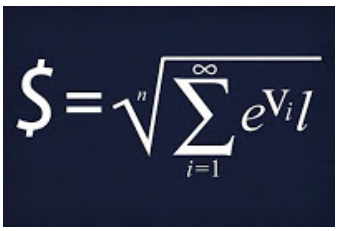
MacroMania

Believe those who are seeking the truth. Doubt those who find it. Andre Gide

Sunday, September 2, 2012

Evil is the root of all money



For the love of money is the root of all evil.
1 Timothy 6:10

A basic question in the theory of money is "why does money exist?" Or, put another way: where does the demand for money come from?

The phenomenon of monetary exchange is so familiar to us that many may view the question ridiculous and/or the answer obvious. But if we stop and think about it, we'll discover that a surprising number of our everyday transactions are made without any reference to money at all. In particular, we regularly trade favors with family members, friends, and associates via implicit credit arrangements known as gift-giving economies. Indeed, the phenomenon seems quite prevalent in smaller (and more "primitive") communities throughout history.

So if money is not necessary in transactions--even credit transactions--then why is it used? Monetary theorists have been asking this question for a long time. The standard answer to be found in virtually every undergraduate macro textbook is that "money solves the double coincidence problem." That is, without money, trade is restricted to barter transactions. And because it is difficult to find a trading partner who happens to want precisely what you have to sell and *vice versa* (a double coincidence), barter exchange is inefficient.

I want to argue here that this familiar story is all wrong. (John Quiggin offers a related critique here.) Up until recently, I used to think that a lack of double coincidence was necessary--but not sufficient--to rationalize the use of money. I now question whether a lack of double coincidence is necessary at all.

What does seem fundamental to the question is a lack of commitment. Kiyotaki and Moore label this friction an *evil* (hence, their play on Timothy, which I borrow as the title of this post). But the basic insight, as far as I can tell, seems attributable to Doug Gale (The core of a monetary economy without trust).

Before I proceed, I should take a moment to define what I mean by monetary exchange. I define money to be an object that circulates as payment instrument across a sequence of spot exchanges. In the models I describe below, money takes the form of a perfectly divisible and portable income-generating asset. Equivalently, it takes the form of perfectly divisible, non-counterfeitable, and enforceable claims to an income-generating asset. It is not even important what form these claims take--they can be paper or book-entry objects, for example. The only requirement is that the claims constitute well-defined property rights (the same assumption is made by the fact of possession of a physical asset).

Wicksell's triangle

Consider an economy consisting of 3 people, Adam, Betty, and Charlie. There are 3 time periods: morning, afternoon, and evening. There are 3 (time-dated and nonstorable) goods: morning-bread, afternoon-bread, and evening-bread.

Each person is endowed with an asset--a bread-making machine. Adam's machine produces bread in the evening, Betty's machine produces bread in the morning, and Charlie's machine produces

David Andolfatto

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Real GDP +2.1 %, Comp. Annual Rate of Chg. on Q4 2019

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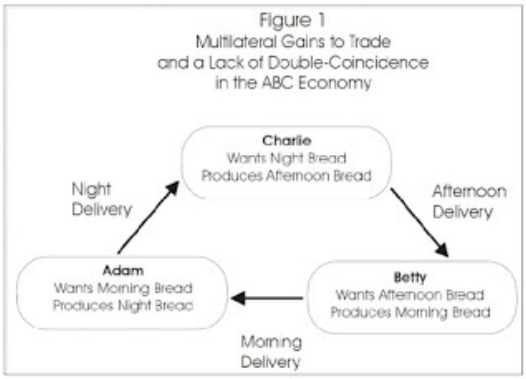
bread in the afternoon.

While each person values their own production "a little bit," they value someone else's production "a lot more." In particular, Adam wants morning-bread (from Betty), Betty wants afternoon-bread (from Charlie), and Charlie wants evening-bread (from Adam).

This economy features a complete lack of double-coincidence. That is, for any pairing of individuals, there are no bilateral gains to trade. On the other hand, this economy features a triple-coincidence of wants: there are *multilateral* gains to trade. The efficient allocation has everyone getting the good the value highly, and disposing of the good they value less.



Notice that each person is in a position to issue an IOU promising a bread delivery at some specified date (morning, afternoon, or evening).

