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2010

This article can be cited as: Howden,David. 2010. "Knowledge Shifts and the Business Cycle: When Boom Turns to Bust." *Review of Austrian Economics* 23(2): 165-182.

It can be found at: http://www.springerlink.com/content/br826pm70mh22450/

Knowledge Shifts and the Business Cycle: When Boom Turns to Bust[1]

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Abstract: Informational cascades can be used to augment the existing Austrian business cycle theory. As first-order users of knowledge know the direct causes of a price change, they transmit this knowledge to second-order users through the price system. Banks with direct knowledge of the sources of the fresh liquidity during a credit induced boom have knowledge of the boom's artificial and unsustainable nature. Higher-order users lack this direct knowledge, and hence continue investing largely ignorant of underlying developments. When first-order users of knowledge sense the boom has run its course, they exit the market, sending a strong signal to higher-order knowledge users that the boom has ended – a fragile situation built upon an informational cascade begins collapsing. Simultaneously, the boom is characterized by an influx of capital and knowledge into the financial sector owing to increased profits relative to the real economy stemming from Cantillon effects surrounding the credit injection. As knowledge pertaining to real production has also exited, the bust commences with a misallocated productive structure requiring equilibration to become consistent with consumers' wants. Actions which inhibit this knowledge from returning to the productive structure will unnecessarily lengthen the time to recovery.

Keywords: informational cascades, overshooting, business cycle, inflation
JEL codes: D82, E31, E52

1 The author wishes to thank the Ludwig von Mises Institute for generous support while writing this paper. Joe Salerno, Philipp Bagus, Leland Yeager, Roger Garrison, Matt Machaj, Matt McCaffrey and two anonymous referees provided helpful comments which greatly bolstered the arguments herein. All remaining errors are solely my own.

Introduction

The debate over the continued relevance of Austrian Business Cycle Theory (ABCT) has proceeded, generating several critical works aimed at criticizing the macro-theory's foundations.2 Although the process through which an Austrian business cycle is propagated has been thoroughly explored, there is one aspect of the cycle that has received relatively little attention – the point at which boom turns to bust. Much recent work has raised diverse new points that demonstrate new rationales for the unsustainability of the boom. Huerta de Soto's (1998: 667) application of the prisoner's dilemma has shown that ABCT is not necessarily inconsistent with the rational expectations' assumption.[3] Evans and Baxendale (2008) have demonstrated that not all entrepreneurs must err in clusters for the bust to occur. Rather, the marginal entrepreneurs are sufficient to entice this change. Additionally, "herding behavior" has been suggested as an explanation consistent with ABCT to explain asset bubbles (Koppl 2002, Bagus 2008). This paper will build on this existing literature and further strengthen the argument that the boom is unsustainable, as well as demonstrate a new problem inhibiting a speedy recovery from the bust. To these ends we advance two new knowledge problems.

First, informational cascades serve to demonstrate why entrepreneurs are unable to discern the true sustainability of the boom. As information loses quality through its shared usage, its transmission results in the deterioration of the quality of any decision-making based upon it. The deterioration, and in some cases complete loss of knowledge can be explained within the framework of ABCT when augmented with some of the existing literature (notably Huerta de Soto 1998 and Bagus 2008).

Tullock (1987: 73) posits that there is no particular reason why credit inflation, even high levels

2 Tullock (1987), Cowen (1997), Yeager (1997), and Wagner (1999) provide negative assessments of the relevance and fundamental validity of ABCT. Salerno (1989), Block (2001) and Barnett and Block (2005; 2006) provide responses stressing the applicability of a properly understood ABCT, used within its logical limitations.

3 See also Carilli and Dempster (2001) for a similar application and conclusion. Mises (1928: 135-136) also comes to a similar conclusion, if in less formal terms. These works are significant as they explain *why* it is that banks seemingly fail to learn from past experience concerning the consequences of an inflationary monetary policy. For even if they *did* learn, the knowledge would be useless if they were still forced into acting in the manner described by Huerta de Soto (1998).

thereof, cannot continue unabated for lengthy and sustained periods of time. Current rationales for the change from boom to bust in ABCT show that under inflationary conditions more investment is undertaken than real resources exist to sustain. Eventually a resource constraint will become binding, with a necessary shift from boom to bust. Of course, if this were the trigger of the bust we would expect to see skyrocketing input prices, as scarce resources begin to be intensely bid up to complete projects previously undertaken with the expectation of greater resource availability. However, in reality the boom need not always reach this point. Instead, it will be demonstrated that entrepreneurs who have first-order knowledge of the sources of the credit inflation will exit the market when they sense profits under unsustainable conditions have been maximized. This sends a strong signal to the second-order users of knowledge – those who have gained access to the knowledge of the augmented credit supply only later through the informational cascade – and who adjust their expectations accordingly. A fragile situation built upon little knowledge of the true situation is broken. Market participants operating at the margin become the fuel that feeds the decline, acting as triggers upon which other marginal entrepreneurs are affected negatively.

Second, we establish that the turning point in the cycle can best be demonstrated as a knowledge problem. As entrepreneurs shift from less to more profitable activities to maximize their own personal profit levels, the structure of knowledge concerning production undergoes a shift as well. Previously, profit was sought through aligning the *real* structure of production with the needs of consumers via an appropriate Wicksellian natural rate of interest. As profit opportunities become relatively abundant in the financial sector augmented with fresh credit, an entrepreneurial shift occurs which displaces activity in the *real* economy by the *financial* economy. A resultant shift in the structure of knowledge occurs simultaneously, as different factors become the focus of profit-seeking activity, and as more attention is paid to the monetary authorities at the expense of consumer want preferences.

