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Further thoughts on a synthesis

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It is a pleasure to contribute to a volume honoring the work of Leland Yeager. It has long been my belief that Professor Yeager is, perhaps, the most under-appreciated monetary theorist of the twentieth century.[1] He has contributed to our understanding of the role of money in advanced economies and to the macroeconomic processes of those economies in ways that reveal profound insights into the operation of the market process. His pursuit of "good economics" without significant regard to the winds of intellectual fashion, whether those fashions be methodological or ideological, along with his refusal to be pigeon-holed into an all-encompassing school of thought by which others could define, and perhaps dismiss, his work, make him an inspiring role model for all who see themselves in similar terms. In the spirit of Yeager's non-sectarianism, I would like to explore the connections between Yeager's work in the monetary disequilibrium theory tradition and recent work in Austrian macroeconomics. What I hope to show is that Austrians have much to learn from Yeager and that Yeager's work is more compatible with Austrian macroeconomics than he has been often willing to admit.[2] In finding the common ground between these two bodies of work, I hope to create a common theoretical language through which might emerge a twenty-first century macroeconomics that takes money, the disequilibrium market process, and monetary institutions more seriously.

This attempt to find a common theoretical language that could include insights from both monetary disequilibrium theory and Austrian macroeconomics is in contrast to the argument in Rabin's (2004: 203) otherwise excellent book that the Austrian theory is an "alternative" to the monetary disequilibrium approach and that Occam's Razor demands that the Austrian approach be jettisoned because it is "unnecessarily specific" and because the monetary disequilibrium approach can explain the same phenomena more simply. Key to Rabin's argument is his claim that the savings–investment nexus is largely a sideshow to the main monetary issues. I will attempt to argue instead that the two approaches can be combined, rather than one subsumed in the other, and that, if anything, we can make good use of Garrison's (2001) three quadrant "macroeconomics of capital structure" model to illustrate important aspects of Yeager's approach.

"The essential properties of the medium of exchange" and the market process

Yeager's (1968) understanding of the monetary disequilibrium tradition begins with the fundamental properties of money. The most important of these properties is that money is the generally accepted medium of exchange. In an advanced economy, money is half of (virtually) every exchange. Although we normally think in terms of money holders buying goods and goods holders selling goods, it is fruitful to remember that the money holders are also selling money and the goods holders are also buying money. The exchange of money for goods *between* two traders is also an exchange of money for goods or goods for money in the pockets of *each* trader. Money's role as half of every exchange points out the way in which such exchanges cannot even occur if money does not exist, and how potential exchanges that are of mutual benefit might not take place if the supply of money is insufficient, whatever that might mean. Finally, it is through the monetary exchange process that goods acquire prices reckoned in money, which enables actors to engage in economic calculation and contemplate more effectively the costs and benefits of their actions.

Two other features of money that Yeager emphasizes are that the demand for money is a demand to hold real money balances and that our acquisition of money has a "routineness" to it that distinguishes it from other goods. The so-called "cash balance" approach to the demand for money dates back at least to Mises, but it is emphasized and made effective use of in Yeager's monetary theory. The demand for money is understood to be a demand to *hold* a certain quantity of purchasing power in one's wallet, pocket, or bank account. We demand money by allowing it to accumulate in our various money balances. When we spend money, we reduce our demand for it. Another way to look at this is that money is one form in which we might choose to store our wealth, thus the act of purchasing is, to the buyer, a trade of a monetary asset for some other kind of asset. The advantage of holding money rather than other assets is that money provides the service of being "available" if one desires to make a purchase. This notion of "availability" is equivalent to "liquidity," and the liquidity of the medium of exchange is (near) absolute. No other asset can be costlessly used to make exchanges, thus the advantage that money has over other assets.

Nothing in these first two properties of money would be strange to Austrian macroeconomists. The first coincides nicely with Menger's (1892) work on the origin of money and Mises's (1980 [1912]) extensions of it in *The Theory of Money and Credit*. The second reflects a sound Austrian subjectivism, in recognizing that what money does is precisely what every other good or service does – provide a stream of subjectively evaluated use-services. The "return" to money held is ultimately the subjectively evaluated utility that actors expect from those availability services, just as the "return" to an automobile is the subjectively evaluated utility of the various (including but not limited to transportation) services it provides.[3]

These first two properties combine to provide the distinction between "actual" and "desired" money balances. Much confusion in monetary theory comes from overlooking this distinction. Although it is true that at any moment in time, all

money is being held somewhere by someone, that does not mean that the supply and demand for money are always in equilibrium with respect to each other.[4] To draw that conclusion is to confuse the "desired" and the "actual," or in the terms of the Swedish economists of the 1930s, it confuses the "ex ante" and the "ex post." Just as with any other good where the amount purchased has to equal the amount sold, so too with money someone must be holding every dollar. However, that need not mean people *wish* to hold those dollars, in the same way that goods markets in disequilibrium can mean frustrated potential buyers and sellers. Differences among individuals' actual and desired holdings of money are proximal causes of them affecting the level of spending in the macroeconomy, as we shall see below. When the supply of money is too large or too small, i.e., when we have inflation or deflation, these discrepencies between actual and desired money balances appear economy-wide. The results are the various costs and discoordination associated with both inflation and deflation. To see those problems more completely, we need to turn to the third property noted above.

Yeager's (1968: 645) third property, the "routineness" of our acquisition of money, is one that has had less attention paid to it by Austrians historically, despite it being at least as important as the other two for understanding the monetary economy. What Yeager argues is that we will always accept money in exchange even if this means temporarily having more of it than we might wish to hold. We know we can always trade the excess for goods and services. The important implication of this insight is that we have much more control over getting rid of money than we do obtaining it. This point is particularly important when money is in short supply. If one's money balances are lower than one would wish, one has only two basic options: acquire more money, or reduce one's expenditures. Given that money continues to arrive in a routine way, by reducing one's expenditures, one can allow one's money balances to replenish. Balances can also be replenished by increasing one's income or by selling off assets, but both of those require the cooperation of willing others. Reductions in expenditures are completely in the control of the actor. With excess supplies of money, it certainly makes more sense to eliminate the imbalance by spending it and acquiring non-money assets than it would to reduce one's money holdings by reducing one's income!