Just to start things off, imagine that our group meet at the beginning of time (just before morning) to arrange their affairs. If everyone is perfectly trustworthy, then everyone can just promise to "do the right thing" and that's the end of the story. That is, if people can commit to their promises, then monetary trade is not necessary, despite the lack of double coincidence.

Suppose instead that our group is not so trustworthy. Suppose Adam takes his morning delivery of bread and consumes it, but then refuses to make his promised night-delivery (consuming it for himself)? Well, in this case, our traders could agree to swap bread-machines at the beginning of time or--equivalently--swap securities (IOUs) representing clear titles to machines and their produce. (This latter type of exchange is what happens in an Arrow-Debreu securities market). In this case too, there is no role for an asset to circulate as a payment instrument.

O.K., let me now give the double-coincidence problem more bite by assuming that people meet sequentially and bilaterally over time. In particular, assume that Adam meets Betty in the morning, Betty meets Charlie in the afternoon, and then Charlie meets Adam in the evening. In each pairwise meeting, there are no gains to trade. But as long as people are committed to "doing the right thing," then this should pose no problem. In the absence of evil, money is not necessary.

But what if the members of this society are not so trustworthy? Then Adam asks for Betty's morning bread, Betty will demand a *quid-pro-quo* exchange of property. The only thing Adam has to offer is his night-bread machine--something that Betty has absolutely no taste for. Nevertheless, she will take it as payment because she expects to be able to use it as money at a later date. Indeed, Charlie should be willing to make his afternoon delivery to Betty in exchange for the night-bread machine because Charlie wants to consume at night. Evil--the lack of commitment--is a problem that can be solved here by the institution of monetary exchange. (Technical note: money is the unique solution if allocations cannot be conditioned on individual trading histories.)

Conclusion: *A lack of double coincidence problem is not sufficient to explain monetary exchange. A lack of commitment is necessary to explain monetary exchange.*

Monetary exchange with no double coincidence problem

My ideas about monetary exchange and the role of exchange media in general began to evolve after reading Gary Gorton's informative paper Slapped in the Face by the Invisible Hand (I recall telling Gary that getting slapped in the face by the *visible* hand was no less painful, but he only laughed).

I was intrigued by Gorton's description of how the shadow banking sector worked hard to create high-grade assets (e.g., senior tranches of diversified pools of mortgage debt) that ended up playing an important role in the payments system. The activity looks a lot like standard banking, i.e., issuing a set of senior liabilities backed by a diversified portfolio of assets. In standard banking, these senior liabilities (whether in the form of banknotes or book-entry items) circulate as money. The shadow banking sector's liabilities seem to have "circulated" as collateral in repo markets. The stuff sort of looked like money. And yet, it did not seem to be solving any double coincidence problem.

So here is my little model. There are only two people this time, Adam and Betty, but still 3 periods. Each person is in possession of two assets: a human capital asset, and some other asset (K) that

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Assume that Adam is good at working in the afternoon and that Betty is good at working in the morning. Moreover, Adam wants a morning service, while Betty wants an afternoon service (so Adam is impatient, Betty is patient). Assume that the special asset K delivers output only in the evening for both parties.

The efficient trading pattern should be clear enough: Betty makes a morning delivery to Adam, Adam makes an afternoon delivery to Betty, and then both parties retire in the evening to consume the fruit of their special asset K.

As before, if people could commit to their promises, then a credit market implements the efficient allocation: Adam borrows bread from Betty and pays her back in the afternoon.

But what if people cannot be trusted to keep their promises? If I replaced "human capital" with the earlier bread machines, then a simple swap of bread machines would do the trick. But suppose it is impossible to transfer human capital in this way (indentured servitude is legally prohibited). What can be done?

Well, it would seem that one solution would be for Adam to use his special asset K to pay for his morning service. But why would Betty agree to such a transfer? After all, she does not attach an intrinsic value to Adam's special asset.

The answer seems clear. Betty could use Adam's K asset as money in the afternoon. In particular, she could offer to return the asset to Adam in exchange for the afternoon service she desires. Adam should be amenable to such an exchange as he attaches an intrinsic value to this special asset.

