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NOVEMBER 7-8, 2014 TORONTO, ON

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Aims and Scope

The Journal of Prices & Markets, published by the Ludwig von Mises Institute of Canada, is a journal that seeks to improve the understanding of the role of markets in the economy. Submissions should seek to shed light on contemporary issues while being grounded in a praxeological reasoning. Prices & Markets welcomes submissions from a variety of fields such as politics, sociology, and psychology, where ever they can bring relevance to economic and financial questions.

Mission

It is the mission of the Ludwig von Mises Institute of Canada to educate the public to the importance of placing human choice at the center of economic theory, to encourage a revival of critical historical research, and to advance the Misesian tradition of thought through the defense of the market economy, private property, sound money, and peaceful international relations.

"Economics is mainly concerned with the analysis of the determination of money prices of goods and services exchanged on the market. In order to accomplish this task it must start from a comprehensive theory of human action…. [I]t must not restrict its investigations to those modes of action which in mundane speech are called "economic" actions, but must deal also with actions which are in a loose manner of speech called "noneconomic."

— Ludwig von Mises

Editor's Introduction

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On November 7-8, 2014, the Ludwig von Mises Institute of Canada hosted the 3rd annual International Conference of Prices & Markets (formerly the Toronto Austrian Scholar's Conference). The event took place at the University of Toronto, and held an opening reception the evening before. Participants came from around the globe, including the Austrian, Germany and the United Kingdom.

Doug French got the event rolling with a powerful speech entitled "Austrian Sin and Malinvesting in Las Vegas." The crisis that erupted six short years ago didn't just have economic repercussions, as French made clear. Humiliation and despair abounded, suicides skyrocketed, and families were destroyed. The speech underscored that while economics might be value-free, the implications are far from it.

Eight separate sessions allowed the 24 presenters ample opportunities to test out their

new theories. Attendees were also afforded the possibility to ask questions and mingle with the presenters. Topics covered the range from theory to history, with a special session set up for documentarian Jimmy Morrison to unveil his newest film "The Bubble Film."

This *Papers and Proceedings* allows the reader unable to attend to get a glimpse of the ideas conveyed over the course of the two-day event. While these pages lack the warmth and camaraderie of the event, they do give the interested reader a feeling for the type breadth and depth of scholarship covered in two short days. This year´s event will be held once again at the University of Toronto on the 6-7 of November. I hope to see you all there.

The First Step to Returning to Sound Money: Requiring 100% Reserves on Bank Demand Deposits

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The most important characteristic of sound money is that it is backed one hundred percent by reserves. Let us acknowledge that the fiat money that we all use is comprised of pieces of paper in our pockets and demand accounts in banks. We may access our demand accounts in banks via paper checks, electronic debit cards or some other means.

Two Ways for New Money to Enter the Economy

In the fiat system we currently live in there are two methods by which new money enters the economy. In the first method, the Fed conducts open market operations in which it buys an asset with money it creates out of thin air. It pays for these assets with money that it creates out of thin air.

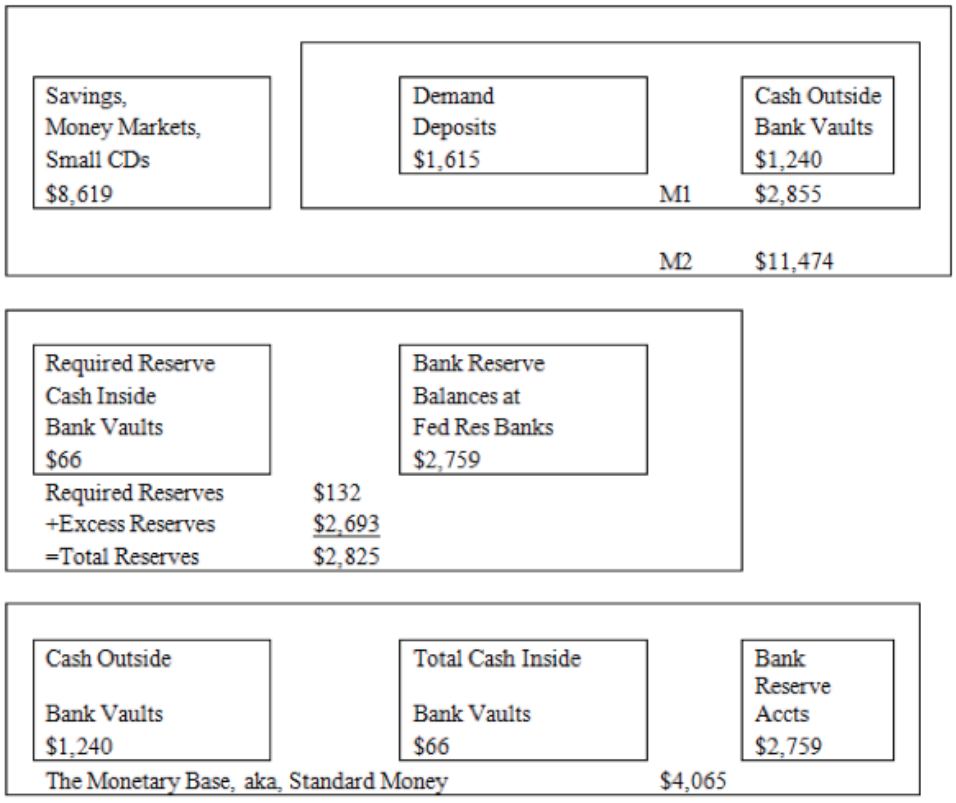
Once created, most of these new fiat dollars end up as reserves in the banking system and will

remain there until the Fed sells some asset in a reversal of its prior open market operation. It can sell the asset only by offering it at a price low enough to entice buyers, which may mean raising the interest rate.

The second method by which money can enter the economy is via bank lending. Under the present fractional reserve banking system, one dollar of new reserves can be pyramided into around ten dollars of new money. The bank credits a demand account when it makes a loan. This money was created out of thin air by the banking system. Historically, banks have created more money via their lending operations than the Fed has via open market operations, because each dollar of new reserves can create multiples of new money via bank lending

Prior to the Fed's unprecedented expansion of base money in 2008, there were very few excess reserves in the banking system. The banks quickly expanded lending--and, thus, the money supply--to convert any new, Fed produced excess reserves into required reserves. Banks simply used their reserves to the fullest in order to make more money.

Cash, Reserve's, the M'S, and the Monetary Base – a Visual Depiction[1]
October 15, 2014 ($ bn.)



1 The above chart displays three boxes. The first box visually displays the components of the money supply--M1 and M2. The second box visually displays the components of bank reserves-- cash and bank reserve account balances at the Fed--and how much of these reserves are required and excess to the fractional reserve banking system. The third box visually displays the three components of the monetary base. This data was obtained from the Federal Reserve System as of October 15, 2014.

A Unique Opportunity to Mandate One Hundred Percent Reserves

To stop inflation in the Austrian sense--i.e., stop the increase in the money supply--requires two things. First, the Fed must stop increasing reserves. Second, the banking system must stop pyramiding these reserves into new money. Both must be stopped, but ending fractional reserve banking addresses the most immediate danger, because the banking system capacity for increasing the money supply is many times that of the Fed's capacity for manufacturing new reserves.

However, there is a new, bigger danger now. Whereas in the past total reserves were very low and there were almost no excess reserves in the banking system, today the numbers are growing each month. As of October 15, 2014 excess reserves amounted to $2.693 trillion. The ratio of required reserves ($.132 trillion) to bank demand accounts ($1.615 trillion) was 8.2%.

If the banking system utilizes these excess reserves as efficiently in the future as it has in the past, checking balances could increase by twelve fold for each dollar of excess reserves. But it gets worse.

Checking balances could go from $1.615 trillion to $34.456 trillion (($2.693 trillion/8.2%) + $1.615 trillion). If we add the $8.619 trillion of savings, money market accounts, and small certificates of deposit to the mix of reservable liabilities, the ratio (i.e., required reserves/reservable liabilities) drops to 1.29% (($.132 trillion/($1.615 trillion + $8.619 trillion)) from 8.2%. Total bank deposits that effectively can be withdrawn upon demand would increase by 77.5 fold for each new dollar of reserves! This means that total reservable liabilities could go to $219 trillion (($2.693 trillion/1.29%) + $1.615 trillion +$8.619 trillion). Therefore, excess reserves of this proportion are a ticking time bomb of monetary inflation.

The Realization Rothbard's Deposit and Loan Banks

The obvious way to end fractional reserve banking is to raise the reserve from its current, multi-tiered, complex system to requiring one hundred percent reserves. Fortunately, the Fed's expansion of excess reserves has given us an opportunity, that may be fleeting, to divide the banking system into deposit banking and loan banking and require one hundred percent reserves on deposit banking. Total bank reserves are greater than bank demand deposits...$1.615 trillion of demand deposits and $2.825 of total bank reserves. The Fed could require that the new deposit banks maintain one hundred percent reserves on their current level of demand deposits without creating more reserves. The deposit banks would not be allowed to lend their demand deposits. Demand deposit customers would pay the deposit bank for money transfer services. The banking system's other deposits of savings, money market, and certificates of deposit would move onto the liability side of the loan bank. The loan banks assets would be its loans and investments. The deposit bank's assets would be fiat money reserves. The deposit bank would make its money through fees alone. It would not be allowed to invest its customers' deposits. Customers' savings, money market, and certificate of deposit accounts at the loan banking side would be backed by its loans and securities, the size of the bank's capital account, and the banker's reputation. These non-demand, savings and time accounts would be seen for what they really are: loans made to the

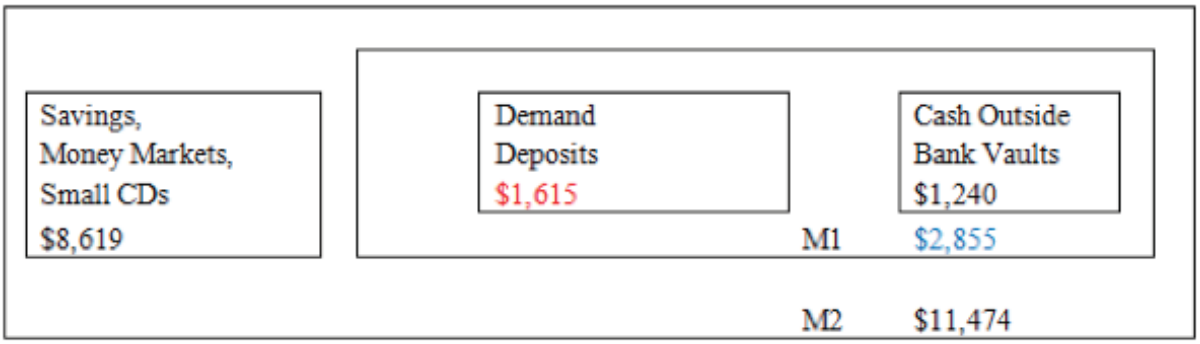
bank.

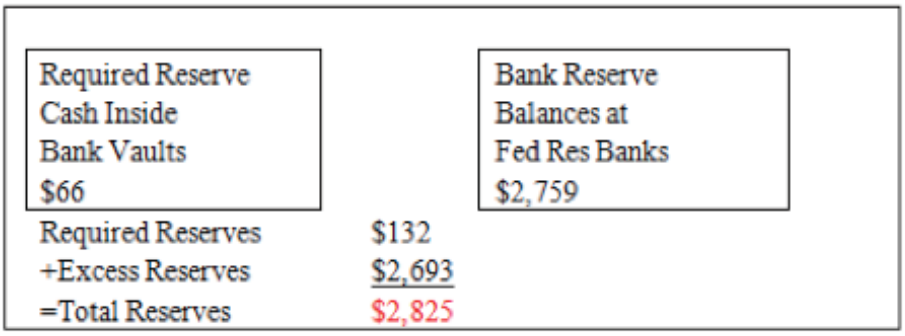
Enforcing 100% reserves on bank demand deposits would mean that the banking system would be defined by the following equation:

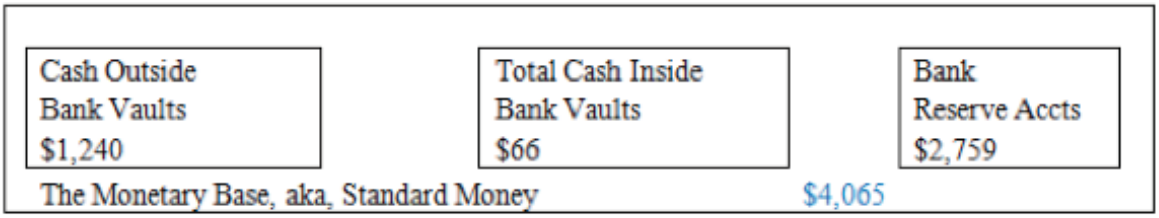
Bank demand accounts = Bank reserves (cash in bank vaults plus reserve accounts at the Fed)[2]

Adding "cash held outside bank vaults" to both sides of the above equation gives this result:

M1 = The Monetary Base[3]
October 15, 2014 ($ bn.)







Transition Issues

The transition from our current system--in which demand accounts are mixed with time accounts and both are lent or used to purchase securities, which results in multiple owners of

2 The numbers in red would be equal to one another.
3 The numbers in blue would be equal to one another.

demand funds--will require some time to sort out. Here are five such issues:

1. Currently the public expects that savings, money market, and some short term certificates of deposits may be redeemed upon demand with no loss of principle and some insignificant loss of interest, just as it expects to redeem checking deposits upon demand. This will not be the case when these deposits are moved to the loan bank. There may be some overnight financing of trade, for which the depositor might earn interest, but most deposits in the loan bank will carry a longer maturity, so that the banker can conduct proper asset/liability management; i.e., ensuring that his loans are being repaid at approximately the same time as his deposits mature, so that he can meet his depositors' possible withdrawal of funds.

2. A corollary of the above issue is the possibility that, prior to the imposition of 100% reserves on demand deposits, current holders of savings and money market accounts may choose to move some of these funds into their demand accounts in order to ensure that the deposits are backed by fiat reserves. They would conclude that the current interest rate on these funds is insufficient to entice them to leave them in the loan bank, secured by loans of unknown quality. Savings, money market, and small certificates of deposit comprise $8.619 trillion as of October 15, 2014. There are not enough excess reserves in the system at the present time to back all these deposit funds by fiat reserves. Nevertheless, the banking system would still have $1.210 trillion in excess reserves after requiring that all demand accounts be backed one hundred percent by reserves ($2.825 trillion of total reserves minus $1.615 trillion of demand accounts). So, the banking system could absorb the public transfer of roughly one trillion of its roughly eight trillion dollars of savings and money market accounts into the deposit banks. Then, the loan banks would have to entice the rest of the depositors not to switch by raising the rate paid on their deposits. It would have $10.675 trillion in loans and securities as assets, which should yield sufficient income to entice current holders of savings and time deposits to leave their funds in the loan bank. The other way to resolve this issue would be to have the Fed create the necessary excess reserves and give them to the banking system. This remedy was suggested by Professor George Reisman at the Mises Circle in Newport Beach, California in 2009.

Regardless of the mix of demand deposits to savings deposits after the one hundred percent fiat reserve requirement becomes law, all excess reserves must be removed from the banking system and the public must understand that normal commercial law will require that only demand deposits are backed by reserves. A demand deposit must display all of the following characteristics:

a. The balance in the deposit bank does not earn interest, because the banker cannot lend the money to someone else.

b. The depositor pays fees for the deposit bank's services.

c. The balance of the account must be instantly redeemable at full face value upon demand.

d. The redemption does not require prior notice to the bank.

The deposit bank's demand deposits must equal its reserves, whether held in the form of cash or as a deposit at the central bank. A new loan could be made at the loan bank only after repayment of an existing loan or a decision by a holder of a demand deposit to transfer some of his money to the loan bank in order to earn interest. In other words, loans must be funded out of a prior act of saving and not from fiat money creation.

3. The loan side of the banking system may sustain losses in the near term, since the interest rate charged to borrowers cannot be adjusted upward on most loan contracts in order to pay for the probable increase in deposit rates required to entice savings and time depositors to keep their funds in the loan bank. The loan banks would have some reduced costs, such as the expense of paying for the money transfer and settlement system--checks, debit cards, etc. These services would be transferred to the deposit bank, where the depositors pay fees for all services. Plus, the FDIC would be liquidated, so neither deposit nor loan banks would incur that expense or the expense of paying for periodic FDIC examinations. In the long run, after the system has stabilized, the market would determine both loan and deposit rates, and only the most astute bankers would survive and prosper.

4. Legislation is required to mandate 100% reserves on demand deposits. Such legislation would finally correct the underlying error that has plagued the banking system for two hundred years; i.e., the series of court cases in England--Carr v.Carr (1811), Devaynes v. Noble (1816), and Foley v. Hill and Others (1848) that ruled that a deposit is a loan to the bank and not a bailment.

5. Stopping the money printing presses most likely will trigger a severe recession, as those non-wealth generating, bubble activities, which are supported by a continuing source of new money will collapse and be replaced over time by real wealth generating activity. But one should not conclude that it was the stopping of the money printing presses that created this situation. Money printing produced the bubble activities that must be purged at some point, either earlier, when we have some control over money matters, or later following a general, catastrophic economic collapse.

Conclusion

The Fed has created an opportunity to make the move to 100% required reserves on demand deposits. The banking system would be divided into deposit banks, which would hold only demand deposits and for which the 100% reserve requirement would pertain, and loan banks that would act as fiduciary intermediaries for those seeking to invest their excess demand funds. We would have an honest banking system under the same rule of commercial and criminal law as all other commercial enterprises. As long as deposit bankers kept 100% reserves, the money supply could neither shrink nor expand. Loan banks would disclose that their liabilities were held at risk, which is no different than buying a stock or bond. Reputable private auditors would ensure that deposit bankers were following the 100% reserve rule and that loan bankers were not operating a Ponzi scheme. Ordinary district attorneys would enforce the law, eliminating the need and expense for government regulators and deposit insurance. Stockholders would be subject to unlimited liability for fraud.

This proposal deals only with ending the banking side of money inflation. The next step would be to ensure that no entity can manufacture fiat reserves out of thin air. Either the Fed itself would be prohibited by law from doing so, via its open market operations, or Congress could abolish the Fed and establish some agency to insure that the now fix supply of money is backed by the government's gold reserves at whatever price is required to back all of M1 by the Fed's 261.5 million ounces of gold. At that point anyone could take gold to this agency and get dollars at the fixed rate or take dollars to this agency and get gold at the fixed rate. Once the public understands the true nature of money as something that has legal backing to a commodity at a contract rate--such as the dollar to gold ratio of $35 per ounce, as established at Bretton Woods--it would understand that any trusted agency could produce money, not just governments. At that point legal tender laws could be abolished and money production would be privatized and governed by normal commercial and criminal law. Sound money would have returned to its rightful place in the market.

Money in a World of Finance

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Despite central bank efforts of the past six years, there seems to be little need for money (narrowly defined) in the financial system. Mutual funds currently hold about 5 percent of their assets in cash. The size of the market for money market mutual funds, a close money substitute commonly held in investment portfolios, is at an all time low at less than 3percent of total stock market capitalization (down from over 12 percent just five short years ago). Businesses are increasingly reliant on non-bank funding, with the size of the global shadow bank industry conservatively estimated to be $75 tr. as of 2013, with $25 tr. in the United States alone (Financial Stability Board 2014). Reliance on credit amongst households, businesses and governments are at or near record highs. The banking system, the traditional originator of demand deposits (perfect money substitutes) doesn't seem to have much of an appetite for issuing new money either. The total deposit base of $12 tr. would, if fully lent out at the applicable reserve ratio, balloon to $215 tr.

All of these examples demonstrate a clear decline in the role money serves in the modern financial economy. They also point to the importance of imperfect money substitutes in performing roles typically assigned to money. In this paper I will look at where and what

function money serves in the world of finance. I will then turn to the reasons why the demand for money has declined and the demand for its substitutes has increased. I conclude with a brief look at specific reasons why the money is currently held in such low regard relative to alternative financial assets.