Finally, the particulars concerning the severity and duration of the bust can be explained by two

factors. Sticky prices in the real economy relative to the highly flexible financial economy cause a time spread between the relative adjustment processes. Adding to this lag in the real recovery process, however, is the knowledge shift that occurred during the boom. As entrepreneurs focused their attention on the financial economy, significant knowledge concerning the real economy was ignored or lost. As a result, a rebuilding of the structure of knowledge must occur *prior* to (or at least concurrent with) any rebuilding in the structure of production that eliminates the imbalances of the boom. Activity that inhibits the re-building process of this structure of knowledge will necessarily affect the rebuilding of the structure of production to the detriment of consumers.

Hayekian roots of informational cascades

Hayek (1945: 536) provided one of the most compelling examples of prices as transmitters of information throughout the market.[4] His famous "tin example" showed that demand, as well as other underlying factors, may arise on the market which affect the prices entrepreneurs are willing to bid for certain goods. Price changes will reflect these underlying factors, and entrepreneurs will later become implicitly aware of them through these changes. Entrepreneurs need not know the causes of the price changes; instead they may retrieve this information through the price system. Provided prices remain 'sufficient surrogates' of the underlying knowledge embedded in them, decisions can be undertaken with no negative consequences compared to those made with the actual knowledge of the underlying factors affecting these prices

Bikhchandani, Hirshleifer and Welch (1992) advance a similar concept, "informational cascades", whereby quality information is sacrificed through the pricing system. First-order users of

4 This distinction may, however, be better attributed to Pigou (1927) as he wrote of individuals routinely abdicating responsibility in situations where high amounts of social agreement exist. Particularly important is the emphasis on the financial realm whereby attitudes and beliefs towards business conditions are spread and diffused through the market with little regard to fundamental reason. Errors in optimism among some segments of the market will be transmitted to others with little heed to the underlying causes of such expectations.

knowledge – those with direct experience creating the prices which reflect the underlying fundamentals – transmit this information to higher-order knowledge users – those who lack a direct link with the cause of the knowledge, but who only gain this knowledge through the price system. As individuals abandon their individual assessment of the quality of information, a general deterioration results as quality becomes a subsidiary concern. Much as Hayek (1945) asserted, individuals no longer concern themselves with the particular reasons for price changes. Instead, they accept the price system as an approximate summary of these underlying reasons, and economize on resources accordingly. Group generated information becomes prevalent and is used by individuals as the basis of their own decisions. The critical problem is that individuals lose all incentives for developing good information (i.e., accurately based upon the underlying factors that influence it). One considerable failing of informational cascades is the lack of attention paid to the question of *why* entrepreneurs begin to disregard quality considerations of the information they use (Bagus and Howden 2009b). Without an explanation for this process, the conclusion of a deteriorating level of quality of information in these cascades rests on shaky ground. As Thomsen (1992: 48) notes, Hayek's tin example shares a similar problem. The knowledge transmitted through the pricing process omits the information regarding the reason for the price changes. As a result, prices may tell us how prior entrepreneurs valued the knowledge embodied in those prices, but they tell us precious little about how current entrepreneurs value the future potential of the summarized knowledge. Hayek (1945) was quite clear that for the users of the price system what matters is not the "whys" of price formation The price system may tell us much of what others believed past knowledge to signify, but little about its future implications.5

A distinction can be made between different "orders" of knowledge users. First-order users are

5 Indeed, Lachmann (1943: 72) had already alluded to the problem of separate knowledge sets and their effect on action, stating: "Two farmers confronted with the same observable event, a rise in apple prices, will yet take different views of the situation and react differently if one interprets it as a symptom of inflation and the other as indicating a shift in demand under the influence of vegetarianism."

those who know the source of the knowledge summarized by the pricing system. In Hayek's example, first-order users of knowledge are those who know that a demand shift has occurred in the tin market, resulting in a price increase for the commodity. Higher-order users of tin will only see the increase in the price of tin, and need not be concerned with the specific information which originally caused the price change. As the knowledge user becomes more distant from the first-order user, they face a continual degradation in the quality of their information – that which pertains to the cause of the original price change.6 As higher-order users accept the knowledge through the altered price system, price changes may be a diminished reflection of the original impetuses for price changes, as these reasons are not directly known to the higher-order users.7

Hayek's (1937: 34) dictum was that we should question why anyone should be right before we ask why they should be wrong. It is pertinent to ask why anyone would accept 'wrong' (or at least incomplete) prices before pursuing 'correct' prices.[8] If prices are not genuine reflections of the underlying knowledge and real conditions, the decision-making process can be perverted accordingly with devastating effects on plan coordination.[9] If it becomes clear that quality deterioration may be

6 One interesting early application of informational cascades has been presented by Brillouin (1956). As information is either held as free (i.e., non-communicated) or bound (i.e., physically transmitted in some manner) the two are linked by the possibility of loss of resultant information (i.e., negentropy). In fact, as Brillouin (1956: 155) demonstrates, with any transmission of information, the best case scenario is that no loss of relevance results. Hence, with the probability of the loss of transmitted knowledge always greater than, or equal to, zero, there is always the strong possibility that knowledge will eventually lose relevance through continual transmission. As Brillouin (1964) later shows, each additional transmission of information results in a general loss of negentropy (i.e., information). We thank an anonymous referee for referring us to this work.