Conclusion: *A lack of double coincidence of wants is not necessary to explain monetary exchange. A lack of commitment is necessary to explain monetary exchange.*

(Technical notes: the monetary object here cannot be playing any record-keeping role. Also, I realize that bilateral credit relationships can be sustained via the threat to suspend all future trade in the event of default. Understanding this does not diminish the role played by the special asset above--it can still be used to increase the threatened pain of default, thereby expanding the supply of credit.)

Relation to the repo market

Another way to implement the efficient allocation above is via a sale and repurchase agreement (repo) or, what amounts to be the same thing--a collateralized loan.

Note that the fundamental role played by Adam's special asset is that of a hostage. Betty is saying "you better pay me back, or you'll never see your beautiful asset again!"

And so, Adam and Betty might agree beforehand to a repo transaction: Betty agrees to buy the asset in the morning and resell back to Adam in the afternoon. Equivalently, Adam borrows a morning service using his special asset as collateral. In all of these transactions what is important is that property rights are transferred to Betty (the creditor).

How these rights are most efficiently transferred would seem to dictate the method of payment--i.e., whether by *quid pro quo* exchange, a repo agreement, or as a collateralized credit arrangement. In all of these cases, the asset is playing the same economic role--it is being used to support an intertemporal credit arrangement in the absence of commitment. In this sense, we could legitimately label the asset an *exchange medium*, even if it is not literally circulating from hand-to-hand (it is circulating from account-to-account, however).

Conclusion

A lack of double coincidence is neither necessary or sufficient to explain the demand for money. Evil appears to be the root of all money. The sermon is now concluded!

Posted by David Andolfatto at 8:18 AM

60 comments:

Unknown September 2, 2012 at 9:02 AM

This comment has been removed by a blog administrator.

Reply

Pedro Bento September 2, 2012 at 11:23 AM

Now assume perfect record keeping and perfect commitment. But some buyers don't want the government (contraband) or others in their community (porn) to know what they're buying or selling. Again, 'evil' is the root of all money.

Reply

Replies

David Andolfatto September 2, 2012 at 1:14 PM

Ah yes, Pedro, this reminds of a paper by Kahn, McAndrews and Roberds "Money is Privacy."

http://www.minneapolisfed.org/research/events/models/Money_Is_Privacy.pdf

Reply

Unknown September 2, 2012 at 12:48 PM

This comment has been removed by the author.

Reply

Mike Sproul September 2, 2012 at 12:49 PM

"Evil is the root of all money." Best line I've heard in a long time.

Reply

Unknown September 2, 2012 at 12:54 PM

David

Thank you for taking down my post, as I was mistaken.

Lawyers don't learn what money is in the first weeks of their contracts course in law school.

Good law schools teach this on the first day, as a class mate reminded me. We actually learned the definition of money when the Dean told the assembled first year class that those who did not understand that we wouldn't be here if people were honest and lived forever should get up and leave.

It is no wonder that our economy is so screwed up. Economists with Phds don't know that the need for money arises out of dishonesty; they don't know as are much about money as a first day law student.

When you figure out how to finance out getting out of the Lesser Depression buy and ad in the paper and let us know and we will read your blog.

Until then, I going go to ask our state legislature to start requiring economists to be licensed.

Reply

Replies

David Andolfatto September 2, 2012 at 1:11 PM

Aaron, where are you when we need you?

Anonymous September 3, 2012 at 1:14 PM

I am going to ask David to ban your nonsense, John D.

Reply

JP Koning September 2, 2012 at 7:56 PM

"Before I proceed, I should take a moment to define what I mean by monetary exchange."

Can you flesh this out a bit?

By money, you seem to oppose it to credit/promises/IOUs/favours. Yet you go on to describe money as a claim to some underlying asset, for which the "requirement is that the claims

constitute well-defined property rights." Credit, promises, and IOUs also provide a claim on some underlying asset, and therefore would seem to qualify as money according to your use of the word, which I don't believe is your purpose.

Which leads me to think that your definition of money is that of some object that appears in a sequence of spot exchanges, whereas a non-money is extinguished after the first exchange.

Perhaps some examples? Is a demand deposit money? What about a claim to a meal that happens to circulate over many transactors? Gold coins? What about a negotiable 3-month promissory note ie. a promise that can be passed over multiple transactors before finally being extinguished?

Reply

Replies

David Andolfatto September 2, 2012 at 9:31 PM

Hi JP, you raise an excellent set of questions. I'll do my best to answer them.