Money as a Financial Asset

"What you get and when you get it" are the two attributes that all financial assets can be assessed by. "What you get" refers to the type of value provided by the asset, whether market value (determined as per specific supply-demand conditions) or par value (where the payout is predefined). "When you get it" refers to the time period under which the holder can lay claim to the value contained in his financial asset. Value is unleashed either on demand or in the future, after some requisite waiting period. Creating a categorization according to the four values these two attributes can have gives rise to four different types of financial asset, as per table 1.

		Value of Asset	
		Par Value	Market Value
Availability	Present	Money	Equities
	Future	Bond	Future/Forward

Table 1: Categorization of Financial Assets

Source: Howden (2015: 46)

Money is a unique financial asset in the sense that it is the only one capable of offering the holder present, or on demand, availability while at the same time trading at par value. This distinctive combination stems from the two roles that money serves in the economy. On the one hand, money functions as an exchange medium to settle pecuniary obligations. On the other hand, it is also the unit that defines prices for all other goods. When the same good functions as both the exchange medium and pricing unit, the result is a financial asset that trades at par value, on demand: money (Howden 2015).

The par value nature of money stems directly from it exchanging in terms of itself. The on-demand nature is a result of money taking on a role as the generally accepted medium of exchange. Note that the generally accepted medium of exchange is not, under this chain of reasoning, what defines money (as is commonly the case in discussions concerning the origin, role and quantity of money). It is rather a function that arises due to the widespread demand for an asset that eliminates risk and uncertainty in the payments system.

Mises (1949: 244-51) creates an equilibrium construct to show the conditions under which money is demanded by first illustrating those were it will not be. In his "evenly rotating economy", Mises demonstrates that only under conditions of full certainty regarding the timing and magnitude of future expenditures would an individual's demand for money fall to zero.

This outcome arises as if one knew both of these criteria he could either invest his funds for the relevant time period and have the investment mature when the expenditure comes due, or settle it now on the futures market at a discount. Thus, any demand for money must stem from a demand for certainty.[1]

Since the two relevant criteria determining the individual's demand for money can be traced back to an uncertainty concerning the timing and magnitude of his future expenditures, it is instructive to assess those cases where only one of the criteria is unknown. In general, uncertainty can exist regarding when a future expenditure will occur, or the magnitude of the expenditure, or both simultaneously, as outlined in table 2.

		Timing of Expenditure	
		Known	**Unknown**
Magnitude of Expenditure	**Known**		Structural
	Unknown	Systemic	**Case, Knighitan**

Table 2: Uncertainty Types

Structural uncertainties arise when one lacks knowledge of the states of the world. Something may occur in the future, or not, but what exactly may or may not occur is not known in advance. In contrast, systemic uncertainties are those where a future state of the world is known, but whether this state will occur is unknowable. Examples of the former type typically centre on fundamentally new paradigms that seemingly come from nowhere. The Smartphone revolution, for example, or the Haitian earthquake of 2010, the Japanese tsunami of 2011, or any other such similar "out of the blue" occurrence. Systemic uncertainties occur, in some sense, much more frequently (or at least they appear that way since the outcome is known in advance), e.g., the current economic sanctions against Russia – will they continue through to the end of the year, or will they end soon? The answer to this query could just as easily be answered either way, and there is no way that the answerer could know in advance. To choose a more mundane example, the gambler knows that a die will give a number one through six 1/6 of the time, but on any such roll he is completely (systemically) uncertain – he has no idea *when* a certain outcome will obtain. (Over a series of rolls he could hedge his bets, but for any one roll the outcome is a complete crapshoot.)

1 Misunderstandings concerning the use of money in the evenly rotating economy have typically surrounded a confusion between money existing as a pricing unit versus a medium of exchange. While the certainty of the ERE specifically rules out any role of money as a medium of exchange, "money" still exists as a pricing unit (Howden 2009). It is questionable in light of discussion later in this paper whether such a good acting as money coincides with what a strict economic definition of money would entail.

These two specific uncertainties are important in the sense that the individual can protect himself, or hedge, against them through various financial means. To say that one is structurally uncertain about the future is to admit that the future is unknowable. This statement does not imply that the timing of the unknown future is unknown. Over the course of the individual's life many novel events will occur that he could not have foreseen, yet all of these events will have to occur over his life. As such, he is uncertain only about the future outcomes but from the way he has bounded the question, the individual has complete certainty as to the timing of such outcomes. Something could happen to you in the future, though you have no idea what. However, you do know (at least tacitly or approximately) when this will occur. One can easily hedge for such an outcome by holding savings in the form of a bond whose maturity is within the expected range of the outcomes occurrence. Since you have no idea what the outcome will be, one can at least buy "insurance" against this outcome by having a known sum of money available to them. Since a bond pays out a fixed sum after a predefined period, it allows the individual to hedge structural uncertainties.

As a concrete example, within the next 15 years I will have young children who may or may not get sick (or have some other chance event affect them). Approximately 40 years from now I will myself be an elderly man, who may be faced with the same unknown future events. I do have a feeling for what these events will cost me (or, I can choose to "insure" myself for these events up to a specific amount), and I known when they will occur. My insurance policy for these systemic uncertainties can be bought in the form of a 15-year and a 40-year bond, both of which will make the requisite amount of money available to me at the expected moment.

Systemic uncertainties arise when one knows the outcomes but not their timing. The economic sanctions against Russian will end at some point but I have no idea when. When they do end I would like to invest in Russia to take advantage of its economic recovery (and expected appreciation of the ruble as exports resume). Since I do not know the timing of this outcome I can only prepare for it by holding a financial asset whose value is accessible at a moment's notice, or on demand. Equities allow the holder to gain instant access to the market value of the shares. As such, holding equities will allow the individual to purchase a product allowing him to invest in Russia at that uncertain future date.[2]

These two types of uncertainties – systemic and structural – could also be met by holding money. While this is one option, it comes at the cost of foregone interest or share appreciation over the holding period. However, there is one source of uncertainty that money can *only* serve as a hedge for. Returning to table 2, what is commonly referred to as Knightian (Knight 1921) or case probabilities (Mises 1949: 110-13), is the intersection of the two specific courses of uncertainty. In some sense of the word, this is what most people have in mind when they speak of "uncertainty" – you lack knowledge of the future states of the world, and whether they will ever exist (or if so, when).

2 Of course, one could also have held a bond and sold it before maturity as needed. In this case the bond has ceased to be a par-value product, though, as the proceeds will be valued on the market as per prevailing interest rates and risk factors. As such the early sale of a bond converts it into an equity share (Howden 2015).

Such a feeling of uncertainty can only be hedged against by holding one financial asset: money. The reason is that money is the only asset that is available both on demand and at a pre-defined, or par, value. Any demand for money must stem from a feeling of not just uncertainty in general, but Knightian uncertainty in particular – a complete lack of knowledge concerning what or when an event will occur.

Subjectivism and the Demand for Money

One of the central tenets of modern economics is that value is subjectively derived in the individual's mind. An objective reality exists, e.g., there is something called a "car", but the value imputed to that object is a teological construct. This does not imply that all economic phenomena are of a fundamentally subjective nature. Many facts are able to be objectively stated.

The category of goods in general exists in an objective way, though their value is subjectively determined by the individual. A price, in contrast, is an objective expression of these subjectively determined values. One of the primary benefits of a price is that it gives an objective basis from which to make choices based on the subjective valuations placed on various goods. (e.g., while the individual has a value scale placing various goods in a ranked order from most to least desired, it is their price that enables him to decide which of those choices to act upon.)

Financial assets, such as those in table 1, differ from goods in general as they lack use value. They are only good insofar as they are able to be exchanged for money which is then traded for a good that is directly useful to the individual.[3] In short, financial assets only possess exchange value. Some of the factors that determine these asset's values are objectively determinable, e.g., interest returns on similar products, maturity, etc. Other factors are subjectively determined by the individual, e.g., what is the acceptable level of risk, what time horizon is the asset expected to be held for, etc. Objective prices for financial assets exist to the extent that they are the result of the marginal buyer and seller formalizing their demands through exchange. The value placed on these assets, however, will ultimately be of a subjective nature and will determine whether the individual is a demander or supplier of the financial good in question at a given price.

Money is unique in several regards. Like other financial assets, its value is limited to the exchange value it has in procuring goods and services or settling pecuniary debt obligations. How highly valued it is in this exchange role is determined by the objective price array that exists at any given moment in time. Ceteris paribus, higher prices for goods imply a lower exchange value for any unit of money. Furthermore, while all other financial assets have a value determined by the qualities of similar assets, money faces no such competition. Its uniqueness stems from the fact that it is the only asset that redeems at both par value and on demand. A bond, in contrast, is valued according to how well it fares with respect to other bond-like products, i.e., yields on

3 Here I ignore commodity money as a financial asset and focus exclusively on its fiat alternative. To the extent that the commodity functioning as money has a direct use value to, it can be categorized as both a good and a financial asset. This categorization will be determined by the demands of the individual, and are outside the scope of this article. I also ignore share certificates that the individual may derive value from by hanging on his wall, or money with numismatic value. In short, I herein address only the value of financial assets *qua* financial assets.

bonds of different maturities, risk factors, etc. An equity share is valued according to how liquid it is (i.e., how "on demand" it can be sold), its risk factor relative to other shares, etc. There is no other asset other than money that trades at par value and on demand. Money is also the only financial asset that has no risk in the sense that its value is always defined in terms of itself (it trades at par value) and because it does not have to be converted into money in order to be serviceable – it is the means of final settlement. (Unlike all other financial assets that must be converted into money, and face risk accordingly, before they can be useful.)

As a result, although the value of a sum of money is derived subjectively by the individual, its demand can only come from one objective characteristic – to settle pecuniary obligations. Assets that serve as perfect money substitutes to the extent that they trade at par value on demand, e.g., demand deposits, will likewise also have an objectively identifiable and unique demand. The source of this demand can furthermore only stem from one specific type of uncertainty, as outlined in table 2. As such, to speak of the demand for money amongst different margins, e.g., liquidity demands placing money along an access of other highly-liquid assets or a demand for certainty as to nominal future purchasing power, misses money's main point.

If an individual was only concerned with his liquidity position – being able to quickly access his money at some unknown future point – he could hold his purchasing power in the form of an equity share and reap all the benefits that money would provide *to this particular end* and at lower cost. Alternatively, if the only factor the individual was concerned with was holding a pre-defined amount of purchasing power for the future he could satisfy *this particular end* by holding a par-value financial product such as a bond. It is only in that specific circumstance where an individual knows neither the magnitude nor the timing of his future expenditures – he is in a state of Knightian uncertainty – that he will demand to hold money.

Conclusion

I will conclude with some brief and sundry remarks about why the demand for money has decreased so much in recent years. Alternatively stated the question asks why the demand for somewhat similar assets, as described in the introduction, have increased recently.

The compositional shift from money and into debt or equity financial assets can only be explained as a response to an increase in one of two specific types of certainty. To the extent that an individual's feeling of systemic uncertainty increases, that is to say, he feels more certain about when a future expenditure will arise but has no idea what such an expenditure may be, he will shift his financial assets into bond-type products. Bonds can be selected so as to mature at the time when the individual expects the unknown event to occur, and the magnitude of his bond purchase signals the degree which he is trying to purchase a hedge against these future events. The aging man becomes less uncertain of when some adverse event will affect his life as his years remaining dwindle. His uncertainty remains, however, as to what (if any) emergency will afflict him. As a result of this increased certainty concerning the timing of an emergency he can hold his purchasing power in a loan that matures at the necessary time.

Alternatively, to the extent that an individual's feeling of structural uncertainty increases,

that is to say, he feels less certain about when (if ever) some adverse event will arise but he feels more certain that something will occur, he will shift his financial assets into equity-type products. Equities will allow the holder on demand availability of a value that has yet to be determined. As such, the purchaser can hedge his uncertainty about the timing of his funding need by holding an asset whose value can always be released (or converted to money for final expenditure) at a moment's notice.

The corollary to the preceding two paragraphs is that if the demand for money has decreased it is because the certainty of either the timing of future expenditures *or* the magnitude of future expenditures has increased. The rise of many financial innovations over the past thirty years has increased both of these certainties. As credit-based products become more prevalent for the retail consumer – such as credit cards or in-store credits – there is an increased certainty as to the timing of future expenditures as these can be undertaken and known in advance when they must be paid for. The result of this outcome is an increased demand for bonds that allow the holder a return while securing the nominal amount needed to pay off the accumulated debt at the appropriate date. Alternatively, the uncertainty regarding the magnitude of a future expenditure is affected by the expected volatility in the general rate of price inflation. To the extent that the great moderation over the past 35 years has resulted in a period of low and stable price inflation, individuals are much more certain as to the amount of purchasing power necessary to fund these future expenditures. (One could consider how similar the answers to the question of what the present value of their desired retirement fund would be if asked today versus five years ago, especially compared to the wildly divergent answers one would have received if they asked in 1978 and 1982 as a result of the relative constancy of price inflation in the former period over the latter one.)

As one final consideration, note that these demands for financial products – money, bonds and equities – are the result of expectations or feelings of uncertainty. These may turn out to be misplaced or incorrect ex post facto. It remains, however, these forecasts of uncertainty that ultimately determine the type of financial asset the individual holds his purchasing power in.

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Implications of the Economic Calculation Debate for Rural Land Use in Ontario

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Land use planning is a pervasive feature of rural life in Canada, as in most OECD countries. Various levels of national, subnational and local governments are involved.

Regulations and by-laws on land use seem to be getting more and more specific. Grass roots organizations are emerging as part of a social reaction to the encroachment of land use planning on land owner rights.

In contrast, few economists still believe that central planning is a viable mode of social

organization, especially after the dissolution of the Soviet Union in 1989 and China's economic transformation since 1978. Most economists today consider the market economy to be superior to central planning as a means of achieving economic efficiency. In land use policy, however, we are witnessing a general trend towards central planning of land use in many jurisdictions

We argue that this paradox is a consequence of an artificial intellectual separation. Theorists and practitioners of rural land use planning seem to operate without regard to the findings of the theoretical and practical literature on the economics of central planning. And contributors to the literature on general economic central planning have not explored the implications of their findings for local and regional land use planning. The purpose of this paper is to provide some preliminary linkages between two communities of thought and practice.

Background: The Economic Calculation Debate

The theoretical economic calculation debate occurred largely between 1920 and 1940. Lavoie (1981) argued that participants in the economic calculation debate adopted one of two competing and incompatible paradigms of economic theorizing. The economists who ended up adjudicating the debate generally all adopted one of these paradigms, making the adjudication less than impartial. The debate focused on the challenge posed by Mises, who argued that without market prices for goods of higher order, it is impossible to know relative scarcity of different components of the capital structure, and therefore allocation of those goods of higher order among their competing employments will be arbitrary (Lavoie, 1981). Mises was later joined by Hayek and Robbins, arguing that lacking market prices for goods of higher order, rational calculation is unfeasible under collective ownership of the means of production Lange and Lerner, among others, argued that a stimulated market model could be used to guide resource allocation under collective ownership of the means of production , making central planning feasible. Hayek refuted Lange's model by emphasizing the knowledge problem: the impossibility of gaining these crucial data for centralized calculation. By the mid-1950s, the consensus view of academic economists in the UK, the United States and Canada was that Mises and Hayek lost the debate. Samuelson suggested in his Economics (Chapter Thirty- two, 1988) that the economy of Soviet Union was no less efficient than the United States.

Public perception, however, began to change after 1989 when the Berlin Wall came down and western country journalists began to get an improved understanding of the economic chaos that had been hidden behind the iron curtain. Somewhat later, and generally grudgingly, academic economists began to consider the possibility that the prevailing consensus on central planning had been wrong, and some have even began to wonder if Mises, Hayek and Robbins had been correct. The consensus view among academic economists in the west today, and perhaps in society generally, is that central planning as a mode of social organization is not viable, from both theoretical and practical perspectives. However, the growing trend on rural land use planning really imposes an interesting question: why is land so special?

Existing Rationales of Rural Land Use Planning

Barlowe (1985, Chapter 17) explores the nature, types, rationales, and the processes of

land use planning. He defined land use planning as the "conscious direction of effort toward the attainment of a rationally desired goal". To Barlowe, the rationale of planning in general is to avoid chaos-- to avoid individual's conflict interests, exploitation, and less optimal social welfare. Implicitly, Barlowe seems to accept the central planners' assumption that there is such a thing as a unified rationally desired goal, that planners can know what this goal is and have the capability of allocating land use in a manner consistent with the realization of that goal. Barlowe argued that as long as land owners work towards common goals in productive use of their land, there is no need to interfere, however, if the use of land has direct conflicts with members of the society, land use planning is needed.

Frankena and Scheffman (1980) examined the market failure rationales that had been offered in support of provincial rural land use policies in Ontario up to 1980. They identified five general categories of market failure: market power, externalities, public goods, uncertainty, and, incorrectly, distortionary government policies. This last item is actually a category of non-market failure, not market failure (Wolf, 1979). According to traditional market failure theory, an agent is defined to have market power if he or she is not a price taker. Typically, this category of market failure is associated with the theory of monopoly and the theory of imperfect competition and is they concluded that it was of limited relevance for the rural land market they were studying. Externalities, a second category of market failure, arise when one person imposes costs (negative externality) or bestows benefits (positive externality) on another person or persons without the consent of the affected person(s). Positive and negative externalities can also create difference between marginal social costs and prices. In rural land markets, externalities have been cited frequently as sources of conflicts over amenities, pollution and congestion problems. Their third category of market failure was public goods. Public goods are defined as goods that are non-rival in consumption and for which exclusion of non-contributors is either costly or impossible. Public goods are associated with free-rider problems. Frankena and Scheffman (1980) argued that agricultural land has some characteristics of public goods, such as benefiting passers-by for providing open-space. Uncertainty is another potential source of market failure, mainly because there are not sufficient markets or institutional settings for risk pooling.

Implications of the Economic Calculation Debate

One of Frankena and Scheffman's (1980) major findings was that rural land use policies in Ontario had beend designed without regard to economic evidence and concepts. They pointed out that rural land use policies during the time period they studied did not seem to be based on empirical studies and that many policy rationales were not justified economically. For instance, data showed that only 1% of the good farmland was converted to built-up use, and rural to urban conversion accounted only 10% of the decrease in census farms from 1951 to 1976. Also, they pointed out that policies generally assumed that there was a fixed supply of farmland, which was incorrect[1]. Policies also generally assumed that land that is best suited for farming should be kept

1 Among other things, the effective supply of agricultural land can be enhanced by draining wetlands, which happened historically in Ontario in Lambton, Kent and Essex counties, and also at the Holland Marsh. In addition, tile drainage has removed production limitations associated with excessive spring moisture, effectively increasing the supply of higher productivity agricultural land in the province. Irrigation can have a similar effect in selected situations where moisture during the growing season is limiting.

in farming, which is a conclusion resting on a theory of absolute, not comparative advantage.

While they were generally critical of what they saw as the weak economic foundation of the land preservation policies that they studied, Frankena and Scheffman (1980) did not mention the economic calculation debate. In contrast, in the U.S. debate on rural land use planning, Pasour (1983) identified four important implications of the debate, which are the "use of knowledge in land-use decisions", "problems due to time", "public choice considerations", and "inflexibility of land-use controls".

For the first implication, Pasour (1983) was critical of what had come to be called "scientific management" as a way to manage natural resources. He pointed that Hayek's (1945) distinction between scientific knowledge and what Hayek called the knowledge of the particulars of time and place meant that so-called scientific management could not deliver on what it promised.

Pasour (1983) acknowledged that a common rationale for land use policies is that there is an inadequate incentive for individuals to preserve farmland preservation because the benefits will only be realized in the future. Pasour (1983) argued that in fact expectations are reflected in current asset prices, including land prices, so the current land price can reflect the demand of this piece of land today and expected demand in the future. Demsetz (1967) made a similar point that current land owners serve as brokers for the interests of future generations. In addition, Pasour pointed out that, in the absence of market prices as a guide, land use planners would have to guess at the needs of future generations in any case. Pasour (1983) identified a systemic incentive problem arising from the separation of authority and responsibility which results in planners not bearing the costs or the benefits arising from their decisions. Misallocation of agricultural land thus will not have negative consequences for the government. In this case, there is no reason to believe the central planner will make efficient allocation decisions.

Lastly, Pasour (1983) noticed that planners and the elected officials who direct them are motivated by self-interest, and decisions are often short-run oriented due to the pressure to seek re-election. He points out that this contradicts to Hayek's view of a rational economic calculation, which must take the interests and preferences of all affected parties into consideration.