What becomes clear from Yeager's approach is that discrepancies between the actual and desired quantity of money will result in changes in expenditures, affecting the traditional macroeconomic aggregates. When actual holdings are less than desired holdings, expenditures will fall and recession will ensue in a process to be explored below. When actual holdings exceed desired holdings, the excesses will be spent, driving up prices and causing various forms of economic discoordination that will also be explored below. The key point for reconciling Yeager's approach with that of the Austrians is to recognize that the former case, that of the insufficient supply, corresponds to the traditional monetary disequilibrium theory explanation of depressions, while the latter case, that of the excess supply, corresponds to the Austrian concern with inflation and the possibility that it could generate a business cycle and eventual depression. These two theoretical approaches can fruitfully be seen as two elements of the same underlying story.

Central to that story is the market process that is kicked into motion by either case of monetary disequilibrium. Rabin (2004: 71–4) describes this as "The Wicksell Process" (or what both Keynes and Friedman called the "fundamental proposition in monetary theory"). We start by noting that because the demand for money is a demand for real purchasing power, we need to distinguish between the nominal and real demand for money. We then combine this point with the earlier argument that the actual/desired imbalance will either increase or decrease spending depending on the direction of the imbalance. The result of those changes in spending will be upward (in the case of too much money) or downward (in the case of too little) pressure on prices. As prices begin to move in the appropriate direction, the nominal demand for money moves in the same direction – as prices begin to rise, actors will demand higher nominal money balances, and as prices fall, their nominal money demand will fall. Eventually, and how long this takes is crucial to understanding the problems that monetary disequilibria can cause, the price level will change to the extent necessary to drive the nominal demand for money into alignment with the real quantity in existence. Put differently, the changes in the price level that occur during this disequilibrium market adjustment process induce actors to be increasingly satisfied with their real money balances. The changes in the price level cause changes in the real value of actual money balances, leading to changes in the actor's nominal demand for money until those changes in nominal demand are aligned with the real value of actual holdings (cf. Rabin 2004: 77).

To see this more clearly, we can explore each of the two disequilibrium cases separately. In the case of actual balances being less than desired ones, actors will restrict their expenditures in order to replenish their money balances. As everyone attempts to do the same thing, there will be downward pressure on prices, as demand slackens economy-wide. Eventually, sellers will begin to lower prices. This will increase the real value of the people's actual money balances, pushing them slightly upward toward their desired levels. Prices will continue to fall in the face of demand still well below the original starting point, even as expenditures might start to recover from their early trough. Prices will stop falling when the real value of the quantity of money in existence matches the demand for real balances. If actual balances exceed desired balances, then the resulting increase in expenditures will put upward pressure on prices. As prices begin to climb, the real value of the excess balances falls, thus reducing the amount that is "excess" and slowly slackening the need to shed them into the expenditure stream. This adjustment process will stop when the price level rises sufficiently to reduce the real value of the quantity of money in existence such that it matches the demand to hold real money balances.

To summarize: changes in the quantity of money that induce monetary disequilibria will put into motion a market process that causes changes in the price level that adjust the real value of that quantity of money (or, equivalently, the nominal demand for money balances) such that it matches the unchanged, ex-hypothesi, demand for real money balances. Changes in the demand for real balances in the face of an unchanged quantity of money will also put this adjustment process into motion and will cause the real value of the actual quantity of money to change such that it matches the new demand for real balances.

Finally, although our focus has been on the way in which the market process will restore equilibrium (again, ceteris paribus) through changes in the price level, we can also point out that equilibrium can be restored through changes in the nominal quantity of money. For example, should the monetary authority mistakenly allow the money supply to fall such that actual holdings are less than desired holdings, it can respond with expansionary policy that reflates the nominal quantity such that actual holdings realign with desired holdings. In the face of changes in the demand for real money balances, the monetary authority can, in principle, respond quickly with changes in the nominal supply in the appropriate direction that would change the actual quantity to match the hypothesized change in demand. In the sections to follow we will suggest why this strategy should be strongly preferred to allowing the Wicksell adjustment process to play itself out.

One important point of contact between Yeager's perspective on monetary disequilibria and Austrian economics is that it involves a process story of the sort that Austrians generally favor. Specifically, if one looked only at the comparative statics of the original equilibrium and the equilibrium after the Wicksell process plays out, and one focused solely on aggregates such as the price level, one might be led to conclude that there was no damage done. All that has happened is that nominal values have been raised or lowered depending on which disequilibrium prevailed. However, as we shall see below and as the brief analysis above suggests, it is during those very disequilibrium market processes that all of the interesting things happen, including the microeconomic discoordination that characterizes inflation and depression. Comparative statics will not suffice to elucidate the costs of deflation and inflation; only a theory that explains the underlying processes of adjustment can do so.[5]

Excess demands for money and a market process theory of depression

Where the Yeagerian and Austrian theoretical frameworks meet is in seeing the destructiveness of monetary disequilibria as taking place during the transition process that moves from one point of monetary equilibrium to another. Although the comparative statics may lead one to believe that it is "just" a matter of the price level adjusting to realign the real value of actual money balances to the desired level of real balances, the key shared insight is that the price level does not simply "just" change. The price level is in its essence a theoretical construct that reflects millions of individual prices determined on individual markets across the economy. When monetary disequilibria spill over into the spending stream, the changes in expenditures will not affect all markets equally.[6] The result is that different prices will not be affected equally as well. The upward or downward pressure on individual prices will not be the same across markets. The ability of the price level to adjust to restore equilibrium will depend upon the degree to which the various individual prices are able to adjust quickly and accurately in the face of monetary disequilibria. If prices do not adjust quickly to either excess supplies or demands for money, the economic costs of those disequilibria will be revealed during the transition process.