7 Some may argue that central bank transparency allows individuals to become aware as to the true origin of the fresh credit. This is, however, complicated by two factors. First, money's fungibility makes those higher-order users of knowledge unaware of what *portion* of the new liquidity is savings, and that which is credit. Second, as any initial increase in bank credit under a fractional reserve system will be compounded as it is transferred among latter recipient fractional reserve banks, the degree to which the newly available liquidity is caused *directly* from an increase of credit by the central bank, and that which is caused *indirectly* by the fractional reserve system, will be difficult to discern.

8 Keep in mind both Hayek (1968) and Mises (1949; 1951) viewed all prices as disequilibrium prices, and by definition, *false* prices (to use Mises' (1949: 338) words). It is Hayek's competitive discovery process that seeks the necessary knowledge to replace these false prices with somewhat less false prices. Indeed, much like Kirzner (1992: 117) stresses, it is the existence of these disequilibrium prices that spurs on the entrepreneurial discovery process.

9 Coordination can occur through ways other than the pricing system. Kirzner (1973: 216) shows this can be achieved through the decision to interact with another or not, a signaling process which need not rely on any price. Likewise, Thomsen (1992: 90) reminds us that not all action coordinations need result from information coordinations.

sustained through the knowledge transmitted through the pricing mechanism, it remains to be seen why it is that this occurs. Entrepreneurs, forever in the search for new profit opportunities, should be able to discern the discrepancy between the information they are given through prices, and that which the underlying factors suggest should prevail.[10]

One solution to this issue could be that entrepreneurs begin to act irrationally under such boom conditions – a type of irrational exuberance or animal spirits. However, as we shall see, the problem of deterioration of the quality of information – informational cascades – can obtain even in the presence of extreme rationality; for example, rational expectations.

Dilemmas in the monetary realm: an entrepreneurial catch 22

Huerta de Soto (1998: 667) works within a prisoner's dilemma framework to demonstrate why banks will systematically partake in a credit expansion, even if it is known that it will lead to certain detriment (i.e., they employ rational expectations). Assuming an exogenous credit expansion, banks are faced with a choice between participating in the expansion (which they know or suspect will be short-lived) and refraining from doing so. An equilibrium obtains with all banks participating in the credit expansion, lest they be left behind, or possibly bankrupted, as others do so profitably.

One caveat with the above analysis is that although banks may participate in a credit expansion, given the assumption of rational expectations, they will do so only for a finite time to maximize profits. That implies that they will exit the market prior to a collapse occurring. Relative performance becomes important as each desires to compete profitably with their competitors in the short-run, while surviving (or more optimally, maintaining relative profits) in the long-run. Timing becomes a central issue as the

10 Huerta de Soto (1998) reckons that in the monetary sphere entrepreneurs are susceptible to being unable to discern between one such price – the natural rate of interest. As money is a fungible good, entrepreneurs are unable to identify that which has resulted from true savings (i.e., an offsetting reduction in consumption) and that caused by an inflationary monetary expansion. Carilli and Dempster (2008) explore some of the difficulties inherent in identifying the real interest rate (i.e., that caused by time preference), as they attempt to proxy this from historical savings rates.

key to this process is exiting the market at the correct time.

The resultant catch 22 breeds an informational cascade. Banks cannot resist from participating in the inflationary process as this will leave them at a profit disadvantage to their competitors. As they must partake, they create a continual reduction in the quality of information transmitted through the price system which is dependent on the money they are responsible for distributing through the real economy. For example, in the prisoner's dilemma, we assume that all participants realize that it is collectively more beneficial to refrain from participating in the inflationary boom. However, any one participant will realize that if they cheat while others refrain from doing so, substantial profit opportunities will abound. One of two things can result. Either another bank will identify that the same original profit opportunity from 'cheating' exists and partake accordingly, *or* they will realize that a competitor is 'cheating' and be forced to do so as well to maintain relative profits. In either case, the decision is made on the basis of the information of competitors' actions, regardless of what the individual actor deems optimal based upon their personal (i.e., independent) information. The catch 22 that develops is that, although all may individually know a more optimal decision in the face of the uncertain outcome, all will rely on the collective decision of the others to base their action on. The private information about the detriment of the credit expansion becomes secondary to the group information concerning how to maintain relative profits.

Not only do banks get swept into the catch 22 by increasing loans in this situation but individuals become active participants through the informational cascade. As individuals become higher-order users of the knowledge transmitted through the increased credit, it is clear that it becomes increasingly difficult for them to ascertain the source of the increased supply of credit. As the fresh credit, exogenously increased by the central bank, is transmitted further from the source, information pertaining to this source is gradually lost. Individuals become less aware that the origin of the new credit was central bank induced inflation, and not through a general increase in the savings rate.

It may become clear at this point that two groups of entrepreneurs are acting upon two different knowledge sets.[11]

The first set of entrepreneurs are those that have access to the true source of the boom (the inflationary monetary policy) – first-order users of knowledge (i.e., primary dealers, bankers, etc). As has been demonstrated through the prisoner's dilemma, this group will be forced to partake in the boom, lest they be forced out of the market by declining relative profit rates compared to those earned by other active participants. As this group may have knowledge as to the boom's unsustainable nature, they will only participate conditional on exiting prior to the bust developing.

