t^{t-1}$ and investment, $I_t = D_t - D_{t-1} + L_{t-1}$ with respect to h given that the relationship for the goods-market equilibrium is in general:

$$Q_t^t + Q_t^{t-1} + D_t = N_t^a L_{t-1}^{1-a} + (D_{t-1} - L_{t-1}).$$

So, rearranging terms:

$$\underbrace{Q_t^t + Q_t^{t-1}}_{Q_t} + \underbrace{(D_t - D_{t-1} + L_{t-1})}_{I_t} = \underbrace{N_t^a L_{t-1}^{1-a}}_{Y_t} \quad (10)$$

We do know from Barro (1997) that in the real world, total investment is much more volatile than total consumption, and if our model is plausible, a similar result should be obtained below as well. In any case, one obtains readily from (10) that:

$$\begin{aligned} Q_t = Y_t - I_t &= N_t^a L_{t-1}^{1-a} - (D_t - D_{t-1} + L_{t-1}) = \\ &= N_t^a L_{t-1}^{1-a} - \left(\frac{1}{2} a L_{t-1}^{1-a} - D_{t-1} + L_{t-1} \right) = \\ &= \left(N_t^a - \frac{1}{2} a \right) \left[\frac{2h_{t-1}^2 (2 - h_{t-1}^2)}{(1 + h_{t-1}^2)^2} \right]^{1-a} + \frac{(2 - h_{t-1}^2)(1 - 2h_{t-1}^2)}{(1 + h_{t-1}^2)^2} \end{aligned}$$

and hence, that:

$$I_t = Y_t - Q_t = \frac{1}{2} a \left[\frac{2h_{t-1}^2 (2 - h_{t-1}^2)}{(1 + h_{t-1}^2)^2} \right]^{1-a} - \frac{(2 - h_{t-1}^2)(1 - 2h_{t-1}^2)}{(1 + h_{t-1}^2)^2}$$

It follows that:

$$\frac{\partial Q_t}{\partial h_{t-1}} = \frac{\left(N_t^a - \frac{1}{2}a\right)(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} - \frac{18h_{t-1}(1-h_{t-1}^2)}{(1+h_{t-1}^2)^3} \quad (11)$$

and:

$$\frac{\partial I_t}{\partial h_{t-1}} = \frac{\frac{1}{2}a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} + \frac{18h_{t-1}(1-h_{t-1}^2)}{(1+h_{t-1}^2)^3}. \quad (12)$$

This last derivative will be positive only if $1-2h_{t-1}^2 > 0 \Rightarrow h_{t-1} < 1/\sqrt{2}$. That is, investment responds positively to improved confidence to the economy and improved bank rating during a recovery and up to $h=1/\sqrt{2}$. And, entering a recession from $h=1/\sqrt{2}$, investment contracts alongside the increasing mistrust to the economy and the worsening bank rating. Similar will be the trends in consumption if beyond $h_{t-1} < 1/\sqrt{2}$ in (11), we have in addition:

$$\begin{aligned} & \frac{\left(N_t^a - \frac{1}{2}a\right)(1-a)2^{2-a}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} > \frac{18(1-h_{t-1}^2)}{(1+h_{t-1}^2)^3} \Rightarrow \\ \Rightarrow & \frac{N_t^a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} > \frac{1}{2} \left[\frac{a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} + \frac{36(1-h_{t-1}^2)}{(1+h_{t-1}^2)^3} \right] \end{aligned} \quad (13)$$

and $N_t^a > a/2$. Of course, it would not be plausible to assume anything else about N_t , because with $a=0.8$ it would involve $N_t < 0.318$ and with $a=0.7$ we would have $N_t < 0.223$, i.e. a complete collapse in the labor market and of the economy in either case given that these are the values of a that are empirically relevant (see e.g. Felipe and Adams 2005).