In the case of excess demands for money, the question is how quickly we can expect prices to fall in the face of slackening expenditures. If it were the case that as soon as excess demands for money appeared, prices fell instantly to a lower level that restored the real value of actual money balances to the desired value, then those excess demands for money would be, for all intents and purposes, socially costless. However, if there are sound reasons to believe prices cannot react instantaneously, then the costs are real. To the extent that producers do not lower prices in response to slackening demand, we will find pervasive excess supplies of goods and services matching the excess demands for money.[7] Among the goods and services in excess supply will be labor. The inability of prices to respond immediately leads to the classic signs of depression: unsold goods and unemployed labor.

Assuming for the moment that prices are unable to respond quickly, we can see how the original excess demand for money can spiral into what Yeager has termed the "Wicksellian cumulative rot" (Yeager 1986: 370–1; cf. Rabin 2004: 74–5). The key additional assumption here is what is often termed the "dual-decision" hypothesis. Actors cannot separate the ability to spend from having earned the income necessary to do so. That is, spending decisions are not completely separate from income decisions. In order to spend, we must have income and it must come first. Once spending begins to slow down in response to the desire to accumulate larger money balances, it will reduce the incomes of those who see spending on their goods and services slacking off. As their incomes fall, their spending will fall off as well, which will reduce the incomes of another set of market actors, leading to a further fall in *their* spending, and so on. This cumulative unraveling of the flow of expenditures is the monetary disequilibrium-induced depression. Without the spending, excess supplies of goods and labor quickly pile up, leading to the unemployment and idle capital that characterizes the downturn.

The crucial assumption, however, is that prices cannot fall quickly enough to equilibrate the real supply of money and the demand for real balances without actors reducing their spending in order to reach the same result the hard way. For both Yeager and the Austrians, the explanation for what many have called the "stickiness" of prices is simply that markets are processes that unfold through time, rather than having the instantaneous auction-market characteristics of general equilibrium models.[8] In opposition to the general equilibrium model of utility and profit maximization, where any change in the "data" leads to an instantaneous recalculation by agents, causing prices and quantities to adjust instantaneously, the Austrian–Yeager position sees actors as continually searching for, but not necessarily maximizing, better opportunities. Such a behavioral rule might lead to hesitancy to reducing prices in the face of slackening demand if it occurs in a period of generalized uncertainty, for example. Or, actors might wish to accumulate other forms of data before choosing to react.

In addition, as Shah (1997), Greenfield (1994), and Yeager (1986) have noted, game-theoretic considerations may present themselves. No actor will wish to be the first to cut output prices without sufficient certainty of a cut in input prices to offset the probable negative impact on profits. One way to see this problem is that, as Rabin (2004: 195) argues, "Taking the lead in downward price and wage

adjustments is in the nature of a public good, and private incentives to supply public goods are notoriously inadequate." The benefits of going first are dispersed, but the potential costs are concentrated, thus it is difficult to get the process started.[9] The length of time over which no actor is willing to "go first" will also explain the degree of downward stickiness in prices. What all of these possibilities suggest is that actors must begin to *search* for the appropriate response to the change in demand; they will not automatically know what the optimal response is.

Shah (1997: 52–4) provides a further synthesis of the Yeagerian and Austrian approaches by offering a market discovery process explanation of why prices eventually fall. By integrating Alchian's (1969) work on the costs of finding out information about prices into an Austrian entrepreneurial framework, Shah argues that in the face of the slackening demand generated by an excess demand for money, firms will first have to decide whether the loss of business is a local or more widespread phenomenon. This local vs. widespread distinction roughly correlates with the "real vs. nominal" distinction. Given that changes in demand do not come marked with their cause, and given that sellers' interpretation of the cause will affect the benefits of lowering their prices, sellers may well respond first by making changes in the non-price variables relevant to their products as a way to purchase additional information about the fall in demand. As sellers buy time in this way, the full prices of goods (the monetary price plus the non-price factors) become more variable (Shah 1997: 53), and this leads to buyers engaging in more information acquisition and searching for better options. This puts more downward pressure on money prices. Eventually,

> Sellers find that they are unable to maintain their customers *and* profits by simply adjusting non-price variables. In the face of a monetary contraction, delivery lags cannot be shortened or auxiliary services cannot be increased without limits in order to sell more products. Ultimately prices have to be lowered.
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> (Shah 1997: 53, emphasis in original)

Shah later notes that this process is simply a Hayek–Kirzner entrepreneurial discovery process expanded to include non-price factors.

This search process will take time and will not happen smoothly across actors. Even after they unstick, prices, therefore, will not immediately fall to the appropriate level given the excess demand for money. In addition, the ragged nature of the decline in prices will involve wealth redistributions among actors. All of this is in contrast to the perfectly competitive model in which prices react quickly and smoothly to external changes. Modeling human actors realistically leads to a different result.

One element that is missing from the Yeager monetary disequilibrium story is the capital–interest rate process. One of Yeager's significant disagreements with the Austrians is over these very issues. However, the injection of some Austrian capital-theoretic insights into the process explored above provides some helpful new insights. In the next section, we will take a look at the Austrian inflationary

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monetary disequilibrium story, and the role that capital and interest play in it, then bring those back to deflation.

Yeagerian themes in recent Austrian theories of inflation

For much of the twentieth century, Austrian macroeconomics has consisted of its theory of the business cycle. However, in the last 20 years, that has begun to change. Starting with Larry White's (1984) work on "free banking," and continuing through recent books by Garrison (2001) and myself (2000), Austrian macro has branched out in a variety of ways. What the work of White and of Selgin (1988) did was to elucidate the connections between the work on Austrian cycle theory and other traditions in monetary theory that had largely been neglected by Austrians. In particular, the dominant Austrian position on banking issues in the mid-1980s was that a 100 percent gold reserve system was the only theoretically justified regime. That understanding grew largely out of the later Mises, to some extent, and Rothbard's work in the 1960s and 1970s. However, that line of analysis, and Rothbard's in particular, ignored theoretical insights from other strands of monetary theory that undermined the case for 100 percent reserves.