I define money to be any object that "circulates" as a payment instrument (i.e., possesses "exchange value" on top of any "fundamental" value). This definition includes fiat money. The object may exist physically (e.g., paper) or not (e.g., book-entry items). It includes IOUs, checks, etc. -- whatever -- as long as it circulates as a payment instrument (of course, most such object do not circulate in this sense.)

I do not go on to describe money as a claim to some underlyling asset -- I describe the money that arises in my models as having this property.

Yes, demand deposit liabilities issued by banks fit my definition of money because the electronic credits circulate from account to account as a means of payment. I do not think of gold coins serving any significant medium of exchange role today (although they have done so historically).

In any case, here is what I would recommend. Let's not get too hung up on precise definitions of money. Take a look at the economic environments I describe and ask what sort of trading arrangement makes sense. Are there assets (or other objects) that enhance the intertemporal allocation of resources and, if so, what role do these assets seem to be playing? What friction are they overcoming? Do they resemble objects in reality that people call "money" or "repo collateral?" And so on.

I'm still in the process of trying to figure this all out, of course. Please do come along for the ride!

JP Koning September 3, 2012 at 7:31 AM

Money is always and everywhere a controversial topic so I can see why you wouldn't want to get bogged down in definitional issues.

Just to make sure I understand what you are getting at, in formulating your initial question without the thorny word "money", do you mean... why is there a tendency for certain assets to appear in a string of transactions, instead of an alternative situation in which all assets, once traded, cease to appear in subsequent transactions, either because they are extinguished, consumed, or settled?

David Andolfatto September 3, 2012 at 9:07 AM

JP, Yes, that's a reasonable way of putting it. A class of assets is used to support intertemporal resource allocation. In principle (e.g. if commitment is perfect), the use of such assets is superfluous. But when trust is lacking, these assets serve a private and social purpose. When trust in these assets evaporates (as it did in the repo market), intertemporal trade shuts down -- we have a credit crisis. I'm thinking about these and related issues...

JP Koning September 3, 2012 at 11:14 AM

Ok, I am starting to grok.

You've devised some rules of the game (i.e. "meet at the beginning of time" or "people meet sequentially and bilaterally over time") and by introducing "evil" have shown that a pattern of monetary exchange develops (i.e. certain assets begin to appear in long strings of transactions).

But what if the rules change and people meet haphazardly and in different sorts of markets (bilateral, multilateral, auctions), but never know what the format of the market they encounter will be, when it will open or close, nor what goods it will have on offer or will accept. Let's say that this is also a world in which people are committed to "doing the right thing" and there is a clearing mechanism to settle promises efficiently.

As a result, when people meet to exchange, they'll very often accept an IOU and not goods for reasons of convenience. IOUs might take the form of a promise to provide a service or a produced good. The acceptor will carry the issuer's IOU - which is light, portable, and riskless - to other markets to exchange onwards, the subsequent acceptors in turn passing the IOU on. Thus you get the familiar long chain of monetary transactions occurring. At some point the IOU will finally be accepted by someone who actually wants to consume the item/service to which the claim points, and it is extinguished.

But in this case, the appearance of personal IOUs in the long chain of transactions has been motivated by 1. a lack of evil - people trust each other and the clearing system - and 2. the difficulty of knowing if they will ever meet someone who wants what they have and vice versa.

David Andolfatto September 3, 2012 at 12:02 PM

JP, I had to look up "grok"...lol.

Your first paragraph: correct. Your second paragraph: did you mean to say "but consider a different environment"? (Or did you mean to say, consider an environment that is changing over time?) In any case, yes, by all means, let us consider different scenarios.

As a result, when people meet to exchange, they'll very often accept an IOU and not goods for reasons of convenience. IOUs might take the form of a promise to provide a service or a produced good. The acceptor will carry the issuer's IOU - which is light, portable, and riskless - to other markets to exchange onwards, the subsequent acceptors in turn passing the IOU on.

If people could be trusted to tell the truth, they would not have to carry around evidence of their past transactions (the record-keeping function of money has been emphasized by Ostroy 1973 and Kocherlakota (FRB Minneapolis QR, "The Technological Role of Fiat Money.")

The "difficulty of know if they will ever meet someone who wants what they have and vice-versa" is a property of search based models of money. But even there, money is only necessary if people are evil and record-keeping is absent.