But, in so far as (13) is concerned, note that it would be plausible only under an unchanged marginal propensity to consume (MPC), since if this propensity is say 0.8 and income increases by 1 monetary unit, one cannot have that 0.75 such units are consumed and 0.25 deposited with a bank because it would mean that (11) is negative. And, if the MPC does not change because of consumption inertia as behavioral macroeconomics acknowledges (see e.g. Driscoll and Holden 2014), we should also have that:

$$\frac{\partial Q_t}{\partial h_{t-1}} = \frac{\partial I_t}{\partial h_{t-1}} \Rightarrow \frac{N_t^a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} = \Phi,$$

which in conjunction with (13) gives that:

$$\Phi = \frac{N_t^a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} > \frac{1}{2}\Phi,$$

where Φ is the bracketed term on the right of (13):

$$\Phi = \frac{a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} + \frac{36h_{t-1}(1-h_{t-1}^2)}{(1+h_{t-1}^2)^3}.$$

This is a theoretical possibility, indeed, but not endorsed by Barro's findings, which simply attest to the plausibility of the example just mentioned after perhaps some initial consumption inertia. A positive (12) but negative (11) would mean that the marginal propensity to consume declines during a recovery, i.e. people tend to save and deposit proportionately more than before, and increases during a recession, i.e. people tend to live more for the day when things go from bad to worse. And, if given $h_{t-1} < 1/\sqrt{2}$, (11) is negative, (13) becomes:

$$\frac{N_t^a(1-a)2^{2-a}h_{t-1}(1-2h_{t-1}^2)}{h_{t-1}^{2a}(1+h_{t-1}^2)^{3-2a}(2-h_{t-1}^2)^a} < \frac{1}{2}\Phi$$

and since, $\Phi/2 < \Phi$, it follows that: $|\partial Q_t / \partial h_{t-1}| < \partial I_t / \partial h_{t-1}$.

In sum, this inequality is what makes the expansion of money supply powerful during a recession when $h_{t-1} < 1/\sqrt{2}$ though accommodative should be the character of this policy under inflation when $h_{t-1} > 1/\sqrt{2}$ in the Old Chicago policy way and not in the modern monetarist fashion which would stick to some k% rule in a recession, risking the same catastrophic consequences that the adherence to gold standard had in the Great Depression (see e.g. White 2007). One last point needs to be made to see how these policy conclusions differ from the non-quantity theory interventionist policy prescriptions. Consider Figure 2 which illustrates the optimal response of $M \equiv f(x)$ to $x \equiv h \neq 1/\sqrt{2}$ as it derives from the relationship:

$$\frac{2h^2(2-h^2)}{(1+h^2)^2}M = \frac{56}{25}$$

above. The starting point is $h = 1/\sqrt{2}$ and M increases either to the left or to the right of this point, at an increasing rate as recession or inflation worsens. And, when the starting point is the extreme left or right of the diagram, recession and inflation, respectively, it depicts the rate of change of the increase in M , decreasing rate in an any case once instability has been checked

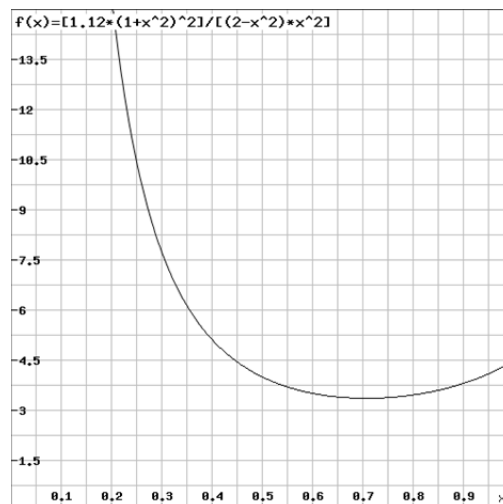


Figure 2. Optimal response of M to $x \equiv h \neq 1/\sqrt{2} \cong 0.7071068$

and the economy is moving towards $h = 1/\sqrt{2}$. On the contrary, the non-quantity theory interventionist practice is equivalent to viewing the Figure upside down, seeing it from its top to the bottom, in which case it shows increasing M at a decreasing rate as steady state is approached from a recovery, and decreasing M at an increasing rate under worsening inflation as a reflection of fiscal expansion and contraction, respectively.

