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Abhandlungen

A Letter on Full-Reserve Banking and Friedman's Rule in Chicago Tradition

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Abstract

Post-war Chicago School advanced a blend of pre-war Chicago and non-Chicago quantity theory, termed Monetarism. The preponderance of the non-Chicago element in this blend has been documented well by the relevant literature. This note maintains that monetarism's only contribution to pre-war Chicago is the *k*-percent rule as a powerful countercyclical policy instrument, indeed, along with the cyclically-balanced-budget and no-open-market-operations rules put forth by pre-war Chicago. Early Chicago's thinking was motivated by what nowadays is called Quantity Theory of Credit too, and a full-reserve banking rule was also included as a policy instrument. This rule was advanced from the viewpoint of no-bank-money-rule. By identifying bank money with commercial bank seigniorage, this rule is found here to be consistent with any value of the reserve ratio that nullifies such a seigniorage depending on the bank profit margin. This rule is also as price stabilizing as the *k*-percent rule, and this is the reason the contribution of the latter to Chicagoan policymaking is linked to its countercyclical rather than anti-inflationary power.

Stellungnahme zum Vollreservesystem der Banken und Friedmans Regel in der Tradition der Chicagoer Schule

Zusammenfassung

In der Nachkriegsära brachte die Chicagoer Schule eine Mischung aus ihrer Quantitätstheorie des Geldes der Vorkriegszeit und einer solchen nicht in Chicago entstandenen Theorie ins Spiel, die Monetarismus genannt wurde. Dass die nicht in der Chicagoer Schule entwickelten Anteile an dieser Mischung überwogen haben, wird durch die einschlägige Literatur gut dokumentiert. In dieser Abhand-

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lung wird davon ausgegangen, dass der einzige Beitrag des Monetarismus zu der in der Vorkriegszeit an der Chicagoer Schule entwickelten Quantitätstheorie tatsächlich die *k*-Prozent-Geldmengenregel von Milton Friedman ist. Diese ist ein wirksames Instrument antizyklischer Politik, im Zusammenwirken mit zwei weiteren Elementen der Chicagoer Vorkriegsschule, einem über den Zyklus ausgeglichenen Haushalt und dem Verzicht auf Offenmarktgeschäfte. Die Motivation der frühen Chicagoer Schule beruhte auch auf dem, was heutzutage als Quantitätstheorie des Kredits bezeichnet wird, und umfasst auch eine Vollreservesystemregelung als Politikinstrument. Diese Regelung geht auf eine „no-bank-money-rule" zurück. Wenn man Bankengeld mit dem Geldschöpfungsgewinn („Seigniorage") der Geschäftsbanken versteht, ist diese Regel mit jedem beliebigen Wert des Mindestreservesatzes vereinbar, der eine solche „Seigniorage" in Abhängigkeit von der jeweiligen Bankengewinnspanne zunichtemacht. Diese Regel wirkt ebenso preisstabilisierend wie die *k*-Prozentregel. Dadurch erklärt sich, weshalb der Beitrag der letzteren zu der in Chicago formulierten Politik mehr auf ihre antizyklische als auf ihre antiinflationäre Kraft zurückzuführen ist.

Keywords: Chicago School, Full-reserve banking, No-bank-money locus-rule, Friedman's rule, counter cyclically balanced budget

JEL Classification: B26, E52, E83

I.

The three pillars of the pre-war Chicago version of the quantity theory of money policy-wise are those crystallized in the Chicago Plan (*Simons* et al. (1933), *Douglas* et al. (1939), *Phillips* (1994), *Benes* and *Kumhof* (2012)) as a yardstick for permanent recovery from the 1929–1933 Great Depression and as an arsenal against future instability: A 100 % reserve requirement ratio, no open-market operations, and a cyclically balanced budget. The quantity theory based explanation of this depression advanced by the Chicagoans in terms of *Fisher's* (1911) equation $MV = PY$ was the slow response of M = money supply to increasing Y = real output (actually, volume of transactions), which in view of rigid P = price level and an "unexpected" behavior on the part of V = velocity of money circulation, disturbed the equality, frustrating in turn business plans, with the subsequent bank credit contraction exacerbating instability.