JP Koning September 3, 2012 at 6:48 PM

"Your second paragraph: did you mean to say "but consider a different environment"? "

Yep, I did. You grokked correctly.

JP Koning September 4, 2012 at 6:38 AM

"If people could be trusted to tell the truth, they would not have to carry around evidence of their past transactions"

I'm probably not explaining my point very well, but this topic is a fun one so let me try again.

Say Jane and Jack meet by chance, Jack is selling wood and Jane is selling copper. Jane wants wood, but Jack doesn't want copper. There is no double-coincidence. Instead he accepts her personal IOU for one unit of copper since she is trustworthy (there is no evil), the IOU is costless to carry (copper is heavy and inconvenient), and he guesses that he'll at some point meet someone who wants to buy copper and therefore a copper IOU (or at least meet someone who

thinks that they'll meet someone who wants copper). Jane's IOU could be written on paper, or it could simply be her word. Either way it is transferable.

Jack finds a village where they are selling bread. They don't want his wood, but will take his IOU for wood or Jane's copper IOU as they think they can in turn exchange these IOUs onward, and they are costless to hold in the interim. Jack, who prefers to pay with Jane's IOU rather than his own, exchanges it for bread.

The villagers need to buy protection, so they go to the capital city with some bread, a bread IOU, and Jane's IOU. The king doesn't want bread but willingly takes Jane's IOU.

The king wants a massage and will pay a masseuse by protecting her, or by providing a protection IOU, or Jane's IOU. The masseuse oddly enough wants copper, so she takes Jane's IOU, sends it back to Jane so as to discharge the debt, and receives the copper back from Jane in the mail.

Anyways, in this story Jane's personal IOU functions as a useful medium of exchange, the point being that you can have long chains of monetary transactions emerge in a world without evil. This is because it is convenient to use IOUs in transactions, especially when markets are distant, their timing uncertain, and holding and transporting bartered goods is costly.

Introduce evil into this world and no one will accept Jane's personal IOU anymore, trade will be have to be conducted with goods, the long transaction chains now facilated by some easily-stored commodity, maybe gold. Introduce some sort of monitoring system and it will counteract evil and maybe reintroduce limited trade in personal IOUs.

By the way, the introduction of evil is really just an informal way of saying limited commitment?

JP Koning September 4, 2012 at 6:46 AM

Like you, I'm still in the process of trying to figure this all out, of course... don't take the above as anything approaching a final conclusion.

Kaleberg September 8, 2012 at 9:09 PM

I don't think you need evil or double coincidences. Money is like learning a language or getting an internet connection. It's value lies in the fact that a lot of people use it. Money's value from the fact that a lot of people will accept it in exchange for goods and services. If no one speaks a language, there is no point in learning it. If no one has an internet connection, you're connection will be of little value. If no one will accept money in trade, then it isn't particularly valuable. The value is in the network.

Of course, getting people to join the network requires dealing with the problem of evil, so you need a way of preventing counterfeiting. Since government already implements private property for most people who own things, it makes sense for the government to provide people with money. Property and money are both valuable government services. (A good way to tell if something is a government is to see if it provides property ownership as a service.)

When the official currency breaks down, people will often throw together their own currency. I live near a street named for a local guy, by the name of Lauridsen, who issued his own money after the panic of '93. He was the savior of the local economy back in those gold standard days. If you go to prison, you'll find it useful to bring some dried mackerel packets as those are the common exchange medium there. There will sometimes even be a parallel currency in use alongside the official one as with Canadian Tire Company dollars.

Reply

Brian Hanley September 3, 2012 at 9:38 AM

I am more interested in money relative to real world examples, examining the differences between societies that don't use money internally and the rest of the world. There is a long history in North America (and some in Europe) of communistic groups that operate without formal money. From Amana and Oneida to the Hutterites, religious groups have been able to operate this way very effectively. Relative to the outside world, in almost every case these groups were extremely successful at becoming wealthy - but not by intent. (It was this which

stimulated Fourier and in turn Karl Marx to believe in collectivism, despite the unequivocal evidence that sans religion communism didn't work.)

I see your discussion as a backhanded swipe at social capital. Social capital underlies systems of exchange and mutual aid. We can see this in other work (don't have the cites on Labor Day AM) that shows it is reflected across the world.

