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Austrian Business Cycle Theory in Light of Rational Expectations: The Role of Heterogeneity, the Monetary Footprint, and Adverse Selection in Monetary Expansion

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Abstract We contribute to the debate over the contemporary relevance of the Austrian Business Cycle theory (ABC) by making three theoretical developments. First, we claim that the heterogeneous nature of entrepreneurship is the best means to respond to a Rational Expectations (RE) critique. If entrepreneurs are different then the "cluster of errors" are not made by everyone, just those on the margin. And if the marginal entrepreneurs are systematically different from the population as a whole, we avoid the implication of widespread irrationality, even though credit expansion will affect real variables. Second, we argue that the size of the monetary footprint is a more telling signal than the market rate of interest, and will not necessarily be revealed by measured inflation. Therefore attention to the official interest rate or Consumer Price Index is misleading, and an inappropriate way to assess applicability. And third, the main harm from loose monetary policy is not that it encourages entrepreneurs to behave more recklessly with capital, but that it encourages precisely the people who can't afford capital at the market rate to borrow, and makes them the marginal trader. This suggests that adverse selection is a more important issue than moral hazard. We acknowledge that empirical work is required to verify these claims, and suggest how this might be undertaken.

Keywords Austrian business cycle theory · Heterogeneity · Monetary footprint · Adverse selection · Entrepreneur

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Introduction

According to Yeager (1997), "Some economists... may consider [Austrian business cycle theory] too unfamiliar, outmoded, or preposterous to be worth any further consideration" (p. 230) and even those who are familiar and broadly sympathetic to the intellectual legacy of Ludwig von Mises and Friedrich Hayek have added critiques (notably Cowen 1997 and Wagner 1999). This article seeks to contribute to the debate regarding the contemporary relevance of Austrian business cycle theory (ABC), by offering several theoretical avenues that remain consistent with the genesis of the theory, and respond directly to a rational expectations (RE) critique.

The "Recap: Austrian Business Cycle Theory" section outlines ABC, which is the basis for our present discussion. "The Impact of Rational Expectations: Criticisms and Responses" section summarizes the critique of ABC, focusing on the application of RE, and presents responses that intend to preserve the original theory. "The Role of Heterogeneity and Marginalism" section begins our own response, by focusing on heterogeneous entrepreneurship and the importance of marginal entrepreneurs. "The Monetary Footprint and the Deception of the Interest Rate" section shifts emphasis away from the interest rate and onto the monetary footprint. "Monetary Expansion Creates Adverse Selection" section argues that credit-fuelled adverse selection is the mechanism through which the cycle occurs. The "Conclusion" concludes.

Recap: Austrian Business Cycle Theory

The traditional Austrian position stems primarily from Mises (1912) and Hayek (1935), and has changed little over the subsequent years. According to Garrison (2001) Austrian capital theory is based upon the interaction of three parts of the economic system. First, the *market for loanable funds* unites the demand for borrowing and supply of lending to establish a market rate of interest. The supply of loanable funds stems from consumer savings, which depend upon time preference—the more patient you are, the more you save. Second, the *production possibility frontier* establishes the intertemporal trade-off between the returns for present consumption and the returns of investment, given current resources. And third, the *intertemporal structure of production* (also known as "the Hayekian triangle") shows how many stages a product passes through before becoming a final good. As shown in Fig. 1 the triangular shape is due to the higher end value of consumer products that can be produced with a lengthy production process—the longer you wait, the more you can get.