Implication of Economic Calculation Debate for Rural Land Use Policies in Ontario

Rural land use policies are a contemporary example of central planning In Ontario, there are several influential rural land use policies aiming at farmland conservation. The Greenbelt Plan (2005), Niagara Escarpment Plan (1990) and the Oak Ridges Moraine Conservation Plan (2002) are scheduled for review in 2015 (Greenbelt Plan, 2005). These policies were designed to protect agricultural land in Ontario, as stated in the Greenbelt Plan (2005) : "The Greenbelt is a broad band of permanently protected land which: protects against the loss and fragmentation of the agricultural land base and supports agriculture as the predominant land use". What makes the planners want to permanently protect Agricultural land in Ontario?

Ontario's land use policies rely on similar rationales discussed by Pasour (1983). One

rationale is that Ontario is losing agricultural land, especially the class 1 land[2]. Both Ontario Farm Trust (2013) and Ministry of Municipal Affairs and Housing (MAH, 2010) quoted from a report by Hofmann (2001) that from 1971 to 1996, 18% of class 1 farmland was lost in Ontario. Ontario Farm Trust (2013) also quoted from a report by Agricultural Odyssey Group (2002), saying that "Agriculture needs the most productive farmland to provide the base for a strong rural economy". The fear of losing productive land is certainly one rationale for the policies. However, a subsequent report by Hofmann (2005) concluded that only 11% of class 1 farmland was lost in Ontario from 1971 to 2001 based on a more accurate method.

The Ministry of Municipal Affairs and Housing, Ontario Farm Trust, and the Agricultural Odyssey Group seem to be unaware of the implications of the subjective theory of value, and the of the concept of comparative advantage. A piece of land can be prime land for agriculture, but it can also be prime land for housing or industries. The determination of absolute advantage in one employment does not solve the allocation problem for a factor of production.

The value of land is subjective to the person who wants to use the land a particular way and enters a transaction. The land buyer may find a class 1 land more productive for uses other than agriculture, and will generate higher returns. In this case, he or she will offer a much higher price than the price he or she will offer if the land is only used for agricultural purposes.. This is the similar to the knowledge problem arisen in the scientific management movement in the Unites States discussed by Pasour (1983).

Menger's (2007) theoretical treatment of goods of higher order explains that the value of goods of higher order, like farmland, is derived from consumers valuations of goods of the first order. Land prices reflect the expectation of the value it can produce. Goods of higher order generally have multiple potential uses. In Mengers' terms, they are generally not perfectly specific nor are they perfectly general. Interaction of competitive buyers and sellers is the process through which subjective values and dispersed knowledge interact to reveal comparative advantage. Of course, entrepreneurs are not infallible. As Pasour (1983) suggested, however, private entrepreneurs will be responsible for their losses, and will correct their mistakes in the future.

A Market Oriented Rural Land Use Planning

Seeing the flaws in government rural land use planning, and the advantages of a free market, a reform of planning is needed to solve the rural land use problems. Mark Pennington (2002) proposed a market based planning system which can incorporate the advantage of competitive market, entrepreneurial discoveries and be consistent with property rights. Pennington (Chapter Six, 2002) suggested that property rights actually can be separated to a bundle of rights, so the owner can only sell some rights associated with the lands, which is defined as restrictive covenants. Pennington argued that restrictive covenants can promote developers to consider the opportunity costs of including things not permitted, and consumers interested in buying properties weigh the benefits and costs of limitations on these lands. In this way, the market incentive allows people who value well protected lands to pay. He argued that

2 According to Canada Land Inventory, land is categorized according to its capacity of agriculture. Class 1 land refers to land which has no limitation on agriculture, while class 7 land is incapable of agriculture.

the key to property rights then becomes that one must pay to have control over other people's property.

Pennington (2002) also advocated the idea of proprietary community, which means the people in this community voluntarily contract to give up control over their property to agree with principles of governance specified in the contract. However, he warned that the best way of mixing individual and common property rights needs to be discovered through trials and errors, and the market will give the answer.

Pennington's idea leaves a lot of room for rural planning. Instead of taking rural land in the name of protection, governments can sell public natural lands with restrictive covenants.

Instead of imposing regulations on farmlands, local governments can promote the idea of common proprietary by indicating the benefits of a better environment, which can be a higher price of the property, and let farmers make decisions. And more options involving contracts and market process can be developed in the rural land use planning context.

Conclusion

In this paper, we identify a paradox in land economics by presenting a linkage between the economic calculation debate and its implications for rural land use planning. The more restrictive rural land use policies in Ontario today reflect planners' unawareness of the economic calculation debate or the findings in literature. The implication of the economic calculation debate applies to Ontario, and it will be beneficial to future policy reviews. A more market oriented land use planning is an alternative way for the current planning. Future study of this approach in the Ontario context will be helpful to increase efficiency in land use planning in Ontario.

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Aboriginal Title: Is There Any Such Thing?

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Property is of central importance to a libertarian or Austrian view of the world. As Murray Rothbard, for example, puts it: "every man has an absolute right to the control and ownership of his own body, and to unused land resources that he finds and transforms. He also has the right to give away such tangible property (though he cannot alienate control over his own person and will) and to exchange it for the similarly derived properties of others. Hence, all legitimate property-right derives from everyman's property in his own person, as well as the "homesteading" principle of unowned property rightly belonging to the first possessor (Rothbard 2002. 60)." As Richard Epstein points out, such a doctrine has been long in coming, beginning with the first clear formulation in Roman law, through to Locke and Blackstone (Epstein 2008. 16).

What then of ownership by those who inhabited this continent prior to the arrival of the first European settlers? It has become fashionable of late in legal circles to speak of "aboriginal title", about which, the main question still seems to me to be whether there is any such thing. On the other hand the Royal Proclamation issued during Blackstone's lifetime referred to "lands of the Indians", and recent judgments of the Supreme Court of Canada have assumed that some

such possessions survived the transition to British sovereignty. Indeed in the case of Tsilhqot'in Nation v. British Columbia, the high court decided in June of this year that such title extended to a specific territory in northern B.C.. While Flanagan and Bains thought that this was in one way a welcome decision, it labored under some serious qualifications (Flanagan and Bains. 2014), which separates it from the sort of liberal position people like Rothbard and Epstein would favour.

Before taking a closer look at some of these illiberal features of the most recent judgment, let us briefly review some of Kent McNeil's arguments in "The Meaning of Aboriginal Title", an article cited by Lamer CJ writing for the majority in Delgamuukw v. British Columbia, which served as the springboard for the 2014 decision 17 years later. In his article McNeil attempts to clarify a couple of questions he considers pertinent to an account of aboriginal title, namely its origin and content. As for the first, the question as to how it originates, while agreeing that any such title would not derive from the Proclamation of 1763 or the legal system which accompanied it, some held that it was based in the occupation of traditional lands prior to British or French settlement and others that it derived from the rules under which tribal society was organized. In the case of the latter, McNeil admits that the courts "did not explicitly require proof of Aboriginal law to establish title." In the case of the former, grounding title in occupation, according to McNeil, creates a logical problem for the *sui generis* doctrine, that the right existed prior to European settlement. To establish that, we would need the proof of Aboriginal law which the courts have apparently not asked for (McNeil 1997).

With respect to the sort of proof available in such cases, Delgamuukw made it clear that a much more relaxed standard would have to be applied particularly with respect to the admission of oral history. Indeed, in the words of the judgement: "[expecting evidence] to provide definitive and precise evidence of pre-contact aboriginal activities on the territory in question… will be an almost impossible burden to meet (Delgamuukw v. BC 1997. 42)". Despite directly acknowledging McNeil's article (Delgamuukw v. BC 1997. 45-46), the majority opinion does not seem particularly troubled by the logical difficulty McNeil raised, namely that positing a right prior and independent of the common law requires equally independent evidence that there was any such right at aboriginal law. No doubt because the court contended, as they put it: " that the ordinary rules of evidence must be approached and adapted in the light of the evidentiary difficulties inherent in adjudicating aboriginal claims (Delgamuukw v. BC 1997. 43)", they seem to have taken refuge in the *sui generis* doctrine, namely that according to aboriginal tradition, title in some form or other existed prior to colonization.

As for the content of aboriginal title, *sui generis* proves a convenient device for explaining that particular aspect of aboriginal title as well. While an earlier decision by the Privy Council appeared to confine aboriginal title to a "personal and usufructory right", Delgamuukw held that what their Lordships were really getting at was the *sui generis* nature of aboriginal title. The judgment added that : "…it is also *sui generis* in the sense that its characteristics cannot be completely explained by reference either to the common law rules of property or to the rules of property found in aboriginal systems. As with other aboriginal rights, it must be understood by reference to both common law and aboriginal perspectives (Delgamuukw v. BC 1997. 45)"

The next paragraph goes on to add: "The idea that aboriginal title is *sui generis* is the underlying principle underlying the various dimensions of that title (McNeil 1997. 142)." One such dimension is that despite being "personal" in some sense, it is inalienable, meaning it can't be sold to third parties, but at disposal would revert to the Crown. For as Lord Watson wrote in the Privy Council decision: "there has been all along vested in the Crown a substantial and paramount estate, underlying the Indian title, which became a *plenum dominium* whenever that title was surrendered or otherwise extinguished (quoted in McNeil 1997.142)." Even though the fact of its being *sui generis* is held to imply inalienability, the court hastens to affirm: " that this does not mean that aboriginal title is a non-proprietary interest which amounts to no more than a licence to use and occupy the land and cannot compete on an equal footing with other proprietary interests(Delgamuukw 1997. 450)."

Another feature of its *sui generis* character, is that although aboriginal title is personal, in that it permits exclusive personal use of the land in question by members of the title holding group, title is not held personally but only by the community. As the court writes: "It is a collective right to land held by all members of an aboriginal nation. Decisions with respect to that land are also made by that community. This is another feature of aboriginal title which is *sui generis* and distinguishes it from normal property interests (Delgamuukw 1997. 46)."

Interestingly though, the court also claims that the *sui generis* doctrine does not necessarily confine title holders to traditional uses of the land which gave rise to title in the first place. Given that various statutes such as the Indian Act and the Indian Oil and Gas Act have been held to permit much wider use of land resources on reserves consistent with the requirements of modern life, the court held that a similar latitude should apply to aboriginal title upheld beyond the reserve.

On the other hand traditional uses cannot be entirely overlooked. Apparently you cannot both claim title to a particular territory and plan to radically alter its use thereafter. In the words of the court: " If occupation is established with reference to the use of the land as a hunting ground, then the group that successfully claims aboriginal title to that land may not use it in such a fashion as to destroy its value for such a use (e.g. by strip-mining it) . Similarly, if a group claims a special bond with the land because of its ceremonial or cultural significance, it may not use the land in such a way as to destroy that relationship (e.g. by developing it in such a way that the bond is destroyed, perhaps by turning it into a parking lot)." Any group wishing to override such limitations could only do so by surrendering their title (Delgamuukw 1997. 49-51)

Having reviewed some of the main features of aboriginal title as decided in Delgamuukw, let us briefly return to the more recent Tsilhqot'in case, where an earlier judgment of the BC Court of Appeal was overturned and aboriginal title over the requested area granted. The court in this case set out 3 criteria which occupation of a territory must meet: sufficiency, continuity and exclusivity (Tsilhqot'in v. BC 2014. 15). With respect to the first criterion, sufficiency, evidence is required "that the land in question belonged to, or was controlled by, or was under the exclusive stewardship of the claimant group (Tsilhqot'in v. BC 2014.17)." As for the second, continuity, there must be evidence that present occupation can be traced to pre-sovereignty days. Finally, to demonstrate exclusivity is for there to be evidence that the claimant group intended a particular

territory for the use and enjoyment of their own members.

Although the court held that the province had not adequately consulted the Tsilhqot'in in this case, aboriginal title does not rule out future government interventions, provided there is prior consultation, the intervention is clearly in the public interest, and that interest outweighs any disadvantages to the aboriginal group.

Where then does this leave aboriginal title and its supposed *sui generis* character. To critics like me, whose opinions, their lordships are wont to remind us, are not "determinative"(Delgamuukw v. BC 1997. 45), it seems that the more often you repeat a notion and throw in a bit of Latin the more readily one becomes convinced that, to paraphrase Russell, there is something which actually answers the description. Who could fail to be impressed by the Law Lord's opinion that there has all along been vested in the Crown a substantial and paramount estate which upon surrender becomes a *plenum dominium?* Or in the less exalted phrasing of the court in Tsilhqot'in: "Aboriginal title is what it is- the unique product of the historic relationship between the Crown and the Aboriginal group in question (Tsilhqot'in v.BC 2014. 24)." So is there really any such thing, or is it one of those distinctions without a difference? Well some courts have thought so, and others have held that while there might be such a thing in principle, the Tsilhqot'in, for example, failed to make out a successful claim to it. This as we saw was recently rejected by the SCC, and since they have unique constitutional authority to develop law particularly with respect to aboriginals, legally of course the doctrine exists.

Aside from legal considerations, and there are enough potential claims to aboriginal title to keep an army of lawyers employed *in saecula saeculorum,* are there any broader questions we might raise about the doctrine? Flanagan and Bains observed in their recent article, for example, that the recent declaration of title: " imposed three conditions that drastically reduce its value and demonstrate continuing paternalism toward First Nations in Canada (Flanagan and Bains 2014. 16)." In a similar vein Widdowson and Howard claim that the net effect of the vast aboriginal industry, of which lawyers are indeed a rather visible part, is that: "The atavistic programs and services they advocate as aiding "self-determination" actually maintain native dependency and dysfunction, thereby justifying demands for increases in government funding (Widdowson and Howard 2008.21)."

Finally, for liberals in the Mises/Rothbard tradition, I would contend that aboriginal title is unlikely to be a step in the right direction. Certainly paternalism is the order of the day when it comes to state actors. The court was at pains in the two judgments to which we have referred to distinguish aboriginal title from the fee simple doctrine at common law which characterizes most of our real property holdings (see Tsilhqot'in v.BC. 25). But as De Soto has argued, individual, as opposed to tribal property holding, is essential to capital formation. His remarks about developing nations have some relevance to our indigenous populations: "Many title systems in developing nations fail to produce capital because they do not acknowledge that property can go way beyond ownership. These systems function purely as an ownership inventory of deeds and maps standing in for assets, without allowing for the additional mechanisms required to create a network where assets can lead a parallel life as capital (De Soto 2000. 60)."

Of course Kent McNeil remains convinced that the grant of aboriginal title is the best way forward because "it accords with common law principles, avoids discrimination, and provides the Aboriginal peoples with the opportunity to develop their lands in ways that meet the contemporary needs of their communities. It is an approach which supports the self sufficiency and growth of those communities and the preservation of Aboriginal cultures. For these reasons , it should be adopted both by the courts and by governments in their negotiations of Aboriginal land claims (McNeil 1997.154)."

As to McNeil's first claim that aboriginal title accords with common law principles, we noted above that the courts seem to have sidestepped any close examination of prior aboriginal law to see how well its principles accord with those of the common law. While some forms of property, for example, existed among pre-European inhabitants, as Flanagan writes: " There cannot have been a single indigenous conception of property, for the ecological and cultural settings of Indians were quite varied (Flanagan 2008. 115)." Such settings ranged from plains and forest hunters to those who fished on the coast. Indeed, the way of life of the latter group was sufficiently sedentary for them to have possessed slaves, a practice which continued late into the 19th century (Flanagan 2005. 118).

Some recent commentators, however, also note that the variety of indigenous ways of life did not necessarily result in the strong prohibitions against theft characteristic of the common law: "Traditional aboriginal societies had no understanding of theft because the kinship relations and low productivity of hunting and gathering economies necessitated sharing for group survival (Widdowson and Howard 2008. 147)." Widdowson and Howard contend that while sharing is admirable it is only likely to reduce conflict if it is across kinship groups rather than restricted to them. In the case of the theft of a large sum of money from the post office, the fact that the money was paid back by the tribe of the aboriginal defendant according to the principles of kinship justice is not likely in their view to impress the Canadian taxpayers who actually bankrolled the restitution (Widdowson and Howard 2008. 150).[1]

As for McNeil's contention that the award of title avoids discrimination, one might reply that in fact it guarantees it, in the sense that those who continue to inhabit traditional lands are prevented from transforming them into personal capital unlike other Canadian proprietors who hold fee simple title at common law. One might therefore argue that in singling out aboriginals for special treatment, or what some have called reverse discrimination, far from being a remedy, the Constitution underwrites their continuing discrimination (*see* Gibson 2009.39).

Thus we see little evidence to support McNeil's view that aboriginal title offers the best way to help aboriginals improve their standards of living. Indeed such an approach assumes the view " that aboriginal problems were caused by the destruction of viable and "sovereign nations" during European conquest, and therefore restoring aboriginal traditions through land claims and self-government must be the answer to native dependency and social dysfunction." Such a view apparently has more to do with the romantic pronouncements of the Baron de Lahontan's Adario than anything else, since "the small bands of hunters and gatherers and horticulturalists

1 With particular respect to cases of murder or family abuse, these authors are concerned about the stone-walling of investigations by kinship-based justice.

that existed at the time of contact were much less economically and politically developed than European nation states making the transition to industrial capitalism (Widdowson and Howard 2008. 51)."

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Economic Calculation in the Academy

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Skills, knowledge, and abilities are valued for their potential to produce valuable output. Such skills allow labourers to produce a greater output, or the same output with less time, effort, or waste, in any given production process. They are collectively called human capital, and understandably so, as human capital bears many similarities to capital goods. However, this analogy does not hold everywhere. Importantly, human capital cannot be allocated according to monetary calculation in the same way that capital goods are allocated, as it cannot be directly exchanged against money.

The analogy between human capital and capital goods holds well when considering their contributions to production processes. To illustrate, suppose that Robinson Crusoe, an unskilled fisherman, and Friday, an expert, spend their days fishing. Friday could teach Crusoe his fishing skills, but both of them would need to forego fishing for a day. Crusoe will request Friday's training if the fish foregone, both those Crusoe could have caught and those he must pay Friday in compensation for his training services, are valued less than the additional fish he can catch in the future given superior training.

Suppose now that two days' schooling, with the first day spent learning the intellectual

1 I would like to thank Glenn Fox for helpful comments on an earlier draft of this paper.

tools to grasp the concepts of the second day, can develop Crusoe's fishing ability to a greater extent than a single day's schooling. Then two days' schooling will be preferred to one day's schooling only if Crusoe's time preference is sufficiently low to justify the loss of the extra day's product and the delay of an additional day before he can begin fishing.

Thus, we see a familiar pattern. Crusoe's choice of whether to sacrifice present consumption to be trained in fishing is essentially similar to the choice of whether to sacrifice present consumption to construct a capital good such as a net. In either case, he trades off present consumption against the potential for increased future production.

As with capital goods, human capital can be part of a more or less roundabout production process. The first day's schooling in the two-day process produces human capital that only has value in that Crusoe expects it to allow the creation of further human capital (developed on the second day) that will allow the production of a greater product in consumption goods (fish).

Capital accumulation increases the diversity of tasks that labourers may perform in the production process. An economy based on net fishing requires labourers with fishing skills and with net-making skills. A complex, modern economy requires labourers with a vast array of different skills applicable at all stages of production.

As the structure of production becomes more roundabout and complex with capital accumulation, so too do the processes of developing human capital. Learning by doing is present in any activity that humans perform repeatedly; it is present in all economies. Learning through a roundabout and indirect process is characteristic of more advanced economies. While these more roundabout production processes are more productive, they also increase the complexity of the allocation problem, the problem of directing scarce resources to some processes over others. The means of confronting this problem are essentially different for human capital than they are for exchangeable factors of production.

Human Capital and Calculation

Given the tight analogy between capital goods and human capital, one might be tempted to drop the distinction entirely and consider them as different manifestations of the same economic phenomenon. As we shall see, this would be an error.

Human capital is woven into the structure of production at every point where labour is present. Any given element of human capital can be useful in the performance of some tasks but not others. Human capital is normally developed with an aim to improve an individual's (present-valued) earnings. The relevant data for directing the development of an individual's human capital are the wages paid to differently skilled labourers over the course of his working life. In a static economy, these would be the same wages paid to such workers in the present, so calculation would be no problem. The worker could simply measure the benefits in terms of these wages, and the costs in terms of the direct costs of human capital development and of wages foregone, to choose his best course of action. However, as the economy is not static, choosing how to develop one's human capital always requires forecasting unrealized future prices.