Thus, I would contend that the reverse is actually true. A religious communism goods and services economy that produces wealth measurable by the outside as worth a great deal of money, is production of underlying value. Hence, it is wealth creation. This is the highest level of social capital.

We have steps down from that, the majority of which are what most economists call "the economy" in which money is used by most parties to measure their exchanges. But within that economy, what we really have is a range of social capital, from near zero to a very high level. Poverty is composed of more than just lack of money.

There are places where money is nearly useless at making an economy work because social capital (ability to trust and altruism) is so low. Conversely, there are places where social capital is so high that money becomes superfluous.

Seen that way, to the extent money works it is dependent on the functioning of social capital (or trust). However, money is only necessary because of some degree of breakdown of social capital.

Reply

▼ Replies

David Andolfatto September 3, 2012 at 12:07 PM

Brian,

Thank you for your comment.

I see your discussion as a backhanded swipe at social capital.

Not sure why.

There are places where money is nearly useless at making an economy work because social capital (ability to trust and altruism) is so low. Conversely, there are places where social capital is so high that money becomes superfluous.

With respect to your first sentence, yes. There are places so screwed up that money, credit, hard work, and all sorts of other things are useless at making an economy work.

Seen that way, to the extent money works it is dependent on the functioning of social capital (or trust). However, money is only necessary because of some degree of breakdown of social capital.

Is this not consistent with what I have written in my post. Just replace "Breakdown in social capital" with "Evil."

Reply

Anonymous September 3, 2012 at 12:10 PM

Well, the Adam Betty Charly economy in fact works a lot like the Blacksmith-Shoemaker-Farmer economy of the seventeenth-eighteenth century villages of Europa. Buying on credit was the rule, debts were sometimes only settled after somebody died and his belongings were sold. No evil here, as people knew each other, maybe did not like each other - but cold not afford to loose creditworthiness by being free riders.

Reply

▼ Replies

David Andolfatto September 3, 2012 at 3:35 PM

Sure, but as I say in my post, you don't have to go that far back. Credit appears to be the rule is small "primitive" societies, what I called "gift giving economies" above.

There is still evil present, but in small societies, people are not anonymous, so

record-keeping is feasible, together with the threat of ostracism for socially unacceptable behavior. Absent such record-keeping, money can substitute as a record-keeping device. This is something that goes back at least to Ostroy (AER 1973?) and possibly before.

My point is that record-keeping is not necessary if the value of the collateral serves as sufficient security (as opposed to the threat of ostracism.)

Reply

Nick Rowe September 3, 2012 at 6:02 PM

I like this post David. But I think I disagree, in part.

I'm trying to buy drugs for money. The dealer pulls a gun, takes my money, and doesn't give me the drugs. Or I pull a gun and take the drugs without paying the money. Money doesn't solve *that* trust problem. Adding a time-delay between the handover of the two goods doesn't really make much difference. It's a fundamental problem with *all* exchange, monetary or barter, simultaneous or delayed delivery.

There's an old paper by Alchian JSTOR: http://www.jstor.org/discover/10.2307/1992014?uid=3739464&uid=2129&uid=2&uid=70&uid=3737720&uid=4&sid=21101192015187

Basically it's a sort of Market for Lemons Problem. (Remember that the Market for Lemons Problem could be solved with trust ("Is your car a lemon?"), so you are still right about trust). There exists one good that it is easy for everyone to do a quality inspection on. That good becomes money. All other goods are like used cars where a mechanic's inspection is costly.

Reply

▼ Replies

Unknown September 3, 2012 at 9:57 PM

What is this---the money must solve every trust problem or its not money doctrine?

Under your example, there is no such thing as money.

Do economists no longer study Coase? Money, like a firm, is merely a way of more efficiently organizing transactions. When money takes on the character that it can be put to anyone to pay a debt, then you have finance and a real modern economy.

Why is the simple so hard? Well, we all know. Money legitimizes government, for only gov't can make the put stick, and we must not ever do that. So, instead of common sense we get spontaneous order and small communities and other drivel that are meaningless in a world of 6 billion people involved in a global economy.

Last, seriously, what kind of "science" do we have when people cannot even define what they are talking about.

Anonymous September 4, 2012 at 6:46 AM

Go away John. The only one who can't define money is you.