The second group are those higher-order users of the public knowledge that has been created by those first-order users, and transmitted along the informational cascade. As quality has deteriorated as it is passed through users, by the time this second group gains access, they will not have the underlying information concerning its true source. Hence, although new credit is now available, this group lacks the knowledge concerning if this has been created through an endogenous increase in real savings, or through an inflationary monetary expansion. For this group, the mere existence of the new funds is enough to signal its availability; no heed need be given as to the origin of these funds. The necessary ancillary background information has been lost. Lacking the underlying information as to the available credit's origin, they see only its existence, and hence, cannot give explicit heed to its continued expansion.[12] Indeed, as Prechter (2001: 121) states, the tendency for higher-order users to accept the information as given without questioning its underlying quality,

11 Garrison (1982: 133) recognizes the implications of Hayek (1945) regarding the duality of knowledge with which agents will be acting upon. Hence, one set of Hayek's tin users know directly the knowledge of the new demand conditions, and another group becomes aware of this through the actions of this first group – they lack the information as to the original source of the demand shift.

12 The fragility of cascades based on their minimal amounts of underlying information is explored in Bikhchandani, Hirshleifer, and Welch (1992; 1998), Gale (1996), Eichengreen et al. (1998), Lee (1998), Bikhchandani and Sharma (2000), and Goeree et al. (2007).

> … is not simply fairly common; it is ubiquitous. Most people get virtually all their ideas about financial markets from other people, through newspapers, television, tipsters, and analysts, without checking a thing. They think, "Who am I to check? These other people are supposed to be the experts."

Heterogeneous entrepreneurs and the exit-point

That the bust is set in motion by the first-order users of knowledge concerning the origins of the newly created credit relies on the concept of distinct entrepreneurial groups working with separate knowledge sets. Much existing literature looks at the effects that heterogeneous entrepreneurs have on the business cycle. Shleifer and Summers (1990) and de Long *et al*. (1990) divide entrepreneurs into two groups. The first are rational speculators (arbitrageurs, smart money, fundamentalists) who base their actions on economic fundamentals. This group is assumed risk averse, with a relatively short time horizon. The second group contains "noise traders" – those who display at least some degree of assumed irrationality. They are assumed to be less sophisticated and more susceptible to fads, rumors, or other ancillary information. In short, their actions cannot be fully explained by the market's fundamental data. Trade between these two groups feeds a bubble, with rational speculators participating so that they may sell out in the future as the situation turns unsustainable.[13]

Evans and Baxendale (2008) build off this framework, taking issue with the claim that ABCT fails to account for a turning-point from boom to bust as it cannot explain why entrepreneurs systematically err in clusters. By showing that once we eschew the concept of homogeneous

13 For earlier attempts at classifying investors into groups endowed with heterogeneous information see Grossman and Stiglitz (1976; 1980), Townsend (1983), and Stein (1987). Most of these approaches treat knowledge as a costly commodity, thus affecting the degree with which it will be sought, and ignore the entrepreneurial discovery process of unearthing and directing this new knowledge. Hence, one group of entrepreneurs become automatons as they simply follow the actions of the other group. See Kirzner (1984b: 205), Thomsen (1992: 33-36), Boettke (1997: 31), Huerta de Soto (1992; 2004), and Sautet (2000: 9) for critiques of this dualism of entrepreneurs, based upon an objectively defined knowledge.

entrepreneurs for heterogeneous ones, it is only the marginal entrepreneurs that must fail to create the bust. As we incorporate this concept of heterogeneous entrepreneurs into our existing framework, we find that these second-order users of knowledge only receive information concerning the boom's sustainability *after* the first-order users make this evident. Hence, as first-order users sense the boom has run its course, they exit from the market, enticing a drop in demand for investments which is signaled through the price system to the higher-order users of knowledge. This sparks a contagion effect whereby increased selling informs other entrepreneurs of the real sustainability (or lack thereof) of the current situation. The disparity between the two entrepreneurial classes, one based upon their respective place in the pecking-order of knowledge receipt, gives rise to one class being at a stark disadvantage when the boom has run its course.14

There is, however, a secondary effect of the knowledge transmission process which serves to complicate the boom's sustainability, as well as affect the duration of the bust. A shift in knowledge occurs during the boom which moves resources into newly profitable sectors of the economy. As Cantillon effects make the financial sector more profitable than the real sector, entrepreneurial resources are shifted in search of these new profits, at the expense of the real productive sector.

Intra *and* inter sector resource shifts

Much existing literature on ABCT focuses on the shifts of entrepreneurial resources that occur along the structure of production during an artificially induced boom. Hence, industries in the higher-orders of production see a relative increase in resources compared to those lower-order, or consumers', industries. More recently, attention has been directed to shifts of entrepreneurial resources *within* the

14 Lachmann claims that interest rate expectations are inelastic, and may only remain inelastic if the underlying fundamentals comprising the current monetary situation are known (1943: 79). As second-order knowledge users are largely unaware of this underlying situation, their interest expectations can be highly elastic – resulting in an acceptance for the increased quantity of credit at a lower than natural interest rate. Mises (1943: 251-252) responds to Lachmann from a different angle, stating that the interest rate need not be visibly depressed compared to other periods, but only lower than it would be if the inflationary monetary conditions were appropriately accounted for.

firm (Leijonhufvud 1981: 248; Horwitz 2000: 119; Koppl 2002: 120; 2003; Bagus 2008). Inefficiencies are bred as entrepreneurs focus on monitoring the behavior of monetary authorities, at the expense of the consumers, whose wants the entrepreneur otherwise aims to serve.