The 100 percent reserve theorists' concern with the need to have bank liabilities completely backed by outside money led them to focus on that relationship rather than the relationship between the supply and demand for money. The policy conclusion they came to was that any expansion of the supply of bank liabilities beyond the quantity of the money commodity was, by definition, inflationary and to be avoided. Underlying this conclusion was the belief that fractional reserve banking was not just inflationary but fraudulent. With the moral-legal injunction to fully-back bank liabilities, expansion of the money supply was tied not to the demand for real balances but to the supply of the money commodity. Deflation was almost ruled out a priori; how could the supply of bank liabilities fall *below* the supply of the money commodity resting in bank vaults?[10]

A key implication of this theoretical stance was that the demand for money was irrelevant in determining what the supply should be. Should the demand for real balances rise, the banking system cannot create more liabilities to match that demand. Conversely, should the demand for real balances fall, there is no way for the nominal money supply to adjust to that new reality. As discussed in the previous section, there are only two options here: either the nominal money supply must change or the price level will bear the brunt of adjustment in order to restore monetary equilibrium. By ruling out adjustments to monetary disequilibrium from the nominal money supply, the 100 percent reserve theorists must rely on the price level to do the equilibrating.

As Selgin and White (1996) point out, the 100 percent reserve Austrians have an interesting inconsistency in their approach that centers around this issue. The injunction against inflation appears to recognize the problems associated with price level adjustment. The traditional Austrian cycle theory's emphasis on the relative price effects of inflation and the malinvestments and redistributions that occur

during the process of the price level equilibrating the supply and demand for real balances fits nicely with the monetary disequilibrium perspective associated with Yeager and others. For the 100 percent reserve theorists, the price adjustments necessitated by inflation do not occur smoothly, instantaneously, and costlessly. The wastes associated with the boom and bust of the Mises–Hayek cycle happen because the adjustment process is so imperfect.

However, should the demand for money rise, the 100 percent reserve Austrians see no trouble with the price level simply "adjusting" downward to equilibrate the supply and demand for real balances.[11] The possibility that the market process will not produce instantaneous and correct downward adjustments does not even appear to have been considered. As Yeager's work suggests, there are reasons to believe that prices will not fall instantaneously and the Austrians' very own insight that markets are discovery processes would suggest that once they come unstuck, they will not fall evenly and "accurately." Moreover, one could ask what is supposed to happen if the demand for money should fall with the money supply fixed by the supply of the money commodity. As real balances are disgorged into the spending stream, why will the effects not be as pernicious as if the supply of money were expanded beyond the supply of the money commodity? Is there a lack of appropriate parallel treatment here?

What is missing from the 100 percent reserve theory analysis is the monetary disequilibrium theory insight that the supply and demand for bank liabilities are connected with savings and investment (Brown 1910). The demand to hold money balances, at least when they are bank liabilities, is a source of loanable funds in a fractional reserve banking system. To the extent that one allows one's bank balance to accumulate, one is supplying loanable funds to the bank by not making any claims on its reserves. This, of course, is why banks want customers. Conversely, as banks create additional bank liabilities, they are meeting the demand for loanable funds by lending those new liabilities into existence. Banks intermediate between those who *hold* bank liabilities (i.e., those keeping funds in their accounts, which appear on the right side of the bank's balance sheet) and those who *borrow* them in order to spend them (i.e., those with loan obligations to the bank, which appear on the left side of the balance sheet). The demand to hold bank liabilities is a form of saving that provides the loanable funds for investment by borrowers of bank liabilities. This connection between bank liabilities and the market for loanable funds enables further connections between monetary disquilibrium theory and more traditional Austrian macroeconomics.

Specifically, we can now bring in the market and natural rate of interest mechanism that has been central to the Austrian cycle theory yet largely absent from the monetary disequilibrium approach. Bracketing out other ways in which the supply and demand for loanable funds are activated in the market and focusing only on bank liabilities, we can see that when monetary equilibrium holds, the market and natural rates of interest are equal. Since Wicksell, the natural rate of interest has been understood to be the rate that directly reflects actors' underlying time preferences, i.e., the degree to which they discount the future. The natural rate is a theoretical construct and unobservable in the market. It can be thought of

as the direct "price of time." Because we cannot exchange time directly, financial intermediaries such as banks have evolved to trade time in the form of money. The supply and demand for loanable funds correspond, respectively, to a desire to part with time by pushing consumption to the future and a desire to acquire time by pushing consumption into the present. To the extent that the supply and demand for loanable funds is constituted only by the voluntary decisions of market actors, it is an accurate reflection of their underlying preferences about time. Therefore, the interest rate charged on loanable funds transactions (the market rate of interest) will be an accurate reflection of the natural rate of interest.

When monetary disequilibrium occurs, this analysis suggests that intertemporal discoordination will follow. Should the money supply expand beyond the demand for real balances, the funds available for investment (the supply of bank liabilities) will exceed the savings supplied by bank liability holders. The excess supply of money will drive market rates of interest down (ceteris paribus and starting from equilibrium) in order to pull in new borrowers, but by hypothesis, time preferences have not changed. With the market rate below the natural rate, we have the usual Austrian cycle theory story where the false signal transmitted by the market rate leads to malinvestment in the form of too many resources devoted to goods farther from final consumption than is justified by the unchanged time preferences of the public. The public is not more willing to part with time, but the artificially low market rates suggest, falsely, that they are. In contrast to the 100 percent reserve theorists, the problem here is not the expansion of the money supply per se, but it being in excess of the demand to hold real balances. For the Yeager-infused Austrian theory, the cycle can conceivably be triggered by a fall in the demand for money that is not met with a decline in the nominal money supply.