Ludwig von Mises' great insight was to recognize the vital role exchange plays in facilitating economic calculation. Mises gives three reasons why calculation based on exchange values (i.e. market prices) is superior to calculation without the aid of exchange values. First, ``it renders it possible to base the calculation upon the valuations of all participants in trade." Second, it provides immediate feedback to the calculating individuals, so each ``will immediately notice whether he has worked more economically than others or not." Third, ``calculation by exchange-value makes it possible to refer values back to a unit" ([1920] 1935, 97-98). In a monetary economy, money serves as that unit.

Capital goods and land can be bought, sold, or rented. The market price of a capital good or a piece of land corresponds to the capitalized value of the stream of rents market participants expect it to produce. Rothbard ([1964] 2009) argues that ``[t]he wage…is the only source of rent that *cannot* be capitalized on the free market, since every man is necessarily a self-owner with an inalienable will" [emphasis in the original] (559). Man's will is inalienable in the sense that it cannot be granted to another person for any future period. Human capital enters into production only by augmenting labour prior to its use in production; it earns rent only in the sense that it allows the worker to earn a wage premium. Thus, it too cannot be capitalized on the free market.

To what extent, then, can human capital be allocated according to monetary calculation? For human capital directly useful in production, the wage premium paid to workers possessing such capital allows it to be allocated according to monetary calculation. However, for the factors required to create this human capital, which include capital goods (e.g. textbooks or technical manuals, classrooms, pens, computers) and labour, contributed both by students and instructors, the relevant price is not the wage premium at any given time but the present value of the human capital. As I have established, this is not expressed as a market price, so it must be estimated without the aid of monetary calculation.

The problem is compounded by the fact that the labour used in the production of human capital itself depends on human capital. For an instructor to teach a student calculus, the instructor should understand calculus and have pedagogical skills. The student should understand algebra and have note-taking and study skills. The instructor's labour is priced through his wage, but the student's labour is not priced, as he works only for himself to produce his own inalienable human capital.

The problem of evaluating human capital becomes more difficult with each step it is removed from exchange. Suppose someone intends to learn algebra in order to learn calculus, in order to learn physics, in order to learn engineering, in order to work as an engineer. Then he must form his valuation of his engineering knowledge by anticipating the stream of rents from the wage premium paid to qualified engineers. He must form his valuation of his physics knowledge by estimating its contribution to his grasp of engineering. He must form his valuation of his calculus knowledge by estimating its contribution to his grasp of physics. His valuation of his algebra knowledge, at last, depends on his estimate of its contribution to his grasp of calculus, and on every other valuation in the logical chain.

Someone must choose how each student is to allocate his time and funds. In a free

economy, each person decides for himself, or delegates the decision as he sees fit. More typically, early educational choices are imposed through the political process, in public schools or regulated private schools. In any case, someone must choose how to allocate each student's time and funds, where these funds may come from the student himself, his family, or from the government's budget.

The decision of whether a young student should learn a little more English, a little more algebra, or deliver newspapers to earn a small income while learning basic job skills requires that the human capital gained in any of these activities be evaluated. A precise evaluation would require the decision-maker to anticipate the eventual market value of the student's potential future skill set and to evaluate each element contributing to this skill set, tracing the logic back step by step to find the marginal contributions of English, algebra, or basic job skills learned in the present. Such precise evaluations are rarely (if ever) attempted, perhaps because the uncertainty introduced at every stage of the process would make the result wildly inaccurate. Most people can give qualitative reasons why it's important to learn algebra; few would attempt to give a precise estimate of the marginal return to an hour spent learning algebra.

Limited Calculation Through Credit Markets

Monetary calculation can enter the production of human capital through credit. Education is a long-term investment, and like other investments it can be financed through credit. In that case, the person whose human capital is being developed shares the entrepreneurial gains or losses with his creditors. In a standard loan contract, the most the creditor can hope to gain is full repayment. However, if the debtor is unable or unwilling to repay in full, the creditor takes a loss. To evaluate a debtor's potential to repay a loan, the creditor must account for the value of his human capital investment. Creditors must be particularly alert to human capital investments that will lead to such low incomes as to jeopardize debtors' ability to repay. However, in this sort of contract, creditors need not concern themselves with the distribution of potential incomes above the point where full repayment is maximally likely. If someone with a $150,000 salary is just as likely to repay his student loans in full as he would with a $200,000 salary, creditors face no incentive to consider the differences between salaries in this high range in allocating credit. Thus, these creditors' role is to limit the supply of loans to the least remunerative human capital investments.

Another, though less common, loan contract allows the creditor to claim some portion of the debtor's income over a certain period. Then the creditor has incentive to extend loans to people who he anticipates will earn high incomes, of which the returns on human capital form a significant part. However, such contracts face a moral hazard problem: By taking a portion of the person's earnings, they disincentivize earning, thus reducing the human capital's total value. This would prevent any creditor from getting the entire entrepreneurial return to a human capital investment, and thus this sort of debt contract cannot serve to completely reintroduce monetary calculation into human capital. Furthermore, even if a creditor could overcome the moral hazard problem, creditors lack the private knowledge possessed by each student about his abilities.

Credit markets are entirely amenable to monetary calculation. When debts are traded

and priced in both primary and secondary markets, they are subject to the process of monetary calculation described by Mises. The choice of whether to extend credit to a student can be based on the valuations of all participants in the market for debt, as they express these valuations in their willingness to trade at various prices. Market prices provide continuous feedback on the quality of past lending decisions. A creditor can immediately recognize a loss or gain when the market prices of his assets, priced in the secondary markets for student debt, rise or fall in response to new information. Finally, debts can be valued in terms of money: the money value that such debts can be exchanged for at the present moment.

However, for creditors to introduce monetary calculation into human capital investments, even indirectly and incompletely, requires the existence of a basically unhampered market in student debt. Such a market does not exist in reality. The prevailing ideology extols the slogan ``education for all.'' Yet for creditors to serve their role, they must restrict credit to some people seeking to be educated. This would horrify those who see education as a human right. Rather than allow this to occur, governments subsidize or socialize both student debt and educational institutions. The goal of guaranteeing access to education for all who want it cannot be achieved without removing the market discipline introduced by private creditors facing profit and loss.

Conclusion

The issue of calculation and human capital is of increasing importance as capital accumulation makes more roundabout production processes economical. As human capital is developed through longer processes with more intermediate stages, this increases the scope of potential errors. While error is always present in human affairs, it can be mitigated.

Human capital is unlike capital goods in that it is inalienable from the person to whom it is attached. This means it can never be priced directly through exchange and thus cannot be subject to monetary calculation. This implies a problem for anyone seeking to allocate his time and funds towards education or other human capital investments. Without exchange and monetary calculation, each student finds himself in the position of a socialist planner with respect to his own education: He must solve a complex allocation problem, accounting for uncertain future states of the world, and he must do so without the aid of the cognitive tools provided by markets and exchange.

His creditors on the other hand, to the extent that they operate in an unhampered market where the prices of loans are undistorted by government intervention, can calculate with respect to prices. Empowered to expand or restrict credit to different students with different educational plans, private creditors could mitigate the worst misallocations in educational investments.

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Formalizing Austrian Thought: A Suggested Approach

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In his book "Socialismo, Cálculo Económico y Función Empresarial"[2], Dr. Huerta De

1 The comments expressed in this publication are my own personal opinions only and do not necessarily reflect the positions or opinions of my employer. I prepared and distributed this publication as an independent activity, outside my regular salaried work. No part of the compensation I receive from my current employer was, is or will be directly or indirectly related to any comments or personal views expressed in this publication. All comments are based upon my current knowledge. You should conduct independent research to verify the validity of any statements made in this publication before basing any decisions upon those statements. The information contained herein is not necessarily complete and its accuracy is not guaranteed. If you are receiving this communication in error, please notify me immediately by electronic mail at martin.sibileau@gmail.com. The comments expressed in this publication provide general information only. Neither the information nor any opinion expressed constitutes a solicitation, an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities

2 "En suma, podríamos concluir definiendo la sociedad como un proceso (es decir, una estructura dinámica) de tipo *espontáneo*, es decir, no diseñado conscientemente por nadie; muy complejo, pues está constituido por miles de millones de personas con una infinita variedad de objetivos, gustos, valoraciones y conocimientos prácticos; de *interacciones humanas* (que básicamente son relaciones de intercambio que en muchas ocasiones se plasman en pre-

Soto suggests that society is a spontaneous, dynamic process of exchange exhibiting an infinite diversity in values. Entrepreneurship is the force that drives this exchange process and consists in the creation, discovery and transmission of information. From Hayek, we recognize that such information is coded by what we know as "the price system". And we also know that when the exchange takes place, it does so with the use of an indirect medium of exchange, also known as money.

Oddly, this process remains much ignored. In my personal experience, as soon as one brings it up in polite conversation, a lack of rigorous formalism is pointed out as the main reason behind the ignorance. Austrian economics is considered "soft", and although many have properly answered this observation (i.e. Huerta de Soto), formalization is still absent. Hence, my humble suggestion on how to approach a definitive formalization of the theory.

Presence of formalization in a theory is always preferable to absence. In the paragraphs below, I give two examples that I think illustrate this point. But I also show that formalization of the market process cannot be mathematized. This is due to the fact that behind the market process lies human action, which is creation, and creation is not decidable in the Church-Turing sense. But the result of this creation, economic goods, are. This has strong implications.

If economic goods are the product of information exchanges, they are algorithms[3], and algorithmic analysis may be applicable. However, the algorithmic algebra corresponding to the market process can be peculiar. The paragraphs below will seek to establish some fundamentals concerning the same.

Why is Formalization Important?

In history, we find examples of how formalization in different fields paved the way to significant further progress. Two cases come to mind: Arabic numerals and Dirac notation, which I understand are also both comparable to the formalization I propose here.

The first case is the introduction of Arabic numerals to Europe in the 13th century.[4] Accounting was developing and Arabic numerals did the trick as from that moment on, these made it easier to calculate ratios.[5]

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cios monetarios y siempre se efectúan según unas normas, hábitos o pautas de conducta); movidas todas ellas por la *fuerza de la función empresarial;* que constantemente *crea, descubre crea, descubre* y *transmite* información , *ajustando* y *coordinando* de forma *competitiva* los planes contradictorios de los individuos; y haciendo posible *la vida* común de todos ellos con un número y una complejidad y riqueza de matices y elementos cada vez mayores…(…)… Consideramos que, en un sentido amplio, coinciden los conceptos de sociedad y mercado, por lo que la definición que damos de sociedad en el texto es plenamente aplicable al mercado" (Huerta de Soto 2001).

3 "An algorithm is a mathematical procedure serving for a computation or construction (the computation of some function), which can be carried out mechanically" (Gács and Lovász 1999: Chap. 2). This is a formal definition. For brevity, I choose here not to discuss the historical, yet fascinating origin of the word and concept of algorithm.

4 Fueled mainly by Leonardo Pisano, better known as Leonardo Fibonacci, thanks to his *Liber Abaci*, in 1202.

5 The book presents examples of conversions of currency and measurements, and calculations of profit and interest.

Another, less famous albeit not less relevant innovation is known as Dirac notation. In an article published in 1939,[6] Paul Adrien Maurice Dirac (1939) introduced what would be known as Bra-ket notation, to describe quantum states. Quantum mechanics henceforth developed into the new paradigm in physics.

Interestingly, there seems to be a parallel in the difference between Quantum mechanics and Classical mechanics and that between Austrian and Mainstream Economics. In Quantum mechanics, energy and matter show wave–particle duality, which together with the uncertainty principle, provide a unifying view of the system. The mathematics of quantum mechanics (bra-ket notation) are abstract, resulting in probability adjusted information.

In Austrian economics, objects are also recognized as subject to an economic duality, as Ludwig Von Mises illustrated when defining the concept of ends and means, in chapter IV of *Human Action.* This duality had already been noted by Eugen von Bohm-Bawerk in his *Kapital und Kapitalzins*, where he acknowledges that something which may be a capital good for someone in particular may not fall under the established (i.e. in National accounting or "*der volkswirthschaftliche Kapitalbegriff"*) concept of a capital good[7]. However, Austrian economists have limited themselves to express that this duality intrinsically attached to human action cannot be examined with mathematics. In other words, unlike the founders of quantum mechanics, Austrian economists have not come up with their own "bra-ket" notation. Nobody is to blame, for the subject matter –human action- is still formidably more complex than the wave-particle duality. But I still believe we can find progress to build on.

The Process of Social Coordination is not Mathematizable

Until the 1930s, it was generally believed that as long as a mathematical question found a precise description, it would be possible to solve it. But, what was meant by a "precise description"? Two interpretations were suggested (Gács and Lovász 1999: chap. 3).

In the first one, we deal with a yes/no question. The decision here can be proved or disproved from axioms. But, human action, what we understand as creativity, the choice of a mean towards an end or an exchange, does not enjoy the benefit of a yes/no decision. Furthermore, the Austrian mathematician Kurt Godel, in 1931, also discarded this interpretation altogether: Perfectly formulated questions cannot be answered from the axioms of a set theory.

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6 "…the question of notation, while not of primary importance, is yet worthy of careful consideration, since a good notation can be of great value in helping the development of a theory, by making it easy to write down those quantities or combinations of quantities that are important, and difficult or impossible to write down those that are unimportant…".

7 "…Innerhalb des allgemeinen Kapitalbegriffes sind ferner bekanntlich zwei Nuancen zu unterscheiden: der volkswirthschaftliche Kapitalbegriff, der die Mittel zu volkswirthschaftlichem Erwerbe und nur diese umfasst; und der individualwirthschaftliche Kapitälbegriff, der die Mittel individualwirthschaftlichen Erwerbs, d. i die Güter umschliesst, durch die ein Individuum Güter für sich erwirbt, gleichviel ob die ersteren im Sinne der ganzen Volkswirthschaft Erwerbs oder Genussmittel, Produktiv- oder Konsumtivgüter sind. So werden z. B. die Bücher einer Leihbibliothek zwar unter den individualwirthschaftlichen, nicht aber unter den volkswirthschaftlichen Kapitalbegriff fallen…" *Kapital und Kapitalzins, Innsbruck, Verlag der Wagnerschen Universitatsbuhchandlung, 1884*

It is the second interpretation that interests me today. The "problem" to solve can be thought of as a family of questions in which case, an algorithm decides them. Before we examine it, I suggest to the reader that any good exchanged in a market can be conceived as an algorithm, i.e. a set of instructions that make possible the satisfaction of an economic goal. If this definition is correct, the so-called entrepreneurial function is nothing but a process in which human beings seek to discover and build an algorithm that solves a "problem" (even though that "problem" may also have to be discovered or created).

This second interpretation poses a challenge: We must now arrive at the mathematical notion of algorithm. Can we define "algorithmic solvability"?

In separate ways, this was answered by two mathematicians and logicians during the 1930s: Alonzo Church (1903-1995) and Alan Turing (1912-1954). Church developed the notion of recursive functions, while Turing that of what is known today as a "Turing machine"[8]. They are equivalent, but I will occupy myself with recursive functions.

In computation theory, a finite set of symbols is called an alphabet. A finite sequence formed from elements of such alphabet is called a word. And an arbitrary set of words is called a language.

Formally, we say that a language L is recursive if its characteristic function is recursive:

$$fL(x) = \begin{cases} 1, & if\ x \in L \\ 0, & otherwise \end{cases}$$

In this case, we can also say that L is *decidable* (If a language L is recursive, its complement is also recursive). But, what does all this have to do with Austrian economics? Here's where Leonardo Pisano's and Luca Pacioli's contributions result relevant, because accounting can be considered a language. If there is a function called *profit function*, with words like "price", "unit cost", "quantity", "overhead costs" and "taxes" such that

$$unit\ cost\ (x))\ *\ quantity\ (x) - overhead\ (x) - taxes\ (x)$$

Then accounting is a recursive, decidable language as far as human action is concerned, because we can say that the composite function: G (*profit (x)*) can either return a 1 if *profit (x)* is a positive number or zero, if *profit (x)* returns is not positive (i.e., the sequence of inputs returns a loss).

$$G(x) = \begin{cases} 1, & if\ x \in L \\ 0, & otherwise \end{cases}$$

Note that by stating that $G(x) = 1\ if\ x \in L$, we are essentially saying that $G(x)$ returns a profit if x belongs to a going concern, the accounting of the market process related to solving (x).

8 A Turing machine is a mathematical machine that can compute an output from an input. The equivalence I refer to resides in that if a problem is algorithmically computable, it can be computed by a Touring machine.

Indeed, this feature is not unique to Austrian economics. Accounting is simply a language. What is relevant to us is that *profit (x)* does not come to exist ex-nihilo[9]. *Profit (x)* is the creation of entrepreneurial activity and it raises an ontological question. Is this entrepreneurial activity in itself also *recursive* or *decidable?* To me, it is clear that it is not: When it comes to *deciding* ends, it is not possible to isolate a set of symbols within a language to characterize human action.

The sentence "$x \in L$" is not decidable.

The *means* used to obtain certain ends do not necessarily need to return a clear duality {0, 1} to be valid, because means are subjective and ends can also be means, which until a moment ago did not exist. Human action is not decidable.

Society as an Inconsistent and Incomplete System

If human action is not decidable, it should be easy to show that society or the market process as a system is neither complete nor consistent.

In a strict sense, a theory is called consistent if for no sentence both it and its negation can be a theorem.[10] But a theorem is also a sentence for which there is proof in a theory, while a theory is an algorithm to decide whether for an input the output is an acceptable proof. Thus, a theory can only be complete when there is an algorithm that for each sentence finds a proof for it or its negation.

In the market process, there is no algorithm to prove *a priori*, for each (x), either that x or that $G(x) = 1$ *or* $G(x) = 0$.

On the other hand, a consistent theory is complete if it has no undecidable sentences. Incompleteness therefore means that the theory formulates only certain properties of a system and that other properties depend on the system considered[11]. I will refer back to this point at the end, when I deal with Socialism.

Social Cooperation as Algorithmic Complexity

If human action cannot be mathematized because society represents an undecidable, inconsistent and incomplete system…how can we even suggest that formalization is possible?

Human action is what creates, among other things, the infinity of algorithms whose output are economic goods. Economic goods are therefore algorithms. Algorithms, of course, are subject to mathematic analysis, but the same is sterile because it leaves aside human action. However, social cooperation, also known as "the market process", can be conceived as a network of algorithms and I believe that the study of its complexity is a worthy endeavour.

In Adam Smith's *Inquiry into the Nature and Causes of the Wealth of Nations* it is already clear (in chapters II and III) that network complexity is the engine behind (if not the very same)

9 *Profit (x)* is also not determined a priori, but subject to uncertainty. I deal with this point later.
10 Idem 6
11 Idem 6

economic growth. Interestingly, today network complexity, the complexity of algorithms and algorithmic algebra can and are formalized within computer science. Is it possible to profit from the advances made in these areas?

Two Unique Features of the Information Network

Certainly, I am not the first to suggest a parallelism between society and information networks. However, there are two important characteristics of the information network we call society, that are distinguishable (yet often ignored) and different from a typical information network.

The first characteristic is that human beings, the nodes of this network, not only transmit but also create information. This creative process is also known as entrepreneurship[12].

The second characteristic is that the exchange of information is not done directly between the nodes, but indirectly, using a medium of indirect exchange called "money".[13]

The Role of Money

If society is conceived as a complex network of algorithms where exchanges (i.e. information exchanges) are of an indirect nature, cooperation should be algebraically represented as the lack of commutative, associative or distributive properties in the network. This means that commuting, associating or distributing (existing) algorithms are <u>not</u> neutral operations.