That is, given cost-price (P) rigidity, a monetary sector problem (a problem in M and V) caused a real-sector (Y) recession, which turned into depression because of the broader financial sector problem coming out of credit money. It follows that a campaign against depression should involve: (a) Full-reserve banking to prevent depression propagation by credit money, and (b) Deficit spending through which "monetary purchasing power" can be put directly into circulation by increasing govern-

ment expenditure rather than by decreasing taxes, (c) Abandoning at the same time open market operations as a means of deficit financing because it is an ineffective means.

And, as far as policy implementation is concerned, rules rather than discretion should be followed; rules like the 100 % bank reserves one. Deficit financing through money expansion should be based on what *Friedman* (1969) came after the war to call "k-percent rule" fostering a constant inflation rate, i.e. price stability in a growing economy. Contrary to Keynesianism upon which permanent state interventionism may be based, for Chicagoans such an intervention is desirable only under instability and especially when recession breaks (*Davis* (1968)). This is how Chicagoan state interventionism becomes compatible with rules; that is, from the viewpoint of a cyclically balanced budget rule. Critical to the understanding of these positions were studies by *Davis* (1968, 1969), *DeLong* (1990), *Friedman* (1948, 1967), *Laidler* (1993), *Moe* (2013), *Patinkin* (1981), *Stigler* (1974), and *Tavlas* (1997).

After the war, a volume of studies under the title "Studies in the Quantity Theory of Money", edited by *Friedman* (1956), came to ascribe the "unexpected" behavior of *V* in the 1930s to its stability when *V* is seen from the viewpoint of a money-demand function. And, consequently, responsible for the Great Depression should have been only *M*, that is, the way the Fed handled money supply. The rule that *M* should always be kept in line with a zero nominal interest rate that *Friedman* (1953) thought that could complement Chicago Plan, appeared subsequently to be making even greater sense. Rules are necessary not only as a means of safeguarding against arbitrary discretion, but also from a *Kydland-Prescott* (1977) control-theory rational-expectations point of view, and because once steady-state has been attained by rules, they prevent deviation from it, ceteris paribus.

It was the expectations about Fed's policies rather than the banks that worsened the recession in the 1930s. Therefore, what is relevant from the viewpoint of policymaking is not any full-reserve requirement, but credible policymaking based on rules, including the annually more or less balanced budget one. Nevertheless, if, for some reason, deficits have to be incurred, *Friedman* (1972) would come to endorse *Hawtrey's* (1931) position on this matter: First, that the two methods of financing a government-spending induced deficit, debt- or money-financing, are equivalent and second, that deficit creation through tax cuts should be preferable because of their supply-side effects, too (*Tavlas* (1997), p.172, fn). After

all, a free-market system is based on incentives and is not compatible with a Keynesian big brother, was what classical Chicago was maintaining as well.

This post-war Friedmanian Chicago economics took the name Monetarism. By capitalizing upon pre-war Chicago "sensitivities" about credible policymaking, rules, individual incentives, and liberalism, by borrowing ideas from non-Chicago quantity theorists like Columbia's *Angell* (1935, 1941), and being corroborated by the rational expectations concept and supply-side economics, monetarism put forth a neo-liberal policy agenda, meeting with the pre-war School only at the rule of no open market operations. Later, *Friedman* (1960, 1963) would replace the rule that bears his name by the "k-percent rule" regarding monetary growth in a growing economy and its connection with inflation. This, too, is in the direction of pre-war Chicago as we shall see right after we elaborate upon the spirit of full banking, which post-war Chicagoans abandoned.

II.

The full-reserve requirement would never be embraced by policymakers. Any theoretical version of it refers to demand deposits, and proposals differ in what to do with the near monies to reduce liquidity enough to ensure stability (*Dixhoorn* (2013)). One way to assess the 100 % reserves rule is by seeing it through the commercial bank seigniorage, *CS*, viewpoint of credit money, of bank money. What the Chicago Plan does not want and postulates that the only way to get rid of it by setting the reserve requirement ratio, ρ, equal to one, is a positive *CS*, which in nominal terms is defined to be equal to $[i(1-\rho)-i_D]D$, where D is demand deposits plus other bank liabilities upon which bank money can be created, i.e. D includes any possible bank lending source, i is the nominal rate of interest, and i_D is the deposit rate (see e.g. *Baltensperger/Jordan* (1997)).