Interest rate policy lowering the lending rate in a recession does not matter within the context of this paper, because $r_L < r_D$, anyway, with their difference being increasing if M does not increase. Moreover, lowering under such circumstances r_L endangers fostering liquidity trap conditions or in modern terms, substitution of bank credit by monetary expansion at the zero lower bound as, for example, Orlowski (2015) has shown to be the case with quantitative easing. But, a policy of restoring the equality of the two rates nominally when the economy operates above the steady state and $r_L > r_D$, might be used in conjunction with the expansion of money supply to restore general equilibrium at a higher price level. Of course, these are policy prescriptions under the presumption of “other things being equal” (*ceteris paribus*) as, for instance, is manifested through the neglect of the public sector and imperfect competition. The monetary authority exists only to insulate the efficiency of intergenerational transfers from variations in h ; its interventions are justifiable on these only grounds. The absence of public expenditure and monopoly power from our model might be not one but two reasons why it predicts mild only inflation and on the other hand, deep depressions as possible consequences of a disturbance in the rating of the banks by the general public. Indeed, in so far as inflation is concerned, there is no market-power to prompt profit-push inflation and there is no government to “confiscate, secretly and unobserved, an important part of the wealth of their citizens” (Keynes 1919, p. 235).

4. CONCLUDING REMARKS

It is clear that allowing for a Keynesian-like general public in a real business cycle model takes us away from the neo-liberal policy recommendations of modern monetarism and new classical macroeconomics, but does not draw us near any other form of modern macroeconomic policy wisdom. It leads us, instead to the non-Keynesian view of money supply policy as one adhering to some full-employment wage index monitored perhaps by some unemployment rate as well *a la* adherence to gold-standard convertibility as the invisible hand of monetary policy. What we really appear to have managed herein, is to offer a tentative behavioral approach to Old Chicago School macroeconomics. It is one that denies the usefulness of some $k\%$ rule because this rule will be catastrophic once recession starts taking its toll. This idleness is what the Fed chose to follow in the 1920s doing exactly what modern monetarism would propose: stick to $k\%$. The Old Chicago is practical; it is as interventionist as Keynesianism is if it fears recession (see e.g. Rockoff 2015). And, what to really its full employment focus comes down is an overall rule of “a wage standard” in the place of $k\%$, which is the modern version of the gold standard.

Hayek (1932, 1933) and Robbins (1934) were right when stating that the asset price bubble that burst in 1929 was the result of the pursuit of price stability by the Fed in the 1920s that swelled up credit expansion. And, all those like White (2007) who does not have illusions about the truth of this old thesis and cautions about what exactly the monetary authority should be targeting, are correct as well. As a matter of fact, he does propose a rule targeting an index of input prices (wages and/or raw material prices) as we do herein, but from the viewpoint of nominal income or GDP targeting. Real income targeting may be obtained once the behavioral element of working-class mood is acknowledged. Otherwise, either the so-called Classical Dichotomy holds, and... “money plays an important role even in Real Business Cycle theory — sort of like the dog that doesn’t bark in a detective novel — becoming so irrelevant that one wonders why the representative agent who is optimizing her consumption through time bothers with it” (Wray 2011, p.2). Or, money is non-neutral and “in the absence of money... the rates of interest would only reach equilibrium when there is full employment” (Keynes 1964, p. 235); that is, money is the ultimate cause of unemployment... Seen Keynes as a heretic as campaigned by

neo-liberalism (see e.g. Boettke and Newman 2016), one way to stick to orthodoxy and yet find a role for money is the Goodhart (2008) way of allowing for default.