Let's represent an algorithm with the symbol: "AL". Commutative non-neutrality therefore means that:

$$AL1+AL2 \neq AL2+AL1$$

This means that the order in which two (or more) algorithms are added (i.e. participate in the market process) is relevant from an economic point of view. Associative non-neutrality therefore means that:

$$AL1+ AL2 \neq (AL1+AL2)$$

Non-neutrality of association is observed in the markets every week, with the announcement of mergers and acquisitions: From the point of view of human action, merging or spinning-off algorithms (i.e. production processes) creates or destroys value. Distributive non-neutrality means that:

$$AL3 *(AL1+AL2) \neq AL3*AL1+AL3*AL2$$

Finally, non-neutrality of distribution means that running an algorithm in parallel (i.e. AL3) to others within a market process is not the same as applying the same algorithm at the end of the process. A special case of this non-neutrality is commonly known as "economies of scale".

12 Dr. Huerta de Soto (2001) calls this process *"función empresarial"* or "*empresarialidad*".

13 Adam Smith already saw the connection between the exchange described above and money.

Therefore, within the sphere of social cooperation, we cannot prove that commutation, association and distribution are neutral. We cannot prove that commuting, associating or distributing instructions with regards to the creation of an economic good will result in a neutral valuation of the same to the consumer. Furthermore, the very same act of commuting, associating or distributing algorithms, whether these yield lesser or greater complexity in the social network is itself human action.[14]

What Role Does Money Play in This Context?

Let's define money as the only good that can be bartered against all others. Austrian school Economics has demonstrated that monetary policy as an exercise in central planning is doomed in the long run, because policy makers are deprived from and cannot process all the information scattered among all the participants of the money market[15]. It is further sustained that there is an overwhelming amount of *disperse* information in the money market, that makes central intervention inferior to the spontaneous process of the market, when it comes to assigning resources.

However, as counterintuitive to the notion above as it sounds, *when formalizing the social network, the operator that enables (non-neutral) association or distribution of information should be most effective when it contains the least amount of information about itself.* The good that complies with this condition is commodity money, of course. Fiat money, as all credit instruments, contains two additional information inputs: probability of default by the issuer and loss given default.

Money therefore, as the algebraic operator that allows association and distribution in the algorithmic network, can only be efficient if it is not itself an algorithm. And fiat money is an algorithm.

Uncertainty in the System

There is always uncertainty in the process of creating and executing algorithms. This is also recognized in computational science. But we should be clear that with regards to the social network, we deal with uncertainty, and not risk. The concept of entropy belongs to computational science, but not to economics, because it is a function of a probability distribution (Clover and Thomas 1991: Chap. 2). Human action is therefore not entropic, because the resulting algorithms are not bound by an *a priori* known set (which would allow for the determination of a distribution function.

However, the algorithms that are part of the market process (i.e. we deal with market goods), indeed contain risk. This means that an algorithm can either "survive" (i.e. it is profitable) or "perish", which can be represented as:[16]

$$G(x) \sim p(x)$$

14 This is consistent with Hayek's hierarchy of complex phenomena.

15 In this context, by money market, I do *not* use the lax definition of money market as one of credit instruments with high liquidity. Money, in this context, is not credit.

16 Perhaps it is not a coincidence that it was Richard Von Mises, who pioneered in 1919 the study of randomness of a 0's and 1's sequence.

This feature of "market" algorithms becomes all the more relevant when we realize that *tranching* the corresponding risk can be thought of a formal analytic equivalence of distribution among production factors. Just like in structured credit different tranches based on expected losses describe the seniority of investors in a cash flow waterfall structure, the acknowledgment of risk in a market algorithm allows us to represent the participation of all factors involved in the same. *Production factors (except entrepreneurship) are, after all, algorithms too.*

Time, Savings and Capital

If we think of society or the market process as a network where the nodes produce and transmit information indirectly, how can we define a capital good, savings and what role does time play?

I would suggest that a capital good is any algorithm that creates other algorithms. Another way to look at a capital good is this: *a capital good is an algorithm that solves decidable problems*. The immediate implication of this is that the discovery of undecidable problems is the realm of entrepreneurship, while that of decidable ones belongs to labour (production factor). *It is precisely the feature of decidability that allows the marginal productivity of labour to be discounted (or tranched) and paid in the form of wages*.

In this context, savings would be the set of those algorithms available in the network, which create other algorithms (i.e. which transform undecidable problems into decidable ones). What is interest in this paradigm? The interest yielded by any algorithm that creates (an) other algorithm(s) is precisely the said created algorithm(s).

It is clear to me that chronological time in this formalization, plays no role. This, I find, is consistent with Dr. Huerta de Soto's observation that in the sphere of human action, time is subjective, not chronologic.[17]

What we understand as the inter-temporal exchange rate or interest rate is simply the relationship between the "time-demand" of comparable algorithms[18]. In other words, interest rates are simply a ratio between the numbers of steps involved in different algorithms.

The Impact of Fiat Money

Earlier, I wrote that fiat money contains information. Like any other credit product, fiat money has an expected loss, which is a function of a probability of default and the so called "loss given default". Central banks these days provide this information openly, as they carry on with inflation targeting. When they tell us that they target a 2% annual inflation rate, they are candidly telling us that according to their calculations, the expected loss of fiat money will be 2% per year.

17 Time is not a dimension, not even an independent variable. What we call a second is simply the Earth's orbital average distance of 149.6 million kilometers divided by 31.56 million units or a sidereal year (i.e. 365.26 days) multiplied by 86,400 units called seconds (i.e. 24 hrs x 60 min/hr x 60 sec/min). A second is therefore another way to express an average of 4.74 orbital kilometers.

18 In computational science, time demand is defined as the maximum number of steps taken by a Turing machine over all possible inputs of a certain length "n".

This new piece of information will affect the exchange process and introduces chronological time in our economic calculations, displacing the subjective time that results from a comparison between the time-demand of a pair of algorithms.[19]

In addition to the expected loss of fiat money, the institution of fractional reserve banking leads to the definitive coercive establishment of chronological time, as the lenders of last resort set their respective benchmark/window rates.

Thus, fiat money and fractional reserve banking introduce additional information in the social network that strongly affects the association or distribution of algorithms (i.e. exchange of economic goods).

Socialism

If society is an undecidable, inconsistent and incomplete system, and if we define socialism as any institutional aggression on entrepreneurship or human action (Huerta de Soto 2001), it is clear that socialism is the attempt to make the system decidable at least and consistent and complete at best.

As stated earlier, a consistent theory is complete if it has no undecidable sentences. *By attacking entrepreneurship, socialism therefore consists in the belief that it is possible to transform society into a decidable system, only populated by static algorithms that can therefore be neutrally associated or distributed by the central planner.*

Socialism is also formally equivalent to introducing axioms in the system that can either prove or negate a sentence, according to the theory of a central planner, therefore making the system decidable, consistent and complete.

Interestingly, when this attempt at decidability, consistency and completeness succeeds, the system loses complexity. Complexity is also lost as a result of both the information fed into the system by fiat money and taxation (including chronological time and besides the additional axioms[20] introduced by the central planner in the name of "social justice"). In the course of human history, this loss in complexity is what is known in lay terms as the "fall of civilization". It occurs every time a severe amount of axioms are introduced in the system, leading to a complete loss in complexity. Historians call those systems that suffer such loss in complexity "self-sustained economies".

Final Considerations: Economic Growth as Complexity

Formalization of human action is desirable and cannot be undertaken with mathematics, because it is undecidable, inconsistent and incomplete. The market process can be described as a network different from that studied in computational sciences: The nodes (humans) not only transmit but also produce information (i.e. entrepreneurial function) and the same is not exchanged directly, but with the use of money. If every economic good is an algorithm, money is

19 Inflation is taxation. Taxation, in general, can also be represented as coercive loss. Because it establishes an arbitrary chronological fiscal period for the loss, it also displaces subjective time from economic calculation.

20 Huerta de Soto would call these axioms "*mandatos coactivos*".

an operator within this unique algorithmic algebra.

This production of information takes place in a context of uncertainty. If an algorithm makes a problem decidable, entrepreneurship is therefore the action of discovering and transforming previously undecidable problems into decidable ones, in the Church-Turing sense.

The role of Economics should therefore be the study of this unique algorithmic complexity: What decreases it and what enhances it. A new notation and algorithmic algebra is still to be created, which would, I believe, lead to impressive advances in the analysis of social cooperation.

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Why Are We Libertarians?

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Before proposing an answer to this question, I would like to state that by "libertarians", I mean the broad group of people who seek an improvement in mankind's condition by means of decreasing the scope of government. In my view, there are various *schools* of libertarianism. Each school of libertarianism is generally associated with a particular author or group of authors. In my writing and social thought, the term 'libertarian' does not refer to a particular school of libertarian thought, but instead refers to a general orientation of *political* thought. A libertarian in my conception is one who believes that mankind's condition can be improved by decreasing the scope of government, and by increasing the range of individual autonomy.

Two Theories of Libertarianism

When libertarians have sought to articulate the reasons for their libertarian views, they have generally provided an explanation in terms of *economics* or in terms of *ethics*. The works of Ludwig von Mises may be considered an explanation of libertarianism given in terms of economics. Prosperity flowing from the division of labor is diminished when the government intervenes in the economy and is maximized when the government abstains from intervention. The best way to maximize prosperity is to minimize government intervention in the economy.

By contrast, the writings of Ayn Rand (1964, 36) may be considered an explanation of libertarianism given in terms of *ethics*. She writes: "The basic political principle of Objectivist ethics is: no man may *initiate* the use of physical force against others…The ethical principle involved is simple and clear-cut… The only proper, *moral* purpose of a government is to protect man's rights…" Thus, Ayn Rand proposes to limit the scope of government on moral or ethical grounds.

An Explanation of Libertarianism

I would like to propose an explanation of libertarianism that is neither an economic explanation nor an ethical explanation. I use the word "explanation" deliberately, because I do not intend to defend or advocate libertarianism today; instead I want to answer the question: why are we libertarians, or, why are there libertarians? This may seem an unusual question to want to answer, but I hope that by the end of this talk, my reasons for framing the question in this way will become clear.

Categories of Consciousness

The most important concept I want to discuss today is the concept of "categories of consciousness." What is a category? A category is simply a classification. For example, *length* is a category, and so is *width*. Most people probably consider *length* and *width* to be characteristics of various *objects* we see and interact with. For example, one might hold that a chair "has" a length and it "has" a width. Length and width are considered characteristics of the chair.

But it is also possible to consider length and width as categories of consciousness. We can assume that characteristics such as length, width, and others, are characteristics—or categories—of our perception. One of the most important essays written about praxeology is F. A. Hayek's essay "The Facts of the Social Sciences." Hayek (1980, 63) writes: "In discussing what we regard as other people's conscious actions, we invariably interpret their action on the analogy of our own mind: that is, …we group their actions, and the objects of their actions, into classes or categories which we know solely from the knowledge of our own mind. We…always supplement what we actually see of another person's action by projecting into that person a system of classification of objects which we know, not from observing other people, but because it is in terms of these classes that we think ourselves."

Hayek is referring to what we may call the *epistemological method*.

The Epistemological Method

The epistemological method is the thesis that the regularity we experience in natural and social phenomena is a function of the structure of our mind or consciousness.

Authur Eddington's book *The Philosophy of Physical Science* is a book about the epistemological method. Eddington (1978, 23) writes: "The epistemologist is an observer only in the sense that he observes what is in the mind." We can attain physical knowledge by examining the results of various observations. But Eddington suggests we can also attain physical knowledge

by examining the structure or form of observation itself.

For Ludwig von Mises (1966, 64; 2002, 65), praxeological knowledge is the result of the epistemological method. He writes: For as must be emphasized again, the reality the elucidation and interpretation of which is the task of praxeology is congeneric with the logical structure of the human mind. Human knowledge is conditioned by the structure of the human mind. If it chooses human action as the subject matter of its inquiries, it cannot mean anything else than the categories of action which are proper to the human mind and are its projection into the external world of becoming and change. All the theorems of praxeology refer only to these categories of action and are valid only in the orbit of their operation."

Happiness and Unhappiness

Two of the most important categories in social science are the categories of *happiness* and *unhappiness*. When I say "happiness and unhappiness," I'm referring to a general or formal notion. Happiness refers to a state of affairs that is acceptable to me and that I have no desire to change. Unhappiness refers to a state of affairs that is unacceptable to me and that I desire to change. By the terms happiness and unhappiness I mean only this formal conception. In this conception there are no degrees of happiness or of unhappiness. I'm either happy with a given state of affairs (i.e., I do not try to change it), or I'm unhappy with a given state of affairs (i.e., I try to change it).

Happiness and Unhappiness as Categories of Consciousness

In the common conception, we consider happiness and unhappiness to be characteristics of objects. Typically, happiness and unhappiness are conceived as characteristics of human bodies. Specifically, they are conceived as distinct experiences occurring within the spaces occupied by human bodies. A person may have an internal experience of happiness or of unhappiness. Happiness and unhappiness are located with, or within, that person; we cannot find happiness and unhappiness in the sand.

However, it is also possible to consider happiness and unhappiness as categories of consciousness. Instead of the conception that happiness and unhappiness are characteristics of *things*, we can assume that happiness and unhappiness are categories of our *perception*; part of the structure of how we experience and perceive things. This assumption has far-reaching implications for social theory. It means that we *can* find happiness and unhappiness in the sand.

In the common, every-day conception, happiness and unhappiness are states I experience within the confines of my own bodily enclosure. Likewise, the people I observe experience happiness and unhappiness within the confines of *their* own bodily enclosures. Happiness and unhappiness are conceived as events or processes that occur in distinct spatial locations. Additionally, there are objects such as rocks, trees and metal coins that I observe, and that simply "exist." They do not experience happiness or unhappiness. There is no happiness or unhappiness to be found in the spaces occupied by these objects.

When we conceive happiness and unhappiness as categories of consciousness, this view

of things changes radically. Happiness and unhappiness are now conceived as forms of my consciousness, not as characteristics of some objects of my consciousness. In this conception, I find happiness and unhappiness in different places not because happiness and unhappiness are "located" there; but instead because happiness and unhappiness are forms of my perception. When objects enter my conscious field—my own body, other people, houses, mountains, books, etc.—I will experience happiness and unhappiness for the simple reason that all objects of my conscious awareness are constituted of consciousness categories. The same principle applies when the objects in my conscious field are *social* phenomena—for example, when I interact with another person, or when I purchase an item online.

The conception of happiness and unhappiness as categories of consciousness means that my every differentiable conscious experience is constituted of these categories. It means that every object of my conscious awareness entails a happiness and unhappiness aspect.

If we conceive consciousness in terms of categories, we can then study how various social phenomena in our conscious field are constituted in terms of these categories. We can better understand how various forms of social interaction impact our happiness by understanding how these forms of social interaction are constituted in terms of our consciousness categories.

Happiness, Unhappiness, and Social Interaction

Consider the following two instances of social interaction: in one instance, I conduct a face-to-face transaction with another person; in another instance, I make a purchase online. In each of these cases there are both *observable* and *unobservable* aspects of the transaction. For example, in a face-to-face transaction, I can observe various aspects of the other person in front of me, but I do not observe the mind of that person (that person's thoughts, goals, motives, or intentions). When I purchase an item online, I can observe the computer screen and keyboard in front of me, but I do not observe the circuitry inside the computer screen or inside the keyboard.

Though both kinds of social interaction entail aspects I do not observe, I may find that sometimes I do not accept the unobservability, but instead take steps to find out more about the things I do not currently observe. For example, I may find it unacceptable that I don't know the motives of the person in front of me, and so I may attempt to ascertain what his or her motives are. This attempt to change a state of affairs—from *not knowing* the person's motives to *knowing* the person's motives—is the definition of unhappiness discussed previously. On the other hand, there are times when I accept the unobservable aspect of the things I do and make no attempt to observe things that are currently unobservable to me. For example, I may just accept that I do not observe the circuitry inside my keyboard and make no attempt to change this situation. The absence of a desire to change a given situation is the definition of happiness discussed previously.

If I find that I habitually attempt to change the unobservability inherent in *some* forms of social interaction (and experience this attempt as unhappiness), this may lead me to choose instead *other* forms of social interaction of which the unobservable aspects I accept, thus experiencing happiness in the absence of a desire to change the unobservable aspects.

Social Interaction and the Market System

In theoretical terms, there are two distinctly different ways in which I can interact with other people. First, I can interact with a person while that person's mind is "present" to me. This is what we might call direct person-to-person social interaction. In my theory, I refer to this kind of social interaction as *interpersonal action*. In an interpersonal action, I address or interact with another person's mind in the sense that the other person's mind is present in my conscious field. In interpersonal action, I locate another mind in my conscious field, and I direct my actions or communications toward that mind. Examples of interpersonal action are: face-to-face conversations, telephone conversations, and generally any instance in which, from my own point of view, I interact with another mind (for example, when I issue a command or threat).

Alternatively, I can interact with another person while that person's mind is not "present" to me, for example, by making a purchase from a vending machine. As a practical matter, I understand that another person will be part of my vending machine transaction at some point in time. However, during the time I make the vending machine purchase, I need not direct my actions or direct any communications toward another mind. I may make a vending machine purchase without another person's mind appearing in my conscious field. Examples of this type of social interaction include street signs, maps, recordings, books, automated bank teller transactions, and Internet purchases. We can also consider the price system as an example of social interaction that does not entail interpersonal action. I may post a price without addressing another mind, and similarly, another person may observe this price without addressing another mind. In this sense, the price system enables social interaction to occur without interpersonal action.

Thus, the market or price system may be understood as a technique for engaging in social interaction and social exchange without engaging in interpersonal action. The market system allows me to obtain the benefits of social exchange without having to address or interact with another mind.

As previously indicated, the different forms of social interaction are not neutral with respect to my personal happiness. In some forms of social interaction I may seek to observe the unobservable aspects of the interaction or exchange. In other forms of social interaction I may *not* seek to observe the unobservable aspects of the interaction or exchange. If I habitually attempt to observe the unobservability inherent in interpersonal action (and experience this attempt as unhappiness), this may lead me to prefer social interaction via the market system, in which I do not try to observe the unobservable aspects of the exchange (experiencing the absence of a desire to observe the unobservable as happiness). In this sense, social exchange via the market system may be understood as a technique for attaining or increasing personal happiness.

Coercion and the Market System

By the term "coercion" I do not mean violence or assault or aggression. By coercion I mean a certain kind of trade or exchange. When I coerce someone, I threaten that person with some harmful consequence and then offer to withdraw the threat of harm *in exchange* for something I want from that person. Much of what government does is based on this type of coercive exchange. The government threatens its citizens with various forms of harm and then

offers to withdraw the harm if the citizens obey its laws and regulations. When I say "coercion," I'm referring exclusively to this kind of social exchange.

If I want to employ coercion, I must locate within my conscious field an entity that I believe will be responsive to coercion. In the current context, this means I must locate another mind toward which I can direct my coercive action or communication. The location of another mind within my conscious field is interpersonal action.

As previously mentioned, the price system enables social interaction to occur without interpersonal action. And this is an important link between libertarianism and the market or price system. Coercion, an essential instrument of government action, requires interpersonal action. The expansion of the price system implies a diminishment in interpersonal action and thus a diminishment in coercion; the basis of non-libertarian society. This is one reason why libertarians call for an expansion of the market system and non-libertarians call for its diminution. As forms of social interaction not requiring interpersonal action expand, opportunities for coercion—the basis of non-libertarian society—are diminished.

Why Are We Libertarians?

We are libertarians because we seek to attain greater personal happiness by expanding the market or price system. The market system is a technique that enables social interaction to occur without interpersonal action. As the market system expands, opportunities for coercion are diminished. This implies a contraction of non-libertarian society, in which coercion by government plays a large role.

Praxeology and Consciousness Categories

As you can see, the theory I've presented today is neither an ethics theory nor an economic theory. I have not explained libertarianism in terms of justice or in terms of material prosperity. Instead, I have described libertarianism in terms of consciousness categories.

One of the long-standing problems of social science concerns the structure of social interaction from the point of view of the individual consciousness. As Alfred Schutz (1972, 98) wrote in his book *The Phenomenology of the Social World*: "We must, then, leave unsolved the notoriously difficult problems which surround the constitution of the Thou within the subjectivity of private experience. We are not going to be asking, therefore, how the Thou is constituted in an Ego…As important as these questions may be for epistemology and, therefore, for the social sciences, we may safely leave them aside in the present work."