In two previous contributions (2000, 2002), I have argued that Austrian macroeconomics is not only its theory of the business cycle, and that it has more to say about inflation than the cycle story. Central to those arguments is the idea that the effects of inflation are dispersed and uneven precisely because money has no market of its own and the excess supplies of money will therefore affect each and every market that the excess supply comes into contact with. This core insight comes from Yeager as does the underlying cash balance approach to the demand for money. The result of this process is that the entire array of market prices is changed in unpredictable and varying ways by inflation. This creates additional epistemic burdens for entrepreneurs as they must attempt to disentangle the effects of inflation from underlying real changes. To the extent they err (and given the complexities of the market that will be frequently), resources get misallocated and distortions result. Inflation undermines the process of economic calculation that Austrians see as a partner with entrepreneurship in making economic coordination and growth possible. Specifically, to the extent economic miscalculation because of inflation leads to increased investment in fairly specific capital, the wastes of inflation may be large. More generally, this undermining of the price system causes a lack of confidence in markets as institutions, and a preference, on the margin, for increased intervention. All of these Austrian observations begin with the Yeagerian insight that money is half of every exchange and that all markets are money markets.

Excess demands for money and the macroeconomics of capital structure

Placing Austrian macroeconomics on the foundations of monetary disequilibrium theory suggests, in contrast to the older Austrian position, that there *are* situations where the expansion of the money supply is appropriate, independent of any money commodity backing it. Should the demand for money rise, we would be facing the sort of Wicksellian cumulative rot discussed earlier. Seen from the Austrian capital-theoretic perspective, we have the reverse of the cycle theory. The public is attempting to supply loanable funds, but the banking system is not producing investment in response. The market rate is above the natural rate, signaling falsely that the public is less willing to part with time than they really are. The result will be firms maintaining the length of their capital projects even though the public is prepared to wait even more, which would justify a longer process of production. Just as the Austrian cycle theory predicts that the abandonment of unsustainable capital projects will be the manifestation of the intertemporal discoordination stemming from inflation, the Austrian-infused deflation theory would predict that unsold inventories on store shelves will be the manifestation of the reverse form of intertemporal discoordination. Producers continue to produce for a level of consumption that is no longer relevant. The attempt to save via money holding has reduced consumption, thus the ongoing projects of producers should be more future oriented than they are. This intertemporal discoordination due to the false interest rate signal will lead to inventory accumulation as producers continue the shorter processes of production even though longer ones are justified. Without the expected consumption expenditure, inventories will accumulate. As we saw above, monetary disequilibrium theory is consistent with the existence of those unsold inventories: the downward stickiness of prices during the early stages will indeed lead to unsold goods on store shelves.

In his 2001 book and in a recent (2004) article, Roger Garrison has put forward a three-quadrant model that illustrates the interconnections among the market for loanable funds, the economy's production possibilities frontier as seen in the trade-off between consumption and investment, and the capital structure as seen in the device of the Hayekian triangle (see Figure 12.1). In those two contributions, Garrison puts the model through its paces with a variety of scenarios, almost all of which involve expansionary monetary or fiscal policy (as well as the "baseline" of savings-induced secular growth). In particular, Garrison uses the Hayekian triangle to illustrate the effects of the boom on the capital structure. During inflation, the artificially lower market rate both encourages the flow of capital resources to the earlier stages of production via its effect on the cost of borrowing, while simultaneously encouraging increased consumption and a demand for goods in the very last stages of production through the induced reduction in savings. As Garrison notes, this pits the structure of production against itself by having the hypotenuse of the triangle starting with different slopes at each axis, not unlike a train track being built from opposite directions only to find out that the two pieces are not aligned. Eventually, producers are faced with real shortages of needed capital and cannot
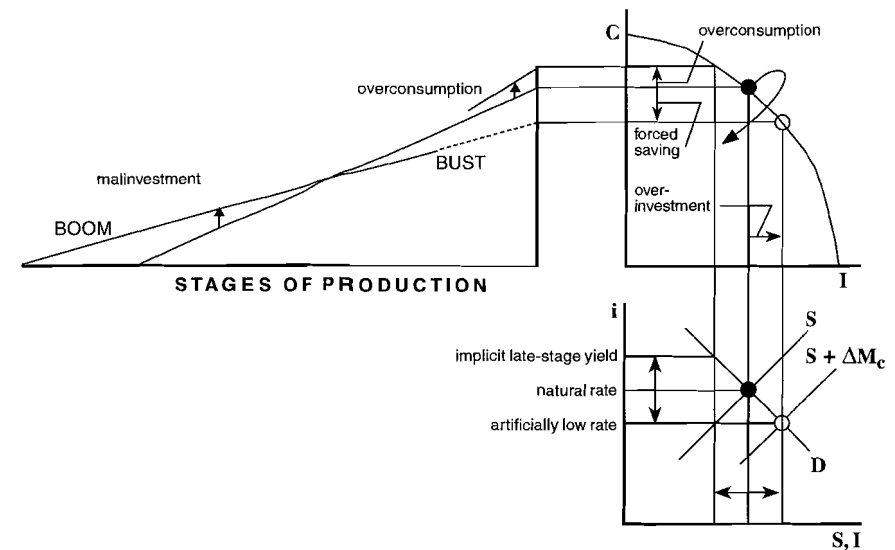
Figure 12.1 Intertemporal discoordination due to credit expansion (Garrison 2001: 69, Figure 4.4).

complete the longer-term projects they have begun. The result is the bust phase of the business cycle.

In this final section, Garrison's model is used to explore the effects of the excess demand for money scenario that Yeager's work addresses. Imagine a downward shift in the supply of loanable funds curve as the public attempts to save more by attempting to hold larger quantities of bank liabilities. Assume further that the banking system does not bring forth an additional quantity of such liabilities, which also means that they are not creating the additional lending now justified by the increased desire to save. For whatever reason, the banking system is unable to respond to the increase in the demand for money by providing more of it for the public to hold. This increased desire to save causes a decline in the natural rate of interest. However, with the banking system not responding appropriately, the market rate of interest does not fall to match it. Like the Austrian business cycle theory, we have the start of intertemporal discoordination as the market rate is sending a false signal about underlying time preferences by, in this case, making it look like consumers are less future oriented than they really are.