Lacking an inflationary monetary policy, entrepreneurs focus their attention on the profit avenues deemed most rewarding given consumer preferences. These manifest through the structure of production, as production must be undertaken cohesively with the final wants of consumers. To the extent that entrepreneurs are able to produce goods and services that consumers desire, profits can be maximized. The result is a structure of production with two inherent features. First, the end value of produced goods is determined by the real value of consumption goods demanded by consumers. This demand is tempered on the consumption end by the applicable savings rate that consumers have chosen, and hence, the residual income component available to be directed towards consumption. This savings rate, in turn, results in a natural rate of interest. Entrepreneurs act upon this rate to lengthen or shorten the structure of production as technology levels, resource availability, and savings deem appropriate. Hence, a production structure lacking misallocation or over-production has a consumption-determined level of output (both final output and stage specific) and a length approximated by the *real* rate of savings prevailing in the economy.

An exogenous augmentation in the money supply (through central bank induced inflation, for example) serves to create distortions along both dimensions which were previously trending toward equilibration through relative profit rates. Entrepreneurs had profited earlier through forecasting consumers' demands appropriately and shifting the structure of production to account for applicable demand shifts. Now, with the introduction of an exogenous monetary change, a new type of profit opportunity emerges, as influenced by monetary policy. Hence, entrepreneurs will no longer profit solely by satisfying consumer wants, but also by correctly predicting changes in monetary policy by the proper authority (generally the central bank), with significant profit opportunities resulting by

equilibrating the changes occurring in the *monetary* realm.[15]

Powell (2002) and Callahan and Garrison (2003) look at two recent financial crises – Japan's crash in the late 1990s and America's dot-com bust, respectively. In particular, they point out the Cantillon effects which occur whereby the first users of newly created money are able to benefit from it before the general price level increases to counter its presence. As inflation builds an effect is created whereby it is more difficult to estimate what the true consumer demand for goods is, as well as the true savings rate prevailing with which to determine an appropriate length for the production structure.[16] A shift in entrepreneurial focus occurs with increased attention paid to the monetary factors affecting these variables, and not the true underlying fundamentals which were previously afforded primary focus. Although there is a shift towards monitoring the monetary authorities in search of profits, a secondary shift occurs owing to these Cantillon effects. Hence, as the financial sector remains the origin of the fresh credit, relative profits are increased at the expense of the real sector, which will not receive the increased funds until a later time. *The production realm takes on an increasingly insignificant importance due to a relative decrease in profit opportunities compared to the financial sector.*[17] A shift occurs where entrepreneurs are drawn from the *real* sector (i.e., that generally concerned with maintaining the structure of production) into the *financial* sector (i.e., that concerned with forecasting changes in the monetary realm).[18]

The question that gains pertinence at this point is: "Why would an entrepreneurial drain from

15 See, in particular, Koppl and Mramor (2003: 256) as they state: "[S]uccess now becomes more closely tied to anticipating the behavior of the Big Player [i.e., the central bank], resulting in a reallocation of entrepreneurial alertness toward this task and away from fundamentals."

16 A true demand for goods would correspond to the renunciation of consumption in the present – *real* savings.

17 We may think of the recent shifts from production to finance that occurred in America's economy over the last boom – profits from production at GM diminished as its financing arm, GMAC, enjoyed increased growth and profitability. Similar cases can be found in many previously large American production companies (i.e., Ford, GE, etc.). Bagus and Howden (2009a) analyze Iceland's recent financial crisis, particularly noting the preceding shift that allocated capital from the real sector (characterized mainly by the fishing industry), into the financial sector (characterized by banking and financial speculation).

18 See Bagus (2008: 291): "[T]he shift in the structure of knowledge or human capital during the asset price boom parallels the shift in non-human capital that has long been at the center of ABCT."

the real sector have such damaging long-term results, such as those resulting from a bust?" An entrepreneurial shift will only occur to a point where profits between the two sectors – real and financial – are equalized. Hence, profits in the real sector *should* increase to a point where the profit rate of the financial economy is situated. Two significant factors delay the equilibration of profits and actually cause a greater divergence as the entrepreneurial shift occurs.

First, we may look at an ancillary conclusion from Dornbusch (1976). As adjustments in the real economy are *stickier* than those of the financial sector, we see a general 'overshooting' of financial sector prices relative to what the underlying real fundamentals would suggest.[19] Dornbusch's conclusion of a general over-reaction of financial sector prices has an important corollary – a relative *under-reaction* of real asset prices. This reflection will manifest in profit levels in the real economy, which will stay relatively level despite the exodus of entrepreneurs into the financial realm.