The theory I have presented today is a *praxeological* theory in the Mengerian/Misesian tradition. Here is how Carl Menger (1985, 62) describes "exact theory" in the realm of social phenomena, the discipline that Mises later named *praxeology*: "The nature of this exact orientation…consists in the fact that we reduce human phenomena to their most original and simplest constitutive factors…and…try to investigate the laws by which *more complicated* human phenomena are formed from these simplest elements, thought of in their isolation." In my work, I try to show how complex social phenomena are formed from elemental consciousness categories,

and in so doing, help us to understand why we are libertarians.

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Is the Theory of the Firm a Missing Chapter in Austrian Economics?

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> *"The problem of entrepreneurship for economists is that the best-developed and best-understood part of economic theory – neoclassical economics – is really mathematics. Business firms in that system are merely formulas, "production function[s]." There are no people, no institutions; it is a timeless paradigm of resources shifting back and forth according to changes in relative prices and costs. This has meant that entrepreneurship, the most forceful, dramatic, and obvious phenomena of economic life, has perforce been ignored by theoretical economists in their story of how economic events happen."*
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> — Jonathan Hughes (1986)

> *"The entrepreneur is at once one of the most intriguing and...the most elusive... characters that constitutes the subject of economic analysis."*
>
> — William Baumol (1993

Hayek's (1945) justifiably famous characterization of the price system does not make specific reference to the roles of firms in the mobilization of distributed knowledge. The price system transforms personal, subjective, conflicted knowledge of the particulars of time and place

into objective price knowledge. What roles do firms play in this process of transformation? Major treatises in the Austrian tradition do not generally contain specific sections devoted to the examination of the economic functions of firms as social institutions. This has prompted some writers to suggest that Austrian economics has a missing chapter, that it has some catching up to do compared to literature in the Walrasian/Jevonsian and the neo-institutionalist traditions in neoclassical economics. The thesis of this paper is that the theory of the firm is not a missing chapter in Austrian economics. The impression that it is a missing chapter rests on a failure to recognize that the treatment of the firm as a social institution in the Austrian neoclassical tradition is thematic rather than topical. Many elements of the Austrian approach to social theory devote considerable attention to the functions of firms in the price system and the insights obtained from this considerable attention anticipate many contemporary rediscoveries in the economic theory of the firm.

Why Do We Need an Economic Theory of the Firm?

It is useful to consider why economics needs a theory of the firm, and perhaps why Austrian economics needs a theory of the firm, apart from the need to understand the roles of firms in the price system. Firms exist (and persist) as social institutions, generally as the product of intentional human action, so it is reasonable to ask why people bother to form firms, in light of the human action axiom. If all human action is an attempt to move from a less desired state to a more desired state, then what is it that makes the formation of something recognizable as a firm a desirable outcome? In addition to being the initial product of intentional human action, firms evolve over time, sometimes in ways not anticipated by their founders, so that firms exhibit aspects of spontaneous as well as planned orders. Some contemporary writers, including Coase, who himself seems to have been inspired by Robertson, characterize the existence of the firm as a paradox. According to this view, firms represent situations where the price system is suspended. Coase uses Robertson's metaphor that firms are like lumps of butter in a pail of buttermilk. The buttermilk, in this context, is the price system. Within the firm, resources are directed by managers without minute by minute regard to market prices, in the interest, according to Coase, of economizing on transaction costs. If we regard firms as systems of cooperation among owners of goods of higher order, then the nature of that cooperation would seem to be centrally related to the subjectivist perspective on capital theory. Ethical and empirical questions about the nature, significance and function of profits would appear to require a theory of the firm as one element in their resolution. What is profit? What function does it serve? And is it a legitimate form of income? As I will argue later, the Austrian tradition, more than any other branch of economics, has devoted more attention the relationships among entrepreneurs and providers of capital, relationships that are typically embodied in firms.

We also need a theory of the firm in order to understand the nature of competition, especially with respect to concerns about apparent forms of anti-competitive behavior of businesses that give rise to various government policies intended to promote competition. Here, Hayek's "Competition as a Discovery Procedure" contains rich insights that have been generally overlooked in this field. There are important questions about the role of entrepreneurship in the formation and ongoing existence of firms that continue to attract attention as does the theoretical

question of whether entrepreneurship occurs within firms. Austrian business cycle theory maintains that clusters of entrepreneurial errors occur in response to changes in money market conditions. We need a theory of the firm to understand how so many decisions made by so many firms could be in error. As a matter of intellectual curiosity, we need a theory of the firm to understand industry structure. In most industries, firms of different sizes, types and ages coexist. New firms emerge, existing firms grow, contract, change their internal organization and some disappear. Why? In addition to satisfying intellectual curiosity, there are important implications for business policy arising from these questions. Ronald Coase (1960) has suggested that we can think about an entire economy as one big firm. If he is correct, then there is a paradox about planning. We need a theory of the firm to explain why planning is functional in a firm, even in a complex firm, but is not functional for an entire economy.

Critical Austrian Conceptual Distinctions

It is not possible in this brief introductory survey of issues to do justice to all of the critical distinctions between neoclassical economics in the Mengerian tradition and neoclassical economics in the Walrasian tradition. But I would like to focus on a partial list of what I see as the more important distinctions. First, it is impossible to comprehend the Austrian perspective on the theory of the firm without understanding the distinction made in that literature between risk and uncertainty. Like Knight, writers in the Austrian tradition maintain that these are two distinct decision contexts. The consensus view in the Walrasian neoclassical tradition seems to be that there risk and uncertainty are synonyms. The Mengerian tradition maintains that there is a fundamental difference between uncertainty and risk, or what Mises called the distinction between case probability and class probability, or what more recently Langlois has described as parametric uncertainty vs structural uncertainty. Israel Kirzner, in the development of his theory of entrepreneurial alertness, relies on the Knightian distinction. According to Kirzner, in a context of uncertainty, "the decision maker [is] ignorant of the extent of his own ignorance. He is subject to genuine surprise . . . he is . . . making a choice without knowing what he is selecting, or what he is giving up." The resolution of uncertainty involves surprise, learning, discovery and adaptation. The resolution of risk does not (eg. flipping a coin). I don't think that it is possible to comprehend the Austrian perspective on the theory of the firm without an appreciation of the maintained distinction between risk and uncertainty.

Space does not permit a detailed examination of other critical distinctions between the Mengerian and Walrasian perspectives. Table 1 provides an admittedly cryptic summary of some of the elements of such an examination. For the purposes of this paper, the implication of the summary offered in Table 1 is that there are paradigmatic differences between the Mengerian and the Walrasian traditions in neoclassical economics. As Kuhn (1962) famously explained, inter-paradigmatic communication is at best difficult. Even familiar concepts like equilibrium and rationality take on distinct meaning and significance in the two paradigms.

Alternative Economic Conceptualizations of the Firm

There are at least five distinct conceptualizations of the firm in the economics literature. Adam Smith saw the firm as an institution that facilitated specialization and the division of

Topic	Mengerian Neoclassical Economics	Walrasian Neoclassical Economics
The Characterization of the Knowledge Context of Business Decision Making	Uncertainty is different from risk	Risk and uncertainty are synonyms
The Existence of Equilibrium	Equilibrium is an ideal type, rarely if ever attained	Equilibrium is a commonly observed, even typical, state
Subjectivism and the Nature of Knowledge	Opportunity costs are subjective, scientific knowledge differs from knowledge of the particulars of time and place	Opportunity costs are objective, scientific knowledge is sufficient for social order
The Nature of Competition	Competition is a dynamic process operating over time	Competition is an equilibrium outcome
The Definition of Economics as a Discipline	Economics is the study of the mobilization of knowledge which is not given in its totality to anyone	Economics is the study of the allocation of scarce means among competing ends
The Nature of Business Leadership	Entrepreneurial alertness and discovery, commitment of capital	Management, optimal search

Table 1: Critical Distinctions Between the Mengerian and Walrasian Neoclassical Traditions

labour, allowing for fuller expression of individual comparative advantage in production. Although he saw the division of labour as the central organization principle in economics, the discipline has not generally followed his early example. The more common conceptualization in Walrasian neoclassical economics, at least until recently, views the firm as an optimizing organization. Sometimes this perspective is characterized as seeing the firm as a production function, an organization that transforms inputs into outputs with a given technology, but the theory actually focusses on optimizing quantities of inputs and outputs. There are many noteworthy contributions to the literature in this tradition, including Carlson (1939), Samuelson (1947), Ferguson (1969) and Fuss and Mcfadden (1978). According to this perspective, firms either maximize profits, given a set of input prices, output prices and a production function, or minimize total cost for a pre-determined level of output given a set of input prices and a production function. In the profit maximization approach, the optimization problem is represented as:

$$\text{Max } PY - C(Y, W) \text{ subject to } Y \leq f(X),$$

were P is a vector of output prices, Y is a vector of outputs, C(Y,W) is a cost function with a vector of input prices, W, and the vector of outputs as arguments. Output is constrained by a production

function, f(X), whose arguments are quantities of inputs. The solution to this optimization problem yields a system of profit, product supply and factor or input demand functions.

From the cost minimization perspective, if the quantity of output, Y, is predetermined, the problem is stated as:

$$\text{Min } WX \text{ subject to } f(X) \geq Y,$$

where the notation is as defined above. In this case, the solution to the optimization problem yields a system of cost and conditional factor demand functions.

Work in this tradition typically adopts the logical positivist methodological position (See Blaug, 1980, for a representative treatment). Validation of this conceptualization of the firm is based on Samuelson`s (1947) exposition of the testable hypotheses implied by the second order conditions required for optimization. The falsifiable hypotheses for profit, supply and factor demand functions involve tests for monotonicity, symmetry, concavity and linear homogeneity. The parallel hypotheses for cost and conditional factor demand functions involved tests for monotonicity, symmetry, convexity and linear homogeneity. The empirical track record for this paradigm is abysmal, however (Blaug, 1980, Applebaum, 1978, Fox and Kivanda, 1994).

One immunizing strategy that has been adopted in this paradigm is to suggest that firms aren`t really profit maximizers or cost minimizers after all, but rather expected utility maximizers. As Just and Pope (1979), however, have demonstrated, the expected utility model does not generate any falsifiable hypotheses. So its use is inconsistent with the empiricist logical positivist methodology. In any case, the econometric evidence seems clear, that firms are not optimizing organizations. A moment's reflection might suggest why this is the case. The traditional abstract conceptualization of firms as optimizing organizations limits the dimensions of optimization to a relatively small number: the quantity of output, the quantities of typically 5 or less inputs, and a scalar profit or cost metric. Actual firms face many more dimensions for optimization. Is the parking lot the optimal size? Is the sign over the door in the optimal font? Is the number of phone jacks in the office optimal? It is inconceivable that actual firms would possess the cognitive capacity to optimize on every dimension of their operations.

More recently, the economic literature on the firm has been dominated by transaction costs economics. Transaction costs were introduced to the economics literature in 1937 by Ronald Coase in what has come to be an influential essay entitled "The Nature of the Firm." Coase's premise is that there is cost to undertaking a market exchange.[1] Coase originally defined transaction costs as the value of resources used up in making, or attempting to make, a market exchange. There are three constituent elements of transaction costs. Search costs are incurred in looking for a potential exchange partner. Negotiation costs are incurred in trying to establish the terms of an exchange, once a potential exchange partner has been located. Verification or concluding costs[2] are incurred after the exchange of items of property has taken place when the

1 Menger (1871) was aware of this phenomenon. He explained it in terms of the differential marketability of commodities. This differential marketability was the basis for his theory of the origin of money.

2 Later, Coase seems to have accepted the term monitoring or enforcement costs for this third subcategory of transaction costs. This migration of terms, however, creates conceptual muddle, since the terms monitoring and

parties to the exchange make sure that they got what they bargained for.

The transaction cost explanation for the existence of the firm is that people form firms in order to avoid transaction costs. This explanation is usually couched in terms of a counterfactual situation in which a manager hires all of the inputs required for production at the start of every business day at the prevailing market price. At the end of each day, in this counterfactual, all of the input providers are paid and terminated. At the beginning of the next day, the process is repeated. The manager and the input owners incur daily transaction costs. The creation of a firm, which in this view is an ongoing hierarchical relationship among owners of factors of production under the direction of a manager[3] avoids these daily[4] transaction costs. This benefit, however, precipitates other costs. The primary cost acknowledged by Coase in his original paper, and this is consistent with his use of Robertson's metaphor that firms are like lumps of butter in a pail of buttermilk[5], is that by directing the employment of inputs without regard to momentary changes in prices in the external markets for inputs, managers of firms may misallocate resources. Additional cost categories identified in subsequent literature by Coase, Williamson and others include opportunistic behavior, such as shirking or hold-up problems. The growing list of incentive problems that have been identified in the transaction cost theory of the firm actually make the ongoing existence of firms out to be something of a miracle.

Although the transaction cost perspective is generally offered as an alternative to the view that the firm is an optimizing organization, a vestigial influence of the firm as an optimizing organization is evident in the transaction cost literature on the boundaries of the firm. Here, the marginal costs of expanding the firm, which means replacing a market exchange relationship with a current factor owner with a contract with that factor owner, equal to marginal benefits, accruing in the form of reduced transaction costs[6]. The transaction cost theory of the firm includes a role for a manager, but there is no theory of entrepreneurial discovery and there is at best an incomplete theory of capital commitment and allocation. Like the optimizing view of the firm, capital is just another input in the transaction cost theory of the firm.

A fourth perspective on the theory of the firm in the economics literature is called the resource based theory of the firm. Penrose (1959) suggested that the firm should be viewed as a collection of resources or capabilities. Owners of these resources earn rents by cooperating in a firm, which is an organization that that facilitates the maintenance of rents. While the definition of resource rents in this theory is conventional, that is rents represent payments to owners of resources that are higher than what those resource owners could earn in their next most attractive employment, the theory does not provide a clear explanation of how cooperation in a firm

enforcement are often associated with contracting costs, and the transaction cost theory of the firm makes a distinction between a market exchange (outside the firm) and a contract (inside the firm).

3 Alternative ways of expressing this relationship are that the firm is a nexus of contracts or that firms embody team production.

4 Of course, the choice of a daily exchange is arbitrary. Why not consider hiring factors twice a day, or hourly, or at one second intervals? Shortening the unit of time increases the transaction costs incurred to search for new inputs.

5 In this metaphor, the buttermilk is the price system or the market. The firm, that is the lump of butter, is suspended in the market, but it is differentiated from the market. Market exchange is suspended in the firm.

6 This is sometimes referred to as the "make or buy" decision in this literature.

facilitates the creation or the maintenance of rents. In this theory, the entrepreneur is an optimal searcher, a resource allocator, but not an opportunity discoverer, so what is called an entrepreneur in the theory is really a manager. The resource based theory of the firm lacks a full development of the economic theory of the entrepreneur and therefore cannot explain fully how firms develop and maintain capabilities.

The fifth economic perspective on the theory of the firm is the thematic treatment of firms in the work of Menger, Mises, Hayek, Kirzner, Sautet, Rothbard and others in the Austrian tradition. This perspective could be called the entrepreneurial/capitalistic theory of the firm. Important contributions include Menger's theories of property and production and his economic analysis of goods of higher and lower order. Also included are Mises' and Kirzner's theories of entrepreneurial discovery and property rights, Fetter's and Kirzner's theories of time preference, interest and capital, Hayek's theory of knowledge, entrepreneurial action in a context of disequilibrium, Buchanan's analysis of the subjectivity of opportunity costs and, therefore, profits, Menger's and Hayek's distinctions between planned and spontaneous orders and Mises contributions to the theory of bureaucratic vs profit organizations.

Israel Kirzner (1997) has suggested that the emphasis on entrepreneurial alertness is the key differentiating feature in the Austrian tradition, and that would imply that it is also the centerpiece of the Austrian theory of the firm. Following Mises, entrepreneurial alertness is involved in all human action. The entrepreneurial function is a type of arbitrage, but it is a richer conceptualization of arbitrage than is normally recognized. Arbitrage is usually understood as the recognition that existing prices that are somehow inconsistent over space or time, and then acting on that inconsistency. Misesian and Kirznerian entrepreneurship, in the context of a business enterprise, is the entrepreneurial perception that *imagined* future prices are too high, relative to current factor prices, or that the *imagined* future prices for a good which does not currently exist are high, *relative to current and expected* factor prices. These entrepreneurial perceptions are tested experientially in undertaking production activities with a view toward future product prices. Entrepreneurial error occurs when these perceptions turn out to be incorrect. It is the working out of these experiential tests that Hayek emphasized in his "Competition as a Process of Discovery." Firms, in this theoretical context, facilitate the testing of entrepreneurial perceptions under pervasive uncertainty. Hayek's inference, in "Competition" is that the outcome of such testing cannot be known in advance. So firms are knowledge production organizations.

There are several unique and at times controversial elements of the economic theory of entrepreneurship in this theoretical tradition. Several authors, for different reasons, maintain that entrepreneurship is not a resource, that it is not a productive factor and that it cannot be bought or sold. Kirzner argues that entrepreneurial alertness has no opportunity cost. Properly understood, entrepreneurial action is the expression of human creativity, will, initiative, vision, imagination and even leadership.

There are three specific characterizations of entrepreneurial action in the Austrian tradition. There is a general recognition in the Austrian tradition that that entrepreneurial alertness is an element of all human action. But there are three specific formulations of entrepreneurial alertness and action that rest on this general foundation. The first of these is

Kirzner's exposition of the pure entrepreneur. The pure entrepreneur perceives opportunities but owns no resources. The pure entrepreneur is literally a disembodied spirit, since owning no resources rules out even self-ownership. Self-ownership implies owning labour, which Kirzner rules out. The pure entrepreneur, to Kirzner, is an ideal type, useful for theoretical examination of the nature of entrepreneurial perception.

A second conceptualization of entrepreneurship is Mises' theory of the entrepreneur-promoter. This individual possesses entrepreneurial imagination but lacks sufficient resources for the realization of that imagination. He or she needs to persuade owners of factors of production, particularly owners of capital, to commit their resources to the realization of the imagined outcomes. The testing of entrepreneurial perceptions in the process of Hayekian competition cannot take place unless the entrepreneur-promoter can persuade particularly the owner of capital to commit that capital to the perceived opportunity. Mises devotes considerable attention to the energetic organizational leadership required to sustain the commitment of resources to the realization of the entrepreneurial vision.

The third conceptualization is Rothbard's theory of the entrepreneur-capitalist. Here, the entrepreneur possesses imagination as well as the means of realization of that imagination. The entrepreneur-capitalist uses owned capital to hire factors of production to realize entrepreneurial vision. Here, the entrepreneur does not have to promote the venture to the capitalist, since the two functions are combined in the same person. The entrepreneur-capitalist commits capital to the hiring of goods of higher order and assigns those goods to the needed processes of production.

The Entrepreneur-Promoter and Market Based Management®

Mises conceptualization of the entrepreneur-promoter is developed and applied in particular detail in Charles Koch's (2007) *The Science of Success*. Koch (2007, p. 25) describes Market Based Management® as an "holistic approach to management that integrates theory and practice and prepares organizations to deal successfully with the challenges of growth and change." Previously, Koch acknowledged the critical role that his study of the ideas of Mises and Hayek played in the development of the theoretical aspects of this integration. The practice came from the adaptive experimental application of this theory to Koch Industries. The characterization of the firm presented by Koch emphasizes the integration of the function and organization of the firm with the price system. Firms that achieve and maintain this integration thrive, while those that do not, eventually, disappear. Hayekian experimentation is a critical element of this integration. This experimentation is undertaken with a clear expectation that some experiments will fail. Failure is not the goal, and firms must have exit strategies when failures occur, but management which strives to eliminate failures undermines the viability of the firm in the longer term. Koch's exposition of the entrepreneur-promoter emphasizes attributes which have attracted limited attention in the business literature and have been ignored, generally, in the economics literature. For example, he maintains that the realization of entrepreneurial imagination requires the development of trust within the organization. He also proposes that a low rate of time preference is necessary for the firm to be effective. Market Based Management® rests on an Austrian understanding of the subjective theory of value, the

principle of comparative advantage, the importance of spontaneous order, marginal costs and benefits and knowledge of the particulars of time and place. This is combined with principled leadership[7] of the organization, which is the basis for the development of trust among owners of goods of higher order cooperating within the firm. The entrepreneur-promoter, as might be expected, is responsible for shaping the vision of and culture of the organization. But, in addition to this function, the entrepreneur-promotor also contributes to organizational design, in the form of shaping processes for the delegation of authority and property rights, the development of systems of accountability and establishment of incentives within the firm. Ultimately, the goal of organizational design is "to provide incentives that harmonize the interests of the individual with those of the company" (Koch, 2007, p. 150).