According to this view, consumer time preference not only establishes the market rate of interest, but also determines the ultimate profitability of production plans. The price at which entrepreneurs can borrow capital, and the type of goods that will find a market, are the consequence of subjective time preference as manifested in the interest rate. Ultimately the ABC rests on a "signal-extraction" problem that occurs when interest-rate changes *aren't* linked to underlying time preferences. For example, when the monetary authority engages in credit creation, the money supply shifts outward and (for a given demand for loanable funds) the interest rate falls. This sends a signal to entrepreneurs that they should invest in lengthening their structure of production and substitute present consumer goods for a larger quantity

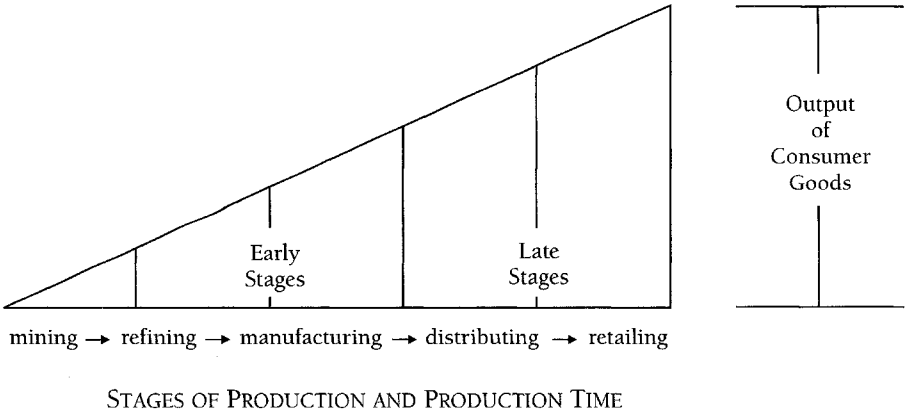

Fig. 1 The "Hayekian Triangle" *Source:* Garrison (2001, p. 47)

of future goods. However this change in the interest rate is not the consequence of more patient consumers, since the money borrowed has been printed rather than saved—time preference hasn't changed. The market for loanable funds is depicted in Fig. 2. Panel (a) shows the effect of an increase in voluntary savings, while panel (b) shows an increase in the money supply. Both result in a lower interest rate, but only the former is matched by voluntary savings.

The credit expansion will lead to an inflationary bubble (such as a rise in the general price level for all goods) that is unsustainable. At some point a bust is inevitable due to the intertemporal mismatch between the time preference of consumers and the products of entrepreneurs. As the malinvested capital is reallocated in line with consumer demand output will fall, creating a recession.

The Austrian theory is built upon the *misallocation* that results from the signal-extraction problem, but does not necessarily warrant a detailed empirical foray into whether entrepreneurs are switching from consumer goods to capital goods. It should be obvious that since capital is scarce entrepreneurs use available funds for their highest value uses. But when the interest rates fall marginal plans that had been postponed now become feasible. These plans will tend to be investment (or at least constitute a predominant element of investment) and thus borrowing *will* lengthen the structure of production.

The Impact of Rational Expectations: Criticisms and Responses

Whether or not the Austrian theory was applicable to the time in which it was constructed, a number of criticisms claim that it requires modification. These range from being supportive of the underlying framework (yet questioning of its present relevance), to calling for an outright rejection (Hummel 1979; Yeager 1986, 1997; Tullock 1987; Cowen 1997; Wagner 1999; Caplan 1997, unpublished manuscript). It's important to note that these critiques come from scholars with a deep understanding of the Austrian position and can be viewed as family squabbles rather than outright attacks. Despite differences in rhetoric we treat these critiques as valid challenges and accept the