That is, what is truly in the spirit of Chicago Plan is a commercial bank system covering only its opportunity cost, because what is truly sought is to take away the adverse effect of banking on the economic cycle, and suffices towards this end a $CS=0$. Setting *CS* equal to zero and solving for ρ, yields that $\rho=(i-i_D)/i$, whose total differential gives when set equal to zero, that $i_D=i^{-1/2}$, with $di_D/di=-i^{-3/2}/2$. One thus obtains the loci illustrated in the $i-i_D$ space of Figure 1. They are all consistent with $CS=0$, each of them gives combinations of i_D and i con-

sistent with a specific value of ρ, and the focus is on the part of the figure below the 45-degrees line since $\rho \geq 0$ iff $i \geq i_D$. Letting $i = \theta i_D, \theta \geq 1$, the optimal $i - i_D$ combination for each locus $\rho = (\theta i_D - i_D)/\theta i_D = (\theta - 1)/\theta$ is given by its intersection point with the ray from the origin of the axes having slope equal to $1/\theta$: Solving the system of the two equations $i_D = i^{-1/2}$ and $i = \theta i_D$, the coordinates of an intersection point are $i = \theta^{2/3}$ and $i_D = \theta^{-1/3}$.

We thus obtain locus $\Gamma\Lambda\Xi$ of the optimal $i - i_D$ combinations, each for each ρ in the interval [0,1]. The $d\rho = 0$ loci have the following meaning. At point Γ, with a $\rho = 0$ and $i = i_D$, although the typical bank can utilize any possible source of lending, it just does not pay to do so, because the profit margin is zero; and it would not pay to resort to the lender of last resort if needed. It follows that in this case, banks lend merely out of the most liquid liabilities, namely out of demand deposits at most, just to cover the opportunity cost, and the locus associated with $\rho = 0$ is identified with this source of lending. When $i > i_D$, when the profit margin becomes positive from an initial position of $i = i_D$, the bank finds itself on a point like Γ', and the emergence of a positive profit margin induces it to expand lending out of less liquid liabilities too, given also that bank borrowing from the central bank becomes easier. That is, the bank moves to the locus on which points Λ and Λ' lie, and exactly to Λ', because given i_D and the composition of the lending source, Λ' is the point at which the profit margin becomes maximum.

Raising ρ to $(1 - \theta)/\theta$ would nullify any profit margin related with this lending source. At point Ξ, when ρ has become equal to 1, the bank is forced to utilize any possible source of lending just to make ends meet despite the fact that $i_D = 0$ and can meet, moreover, any loan demands

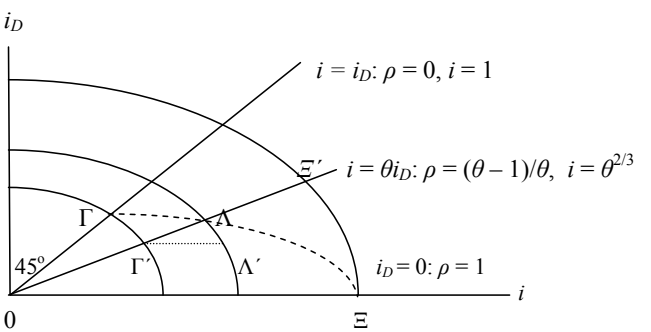

Figure 1: The No-Bank-Money Locus-Rule

whatsoever *via* costless borrowing from the central bank. No restrictions on such a borrowing have been placed. That is, the $d\rho = 0$ loci indicate bank lending starting from demand-deposits utilization, and expanding based on less and less liquid bank liabilities as the locus shifts outwards from the origin of the axes. They are loci of $i - i_D$ combinations, each consistent with a particular bank liability mix used to lend. The monetary policy is such that any bank position like Γ' below $\Gamma\Lambda\Xi$, does not make the most out of profit possibilities, while lending above $\Gamma\Lambda\Xi$ would be charity: Being on $\Gamma\Lambda\Xi$ secures at least coverage of opportunity costs. The monetary policy is one providing no incentives being off $\Gamma\Lambda\Xi$, rendering it a sort of "no-bank-money locus". This locus is the one emerging as the rule in the place of the full-reserve rule once this rule is identified with the no-bank-money one, and once bank money is identified with commercial bank seigniorage.