We can see this process play out by reworking Garrison's Figure 4.4 to reflect the case at hand (see Figure 12.2).

The downward shift of the supply of loanable funds curve looks much like the Austrian scenario. However, this shift in the curve is not an artifice of central bank expansion but a real change in consumer preferences. Given our assumption that the banking system does not translate this into additional loanable funds for borrowers, the market interest rate remains at its original level i_0, setting up an excess supply of loanable funds to the banking system. At i_0 the quantity of loanable
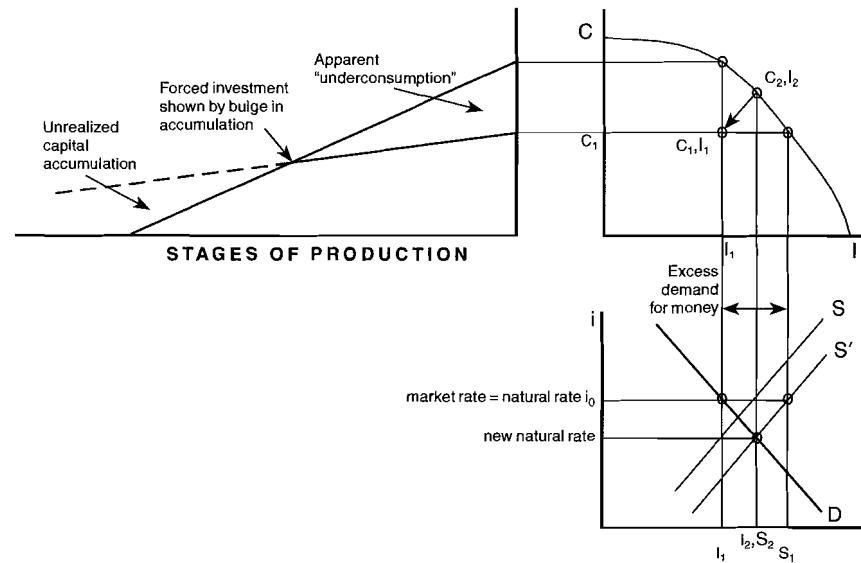
Figure 12.2 Intertemporal discoordination due to excess demand for money.

funds demanded by borrowers is less than that supplied by savers. The hollow point of disequilibrium on the supply curve in the lower right quadrant represents the actual level of savings at i_0, while the hollow point on the demand curve represents the actual level of investment at i_0. The difference between those two quantities corresponds to the excess demand for money. The long side of the market rules here, as in Garrison's case, because there actually is the level of savings at i_0 taking place.[12] The excess quantity of savings can also be decomposed into two effects. The first is the shift in the supply curve that sets the whole process into motion, while the second is the implicit movement along that new curve that results from the market rate of interest remaining stuck at i_0.

This excess supply of loanable funds/excess demand for money implies a decline in consumption expenditures. The amount of this decline can be determined by finding the level of consumption that corresponds to the level of actual saving S_1 taking place. The right hollow point in the lower right quadrant corresponds to consumption level C_1 on the production possibilities frontier. However, the actual point the economy moves to during the excess demand for money is at the level of consumption C_1 and the level of investment I_1. Recall that the actual amount of funds available to entrepreneurs is I_1 not S_1 because the banking system is not translating savings into investment appropriately. The hollow point that corresponds to (C_1, I_1) is inside the production possibilities frontier, reflecting the Wicksellian cumulative rot. It is also of note that I_1 corresponds to the original amount of investment that was taking place before the change in savings behavior by the public. The net result of the banking system failure is a decline in consumption and no change in investment. Had the banking system operated properly, we

would have wound up at C_2, I_2. At that point, consumption has indeed declined (due to the increase in saving), but investment is higher as we would have moved along the PPF and not inside it. As Garrison (2001: 62) depicts it, this is savings-induced sustainable growth. The longer-run effect would be an *expansion* of the PPF due to the increased production made possible by the lengthening of the capital structure.

The lower level of consumption C_1 can be carried over to the stages of production triangle in the upper left quadrant. The effect of the excess demand for money is two-fold. First, the triangle's intercept along the vertical axis falls as the level of consumption falls. Second, the change in savings/time preference implies a different, more shallow, slope for the triangle as it descends from the vertical axis. Again, if the banking system were working properly, we would see a rotation in the hypotenuse with the horizontal axis intercept point moving outward to reflect the increased investment the new savings was making possible. More precisely, with more savings and lower time preferences, we can allocate more resources to higher, and additional, stages of production further from the consumer. With the banking system not doing the job in the example at hand, the actual slope and intercept of the hypotenuse along the horizontal axis remain unchanged from the previous equilibrium. The result is that the two ends of the triangle have incompatible slopes, reflecting the market rate/natural rate disequilibrium, and intercepts that correspond to an economy inside its production possibilities frontier, reflecting the fall in consumption generated by the excess demand for money.

Garrison (2001: 72) describes the effects on the triangle during inflation as it "being pulled at both ends (by cheap credit and strong consumer demand) at the expense of the middle – a tell-tale sign of the boom's unsustainability." Conversely, we might describe the effects of the excess demand for money on the triangle as it "being *pushed* down at the right end while the left end remains anchored in place, causing a *bulge* in the middle – a tell-tale sign of the way deflation idles resources and causes unintended inventory accumulation." The "forced investment" of the unintended inventory accumulation is reflected by the implicit middle-stage bulges in the triangle created by the incompatible slopes of the deflation-ridden triangle. One could also capture the problem by noting that the area labeled "underconsumption" toward the later stages of production is offset by the area labeled "forced investment," which is the area between the unchanged portion of the triangle in the earlier stages and where the triangle *should have shifted to* if the banking system were functional.