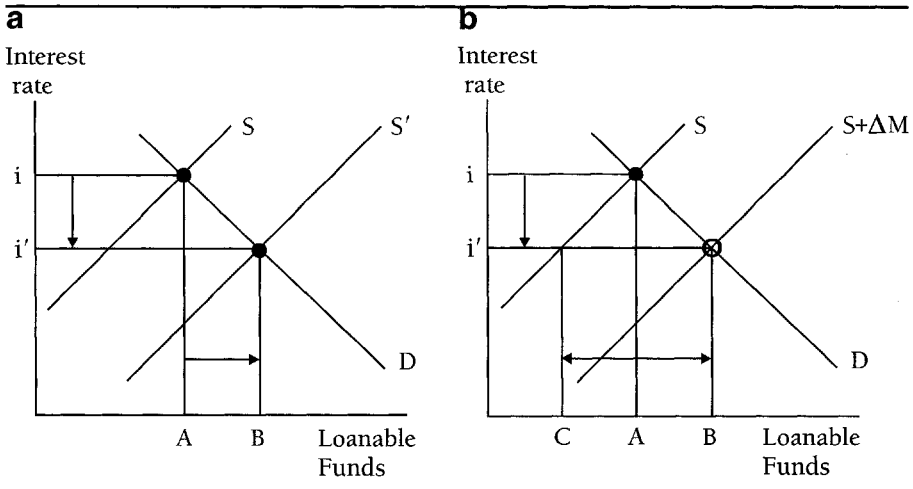

Fig. 2 The market for loanable funds with an increase in voluntary savings (**a**) and credit expansion (**b**); Source: Garrison (1997, p. 24)

fundamental claim that in its present form the Austrian theory requires revision. As a consequence the predictable flurry of counter-critiques (Block 2001; Barnett and Block 2005, 2006) are intellectually enlightening but mostly restatements of the original theory. We take an optimistic position that Austrian cycle theory has a future as rich as its past, and that a broad view of Austrian uniqueness will contribute to this.[1]

It is no coincidence that these critiques have all appeared since the "rational expectations revolution," and despite protestations to the contrary[2], it is important to single this out as a major aspect of the case against ABC:

> The postulated entrepreneurial mistakes in the traditional Austrian theory, which are systematic, violate the rational expectations hypothesis. Entrepreneurs with rational expectations will sometimes chose unprofitable term-lengths for investment, but they will not err systematically toward excessive term-length. (Cowen 1997, p. 77)

> [S]ome effort to incorporate rationality into expectations is essential for any theoretical enterprise.... A presumption of rationality in expectation is surely a requisite for any kind of Austrian theorizing. (Wagner 1999, pp. 69,71)

To be specific, the "cluster of errors" that results from entrepreneurs *all* reacting to credit expansion as if it reflects a change in the savings rate (and mistakenly altering their production plans), is incompatible with rational behavior in the neoclassical sense. This suggests that the theory is an anachronism, as Wagner points out:

> This situation might have had plausibility when Austrian cycle theory was initially formulated... Throughout the postwar period, however, we have

[1] It may appear to be an oxymoron to say "a broad view of Austrian uniqueness," but this uniqueness stems from combining non-neutrality of money; dynamic process; methodological individualism; and heterogeneity of capital. A narrow view of Austrian uniqueness would be to ignore "fellow-travellers" that don't satisfy all conditions. A broad view would utilize any points of tangency.

[2] Note that Cowen denies that his critique of ABC is built on rational expectations (Cowen 1997, p. 8).

> become ever increasingly removed from that earlier time. Statistics, observers, and pundits are everywhere. A cycle theory that depends on the inability of people of people to distinguish, in the aggregate, between an increase in personal saving and an increase in central bank holdings of government debt must rightfully be dismissed on the grounds that it fails to incorporate any reasonable requirement of individual rationality in economic action. (Wagner 1999, p. 71)

The responses seem to accept that "[t]he Austrian claim postulates systematic entrepreneurial errors in the most costly direction" (Cowen 1997, p. 81), but raise two points. First, it can be argued that rational expectations are an inapplicable behavioral assumption and ABC should be *applauded* for contradicting it. For efficient markets to hold all information (and all theories) must be public information, and rational expectations imply the presence of such information across the market. But according to Block, "Wagner is charging that investors know full well the Austrian business cycle theory... however, as Wagner himself attests, virtually no one knows of ABC" (Block 2001, p. 65).[3]

More fundamentally, Tullock argues that business cycles don't *exist*, "There are statistical tests that will detect cycles if they exist and these have been applied to the historic data. The result of the tests is a random walk rather than a cycle" (Tullock 1987, p. 74). Presumably he's referring to stock indices rather than measured GDP but his point is that there's a contradiction between cyclical activity and rational expectations. And Block argues along the same lines, "if the data are so 'widely and readily available' and the commentators are sophisticated, from whence spring bull and bear markets?" (Block 2001, p. 66). This line of reasoning implies that if rational expectations hold ABC does indeed fall apart—but only because cycles wouldn't exist!