Despite our initial assumption of a nominal *CS*, this locus-rule would also ensure price stability as follows. Let r be the real interest rate and π be the inflation rate so that $i = r + \pi$ and $\theta i_D = r + \pi$. If $D = lPY = lMV$, with $0 < l < 1$, so that in growth-rate terms, $d = \lambda + \pi + y \Rightarrow \pi = d - \lambda - y$. Hence, $\theta i_D = r + \pi \Rightarrow r + (D/lY) = \theta i_D \Rightarrow D/lY = \theta i_D - r \Rightarrow P = \theta i_D - r \Rightarrow \theta i_D = r + P$, and since $\theta i_D = r + \pi$, one obtains that $r + P = r + \pi \Rightarrow \pi = P$, which can be the case only if $\pi = 0$. In other words, $\pi = 0$ when $CS = 0$, and $i = \theta i_D = r$. It would also be the case that $m = \pi = 0$ if $y = 0$ as it follows from Fisher's equation in the growth-rate terms, $m + v = \pi + y$, corresponding to $MV = PY$, in view of $v = 0$ as well. To sum up, this is more or less what Chicago must have had in mind when the policy proposal for a $\rho = 1$ was advanced: ρ is only an instrument through which *CS* should be influenced in a manner that would neutralize its effect on cycle propagation. And, that manner is through $CS = 0$, which is found here to be consistent with the entire range of ρ's under the proper $i - i_D$ combinations. For an example of such ρ's, see the Appendix.

III.

Where does *Friedman's* rule that $i = 0$ stand in this discussion? From $\rho = (i - i_D)/i \Rightarrow i = i_D/(1 - \rho)$ follows that $i_D = 0$ too, and from $\pi = 0$ follows that $i = i_D = r = 0$, with indeterminacy in ρ. And, moreover, the price stability which is supposed to be the target of $i = 0$, is ensured by the full-reserve restatement. Consequently, price stabilization is not a

good reason for incorporating *Friedman's* rule into pre-war Chicagoan policy weaponry. But, as it will be shown shortly, this rule does share Chicago's other concern about cycle stabilization; and if it was powerful towards this direction, it would be a worthy addition to Chicago's arsenal.

So, let us continue examining *Friedman's* rule in connection with its countercyclical power *via* the following example regarding public debt accumulation, which was of major concern to pre-war Chicago too. According, for instance, to *Berti* et al. (2013), the debt-to-GDP ratio, δ, generated by continuous deficit spending is under zero-stock flow adjustments: $\delta = \delta_{-1}\left[(1+i)/(1+g)\right] - pbal$, where g_t is the rate of growth of nominal *GDP*, *pbal* is the primary budget balance, and the subscript "–1" denotes the previous period. Setting according to monetarism and/or for fiscal consolidation reasons, $pbal = 0$, yields that $\delta/\delta_{-1} = (1+i)/(1+g)$, or rewriting it in terms of π, $[(1+\pi)(1+b)]/[(1+\pi)(1+y)] = (1+i)/[(1+\pi)(1+y)] \Rightarrow (1+\pi)(1+b) = 1+i = (1+\pi)(1+r)$, b being the growth rate of government borrowing piling upon existing debt.

Now, under $i = 0$, one obtains that $b = (1-r)/r$, whereas an $i > 0$ gives that $b = r$. The latter b will exceed the former one if $r > (1-r)/r \Rightarrow r^2 + r - 1 > 0$. The equation: $r^2 + r - 1 = 0$, has two solutions: $\varphi - 1 = 1/\varphi > 0$ and $-\varphi < 0$, $\varphi = 1.6180339887\ldots$ being the golden ratio. Under fractional-reserve banking, an $i = 0$ is associated with $\pi = -r$ and hence, the negative solution should be considered, implying in turn that *Friedman's* rule is more effective in controlling the growth of government borrowing. Under full-reserve banking and $i = 0$, we have $r = 0$ too, which is neither the case that $r = 1/\varphi$ nor the case that $r = -\varphi$; there is no basis for comparison. And finally, under the same banking and positive $i = r$, the pre-war policy is clearly superior since $1/\varphi > 0$ for sure. But, there is a detail, namely that a $r = -1.6180339887\ldots$ is too large for an r to be plausible, endorsing subsequently the superiority of the pre-war policy for most of the time.