But, such approaches just miss the point that once money is assigned a role other than *luBRICSant* and monetary policy becomes sensible as a policy instrument, money becomes in essence *Chartalist*, and the question then is “for whom” to conduct monetary policy, whom the policy will benefit more. So, to have an active monetary policy in the realm of orthodoxy, something behavioral is needed addressing the “for whom”; and, this is always of political importance as well. In this paper, we saw that the introduction of a behavioral element alone is analytically powerful enough to give an answer to the question “for whom”: For the general public first, and then only for the elite, was the answer, a clear-cut one in the name of Old Chicago macro-monetary economics under Tavlas’ (1997, 2015) interpretation of this school of thought. If Rockoff (2015) is right about Simons, the *Chartalist* character of prewar Chicago quantity theory originates in his definition of money as one including near-moneys, the nearness being a matter of opinion by the asset holder. This “explains how Simons drew Keynesian policy conclusions from the quantity theory. For Simons, it mattered little whether the government issued currency, Treasury bills, Treasury notes, or even Treasury bonds. All were money, or close substitutes for it; ...and thus all had an expansionary impact... The identity between monetarism, as Simons conceived it, and Keynesian economics meant that the labels could be used interchangeably” (Rockoff 2015, p. 17).

Or, according to Minsky (1996, p. 364), “I accept Henry Simons’s view that the aim of economic policy is not narrowly economic. The aim of policy is to assure that the economic prerequisites for sustaining the civil and civilized standards of an open liberal society exist. If... extremes of income distribution, and social inequality attenuate the economic underpinnings of democracy, then the market behavior that creates these conditions should be constrained. If it is necessary to give up a bit of market efficiency, or a bit of aggregate income, in order to contain democracy-threatening uncertainty, then so be it. In particular, there is need to supplement private incomes with socially provided incomes so that civility and civic responsibility are promoted.” The point of prewar Chicago that our discussion here chose to stress is the *Chartalist* character of money in the pursuit of full employment through a rule rather than discretion. A monetary rule is made to avoid *Chartalism*, but the one derived here does favor the general public, and it is *Chartalist* from this point of view: As *Chartalist* as Keynes, because “[a] virulent critic of Keynes, Simons nevertheless revealed a striking similarity in premise and analysis, which, in our judgment, affords a common bond not only for Professors Keynes and Simons but also all fiscalists and monetarists” (Sennholz 1971).

The focus is full employment as a presumption of the quantity theory, and if Simons had in mind a rule for price stabilization, the target of this rule was full employment. Statements like: “Other than the rule or target — price-level stabilization instead of full employment — the monetary and fiscal powers given to the government under the Chicago plan were not much different than those proposed by the Keynesians” (Ebeling 1998) should be evaluated accordingly. Both Simons and Keynes are concerned with the institutional rather than theoretical premises of capitalism (Aschheim and Tavlas 1984), and the rule of real income targeting advanced earlier, appears to bridge this “rule vs. target” difference between the two approaches. And of course, in so far as labor unions are concerned: “Monopoly power must be abused. It has no use save abuse” (Simons 1948, p. 129). The labor market should be free, because, for an index to be workable, it “has to be highly sensitive; otherwise, the administrative authority would be compelled to postpone its actions unduly after significant disturbances or... obliged to use discretion in anticipating changes” (Simons 1936, p. 13).

REFERENCES

1. Aschheim, Joseph and George S. Tavlas. (1984). The Monetary Thought-Ideology Nexus: Simons versus Keynes, *Banca Nazionale del Lavoro*, 37, pp. 177–196.