This leads into the second defense of the cluster of errors, which argues that these clusters are *consistent* with rational behavior. Carilli and Dempster (2001) point out that a rising market can resemble a prisoner's dilemma, and so providing that the entrepreneur leaves the market before it bursts, there are profits to be made from a bubble. If you retrospectively trace the path of a credit-fuelled expansion and asked a rational investor to choose (with the benefit of hindsight) the time at which he'd leave the market, it *wouldn't* be as soon as the bubble became apparent. It would be momentarily before it peaked, because "[w]hen some investors follow positive feedback strategies... it may pay arbitrageurs to jump on the bandwagon themselves... although arbitragers sell out and help prices return to fundamentals, in the short run they feed the bubble rather than help it to dissolve" (Shleifer and

[3] Obviously this implies massive profit opportunities for those of us who *are* familiar with Austrian theory! We are sympathetic to this point but also view financial markets as being efficient. In a neoclassical framework this creates Wagner's Paradox: "The world is efficient today and it will be efficient tomorrow. Yet tomorrow's world will be different from today's. But it is inefficient to change what is efficient. So tomorrow can never happen" (Wagner 1994, p. 136). We reconcile these views by making a distinction between our roles as scholars (observers of the financial system) and entrepreneurs (participants within it). By acting *as if* financial markets are inefficient, we make them *become* efficient, but this is a process view of human action.

Summers 1990, p. 297). "The trick, of course, is getting the timing right: to get in while the getting is good, and to leave someone else holding the bag right before the onset of the downturn" (Block 2001, p. 66). Investing becomes a high-stakes game of musical chairs where entrepreneurs take advantage of the loose money, always hovering over a chair in case the music stops. In fact the greater the number of people using this strategy, the greater the impact of the bust as everyone liquidates immediately.

It should be noted that these responses contradict each other: are investors wilfully irrational for not reading more Mises, or has the central bank created a commons problem? Our position is that the cluster of errors is relatively compatible with rational behavior but only if entrepreneurs are *heterogeneous*, and only if the *marginal* entrepreneurs are given greater attention. In this regard we intend to supplement existing Austrian defenses.

The Role of Heterogeneity and Marginalism

One of they key assumptions of Austrian theory is strict methodological individualism, which conflicts with the representative agent approach of New Classical theory by implying *heterogeneity*.[4] Indeed the treatment of heterogeneous capital (Hayek 1941; Lachmann 1978; Lewin 1999) is not only a major Austrian contribution, but also the foundation of their theory of the trade cycle. It therefore seems odd for Austrians to criticize the RE edifice for the particular characteristics of their representative agents, while accepting the underlying assumption of homogeneous entrepreneurs. Shleifer and Summers (1990) make an eclectic distinction between "noise traders" (whose behavior is affected more by beliefs and sentiments than fundamental news) and "arbitragers" (who are fully rational). This approach seems to combine a Keynesian sympathy for "animal spirits" with a Kirznerian attention to arbitrage, but can also be viewed as a framework where subjective expectations and alertness are compatible, through the adoption of heterogeneity. The noise trader approach acknowledges that there are different *types* of entrepreneurs, and the interplay of those functions is important. This point merely echoes original Austrian cycle theory, and Hayek's heavy emphasis on the heterogeneity and interdependence of agents (Hayek 1935).