Second are the effects from the herding behavior, as outlined in Bagus (2008).[20] The entrepreneurial shift from the real sector to the financial sector entails not only a knowledge shift, but a capital shift as well. Entrepreneurs take with them money which was previously used for real production, and begin speculating on financial assets. This influx places upward pressure on prices in the financial sector, which benefits the profit margins of those who have entered before the monetary

19 Much "rational bubble" literature focuses on this disconnect between real and financial asset prices. Froot and Obsfeld (1991) note that "intrinsic bubbles" develop as fundamental values are departed from for extended periods of time due to the fact that they come to be viewed as either under or over valued. Hence, initial "mispricings" may also reinforce future ones, creating a bubble. Tirole (1982) demonstrates that price bubbles cannot occur in assets having a finite life, and hence, determinable equilibrium value. Tirole (1985) furthers this to account for individual time horizons that continually update and reset to achieve bubbles in assets of finite life, *in a dynamic setting*. Koppl and Mramor (2003: 256), in distinction, reckon bubbles become *irrational* manifestations of herding behavior. The fact remains that rationality has not changed concerning the end goal sought by entrepreneurs (i.e., profits), rather the only change is the means used to attain the profit oriented goal.

20 Bagus identifies three sources of the herding phenomenon: 1. illusory gains increase optimism, 2. credit expansion creates the belief that production is possible without consumption restraint (i.e., Huerta de Soto 1998), and 3. increased financial profits attract new entrepreneurs to exploit profit opportunities (i.e., Mueller 2001: 14). Davenow and Welch (1996), and Bikhchandani and Sharma (2000) provide some alternative sources of herding behavior and review the relevant literature. See also Koppl and Yeager (1996), Ahmed et al. (1997), Gilanshah and Koppl (2001), Koppl and Mramor (2003), and Koppl and Sarjanovic (2003), for empirical looks at herding behavior caused by "Big Players" (i.e., those who are influential, insensitive to profit and loss, and have discretion over the exercise of their power) in the financial markets.

influx occurred. This increase in profits then sends a signal to other entrepreneurs of the more attractive opportunities that await them if they leave the productive sector (i.e., the "old" economy) and enter the financial sector (i.e., the "new" economy).[21] Hence, just as increased liquidity through fresh capital provided the original impetus for the entrepreneurial shift to the financial economy, the continued and increasing profits driven by additional entrepreneurs entering the sector (with their capital) breeds the environment which encourages continued entrance; the herd has started moving to greener pastures.22

Despite the shift occurring from one sector to another, one thing remains homogeneous among all entrepreneurs – the desire to maximize profits by seeking out undiscovered opportunities to exploit. However, while the end sought remains the same, the means utilized shift dramatically.[23] Instead of forecasting consumers' demands, the new financial entrepreneurs are more concerned with forecasting changes in the monetary environment (Leijonhufvud 1981: 248; Horwitz 2000: 119; Koppl 2002: 120; 2003; Bagus 2008). The attention is directed toward the monetary authority in an attempt to gain knowledge of future changes which will affect the financial realm, rather than those changes that will effect the real economy directly.

A second-order effect of the entrepreneurial shift adds to the herding mentality and feeds the loss of production oriented entrepreneurs. Not only are the relative profits of the financial and real sectors competing against each other for capital, the relative profits within the financial sector add a competitive element within itself. Hence, not only are entrepreneurs driven to seek higher relative profits in the financial sector *vis-à-vis* the real sector, they are also seeking higher relative profits than

21 Remembering the implications of Dornbusch (1976), the real sector (defined by sticky prices) will experience little direct impact in the form of downward pressure on prices resulting from this monetary capital shift.

22 Paradoxically, one ancillary effect is that the previous pasture remains quite green. With fewer entrepreneurs exploiting profit opportunities in the real sector, there will be upward pressure placed on profit margins. Although these may increase in absolute terms compared to the scenario before the entrepreneurial shift, they will remain lower than exist in the financial sector, a condition necessary to ensure the shift continues.

23 The homogeneity of the end sought (profit) answers the problem raised against herding behavior theory by Bikhchandani and Sharma (2000: 13): "[T]o examine herd behavior, one needs to find a group of participants that trade actively and act similarly."

others within the financial sector (Horwitz 2003: 87; Bagus 2008: 291). An increase in demand for financial entrepreneurs (investment advisers, Fed watchers, etc) drives a further exodus from the real economy and into the financial sector.

This shift breeds a new type of financial entrepreneur that would not exist lacking the exogenous credit expansion ("noise traders" to use Shleifer and Summers (1990) and de Long et al's (1990) preferred terminology). This in itself is, however, not a sign of irrationality. As was previously mentioned, the uniting factor among all entrepreneurs is the drive to seek out and exploit undiscovered profit opportunities. The new entrepreneurs are merely making a rational shift into the financial sector, as higher relative profits are signaling disequilibria that require adjustment. Due to the informational cascade in effect, some new entrepreneurs see the shift as permanent (i.e., buy and hold), while others see the new economy as unsustainable, but requiring an exit strategy to maximize profits (market timers).

From boom to bust

The caveat in this entrepreneurial shift has been that one group of entrepreneurs – the first-order users of knowledge – have knowledge that the inflation has been caused by an exogenous credit injection and not through increased real savings, while another group – those higher-order knowledge users – have no such knowledge of this effect, only gaining it later through the informational cascade. Higher-order users will not have any reason to believe that the current monetary situation is unsustainable. Resultant prices created by higher-order knowledge users of the cascade will show a continual reduction in quality as a result of the loss of the true information base pertaining to the transmitted knowledge. It becomes clear that at some point in time the first-order users who think the inflationary trend has ended will exit, thus signaling to second-order knowledge users to shift their focus on pursuing opportunities in greener pastures.