This use of Garrison's model allows us to further synthesize the Yeagerian and Austrian perspectives. Austrian cycle theory has long emphasized the "forced savings" that comes with inflation. As Garrison (2004) argues, the best interpretation of that term is to describe the reduction in consumption opportunities that characterizes the period just before the bust, when the goods that were in the middle stages of production as the boom began come to final consumption. The problem is that the allocation of resources to the very early and very late stages of production has robbed the middle of resources, leading to an underproduction of

consumables by the time they come to maturity. The original "overconsumption" along with the malinvestment in the early stages leads to "forced savings" just before the bust as income earners cannot find consumption possibilities and, as Garrison argues, face higher interest rate returns to savings thanks to distress borrowing. Our use of Garrison's model suggests there should be an analogy during deflation.

There is, during deflation, a corresponding "forced investment." This is the unintended inventory accumulation mentioned earlier. Inventories are a form of investment and the false interest rate signal, and reduction in expenditures, that accompanies an excess demand for money leads to overinvestment in inventories. This is the bulging of the middle. The intermediate stages of production are "too high." The resources funding those excess inventories are coming from the resources taken away from the later stages of production as a consequence of the reduction in consumption engendered by the insufficient money supply. Garrison (2004) notes that the simultaneous extension of the very early and very late stages of production during the boom is financed by the undermaintenance of capital in the middle. This could take the form of *underinvestment* in inventories in those stages, but there is a limit to this decumulation so undermaintenance will also take place. What both share is that they involve resources being taken from the middle stages. During deflation, however, there is no necessary upper limit to *overinvestment* in the middle stages, and the resources being taken from consumption will continue to find their way to those middle stages, at least until prices come unstuck.

One final way to blend Austrian insights with the excess demand for money scenario is to compare each one's effects on the capital structure. A central element to the Austrian cycle theory is that the increased investment in early stages of production has the effect of increasing the demand for *complementary* capital goods. This view of capital as a complementary structure, rather than a more homogenous aggregate, is what distinguishes the Austrian approach. As Garrison (2001: 73) argues, Hayek's 1937 article titled "Investment that Raises the Demand for Capital" made this argument as a way of cautioning against viewing all capital as substitutable and thus speaking in terms of "the" demand for investment goods or the marginal efficiency of "capital" in general.[13] This point explains why the boom must turn into the bust, as the unsustainable projects taken on during the boom are unable to find (at prices that will make them worth using) the complementary capital goods needed to complete their projects. In addition, to the extent that the capital goods brought into the production process during the boom are reasonably specific, they will be harder to redeploy in other uses come the bust and the losses of the cycle will be that much greater for the entrepreneurs who purchased them.

Austrian capital theory can add a little bit to the cumulative rot story discussed in the previous section. Unlike the case of inflation, where the distinction between investment or capital "in general" and specific production processes and capital goods is key to understanding the adjustment process that takes place when production is unsustainable, the idling of resources, including capital goods, that occurs during deflation is less dependent upon the particulars of the capital

structure and more a result of the drying up of the money necessary to facilitate exchange and production. As consumption expenditures fall, resources in the later stages of production will be idled. With the piling up of inventories in the middle stages, the capital from the later stages will not be demanded there even if it is non-specific enough to move, and with no change in the interest rate or demand, at least in the short run, in the earlier stages of production, there will be no use for the capital there either. If prices do not fall quickly enough, or if there is no increase in the nominal money supply, the fall in consumption will eventually, through derived demand, begin to idle existing active resources in the other stages of production. Furthermore, with excessively large inventories in the middle stages, it is likely that resources relatively specific to the earlier stages of production will be among the last to come out of idleness as those stages are unlikely to heat up until inventories in the middle stages have been reduced.[14]

Austrian capital theory has other things to say about the recovery process. For example, because the excess demand for money scenario involves a reduction in consumption expenditures, it is often seen as an "under-consumption" crisis. It is tempting, therefore, to cure the problem by artificially stimulating consumption in a variety of ways, particularly through fiscal policy. This confuses the symptom (falling consumption) with the disease (an excess demand for money). The cure is to increase the nominal supply of money to restore monetary equilibrium and bring the market rate back down. Doing so will enable consumers and producers to better achieve intertemporal coordination through their various decentralized decisions that are guided by the now more accurate market rate of interest and individual prices.

Policies that artificially stimulate consumption may well end up distorting the capital structure toward shorter term production processes that are not justified by underlying time preferences. Attempting to restore the vertical intercept of the hypotenuse of the Hayekian triangle will not fix the fact that its slope is out of alignment with the slope of the hypotenuse toward the horizontal axis. In contrast to the unsustainably long projects of the Austrian cycle, where the over-specificity of capital goods can generate losses when the mistakes are revealed, the inappropriately short projects of pro-consumption policies will involve opportunity costs of bypassing longer, more productive processes that could add significantly to aggregate wealth in the long run. If these pro-consumption policies take the form of deficit spending (e.g., increased borrowing to generate transfer payments to individuals), they may well worsen the situation by driving up interest rates and crowding out private investment. If so, the effect is to rotate the broken hypotenuse counter-clockwise, which both reduces future growth through the reduction in private investment and does nothing to cure its being broken by remedying the underlying intertemporal discoordination. The costs of artificially stimulating investment during the Austrian boom are explicit losses; the costs of artificially stimulating consumption during the Yeagerian bust are in the form of the opportunity costs of an unnecessarily short and simple structure of production. The lesson is that intertemporal coordination is best achieved when monetary equilibrium is maintained.[15]