If all entrepreneurs are indeed heterogeneous, it's important to establish the particular characteristics that exert the greatest relative influence over market conditions, and basic economic theory suggests that *marginal* traders should be of chief concern. This turns the question away from the rationality of investors as a whole, to the defining characteristics of marginal entrepreneurs. In a welfare state of easy money there is less competitive pressure to ensure profitable ideas, and thus the marginal entrepreneurs will be those who wouldn't find funds in a free economy.

[4] Wagner (1999) makes this very point, "This requires a framework that allows for divergent expectations, in contrast to homogeneous expectations that characterize a postulated order framework.... What is surely noticeable about people and their expectations... is their heterogeneity and not their homogeneity" (p. 71).

The marginal approach also highlights an important distinction between the financial and real sectors that hasn't been expressed explicitly enough.[5] In the stock market savvy arbitragers can counteract noise traders by taking short positions. In doing so they become the marginal traders and thus offset the volatility produced by erroneous behavior. The spread betting industry demonstrates that over or under-estimations can be traded against and so any error of judgment (whether it's an error of scale or scope) can be rectified. By contrast the real sector deals with capital investment that isn't liquid, and cannot be sold short: if a company altars its structure of production their rival cannot trade against this. For example if a firm anticipates an increasing demand for their product they might invest in a new factory. If a rival believes this judgment to be wrong, they cannot sell that production plan short—the capital is invested in the factory and when the error of judgment is born out by market conditions, it will be liquidated. But since capital structures are asset specific, the firm cannot recapture the investment and the reallocation of capital will be costly. Even though the British government has found an alternate use for the Millennium Dome (as an entertainment complex), the erroneous decision to initially build it as an exhibition center literally destroyed wealth. Therefore unlike financial markets, the marginal entrepreneur will not be correcting the market at all: the tendency is for the marginal entrepreneur to be more error prone than the typical entrepreneur, and systematically so. This might result from some kind of "winner's curse" (Thaler 1992), where those entrepreneurs who accumulate capital at the margin are systematically more likely to have overestimated the market value of their plans. Similarly, the error terms for a population will not "balance out" because potentially profitable (but unrealized) plans don't come to market[6].

The important point here is that we've generated a falsifiable proposition: we're claiming that there are systematic differences that determine the longevity of entrepreneurial profit. In other words a majority of entrepreneurs consistently find chairs when the music stops, but a minority of marginal entrepreneurs (and the investors who fund them) whose movements into and out of the market coincide with (and generate) substantial effects on economic activity don't. For example "The *Sunday Times* Rich List" has provided annual estimates of the fortunes of the one-thousand wealthiest United Kingdom residents since 1989, and there is an increasing number of similar studies.[7] We're claiming that these lists have a relatively stable component over time, but illustrate the movements of marginal entrepreneurs.

The Monetary Footprint and the Deception of the Interest Rate

Thus far we've propagated the view that the market rate of interest is the relevant communication device between entrepreneurs and consumers, and is therefore key to the signal extraction problem. However we believe that critics and defenders alike have overemphasized the interest rate in Austrian theory. Although it *is* the

[5] We credit Nick Schandler with first making the point that follows; it came from a personal discussion.

[6] We credit Isaac DiIanni, from personal discussion, for this point.

[7] For example, *Forbes* compiles several lists ranking individual's wealth.

coordinating piece of information that unites all three aspects of the Austrian system, it's more complex than is typically discussed and we wish to make two claims. First, it's not a single number; and second, the overall size of the monetary footprint is a more relevant variable.

Tullock understood that interest-rate changes might not have the power stipulated by Austrians[8], and a simple thought experiment demonstrates this point. If a business earns £3 million per year and has net borrowings of £1 million, a market rate of interest of 6 percent implies a net interest cost of £60,000. Even if the central bank *unexpectedly* raises interest rates by a full percentage point, this adds just £10,000 to the cost base: inconvenient, but hardly devastating. To be sure many firms have a higher debt–equity ratio but this merely demonstrates the heterogeneous nature of entrepreneurship since different types of firms will be geared differently. Although small but cumulative effects will ripple through an economy to generate macro problems, our point is that (1) only marginal firms are devastated by such a change (and for the majority it is a relatively benign variable), and (2) alternative variables are required to demonstrate the effects of monetary expansion.