2. Avdjiev, Stefan. (2016). News Driven Business Cycles and Data on Asset Prices in Estimated DSGE Models, *Review of Economic Dynamics*, 20 (2), pp. 181–197.
3. Barro, Robert. (1997). *Macroeconomics*, 5th Edition, Cambridge MA: MIT Press.
4. Beaudry, Paul, Deokwoo Nam and Jian Wang. (2012 and 2014). Do Mood Swings Drive Business Cycles and is it Rational? Available at: http://www.economics.ubc.ca/files/2013/05/pdf_paper_paul-beaudry-moodswings-business.pdf and http://jianwang.weebly.com/uploads/1/4/6/3/14639846/bnw_00_beaudrynamwang.pdp.
5. Beaudry, Paul, Dana Galizia and Franck Portier. (2014). Reconciling Hayek's and Keynes Views of Recessions, NBER Working Paper 20101. Available at: <http://www.nber.org/papers/w20101>.
6. Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin and Adam S. Posen. (1999). *Inflation Targeting: Lessons from the International Experience*, Princeton NJ: Princeton University Press.
7. Bordo, Michael D., John Landon Lane and Angela Redish. (2004). Good versus Bad Deflation: Lessons from the Gold Standard Era, NBER Working Paper 10329. Available at: <http://www.nber.org/papers/w10329>.
8. Boettke, Peter and Patrick Newman. (2016). The Consequences of Keynes. Available at: <http://ssrn.com/abstract=2803980> or <http://dx.doi.org/10.2139/ssrn.2803980>.
9. Bradley, Michael D. and Dennis Jansen, W. (1989). The Optimality of Nominal Income Targeting When Wages Are Indexed to Price, *Southern Economic Journal*, 56 (1), pp. 13–23.
10. Branch, William A. and Bruce McGough. (2011). Business Cycle Amplification with Heterogeneous Expectations, *Economic Theory*, 47, pp. 395–421.
11. Croom, Randall and Joyce Bono, E. (2015). Great Expectations-Really! The Curvilinear Relationship between Optimism and Performance, *Academy of Management Proceedings*, 1, 17210.
12. De Grauwe, Paul and Corrado Macchiarelli. (2015). Animal Spirits and Credit Cycles, *Journal of Economic Dynamics & Control*, 159, pp. 95–117.
13. Driscoll, John C. and Steinar Holden. (2014). Behavioral Economics and Macroeconomic Models, *Journal of Macroeconomics*, 41, pp. 133–147.
14. Ebeling, Richard M. (1998). Monetary Central planning and the State, Part 23: Henry Simons and the 'Chicago Plan' for Monetary Reform, *The Future of Freedom Foundation*, November 1. Available at: <http://fff.org/explore-freedom/article/monetary-central-planning-state-part-23-henry-simons-chicago-plan-monetary-reform>.
15. Felipe, Jesus and F. Gerard Adams. (2005). 'A Theory of Production.' The Estimation of the Cobb-Douglas Function: A Retrospective View, *Eastern Economic Journal*, 31 (3), pp. 427–445.
16. Flandreau, Marc. (2007). Pillars of Globalization: A History of Monetary Policy Targets, 1797–1997, CEPR Discussion Paper 6252. Available at: www.cepr.org/pubs/dps/DP6252.asp.
17. Geiger, Neils. (2016). 'Psychological' Elements in Business Cycle Theories: Old Approaches and New Insights, *European Journal of the History of Economic Thought*, 23 (3), pp. 478–507.
18. Goodhart, Charles A. E. (2008). Money and Default. In Mathew Forstater and L. Randall Wray (eds.), *Keynes for the Twenty-First Century: The continuing relevance of the General Theory*, New York: Palgrave Macmillan.
19. Harcourt, Geoff C. ed. (2006). *The Structure of Post Keynesian Economics: The Core Contributions of the Pioneers*, Cambridge: Cambridge University Press.
20. Hayek, Friedrich A. ([1932] 1999). The Fate of the Gold Standard, reprinted in S. Kresge (ed.) *The Collected Works of F.A. Hayek. Good Money, Part I: The New World*, pp. 153–68. Chicago: University of Chicago Press.
21. Hayek, Friedrich A. (1933). *Monetary Theory and the Trade Cycle*, trans. by N. Kaldor and H.M. Croome, London: Jonathan Cape.
22. Keynes, John Maynard. (1919). *The Economic Consequences of the Peace*, London: Macmillan.
23. Keynes, John Maynard. (1964). *The General Theory of Employment, Interest, and Money*, New York and London: Harcourt Brace Jovanovich.
24. Laidler, David. (1998). More on Hawtrey, Harvard and Chicago, *Journal of Economic Studies*, 25 (1), pp. 4–16.