Activities built upon the informational cascade are of a fragile nature. As they are based on little, if any, underlying fundamental information they are instead highly conditioned by the actions of other individuals. That point when first-order users of knowledge start refraining from reinvesting, as well as start selling existing investments, sends a strong signal to those higher-order users of knowledge. At this point, it need not matter where the money moves into, only that it exits the previously green pasture. Simultaneously, the system of price acceptance by the second-order users of the knowledge provided through the pricing mechanism may begin to break down. As the knowledge embodied through prices has become too "dirty" to use, a shift may occur where the true underlying informational element of the system is sought after. As Grossman (1976: 585) states: "[S]ome traders want to know why prices are, for example, unusually high. It is not enough for traders to observe only prices." As the fragile pricing system begins to break down, money and capital flow out of the uncertain financial market and into more certain, or higher yielding, areas of the economy.

This outflow of liquidity will have deflationary effects on financial prices, with the result that average profits in the sector will also decline. For the second-order knowledge users, a relatively small amount of knowledge can change their opinion about the current situation. As entrepreneurs begin exiting the financial markets, profits decline, and a new signal is provided to entrepreneurs – the monetary influx was not sustainable and has now ended.

Compounding this problem are Evans and Baxendale's (2008) marginal entrepreneurs. Those who were only experiencing marginal profitability at the peak now find themselves with declining profits, or outright losses. Typically, late-comers to the financial sector – those who bought assets when prices were near their peaks – will be the first to experience losses as a relatively small fall in prices will erase much of their profit margin. These entrepreneurs will be quickly enticed to shift into higher yielding assets, thus adding to the outflow of capital from the financial economy. This additional deflationary pressure creates a strong feedback loop where entrepreneurs exit as a decreased amount of

liquidity in the financial sector causes downward pressure on profits, with an entrepreneurial shift away from the financial sector compounding this problem.

Two notes on the departing liquidity should be qualified. First, the strong possibility of insolvency and outright bankruptcies by some entrepreneurs will erase the "paper" profits of others and, hence, also place downward pressure on the relative amount of capital exiting the sector. Second is that the outflow of funds will shift to where profits are expected to be highest. This need not be a complete exit from the financial sector. For example, although profits in the stock market may decline beneath those in the real sector, the bond market may offer the highest expected rate of profit, thus enticing capital inflows through these expected relative gains.

The typical presentation of the ABC has a credit injection disrupting a simplistic loanable funds' model (see, for example, Garrison (2001). As the rate of increase of monetary capital is greater than the true real rate of monetary savings, a decrease in the interest rate below the Wicksellian natural rate results. From here a conclusion is drawn that the structure of production is lengthened – investments previously unprofitable at the higher natural rate now become attractive at the lower rate, brought about by an augmentation of credit. What the loanable funds model overlooks is the heterogeneity of avenues the credit injection may be directed into. Implicitly it is assumed that producers become the recipients of the credit and use it on production spending, thus affecting the *real* structure of production. However, fresh credit generally feeds into the financial markets initially (i.e., real estate, bond or stock markets) which delays any disruptions to the real structure of production (Bagus 2008).

The bust may be temporarily delayed if the outflow of money from one area of the financial sector can be transferred to another area within the sector (a flow from the stock market to real estate, for example). The issue that will eventually arise, however, is that the gains in the financial sector will be illusory and may not continue indefinitely. The real sector, as illustrated through the structure of production, must ultimately remain aligned with the ultimate consumption preferences of consumers.

During the boom phase when profits are strong in the financial sector, the economy as a whole gives the appearance that this is uniformly so. Illusory profits in the financial sector may more than offset the actual, but relatively declining, profits in the real productive sector giving the impression that the aggregate economy is performing well. However, when the bust occurs in the financial sector, it becomes apparent that the real productive structure has undergone a debilitating shift during the boom.

The entrepreneurial shift which previously occurred left the real economy with a lack of entrepreneurs to maintain the structure of production. This was not immediately apparent as *aggregate* profits in the economy remained strong, due to the illusory financial gains. However, with the newly diminished importance of the financial sector, the focus returns to a real economy that is woefully disequilibrated from the consumption requirements of the market.[24]

The recovery phase

Discoordinations in the structure of production require time to return a state of malinvestment to one consistent with the preferences of consumers and hence, capable of a growth revival. The financial sector is able to shed its discoordinations quickly (although evidently with much pain) as few natural rigidities exist within this realm. Prices are able to adjust quickly to regain values consistent with what the underlying fundamentals suggest. In comparison, the real economy is subject to many frictions which make the adjustment process potentially lengthy. Time-lags in production mean that misallocations of capital may take significant amounts of time to be repaired. Heterogeneous capital will need to be redistributed which may involve a significant waiting period as entrepreneurs search for a capital structure consistent with consumer demands. Labor in particular exhibits pronounced rigidities

24 Of course, only in equilibrium could a situation exist where entrepreneurs are coordinating the needs between consumers and producers optimally and sustainably (see Kirzner 1984a: 415; 1984b: 204). However, as has been shown, a situation exists which complicates the problem in a much more fundamental way through an inflation induced informational cascade which not only disrupts the convergence between consumption and production needs, but between the productive economy and the financial economy as well.

as workers must undergo both locational, as well as occupational, changes required by the new production structure.