This ties into a deeper point, that by focusing on changes in the base rate of interest scholars have missed out on the more important, underlying adjustments. The Austrian approach stems from Wicksell's distinction between the "natural rate" and "loan rate" of interest (Wicksell 1898). The former is consistent with equilibrium in the structure of production, the later is the rate available on the loans market, and there is a tendency toward equilibrium where the two are equal. In fact Austrian cycle theory is mainly the combination of Wicksell's work on interest rates with the work of Böhm–Bawerk (1884–89/1959) on capital, illustrating that it is part of a broad tradition of monetary theory.[9] Critics of the ABC tend to be adherents to this broader tradition (and therefore see "Austrian" contributions in the context of potentially complementary but non-exhaustive inputs), whereas defenders see a distinct and separate Austrian-only theory. We do not doubt that the Austrian tradition is broader than Mises and Hayek, but believe that significant confusion has resulted from critics focusing on changing interest *rates*, and defenders accepting this position. As demonstrated, we feel that the interest rate alone cannot create the effects that ABC claims. However we also feel that ABC theory doesn't require that it does.

In keeping with Wicksell, the originary rate is an imaginary construction that refers solely to time preference—it is "the ratio of the value assigned to want-satisfaction in the immediate future and the value assigned to want-satisfaction in remoter periods of the future" (Mises 1998, p. 523). When this aggregate rate coincides with the rate of interest of loans we have "the neutral rate" (Mises 1998, p. 535). Mises also introduces the "entrepreneurial component," which are factors associated with the risk of money lending and include political risks. Indeed, "political risks do not affect the height of originary interest, they affect the

[8] Tullock said, "For our analysis, we shall assume that the interest rate which should have been 5 percent had been forced down to 3 percent although that seems a rather large cut granted the generally quite feeble instruments that government have for lowering the interest rate" (1987, p. 75).

[9] Wagner stated, "Between Böhm-Bawerk and Wicksell, the path to the Mises-Hayek theory of the business cycle was a short one" (1999, p. 67).

entrepreneurial component in the gross market rate" (Mises 1998, p. 538). This suggests that if either the originary rate or the entrepreneurial component changes, the gross rate of interest will also alter. But this suggestion is misleading, since the nominal rate need not change:

> It could happen that the nominal interest rates remain unchanged and the expansion manifests itself in the fact that at these rates loans are negotiated which would not have been made before on account of the height of the entrepreneurial component included. Such an outcome too amounts to a drop in gross market rates and brings about the same consequences. (Mises 1998, pp. 549–50)[10]

Rather than settle on the Wicksellian distinction between real rates and loan rates, we should incorporate Mises's deconstruction of the interest rate into an originary and entrepreneurial component. Therefore it isn't a question of whether an entrepreneur can distinguish between a fall in interest rates due to an increase in savings, or, a fall in interest rates due to credit creation; but whether they can deconstruct the market rate of interest into its originary and entrepreneurial components.[11] Precisely *because* entrepreneurs respond to "the interest rate," this generates the cluster of errors.