25. Landmann, Oliver. (2014). Short-Run Macro After the Crisis: The End of the 'New' Neoclassical Synthesis?, University of Freiburg Discussion Paper 27. Available at: http://www.vwl.uni-freiburg.de/iwipol/discussion_papers/DP27_Landmann_Short_Run_Macro.pdf.
26. Minsky, Hyman P. (1996). Uncertainty and the Institutional Structure of Capitalist Economies, *Journal of Economic Issues*, 30 (2), pp. 357–368.
27. Orlowski, Lucjan T. (2015). Monetary Expansion and Bank Credit: A Lack of Spark, *Journal of Policy Modeling*, 37 (3), pp. 510–520.
28. Piketty, Thomas and Emmanuel Saez. (2014). Inequality in the Long Run, *Science*, 344(6186), pp. 838–843.
29. Robbins, Lionel. (1934). *The Great Depression*, London: Macmillan.
30. Rockoff, Hugh. (2015). Henry Simons and the Quantity Theory of Money, Becker Friedman Institute. Available at: <https://bfi.uchicago.edu/sites/default/files/research/SIMONS6.pdf>.
31. Safire, William. (2009). Animal Spirits, *The New York Times*, 10 March 2009. Available at: http://www.nytimes.com/2009/03/15/magazine/15wwln-safire-t.html?_r=0.
32. Schmitt-Grohe, Stephanie and Martin Uribe. (2012). What's News in Business Cycles, *Econometrica*, 80 (6), pp. 2733–2764.
33. Sennholz, Hans F. (1971). Chicago Monetary Tradition in the Light of Austrian Theory, in *Toward Liberty: Essays in Honor of Ludwig von Mises on the Occasion of his 90th Birthday*, vol. 2, ed. F. A. Hayek, Henry Hazlitt, Leonrad R. Read, Gustavo Velasco and F. A. Harper, Menlo Park: Institute for Humane Studies. Available at: <http://oll.libertyfund.org/pages/sennholz-the-chicago-monetary-tradition>.
34. Simons, Henry C. (1936). Rules versus Authorities in Monetary Policy, *Journal of Political Economy*, 44 (1), pp. 1–30.
35. Simons, Henry C. (1948). *Economic Policy for a Free Society*, Chicago: University of Chicago Press.
36. Söllner, Albrecht. (2014). Globalization, Greed, and Exploitation. How to Break the Baleful Path?, *Journal of Business Economics*, 84 (9), pp. 1211–1235.
37. Stigler, George. (1988). *Memoirs of an Unregulated Economist*, Chicago: University of Chicago Press.
38. Sumner, Scott B. (2014). Nominal GDP Targeting: A Simple Rule to Improve Fed Performance, *Cato Journal*, 34 (2), pp. 315–338.
39. Tavlas, George S. (1997). Chicago, Harvard, and the Doctrinal Foundations of Monetary Economics, *Journal of Political Economy*, 105, pp. 153–177.
40. Tavlas, George S. (2015). In old Chicago: Simons, Friedman, and the Development of Monetary-policy Rules, *Journal of Money, Credit, and Banking*, 47 (1) (02), pp. 99–121.
41. White, Lawrence H. (2007). What Type of Inflation Target?, *Cato Journal*, 27 (2), pp. 283–288.
42. Wray, L. Randall. (2011). Keynes after 75 Years: Rethinking Money as a Public Monopoly, *Levy Economics Institute Working Paper 658*. Available at: http://www.levyinstitute.org/pubs/wp_658.pdf.