Is the Theory of the Firm a Missing Chapter in Austrian Economics?

The thesis of this paper is that the answer to this question is no. Austrian economics, going back to Menger, has developed a substantial body of thought that anticipated and even surpassed the insights of the modern business and economic literature. The Austrian perspective has not, however, until relatively recently, been presented topically as a theory of the firm. The Austrian theory of the firm is imbedded in the Austrian theory of institutions, including markets, capital and entrepreneurial alertness.

In the Austrian neoclassical tradition, firms are an integral part of the price system. Price proposing and product introduction are expressions of entrepreneurial action. Among other things, firms propose and adjust prices, as well as production plans. This is an experimental process of discovery that takes place in a context of uncertainty and competition. These critical functions, however, are often viewed with suspicion from the vantage point of the Walrasian equilibrium paradigm. From the perspective of the entrepreneurial theory of the firm, they both would appear to be normal and even necessary adaptive actions. In the Austrian tradition, firms are not like "Lumps of butter in a pail of buttermilk." Successful firms find ways of internalizing the market process within the organization.

I am not suggesting, however, that the treatment of the firm in the Austrian tradition is a closed subject. Important controversies remain to be resolved. A prominent example is a debate about the relative importance of the entrepreneur and the capitalist. Rothbard argues that the capitalist is more important. In his view, there are lots of entrepreneurial ideas lying around, but only a few get exploited because capital is scarce. Kirzner, on the other hand, argues that entrepreneurial alertness is more important. Entrepreneurs, if necessary, can borrow capital from savers to pay for the services of goods of higher order. Let me conclude by stating an hypothesis: that this debate cannot be resolved in the terms in which it is currently expressed. If the firm is a necessary institutional context to facilitate the cooperation of entrepreneurs, capitalists and owners of goods of higher order, perhaps joint necessity of the contributions entrepreneurs and capitalists is a more fruitful perspective.

7 Koch's treatment of principled leadership within the Hayekian firm is similar, in some respects, to Havard's *Virtuous Leadership* (2007)

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Towards an Austrian Theory of Finance

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If there is one area of economics in which the Austrian school has been demonstrably lacking, it is the theory of finance. While their Keynesian and Chicago rivals have produced no less than seven Nobel prize winners for their contributions to finance, the Austrians have been relegated to making their biggest dent outside academia among a relatively small cadre of hard money and gold advocates playing their trade in the capital markets. Other than brief discussions of the equity market and joint stock companies, one finds little that directly bears on the main topics of financial theory in the two leading treatises of modern Austrian economics, whether it be Ludwig von Mises' (1963 [1949]) *Human Action* or Murray Rothbard's (2009 [1962]) *Man, Economy, and State* . This is not to deny that there have been extensive scholarly treatments. The most thorough in the Austrian tradition is that of Fritz Machlup (2007 [1940]) in his book, *The Stock Market, Credit, and Capital Formation*. Yet that was actually written more than seventy years ago before Machlup shifted his allegiance to more orthodox streams of economics. Since then, Austrian minded scholars have published a not trivial number of articles on finance, including Mark Skousen (1994), Peter Boettke (2010), and Gregory Dempster (2011), that strive to apply the school's ideas about entrepreneurship, prices, forecasting, and the business cycle to particular debates surrounding the capital markets. Still missing, however, is a cohesive and systematic exploration of the entire subject-matter of finance culled from Austrian teachings.

What follows are some initial steps in this direction. Adopting the method of Socrates and Aristotle of launching the search for understanding by first surveying and evaluating the prevalent views on the subject at hand, I will run through four pillars of contemporary financial theory: (i) Modern portfolio theory; (ii) the Capital Assets Pricing Model; (iii) the Efficient Markets Hypothesis; and (iv) the Black-Scholes Model[1]. By questioning this canon, we can begin to discern the outlines of an Austrian theory of finance.

Four Pillars

(I) Modern Portfolio Theory

Finance may be defined as the various means of deploying money to manage the time discrepancies between receipts and expenses that arise in the pursuit of one's ends. As an area of study, finance has a long history. We can go as far back as Ancient Greece when Xenophon (1925 [354 BCE]) wrote a work on public finance entitled *Ways and Means* focusing on the city-state of Athens. But to the academic establishment today, finance really started little more than sixty years ago – or, to be more exact, 1952 (Miller, 1999). That was when the so-called big bang of modern finance occurred with the publication in the *Journal of Finance* of an article by Harry Markowitz (1952). Entitled "Portfolio Selection", Markowitz mathematically demonstrated the benefits of diversification, showing that risk can be reduced by investing in a portfolio of securities without sacrificing expected returns[2]. This free lunch, as Markowitz came to call it, arises out of the fact that the price movements of securities are not perfectly correlated with one another. With this free lunch, however, came the recognition that not every kind of risk is compensated in the financial markets. After all, investors only get paid to bear risk that is otherwise unavoidable. Nobody will compensate another person to take on a burden that they can readily eliminate on their own. But to the extent that the risks associated with holding an individual security can be diversified away, investors will only be rewarded for the hazards assumed in holding a diverse group of financial instruments. Not the risk peculiar to a security, but rather a more general kind of exposure must be what explains the returns that investors earn. To maximize returns at a desired level of risk, therefore, Modern Portfolio Theory (MPT) summons investors to focus on the portfolio, rather than the individual security, as the fundamental unit of analysis.

Mises never directly confronted MPT, but his discussion of probability and risk is germane towards the development of an Austrian alternative. Defining probability as those situations where we know something, but not everything, in gauging the truth or falsity of a given proposition, Mises (1963 [1949], pp. 106-117) held that such judgments come in two varieties. Class probability is where we know everything about what will transpire in a class of phenomena, but are unsure about the impending behavior of any particular member of that class. Nicely exemplifying this are throws of a six faced die. We know that in the class of events consisting of all throws of this die that each side will end up having an equal 1/6 share of all instances. Still, we are uncertain about which number will come up on any given roll of the die. We may say that there is a 1/6 probability of any specific number getting thrown, though all we are really doing is

1 There is arguably a fifth pillar, the Modigliani-Miller debt/equity equivalence theorem. But I have decided not to treat it in this short discussion, as it is not as directly related to the financial markets as the other four pillars.

2 For an accessible elaboration of this risk-return dynamic, see Malkiel (2007, pp. 186-190).

stipulating its distribution within the entire set of dice rolls. By contrast, case probability is where we are unable to place a prospective outcome within a class of events, yet still grasp some of the factors influencing its occurrence. To illustrate this, Mises cites the prediction of U.S. Presidential elections. While it may appear that there is a class of previous elections to which we can appeal in calculating the odds of a particular candidate winning, the truth is that every campaign is irreducibly different with respect to the variables that determine the outcome. Not only are there distinct personalities at play, but the social, political, and economic circumstances impinging on the electorate fundamentally vary from one election to the next, as do the valuations that voters bring in assessing their choices. "The case", Mises observes, "is characterized by its unique merits, it is a class by itself" (p.111). Here, quantitatively derived estimates of probability make no real sense. If one happens to go beyond a qualitative sense of expectation to arrive at a number, it will always reflect what Mises calls understanding – that is, an assessment based on experience of a series of unique events applicable to the situation at hand (pp. 51-58).

Given its quantitative pretensions, MPT is best seen as a claim to render investment into a matter of class probability. Furthering this interpretation is that MPT can be likened to insurance, a business whose essential practices Mises identifies with class probability (pp. 108-109). Properly speaking, a firm is engaged in providing insurance when it offers coverage to all parties exposed to a given adverse event, such as premature death. Where the mortality tables indicate that 1 in 100 of all forty year-old men die per year in Canada, the company can safely make money by offering life insurance at a premium reflecting that ratio so long as it does so to a lot of forty year old Canadian men. Anything less than that and it is no longer engaged in insurance, but gambling. However, there is no equivalent of the mortality table in financial markets. Every previous historical incident one might look to shed light on, say, the future direction of the Dow Jones Industrial Average, was driven by a concatenation of singular causes that is not going to be exactly repeated. An Austrian perspective is not thereby compelled to reject diversification as a viable strategy to manage the risk-return trade-off in finance. It only questions the idea that the prospective benefits of diversification can be mathematically delineated; it sees all the calculations of expected returns and covariances that go into MPT as so many metaphors numbering the case probabilities otherwise qualitatively apprehended in people's historical understanding of the markets.

As even the exponents of MPT acknowledge, it is not as if the world was ignorant of the value of diversification before MPT along. In *The Merchant of Venice,* Shakespeare (2000 [1596-1598]) depicts the character of Antonio as not being anxious about his sea trading ventures because his investments were spread amongst many ships (Act 1, Scene 1). Shakespeare gained this insight about diversification by attending to the specifics of human affairs, not by running equations. And it was because of this understanding that he recognized what a quantitative approach cannot with its assumption that the past repeats itself in the future – namely, that diversification is not guaranteed. All of Antonio's ships wind up being sunk. Or, as market professionals nowadays are wont to say: in a financial crisis, the correlations between securities go to 1.

(II) Capital 0Asset Pricing Model

Left hanging in MPT is the nature of the more general risk that investors are rewarded for assuming in well-diversified portfolios. The Capital Asset Pricing Model (CAPM), associated most closely with William Sharpe (1964), is an attempt to specify that recompense. It maintains that the return on a security is essentially a function of two variables. The first is the risk free rate of interest representing the time value of money; the second is a premium for the degree of market risk assumed, measured by the sensitivity of a security to the general tides of asset prices. That sensitivity, in turn, is denoted by beta, from the Greek symbol β in the linear regression equation from which it is calculated. The beta of a security is 1 if its movements perfectly correlate with the swings of the over-all market; a beta of 2 means that the security is twice as volatile as the market, whereas 0.5 indicates that it is only half as volatile. In theory, the market refers to the portfolio of every capital asset in the world, but as the value of all the constituents would be very difficult to collect and aggregate, a proxy is usually adopted, usually in the form of a broadly representative stock index like the S&P 500. So other than being remunerated for sacrificing present consumption, CAPM says that investors are paid an extra amount for shouldering the exposure to such adversities as war, revolutions, depressions, recessions, and natural disasters to which the economic system is subject.

An Austrian view would not deny this risk premium. Yet it would go further in rejecting CAPM's assumption that a corner of the financial universe can be located which is risk free. For that rate, users of CAPM typically input the yield on a highly rated government bond, such as that of the U.S. or Germany, but even the debt securities of the most trustworthy state carry some risk that the latter will be tempted to inflate away its obligations by printing money. Thus included in their yields is a component in addition to the time value of money. "There are in this world", Mises (1963 [1949]) well observes, "no such things as stability and security and no human endeavors are powerful enough to bring them about" (p.226). Governments are no exception to this brute reality. In this way, the Austrian tradition offer something more definite than the abstract notion of beta to explain the systemic market risk that investors are compelled to assume in agreeing to give up their funds in the here and now for some future set of cash flows. As Mises notes:

Over all species of deferred payments hangs, like the sword of Damocles, the danger of government interference. Public opinion has always been biased against creditors. It identifies creditors with the idle rich and debtors with the industrious poor. It abhors the former as ruthless exploiters and pities the latter as innocent victims of oppression. It considers government action designed to curtail the claims of the creditors as measures extremely beneficial to the immense majority at the expense of a small minority of hardboiled usurers (p.540).

Market risks consist not in beta, or any of the other measures that financial economists have subsequently proposed to overcome the now widely acknowledged flaws of CAPM[3]. Market risk equals political risk.

3 On those flaws, see Fama (1992). Since the demise of beta, the Fama-French model of asset pricing has emerged as the leading substitute for CAPM. This model asserts that the returns on stocks can be explained by the price-to-book value ratio and market capitalization, with lower values of these correlating with higher returns. See Fama & French (1993)

(III) Efficient Markets Hypothesis

The centerpiece of contemporary financial economics is the Efficient Markets Hypothesis (EMH). Resuscitating a forgotten doctoral thesis on speculation written by Louis Bachelier (2006 [1900]), EMH came to the fore in the 1960's and 1970's with the contention that security prices immediately assimilate all available information (Fama, 1970). As there is no discernible pattern by which new information enters the market, EMH further maintains that security prices follow a random walk. The practical upshot is that it is impossible for any investor to consistently beat the market by predicting the direction of prices better than otherwise dictated by the even odds of success. Starting in the 1980's, though, EMH was challenged by Behavioral Finance, a more psychologically based approach stating that investors are systematically vulnerable to numerous cognitive biases that cause financial asset prices to deviate from their informationally correct values for sustained periods of time. A succession of events that seemingly belied the idea that markets are completely rational – the 1987 crash, the 1990's dotcom mania, the 2000's housing boom --- lent credence to Behavioral Finance, such that its foremost proponent, Robert Shiller (2000) ended up sharing the 2013 Nobel Prize in Economics with Eugene Fama, the godfather of EMH. Though no longer supreme, EMH remains the default position in academic finance.

What an Austrian perspective would have to contest in EMH is the underlying assumption that equilibrium is the normal condition in markets. EMH does not negate that there are moments when gains from trading are available from exploiting mismatches between prices and the economic realities those are supposed to reflect. But such moments are so short, according to EMH, that for all practical purposes security prices are always in equilibrium. From an Austrian standpoint, this would only hold in an evenly rotating economy where future conditions are entirely known, hardly the situation in financial markets. Rather than being in equilibrium, markets are a continual process towards equilibrium, never (or rarely) ever getting there amid the entrepreneurial search for undiscovered opportunities. As such, Austrian economics does not discount the idea that markets can be beat by astute investors able to predict the future better than others. Warren Buffet and Peter Lynch are not accidents. But it is not easy; it is just as difficult as it is to succeed as an entrepreneur in the larger economy. And like an entrepreneur, an investor's success will depend on an understanding of historical contingencies, even if expressible in quantitative terms, as opposed to a theory positing invariant laws of human behavior. As for behavioral finance, Austrians can potentially make use of its psychological insights when endeavoring to give a concrete account of why investors pursued the goals that they did in the way that they did. Yet, strictly speaking, that would be to engage in the task of economic history. The only psychology, if one wants to call it that, economics needs to logically deduce its conclusions is the axiom that human beings act by choosing among various means to realize their subjective ends (Rothbard, 2009 [1962],pp. 72-74).

(IV) Black-Scholes Model

Nowhere is the mathematical character of present-day financial theory more complex and forbidding than it is among the myriad of equations formulated to price derivative securities. Primary among these is the Black-Scholes Model (BSM), which is meant to value an option -- the right to buy or sell an underlying security at a pre-established price (known as the strike price)

within a specified time frame (Black & Scholes, 1973). BSM prices this right by considering the current price of the underlying security in relation to the strike price of the option, the time left before the right expires, the prevailing risk free interest rate, along with the expected volatility of the underlying security[4]. Entering the financial scene in the mid-1970's, BSM is widely assigned a decisive role in spawning the phenomenal growth that derivative markets have since undergone. Though there are now a much greater variety of derivatives than the options that BSM originally appraised, the conceptual underpinnings of the model continue to influence theoretical valuations of more recent instruments, including those that figured prominently in the 2007-2009 financial crisis, such as collateralized mortgage obligations (CMO) and collateralized debt obligations (CDO). Most significant in this legacy is the assumption of BSM that, in valuing a derivative, the future path of the underlying security's prices can be envisioned as a normally distributed range of periodic returns. To critics, this deludes major players in the financial system into underestimating the chances of extreme negative price shocks affecting their derivative portfolios, thus bringing about a cluster of forecasting errors that are apt to trigger crises (Taleb, 2010).

An Austrian view would be sympathetic to this critique. Insisting that there are no regularities in human affairs for which statistical methods can be used to frame social-scientific laws, Austrians are not in the least surprised that financial markets occasionally exhibit price declines of the kind that a normal distribution of returns says should only happen once every two million years. Not only that, the absence of constant relations in the human condition implies that the entire project of mathematically deducing precise estimates of derivative prices is fundamentally mistaken. As with diversification and capital asset pricing, the valuation of derivatives is properly left to the prudential methods of historical understanding.

Conclusion

Obviously, much more can be said before exhausting everything that the Austrian corpus potentially has to say about finance. Nonetheless, based on the critical survey presented here of four key ideas in contemporary financial economics, one might tentatively conclude that an Austrian theory of finance would, at a minimum, encompass the following propositions:

Diversification is a useful risk management technique, though not perfect, and any benefit it promises is best gauged prudentially and historically

In place of CAPM, an Austrian Capital Asset Pricing Model holds that the expected return of a security equals the time discount rate plus the political risk associated with that security

Instead of EMH, the Austrian Markets Hypothesis is that financial market prices are constantly endeavoring, but never actually succeeding, to assimilate all available information. Investors can beat the market (i.e. achieve better than risk adjusted returns), but it is very difficult to do so consistently.

It is hopeless to mathematically demonstrate any empirically valid equation for the pricing of derivatives.

4 Readers unfamiliar with the equations can consult any derivatives textbook to learn the exact specifications.

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You Didn't Build That: An Austrian Critique

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Elizabeth Warren started it off. On a YouTube video in August 2011 she stated, "There is nobody in this country who got rich on his own — nobody." The obvious message is that one owes others for the success they have had and therefore higher taxes on the rich are warranted.

Obama picked up on the gist of it and in a July 13, 2012, campaign speech stated: "You didn't get there on your own. If you've got a business – you didn't build that." However, this got pushback captured in the statement "I built that". The value of rugged individualism is still well-entrenched in the American psyche. However, Obama later in a more moderate tone reasserted his point with the undeniable and appealing statement that "We did not build this country on our own. We built it together."

The essential message is that transactional relationships with others on the way to one's success imposes an obligation. Conveniently, the easiest method of collecting what is owed is government. This message must be having an impact because beyond benefits received, it appears that many feel that they should give part of their income. This is curious.

Two questions come to mind. The first, what is the nature of society and the role of the

individual within it? This is the concern of the first part of this paper and is answered well in the writings of Mises on human society.

The second question concerns the fact that these statements by Warren and Obama and numerous others favor a more centralized government approach rather than the free market, have great appeal. Simply put, why? The second part of this paper turns to Hayek's last book, "The Fatal Conceit", for some insights. There he contrasts the small group order with the extended order, i.e., the free market.

Mises' Society

The Austrian approach to economic analysis is called methodological individualism, i.e., ultimately individuals make decisions. Mises rejects the tendency to view society as some organic whole that is beyond the individual, and which has objectives that are beyond the individual's objectives. Groups, institutions, governments, etc., don't make decisions. There is some person within them who makes the decision.

Mises explains that society is composed of individuals who voluntarily cooperate with each other in exchanging (Mises 1998: 141). It begins with the market and the fact that by an exchange each gains more than he receives. It is not an equal exchange as some mistakenly think. More is gained by both parties than is given and each gives to get, *do ut des*. There is no one that walks away from a completed exchange that is owed. As exchange relationships widen, individuals gravitate towards producing where either innately, through learning or because of location they can produce at a cost lower than others can, a division of labor. This results in greater output shown by the law of comparative advantage which was most famously articulated by the classical economist Ricardo. Expansion of the number of participants progressively leads to a greater division of labor and a greater output. That Mises bases society on one of the most fundamental of economic laws is astonishing in its simplicity.

For someone to exhort that you didn't build that, you had help from others and thus, you should *give back,* appears as an attempt to expropriate these gains. They are tapping into the experience of everybody realizing the net benefits from exchange. And, because most individuals are unaware of the universal gains from the division of labor it is easy to impose upon them the mistaken idea that something was given to them and a sense of obligation. But, in fact, where everyone voluntarily participates in market exchange, no one owes anything to anyone.

Hayek: Paleo Man

This leads to the second question. Why are we vulnerable to such exhortations? Statements like profits or incomes are excessive, the path of selfish individualism, "greed", has been tried and failed, or that capitalists are exploitative, all tear away at the free market. Certainly, one answer is that most have a very rudimentary or no understanding of the economics. But more fundamentally the answer is in our genetic inheritance.