In his recent *magnum opus*, De Soto (2006) relegates changes in the interest rate to be of minimal importance during the business cycle, and instead focuses on credit expansion. In equilibrium the outcome is the same, but in the real world the interest rate is an imprecise signal of time preference (since there is different interest rates for everyone and everything), and so we follow the Austrian position that the overall size of the "monetary footprint" is more telling than the interest rate. The concept of a "monetary footprint" stems from Shostak's "pool of funding," which is the stock of saved goods that allow entrepreneurs to invest in more roundabout production[12]. Although credit expansion doesn't necessarily lead to an increase in traditional inflation, it will affect the size of the monetary footprint and thus the latter is a more appropriate measure. This turns attention to the most suitable measure of the money supply, and we follow Shostak (2000). He distinguishes between credit and claim transactions to argue the following components of money supply: (1) cash, (2) demand deposits with commercial banks and thrift institutions, and (3) government deposits with banks and the central bank.[13]

[10] As a referee points out, nonprice mechanisms are not unique to the loan market.

[11] Furthermore, if we accept that Austrian assumption of uncertainty the entrepreneurial component is impossible to quantify.

[12] This concept has been referred to in print more often than formally defined, but see Shostak (1999).

[13] Also see Rothbard (1978) and Salerno (1987). In practice we follow Shostak's Austrian School of economics money supply definition (AMS) as being the most accurate measure of the monetary footprint. Also see the new measurement "money with zero maturity" (MZM) which focuses on money that is immediately redeemable. Thornton views this as being close to an Austrian definition (Thornton 2008), while Shostak does not (Shostak 2003). The Ludwig von Mises Institute also tracks the true money supply (TMS) which is comprised of the following: currency component of M1, total checkable deposits, savings deposits, U.S. government demand deposits and note balances, demand deposits due to foreign commercial banks, and demand deposits due to foreign official institutions.

It is not only the interest rate that tempts economists to overemphasize aggregate variables, because this same convenience of having a single proxy affects inflation. Egger (1995) demonstrates that the Austrian concern for individualism precludes aggregation, "the focus on... 'prices' rather than 'price' (level) or rate of interest or other aggregate, establishes common ground with the Austrians at the most fundamental level" (Egger 1995, p. 5). According to mainstream monetary theory, credit expansion will—*ceteris paribus*—lead to a proportional increase in the general price level, suggesting that cycles will produce inflation.[14] But as Garrison says "the Austrian theory does not hinge on there being any price-level inflation during the boom (Garrison 2001, p. 1). In other words, "a process that deserves to be called 'inflationary' may take place under the cover of a 'stable' price level" (Marget 1937, p. 28; see also Marget 1942, pp. 248–49; cited in Egger 1995, p. 12). Although, as point out by Friedman, "inflation is always and everywhere a monetary phenomena" (Friedman 1992, p. 49), "there is nothing in Friedman's work that states that monetary expansion is always and everywhere a consumer price phenomenon" (Ferguson 2006).

But serious errors can be made by equating inflation with the measured price level (be it the consumer price index [CPI], retail price index [RPI], etc). Indeed this is Tullock's first "nit":

> Rothbard never explains why the inflation that is part of his theory cannot simply be continued or even accelerated. I understand why Mises without our modern experience thought it was impossible, but anyone familiar with the present world must realize that inflations can, at least, continue for very long periods of time and reach very high levels of monetary depreciation.... It is the flu, not pneumonia. (Tullock 1987, p. 73)

By focusing on the monetary footprint we can take a broader, longer term, and more accurate view of the effects of credit expansion. Pumping money into the economy is akin to pumping air into an airbed. If commentators are focusing on the CPI (which is just one measure of the monetary footprint, or just one air pocket in the mattress) the monetary authority will face an incentive to use policy to keep it low. But pushing down on one bubble merely transfers the air somewhere else. A stable CPI comes at the expense of inflationary bubbles in asset prices (the dot com boom), house prices (the subprime crises), or perhaps even commodity prices.