Conclusion: toward a post-Wicksellian macroeconomics

Bringing the Wicksellian natural rate process, Austrian capital theory, and the Hayekian triangle into the Yeager story creates a more integrated approach to monetary disequilibria and intertemporal coordination. In particular, it suggests that all cases of monetary disequilibria involve intertemporal discoordination, in the form of misleading interest rate signals, and that this discoordination will manifest itself within the capital structure, particularly in the misalignment of the early and late stages of production processes. Combining the Wicksellian interest rate mechanism with a process-oriented view of microeconomics further unites the Yeagerian and Austrian perspectives. Both emphasize that adjustments to monetary disequilibria can occur on many margins, that they take time, and that they will not happen in even, smooth ways. Both perspectives agree that although there can be macroeconomic disturbances, the results of such disturbances will always manifest themselves in the microeconomy. An approach that does all of the following shows great promise in being able to diagnose and treat most, if not all, macroeconomic ills:

- Sees the microeconomy in terms of discovery processes not equilibrium solutions and sees prices as knowledge signals not just incentive aligners.
- Integrates institutional considerations into macroeconomic analysis.
- Understands the unique properties of money as a medium of exchange.
- Integrates the relationship between money and the loanable funds market.
- Sees the interest rate as a signal for intertemporal coordination and recognizes the market rate/natural rate distinction.
- Views capital as a structure exhibiting complementarity and necessitating substitution in the face of change.

It is the argument of this paper that just such an approach can be created by combining the underlying elements of Yeager's work on monetary disequilibrium theory with Austrian approaches to inflation and business cycles.

I have tried to argue here that seeing these two approaches as alternatives or competitors is mistaken. They are ultimately complementary if one wishes to explain both inflation and deflation and explain both the boom and bust of the Austrian-type cycle. Moreover, as I have argued elsewhere (Horwitz 2000, 2002), the Austrian analysis of inflation is about more than just the cycle theory, although that has been the focus in this essay. The insights from Yeager and others working in the monetary disequilibrium tradition (including Rabin's excellent book) add value to the work of Austrians by providing their theory with more secure microeconomic underpinnings by clarifying the nature of money as a medium of exchange and its role in the discovery process of the market. They also add value by providing Austrians with a framework for explaining the secondary depression that can occur during the bust, and that *did* occur in the historical case of the Great Depression. Any complete explanation of the Great Depression must make use of both Austrian and monetary disequilibrium insights. Austrian work can also add

value to the Yeagerian approach. Austrian interest and capital theory can illuminate aspects of the intertemporal discoordination caused by excess demands for money, and Austrian microeconomics can provide important insights into the reasons why prices are unable to immediately adjust in the face of monetary disequilibrium. Viewing these approaches as substitutes rather than complements retards our ability to understand more fully macroeconomic disorder and intertemporal discoordination. As the application of Garrison's model to the excess demand for money scenario shows, it is possible to explain that scenario using Austrian tools just as using Yeagerian tools can illustrate important effects of inflation. Contrary to Rabin's attempt to excise Austrian theory cited at the start of this paper, I note here that Occam's Razor can cut both ways.

Given Yeager's long-time role as a sympathetic but merciless critic of Austrian economics, and his long-standing concerns about Austrian business cycle theory in particular, this last point most likely comes across as a challenge rather than a tribute. In light of Yeager's willingness to challenge Austrians on these issues both in his written work and as a teacher and lecturer for the many decades of his outstanding career, I would hope that throwing a challenge right back at him and others, such as Rabin, in the monetary disequilibrium tradition is the highest form of tribute to be offered. Imitation is said to be the sincerest form of flattery, and Leland's willingness to engage those with whom he disagrees both vigorously and with the highest standards of scholarship is well worth attempting to imitate.

Notes

1 It goes without saying that Professor Yeager has contributed to a number of areas both in and beyond economics, as the other papers in this volume indicate. My contribution, however, will focus on his work on monetary theory.

2 Many of the themes below are explored in Horwitz (2000). What follows can be fruitfully read as an update and expansion on those ideas in light of several contributions that have emerged since, particularly Garrison (2001) and Rabin (2004).

3 For more on the role of subjectivism in the yield on money held, see Hutt (1956), Selgin (1987), and Horwitz (1990).

4 Yeager (1982) discusses the "individual and overall viewpoints" in monetary theory to make this point.

5 As Hayek (1995 [1931/1932]: 128) recognized in his critique of Keynes, "Mr. Keynes's aggregates conceal the most fundamental mechanisms of change."

6 The centuries-old insight of Cantillon, Hume, and others applies to both inflation and deflation, as we shall see below.

7 Rabin (2004) has an excellent extended discussion of "Walras' Law" that clarifies a variety of issues surrounding this point.

8 Shah (1997) provides the best overview of the issues raised in this section.

9 Productivity-induced downward pressure on prices does not present this problem. Where individual entrepreneurs have increased their productivity, the benefits from downward price adjustments are internalized in the form of higher profits, therefore they do not face the public goods problem when contemplating price reductions driven by increased productivity.

10 *Disinflation* was another story. Rothbard (1962: 851), for example, argued that the only permissible circumstances under which the money supply could shrink was if inflation

had occurred and the supply of bank liabilities was being shrunk to return the reserve ratio to 1.

11 See the discussion in Horwitz (2000: 170–4) and the citations therein.

12 The short side rules in goods markets, but the long side rules when it comes to money precisely because of the "routineness" and liquidity of money that Yeager notes. We can always spend or not spend money. We do not have the equivalent ability with goods.

13 This Hayek article can also be read as a continuation of his debates with Knight over the nature of capital. Central to the article's argument is that capital cannot be viewed as Knightian "Crusonia plant."

14 For instance, automobile workers might not get rehired until well into the recovery as existing inventories of cars that went unsold during the recession would have to be cleared out before assembly lines got back to normal production.

15 This paper does not address the question of what sort of monetary regime is most likely to maintain monetary equilibrium through time. I have argued (Horwitz 1992, 2000) that a free banking system will do so, while Yeager and other monetary disequilibrium theorists have argued for variations on what Yeager calls the Black–Fama–Hall model. In previous work (Horwitz 2000: chapter 7), I compare and contrast these models with 100 percent reserve banking in terms of their ability to maintain monetary equilibrium.

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