In "Fatal Conceit" Hayek refers to primitive peoples, members of roving bands of maybe twenty to a hundred whose instincts developed within the small group (Hayek 1989:11). The

social ordering that existed over some 2.6 million years, the Paleolithic period, tended to be stable in the sense of little change in technology. However the period was long enough for many genetic adaptations resulting in the primitive form of today's man (Paleo man).[1]

Small groups that cooperated more effectively would be favored in evolutionary competition. Foremost among the elements that result in greater cooperation is the instincts towards solidarity and altruism. The more the members of the group shared common interest, the more they agreed on the actions they should take, the more they gave each other mutual support, the more they were loyal and the more they were concerned for the wellbeing of each other all contributed to the group's survival and the evolutionary reinforcement of those very instincts. These instincts would be decisive and Paleo man can be characterized by them.[2]

To begin with, Paleo man was not individualistic. For one, he was not likely to survive on his own. Further, he generally acted in accord with the consent of the members of the group or, at most, directed by a headman. The group would have shared the same aims and perceptions. Paleo man knew each member of the group, they were likely kin, and he had frequent face-to-face contact. His loyalty would be limited to the group and he would be suspicious of and may be aggressive towards strangers.

Paleo man would tend to be an egalitarian. Unequal shares would disrupt unity. As a hunter-gatherer, his skill set would be similar to the others in the group. He would have an obligation not only to share what he got, but also share knowledge about food sources and shelter. He would have a desire to contribute visibly. He would be noncompetitive in the sense of not trying to gain a greater share.

Paleo man was nomadic and would want to minimize the burden of travel. Thus, he is unlikely to be acquisitive.[3] Property beyond the personal would be shared by all. Private property connoting a private sphere of acting would be unthinkable.

Paleo man's world is visible and concrete. His objectives were basic: safety, food and shelter.

He would be comfortable with the tangible and easily understood and suspicious of the intangible and not readily knowable. Physical prowess of its members enhanced survival of the group. Creation of value by gathering and hunting of food was a physical act.

It is not intended that the instincts of Paleo man be trivialized or underestimated. On the contrary, his instincts are a vital component of living meaningful lives and there are a host of circumstances where they are desirable. Examples include the voluntary action called for in naturally caused calamities, the sharing during more intimate times with family, the camaraderie in social groups, even the coordination within firms to achieve its objectives. The fulfillment of these instincts provides satisfaction. The togetherness and sharing add meaning to our lives. Paleo

1 Hayek does not use the term Paleo man but the time period he specifies make it unmistakable that he is referring to the small group's evolution during the Paleolithic period. (Hayek 1998:11)

2 Paleo man's instincts described by Hayek are spread throughout his book. (Hayek 1998:11) The following tries to gather them together with some enhancement.

3 Hayek does not include non-acquisitiveness in his specification of instincts.

man is us and our instincts are collectivist.

In a sense, the genetic endowment, the instincts of Paleo man is an equilibrium value system. It is akin to the useful concepts of "long-run equilibrium" and "an evenly rotating economy" in economic analysis. It can be seen as a relatively fixed set to which reference can be made as changes come about. These instincts are more likely to predominate, but not completely, in the determination of a person's attitudes and emotions.

Hayek: Extended Order

Hayek's extended order is essentially the free competitive market; extended because it goes well beyond the order of the small group. It produces means involving people and places that are largely unknown moving towards a multitude of personal ends also unknown. Most exchanges are between strangers. Prices determined in an impersonal market reflect values and costs and may indicate profit opportunities, which redirect the allocation of resources. The free market is competitive. It involves individuals with initiative trying to outdo each other. For trading, private property is necessary.[4]

The competitive order involved rules that are demanding: fulfilling contracts, the discipline of work, risk taking, savings, and restraining instincts. The abstract concept of price, which gives little information about the why of its movements, directs decisions.

Hayek contends that the free market and its rules have also resulted from a process of evolution, cultural evolution, which is ongoing. Adaptations that are favorable allow groups to prosper and are passed on and disseminated by imitative learning. This process is similar to the process of natural selection via the genes. Learning allows cultural evolution to be much faster than genetic evolution. Further, the markets can be said to be wiser than any persons. The rules that have evolved and survived over the long run are the winners. They have made the most productive use of resources and are sustaining the largest numbers. However, to maintain the adaptive process of the markets and the possibility of new rules arising it is essential that prices and profits be free to reflect fully actual conditions.

Instincts versus Rules

The extended order rules and Paleo man's instincts are in tension. For starters, the restraints imposed by the rules on Paleo man's instincts would be disliked and the discipline required to follow the rules is burdensome. Acting in accord with instincts is a form of freedom.

Further, there would be a disassociation of the inner instincts from the outside requirements to behave in accord with the rules of the market. This can be understood as a form of personal alienation and may even produce guilt.

The list of the conflict between instincts and rules is even longer. Paleo man's communal feelings, oneness with the group, are in opposition to the separation from competitively trying to outdo others for a greater share. His interactions are all with familiar people, market exchanges

4 Probably the best article describing the far flung, involved, impersonal market interrelations is given by L. J. Reed in his article *I Pencil*. (Read 1999).

are mostly with strangers. Private property and material acquisitiveness is foreign to him. The existence of poverty when he has much is uncomfortable and may also produce guilt.

The free market involves abstractions and Paleo man's life is comfortably filled with tangibles. The free market itself appears chaotic compared to the somewhat knowable stable world within the group.

It is especially in times of stress, uncertainty, and crisis that the Paleo instincts are more likely to come to the fore. Then, appeals for togetherness and sacrifice, will be understood. Selfishness and private gain will be condemned. He would be more subject to a demagogic appeal to passion, and the urge to act, maybe violently with a mob, is more likely. Distortions in the meaning of words, propaganda, and advertisements from pressure groups appear to target Paleo man.

Hayek warns that to return to an order that gives free reign to instincts will result in the loss of productivity gains that come from the free market and the rules thereof. It may even lead to the complete undermining of the market itself. Abandon the use of money, return to autarky, eliminate the banks and the financial markets and millions, if not billions, would suffer (Hayek 1988:27).

Mises writes that the fateful error of the early classical liberals was that they thought the masses were "morally good and reasonable" and that democracy would throw off "the chains of tradition and superstition" (Mises 1998:193). A new age of improvement through rational conduct would arise. They did not fully account for the instincts of Paleo man.

Examples

To Paleo man the labor theory of value is obvious. Production for use rather than for profit would have appeal. That rent for property is unearned makes sense. That prices should just cover cost is basic logic. That interest rates should not be excessive is only fair. These statements, all anti-free markets, would be very understandable to Paleo man.

The recognition of Paleo man's instincts is paradigmatic. It appears to be applicable to any number of occurrences. In addition to the situation indicated in the title of this paper, *you didn't build that,* what follows is suggestive.

One of the more renowned political exhortations in recent history is President Kennedy's: *"ask not what your country can do for you - ask what you can do for your country."* Mises would have classical liberals responding, why we are being asked "to renounce our well-being for the benefit of society" (Mises 1998:147). Now this response makes perfect sense to an economist in light of the gains from the division of labor within the framework of society. But for Paleo man who finds his safety and very existence within the group and the understanding that each of the members must contribute to maintain it, that response would at minimum not make sense, but, more likely, he would be offended and possibly angered.

As another example, Rahm Emanuel in November of 2008 said "You never want a serious

crisis to go to waste. And what I mean by that is an opportunity to do things you think you could not do before." That statement can be interpreted in light of this paper as, centralized control can be expanded at the expense of the free market when Paleo man's instincts are intensified.

And another: Articles about the recent Occupy Wall Street movement identify three sources of their grievances, unfair income distribution, financial markets, and capitalism itself. The occupiers were Paleo man instincts carried into mass action.

Conclusion

The main point is that to maintain the viability of the free market Paleo man's instincts must be taken into account. These instincts give rise to attitudes and emotions appropriate for the small group. Applying the logic of his instincts to the market is misplaced and would undermine it.

Knowing the existence of Paleo man's anti-market instincts may appear to make the problem of explaining the importance of the free market and the costly effects of an increasingly centralized egalitarian system, seem more formidable. But, on the positive side, it is important to realize the exact source and nature of the resistance. Only then can the problem be addressed correctly. We cannot mentally bludgeon with our seemingly cool and cute economic abstractions. Patience, perseverance, and simplification are necessary to persuade. Ideas, while maintaining their integrity as much as possible, need to be put into the conceptual framework of the greater community, and be made understandable to the instincts of Paleo man.

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Boom and Bust: The Role of Business Valuation in the Recent Financial Crisis

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Recently, we observed one of the greatest economic downturns in history, i.e., the financial crisis and its effects. Even though capitalism is often blamed for causing this crisis, it must rather be characterized as a crisis of socialism. Financial crisis's breeding ground is the centrally planned low interest rate policy of central banks in the aftermath of the "dotcom bubble", because it distorted the free market for interest rates and, hence, caused a typical boom and bust cycle by misleading investors into malinvestments (e.g., Woods 2009). Since investors base their investment decisions upon business valuations (e.g., Hering 2014), it is crucial to analyze how a low interest rate policy influences business valuation and how business valuation contributed to the recent financial crisis.

Low interest rate policy's impact on business valuation

The two most popular approaches to business valuation, which investors apply in preparation of their decisions, are the *income approach* on the one hand and the *market approach* on the other hand. The former appraises a certain business by discounting its expected future benefits, whereas the latter tries to deduce business values directly from observable (market) prices.

Since the *income approach* is based upon the widely recognized present value technique, a low interest rate policy may potentially influence either of the two crucial input parameters, i.e., the discount rate or the future benefits, and possibly even both. Since the *discount rate* reflects a certain interest rate, obviously the discount rate at least might be affected by central banks' interest rate policy. Generally, a lower discount rate (based upon the current interest rate level) leads to higher business values and, hence, (market) prices paid.[1] This conclusion can be simply drawn from the financial-mathematics based relations within the income approach.

The income approach is found in the currently prevalent discounted cash flow methods (DCF). Usually, these methods rely upon models from neoclassical finance theory for the assessment of the discount rate, especially the capital asset pricing model (CAPM) for the measurement of the cost of equity (Koller, Goedhart, and Wessels 2010). Since the CAPM considers several factors ("risk-free" rate, expected return of the market portfolio, beta-factor) for the assessment of (parts of) the discount rate (e.g., Damodaran 2012), a lowering of the general interest rate level by central banks does not necessarily cause decreasing discount rates. A lowered "risk-free" rate may possibly be compensated for by either the expected market return or the beta-factor. However, usually the "risk-free" rate is estimated future-oriented, whereas the market return and the beta-factor are assessed using empirical observations, i.e., based upon historical data (e.g., Matschke and Brösel 2013). Hence, the "risk-free" rate already includes a recent interest rate level lowering, while the market return and the beta-factor still exclude the intended economic stimulus. Therefore, in most cases a low interest rate policy causes lower discount rates based upon the CAPM. In addition, in the most popular DCF variant, the weighted average cost of capital method (WACC), the discount rate also contains cost of debt (e.g., Brealey, Myers, and Allen 2013). Lending at lowered interest rates ceteris paribus causes an increasing debt ratio and finally a decreasing discount rate within the WACC. Therefore, the interest rate level lowering causes higher business values and, hence, an increasing price level.

Basically, central banks intend to stimulate the economy with a decrease in the interest rate level by providing incentives to spend money (investments, consumption) rather than save it (e.g., Herbener 1999). For this reason, central banks' low interest rate policy also impacts the estimation of future benefits within the DCF methods. The economy temporarily benefits from the artificial boom caused by central banks' interest rate policy, which is reflected in increased turnover and higher net income. Since appraisement practitioners usually use current or frequent benefits for a simple extrapolation, they tend to overestimate a business's future benefits in low interest rate periods. Unfortunately, most appraisers are not aware of the Austrian business cycle theory (ABCT);[2] they are, therefore, misled by the artificial boom caused by the central banks' low interest rate policy. As a result, business values and, therefore, prices paid increase in response to an interest rate level lowering.

As can be seen, central banks' decision to lower the interest rate level heavily impacts both the discount rate and the estimation of future benefits within the prevalent DCF methods. Even

1 For an exception to this general rule see Hering (2008).

2 For the fundamentals of ABCT see e.g. Rothbard (2009).

though the discount rate does not necessarily decrease in response to lowered interest rates, in the aggregate, business values increase as a result of lowered interest rates and finally cause rising (market) prices. Therefore, central banks' low interest rate policy leads to an upward spiral that misleads investors into malinvestments which are only seemingly profitable.

In contrast to the income approach, the *market approach* does not appraise a business by discounting its future benefits; instead, the basic idea of the market approach is to deduce business values from observable (market) prices (e.g., Olbrich 2000). If the business under consideration is listed at a stock exchange, according to the market approach the appraised business value equals the price for a single stock multiplied by the amount of stocks issued (plus a control premium). If the business to be analyzed is not listed, the business value is deduced from either "comparable" companies' stock prices or the price which has recently been paid for a "comparable" company as a whole.

Usually, stock markets benefit from central banks' decision to lower the interest rate level (Kelly 2010). Cheap money is available in the market and it is used – at least in parts – to invest in stocks. Therefore, the market prices of stocks increase on average due to the rising demand. Since the market approach tries to directly deduce business values from (market) prices, an increased price level automatically leads to increasing business values. Therefore, a low interest rate policy causes a circular flow. Increasing prices lead to higher business values which lead to further rising prices; consequently, malinvestments are inescapable.

Mainstream's misconception

The various *DCF methods* are undoubtedly the most popular business valuation methods of our time (e.g., Brösel and Hauttmann 2007). However, they aim to calculate a single objective market value for goods and, therefore, neglect the subjectivity of value. Since such an objective market value does not exist in the real world, DCF methods usually (have to) rely upon models known from neoclassical finance theory, especially the CAPM as well as Modigliani's and Miller's irrelevance proposition (MM), for the assessment of the required discount rate (e.g., Matschke and Brösel 2013). Both MM and CAPM are based upon several highly restrictive assumptions, which particularly contain an assumed perfect capital market that is characterized by a single secure market interest rate i for both lending and investing, an unlimited access to lending, information symmetry and the absence of taxes and transaction costs (e.g., Hering 2008, Hering 2014). In addition, the CAPM also requires the assumptions of market participants' homogeneous expectations and risk aversion (e.g., Hering 2008). As a result, MM and CAPM and, hence, DCF methods assume an artificial and escapist world (e.g., Rapp 2014a).

Since DCF methods deny the subjectivity of value, they do not consider the actual crucial individual factors, especially subjective ends and means (financial opportunities); instead, current DCF methods primarily focus on "objective" capital market data (Hering 2014). Therefore, market developments remarkably influence the appraisement calculus. Finally, the strict market orientation leads to an upward spiral in the forefront of the crisis and in a race to the bottom once the market turns. As DCF methods deny the subjective nature of value, usually rely upon unrealistic assumptions, and require a strict market orientation, they mislead real-world investors

into misallocations (e.g., Olbrich *et al* 2015).

Comparable to the neoclassical DCF methods, the common *market approach* aims at the assessment of a single objective market value for goods. Hence, the market approach neglects the subjectivity of value, too (Olbrich 2000). In contrast to the DCF methods, the market value is deduced from observable (market) prices. Therefore, the market approach misunderstands the basic relation between (business) values and prices, since (business) values cause prices, but prices do not cause (business) values (e.g., Rapp 2014b). As a consequence of this fundamental misunderstanding, the market approach misleads investors into malinvestments. Again, the strict market orientation leads to an upward spiral in the forefront of the crisis and to a downward spiral once the market turns.

Austrian alternative

Obviously, there is a necessity for a proper alternative to the current mainstream in business valuation. First of all, one needs to recognize that business valuation must respect and consider the subjectivity of value in order to really support entrepreneurs in their real-world investment decisions (e.g., Matschke, Brösel, and Matschke 2010, Herbener and Rapp 2014, Olbrich *et al* 2015). Fortunately, a subjective approach to business valuation, which meets this criterion, has been developed by German-speaking authors over the past more than a century and a half. These authors traditionally refer to the marginal utility concept and early Austrian economists, especially Carl Menger (e.g., Liebermann 1923, Schmalenbach 1937, Brösel, Matschke, and Olbrich 2012, Matschke and Brösel 2013, Hering 2014, Olbrich 2014 and Rapp 2014a). Since Menger can be characterized as the founder of Austrian economics, subjective business valuation theory and Austrian economics are blood brothers in fact. Mises explicitly recognized the implementation of subjectivism into the early German business management theory by emphasizing the works of Eugen Schmalenbach (Mises 1933 [2003]), who was one of the most crucial driving forces for the development of the German business management theory, in particular accounting theory and subjective business valuation theory.

The subjective business valuation theory illustrates how the subjective nature of value can be reflected in business valuation. Following this concept, the income approach can be used for the purpose of a subjective business valuation, if applied in the shape of the future earnings method (FEM) (e.g., Olbrich *et al* 2015). In contrast to the currently prevalent DCF methods, the subjective FEM needs to contain strictly individualistic input parameters. Therefore, the income approach's numerator must consider the future payment flows which a specific deciding person expects to gain from the business under consideration, including personal tax rates and potential tax loss carry forwards, individual synergy effects, the possibility to influence the company's corporate policy, personal future expectations as well as the individual's appetite for risk (e.g., Olbrich *et al* 2015).

In contrast to the popular DCF methods, the denominator, which serves as a standard of comparison for the business being appraised, should not incorporate a patchwork of different and – with regard to underlying assumptions – incompatible neoclassical models (MM, CAPM), since they deny the subjectivity of value and require escapist assumptions in order to deduce a

(pseudo-)"objective" standard of comparison. Instead, the subjective FEM concept necessitates the consideration of the deciding person's individual optimal marginal use of money which is determined by this person's (financial) ends and alternatively available means, i.e., alternative investment and funding opportunities (e.g., Olbrich *et al* 2015). The individual marginal utility of an additional dollar is determined by the internal rate of return of a certain individual's marginal object, i.e., the internal rate of return of the last funded or invested dollar in this person's overall investment and funding program (e.g., Hering 2008). The crucial marginal object either accords with the least profitable investment opportunity or the most expensive funding alternative which is ranked and chosen by the deciding individual in order to reach his personal ends. For person A, who is partly funded with debt capital, the best alternative action to purchasing a certain business might be to pay back the most expensive loan (at least in parts), whereas for person B, who is not at all indebted, another investment alternative is the best available action compared to the purchase of the business under consideration. Therefore, person A and person B need to consider their actual best alternative action's corresponding internal rate of return as their subjectively correct personal standard of comparison.

Following FEM's requirements pointed out in this section, business valuation can avoid the current mainstream's misconceptions and, hence, does not mislead real-world investors into misallocations. However, the subjective application of the income approach may also be – at least partly – influenced by a low interest rate policy, since such a policy *can* have an impact on the individual investment and financing opportunities. If central banks' low interest rate policy actually affects a certain individual's marginal object, even the subjective business valuation concept will result in a distorted business valuation for this specific person. But it is not and it cannot be business valuation's responsibility to eradicate a socialist interest rate policy. As long as there will be central banks, every business valuation – (pseudo-)objectively or subjectively applied – may be distorted. Fortunately, the subjective, Austrian concept of business valuation can be combined with the findings of ABCT. Consequently, the estimation of future payment flows should consider the development of central banks' artificially created boom and bust cycles (Herbener and Rapp 2014). Thereby, appraisement practitioners can avoid overestimations of future benefits in low interest rate periods and, hence, being misled by central banks' market distortions. Therefore, the subjective concept of business valuation can at least limit low interest rate policy's negative effects and – unlike the neoclassical DCF methods as well as the market approach – does not support central banks in misleading real-world investors into disadvantageous investments.

Four main conclusions

Four main conclusions can be drawn from the above presented:

Central banks' low interest rate policy has a heavy impact on the two most popular business valuation approaches and basically leads to higher business values which result in only seemingly profitable investments.

Both the popular neoclassical DCF methods as well as the market approach to business valuation include misconceptions that finally mislead investors into misallocations. The required

strict market orientation causes an upward spiral in booms and a race to the bottom in busts.

A proper alternative can be found in the mature subjective business valuation theory which is inspired by early Austrian economics.

Even the subjective concept is not able to finally solve the problem of central banks' market interventions; however, at least it can limit its effects.

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