Yet, there is one case in which *Friedman's* rule is always superior regardless type of banking, which is the case when it is accompanied by budget deficits as follows: When $pbal \equiv G - \tau Y \neq 0$, we obtain that $b = r - Y(G - \tau Y)$, where G is real government spending and τ is the average tax rate. When $i = 0$ and $r < 0$, one obtains that $b = -r - Y(G - \tau Y) < 0$ when $G - \tau Y > 0$ as well. Deficits are helpful when $i > 0$ under full banking too, since $b = r - Y(G - \tau Y) < r$; but only under $r < 0$ one can be sure that $b < 0$. They are deficits induced by increased government spending rather than by tax cuts, because

$\partial b/\partial G = -Y < 0$ and $\partial b/\partial \tau = Y^2 > 0$. With no open market operations, deficits are seigniorage-financed, a means for putting money directly into circulation to counter the contraction from fighting the debt.

That is, one thing, which is certain is that in contrast with monetarism, the pre-war Chicago School is correct for not advocating an annually balanced primary budget rule and tax-cut based deficits. But, it appears that if not the steady-state *Friedman*'s rule *per se*, the growing-economy "*k*-percent rule" for sure, does have its place in the overall Chicagoan policymaking. It is the monetarism's contribution to Chicago, not from the viewpoint of price stabilization, which is anyway ensured by the no-bank-money rule, but from the viewpoint of alleviating output fluctuations.

IV.

In sum, the four pillars of a unified, pre- and post-war, Chicagoan policymaking are the full-reserve/no-bank-money requirement as advanced earlier, the *k*-percent rule, no open market operations, and cyclically balanced budgets. Free-market supply-side incentives are built-in this scheme, with no need for any further special supply-side economics costume. Policy credibility is also built-in the form of trust to the policymaker on the part of the people regardless of how people form expectations.

The no-bank-money rule is a sine qua non one for the subsequent small (vis a vis the Keynesian big-brother state), efficient, and highly democratic welfare state, because the various definitions of the money stock are associated with different time span and price-level realization size, confusing thereby policymaking. Under the no-bank-money requirement, this definition is confined to the money controlled fully by the central bank, making subsequently fully effective the *k*-percent rule, since the bank liabilities become immaterial for the price level when banks operate covering only their opportunity cost. Only then the economy can be hoped to start working close to something like a clock.

It is important to be viewing this matter within the broader context of the monetarism-free Chicago School and not in isolation. Nowhere in the modern literature are this School's worries about the destabilizing role of the overall financial system spelled out as explicitly as through *Werner's* (1997) quantity theory of credit presented through this Journal, too. He breaks down the equation of exchange into two parts, one related with the central bank and the real economy, and another one related to commercial bank money and financial transactions.

He can thus explain many failures in policymaking worldwide – failures owing to the financial system and feared by pre-war Chicago – and he praises the merits of the German bank-sector architecture, "centred on not-for-profit, locally based banks (Sparkassen, Volksbanken), … [being] able to deliver stable growth without asset bubbles and banking crisis for a long time period, largely because the dominant banks have an inherent interest in lending to small, local borrowers, who are less likely to engage in financial speculation …" (*Werner* (2009), p. 28).

Indeed, by comparison to other banking systems, this is an exceptional banking architecture, having results similar to those sought by the full-reserve/no-bank-money rule advanced herein. But, the German banking is the product of historical circumstances, based on voluntary action, which as such is vulnerable to change once interaction with conglomerates is mandated by the circumstances (Deutsche Bank, Commerzbank). The point is that voluntary and policy-induced non-profit banking are two different matters. What we have herein is an overall policy perspective put forward as a first-best in the sense of sacrificing one of its pillars, the whole edifice of efficient welfare state is sacrificed.

Appendix

Calculations of such ρ's [(Lending Rate-Deposit Rate)/Lending Rate] based on World Bank data (http://data.worldbank.org/indicator/FR.INR…./countries) for selected countries as if the current country interest rates were the ones consistent with $V = 0$, appear below in Table 1, illustrating arithmetically too, the nexus between full reserve banking and no bank money.

Table 1

Hypothetical ρ's Consistent with V = 0

	2009	2010	2011	2012
Argentina	0,258764924	0,131722276	0,241939893	0,144894532
Australia	0,488581315	0,421293646	0,439418417	0,438470729
Brazil	0,792187418	0,778192807	0,749509347	0,784165231
China	0,576271186	0,526678141	0,466463415	0,5
Japan	0,747630561	0,687122002	0,692465715	0,660390764
Russia	0,439303212	0,444530046	0,474876847	0,391941392

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