A significant factor influencing the length of recovery time required in the real sector is the knowledge shift which occurred during the boom phase. Entrepreneurs that previously developed the productive capabilities of the economy were drawn into the financial sector resulting in an alteration of the required knowledge and skill-set. While entrepreneurs previously succeeded by remaining aware of changing market demands based on consumer wants, a new knowledge set was bred which shifted the focus to the changing monetary environment. With the onset of the bust, an entrepreneurial shift must occur which relocates the financial entrepreneurs *back* to the role of productive entrepreneurs. The knowledge previously acquired concerning the monetary arena may be of little use with the new productive focus.[25]

Measures which disrupt this learning process, although lessening the immediate hardships of the bust, will prolong the length of time until a healthy recovery may occur. Bailouts for bankrupt firms will delay the immediate pain caused by losses and layoffs of the affected companies, however, a significant disruption of the healthy learning process will result. As entrepreneurs do not learn that the activity chosen was not conducive to a healthy structure of production (i.e., one structured according to real savings rates and producing goods demanded by consumers) the bust will continue until the learning process is complete. Only when entrepreneurs have regained knowledge of maintaining a productive structure parallel in both length and breadth to the demands of consumers and constraints of real resources may a period of healthy growth resume.

A healthy recovery phase, then, will be one characterized by an allowance for entrepreneurs to

25 Some posit that the bust is caused by a loss of confidence in the financial markets (i.e., Bagus 2008: 292). However, this is a proximal effect, not a cause of the bust. The cause of the loss of confidence is that *loss of knowledge* concerning the *real* economy. As the solution is now known to lie in creating a more cohesive productive structure, entrepreneurs are in a position where the necessary knowledge to do so is lost, or temporarily forgotten. With no immediate knowledge of how to rectify the malinvestments in the economy, entrepreneurs may *then* lose confidence in their own ability to navigate the ensuing storm.

replace the skills learned in the previous expansionary financial environment with the skills needed for the maintenance of the production structure. To the extent that entrepreneurs are inhibited from achieving this necessary state, a healthy recovery phase will be delayed.

Conclusion

Austrian business cycle theory has faced criticisms which center on the exact process which shifts the artificially induced boom into a necessary bust. By viewing entrepreneurs as heterogeneous actors, we find that disparities in the *quality* of information each respective entrepreneur utilizes will breed differences in how long they believe the boom period will remain profitable.

Informational cascades provide a necessary link in understanding how the boom period reverts to bust, thus answering criticisms previously inadequately attended to. The inherent deterioration in the quality of knowledge one set of entrepreneurs has available leads to erroneous conclusions as to the sustainability of the boom. As entrepreneurs with knowledge of the true sustainability of the situation exit the financial economy when they perceive the boom period to have run its course, a signal is sent to other entrepreneurs that the knowledge they previously acted upon was at best tenuously linked to the true underlying information. A fragile situation begins to collapse, with marginally profitable entrepreneurs going bankrupt or otherwise exiting the market, thus compounding losses and placing downward pressure on others' profits.

Relative profits in the financial sector are higher than in the real productive sector as this sector marks the entry point of the fresh monetary injection into the economy. As entrepreneurs are drawn into the relatively more profitable financial sector, two important resources are drained from the structure of production. First, money capital is removed and used for speculative purposes. Second, a removal of entrepreneurial knowledge occurs as individuals shift their attention away from consumer demands and toward the monetary authority's actions. The continual influx of fresh credit into the financial sector

places upward pressure on financial profits, while the disappearance of profit exploiting entrepreneurs from the real sector places upward pressure on production-oriented profits. As the relative profit spread between financial and real sectors remains positive (due to the Cantillon effects from the credit injection), the shift of capital and entrepreneurs will continue relatively unabated, thus draining resources from the real sector.

As the existing structure of production has become inconsistent with prevailing time preferences and resource availability, a necessary bust must occur to create a structure consistent with these demands. As a knowledge shift occurred which replaced knowledge of production with that of financial and monetary speculation, a learning process must be undertaken by entrepreneurs before the economy may reach a point where healthy recovery is possible. To the extent that this process is disrupted, a true sustainable recovery will be delayed.

An increasing body of ABCT literature focuses on knowledge problems stemming from an artificially increased credit supply. This paper has added two new aspects to the theory. First, we have shown how informational cascades result in a degradation of information among higher-order knowledge users, which leaves them at a loss to understand the true sustainability of the boom. The fragile nature of their knowledge rests on the actions of others. Hence, when those individuals with first-order knowledge concerning the true source of the fresh credit sense the boom has run its course and exit accordingly, a signal is sent to those who lacked knowledge of the economy's unsustainable nature. Second, the existing literature showing a shift in the entrepreneur's focus to the actions of the monetary authorities, has been augmented with a real resource shift to the financial sector. Hence, not only is there a misallocation of resources *along* the structure of production, but also a shift from the real to financial sector of the economy. As entrepreneurs and resources are shifted into the newly profitable financial sector at the expense of the real sector, a loss of knowledge concerning how to maintain a structure of production aligned with consumer demands occurs. Disruptions to

entrepreneurs' abilities to relearn this lost knowledge will prolong the bust needlessly. Thus, a more thorough understanding of the business cycle is gained with these two new knowledge considerations.

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