Monetary Expansion Creates Adverse Selection

According to Cowen, "For the [ABC] theory to hold, entrepreneurs must be fooled by incorrect price signals emanating from the interest rate," but this can also be seen as inducement (Barnett and Block 2006, pp. 34–35). In other words, "entrepreneurs are in fact *bribed* into making otherwise unwarranted investments in the higher

[14] Austrians would stress the relative price changes, or "Cantillon effects" along the way. Cantillon is generally credited with the idea that inflation creates relative price changes as well as a rise in the absolute level. Since these relative changes occur during different time periods, inflation creates redistributive effects depending on how it is injected into the system.

orders of the structure of production" (Block 2001, p. 66; emphasis in original). This problem surrounding the signalling capability of the interest rate will in fact determine which *type* of entrepreneur will participate in the market. At this point we can provide the context around an earlier quote from Mises:

> At the gross market rate which prevailed on the eve of this disturbance, all those who were ready to borrow money at this rate, due allowance being made for the entrepreneurial component in each case, could borrow as much as they wanted. Additional loans can be placed only at a lower gross market rate. It does not matter whether this drop in the gross market rate expresses itself in an arithmetical drop in the percentage stipulated in the loan contracts. It could happen that the nominal interest rates remain unchanged and that the expansion manifests itself in the fact that at these rates loans are negotiated which could not have been made before on account of the height of the entrepreneurial component to be included. Such an outcome too amounts to a drop in gross market rates and brings about the same consequences. (Mises 1998, pp. 549–50)[15]

In other words if entrepreneurs use the interest rate as their guide, credit expansion will *systematically* encourage high risk projects to be undertaken. Traditionally these are cast as investing in capital goods rather than consumer goods, however, we are simply referring to marginal investments. When the monetary footprint increases the marginal entrepreneurs become those unable to borrow money at the originary rate, and are therefore the most vulnerable to further rate changes. We have a large, relatively stable population of entrepreneurs who take advantage of cheap credit but have the capacity to keep an eye on the chairs when the music stops. But there is also a small, volatile subset of entrepreneurs who are enticed into a market that cannot sustain them.

A signal extraction problem creates this information asymmetry, which is typically viewed as a *moral hazard* problem, "The ABCT is a theory about how people's actions are affected (changed) by a particular type of government intervention" (Barnett and Block 2006, p. 32[16]). However, we believe that the opposite side of the coin is more important: credit expansion creates an *adverse selection* problem by enticing "bad" entrepreneurs into the market, making them the marginal traders, generating disproportionate effects on the market. And all this can occur without drastic changes in the interest rate or measured inflation.

Conclusion

According to Caplan (1997, unpublished manuscript), "If the ABC has anything to contribute, it must add something further—something both original and true—to this lesson," and we take this charge seriously. We feel that we have gone beyond merely

[15] Our thanks to Roger Garrison for pointing out this quotation.

[16] Also, in a footnote we hear that: "Although the Fed must bear the ultimate blame for the real estate boom, there is enough blame to spread around to other parties that aided and abetted them... probably most important were the folks at Fannie Mae and Freddie Mac... they expanded their balance sheets immensely... because they... understand their debt to be guaranteed by the U.S. Treasury... a major case of moral hazard." (Barnett and Block 2006, p. 32, n. 11)

restating the Austrian position, and have added three claims that improve our understanding of business cycles. First, emphasizing the heterogeneous nature of entrepreneurship is the best means to respond to the rational expectations critique. If entrepreneurs are different then the cluster of errors are not made by everyone, just the marginal ones. And since the marginal entrepreneurs are systematically different from the population as a whole all they may possess rational expectations, but credit expansion will still create negative consequences. Second, we argued that the size of the monetary footprint is a more telling signal than the market rate of interest, and will not necessarily be revealed by measured inflation. And third, the main harm from loose monetary policy is not that it encourages entrepreneurs to behave more recklessly with capital, but that it encourages precisely the people who can't afford capital at it's natural rate to borrow, *and* makes them the marginal trader.

Hayek didn't shun empirical work, and nor should we, but like him we need to get a solid theoretical grounding prior to empirical work being undertaken. We hope in this article we have demonstrated where attention should be directed to ensure that Austrian theory becomes relevant for friends and foes alike.

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