David Andolfatto September 4, 2012 at 7:09 AM

Hi Nick,

I was hoping for you to comment...thanks!

I do not think your "theft" story is relevant. I was talking about commitment to promises made. Of course money does not solve the problem of theft, war, etc.

Yes, I am familiar with Alchian's paper "Why Money?" There's certainly something to that paper and, as you say, even that hypothesis relies on an "evil" (lying for private gain at society's expense).

Are you aware of Gary Gorton's hypothesis about what made MBS so "liquid" in the repo market? He claims that the securities were so complicated that everyone

was symmetrically *ignorant* of their underlying attributes. The liquidity properties of a security are destroyed as soon as anyone has an incentive to generate private information over them (as is the case with equity, for example).

Anyway, thanks for reminding me of that paper!

Reply

Josh September 3, 2012 at 9:20 PM

David,

A quick thought and follow-up question. Ross Starr once remarked something to the effect that the double coincidence of wants could not be sufficient to explain money because grocery store clerks are paid in money and not (even partially) in groceries, despite the fact that they clearly need food.

Thus, to show that the double coincidence of wants problem is not a necessary or sufficient condition for the existence of money, shouldn't one begin with a model in which there IS a double coincidence of wants. In describing your model, you write:

"Assume that Adam is good at working in the afternoon and that Betty is good at working in the morning. Moreover, Adam wants a morning service, while Betty wants an afternoon service (so Adam is impatient, Betty is patient)."

So Adam has an afternoon good, but wants a morning good. Betty has a morning good, but wants an afternoon good. Isn't this a basic absence of double coincidence of wants problem? I am in complete agreement with you that this condition is not *sufficient* for money to exist. However, I don't think that your model proves that it is not a necessary condition. To do so, wouldn't you need to start from a point in which there isn't a double coincidence of wants problem (e.g. the Starr example above)?

Reply

Replies

David Andolfatto September 4, 2012 at 6:56 AM

Josh,

Excellent observation by Starr! Thanks.

You are absolutely correct in what you say, but note that I do consider an economy in the second half of my post where there is no double coincidence problem. Perhaps I did not make this clear enough? Can you go back and read it for me? Maybe you missed it, or maybe I wasn't clear enough.

Josh September 4, 2012 at 9:49 PM

David,

I think that I must be missing something. The passage that I quoted above is from the second section of the post.

David Andolfatto September 5, 2012 at 6:58 AM

Josh,

So Adam has an afternoon good, but wants a morning good. Betty has a morning good, but wants an afternoon good. Isn't this a basic absence of double coincidence of wants problem?

No, it is not. There are bilateral gains to trade in this example. (Just write down a 2-period endowment model where people differ in tastes/endowments--have we ever called this a double coincidence problem?)

In the Wicksellian model, there are no bilateral gains to trade (pairing any two individuals implies no gains to trade). But there are trilateral gains to trade in the Wicksellian triangle.

Does this make things clearer. In part, the issue here might just be semantic.

Josh September 5, 2012 at 11:41 AM

I think that the issue here is largely semantic, but let me explain where I am coming from.

In Nosal and Rocheteau's book, they outline the benchmark search framework as follows:

"In the DM some agents can produce but do not want to consume, while other agents want to consume but cannot produce. For convenience, we label the former agents sellers and the latter agents buyers, which captures the agents' roles in the DM. Our assumption on preferences -- sellers have no desire to consume in the DM -- and technologies -- buyers are not able to produce in the DM -- **generates a double-coincidence problem in matches between buyers and sellers.**"

The emphasis (obviously) is mine.

The setup in the search model is essentially equivalent to the setup that you reference above. I interpret that setup to be consistent with an absence of a double coincidence of wants in the sense that neither agent is able to provide what the other wants at a particular point in time.

You seem to be arguing that a double-coincidence problem doesn't exist if there is bilateral exchange. Thus, our initial disagreement has nothing to do with the double-coincidence problem being a necessary or sufficient condition, but rather how we define the double-coincidence problem.

Josh September 5, 2012 at 11:43 AM

Oops, that should have read "bilateral gains from trade" in the last paragraph.

David Andolfatto September 5, 2012 at 12:00 PM

Josh, implicit in Nosal and Rocheteau is the idea that agents never meet again in the decentralized market. If they did meet again, there would be an opportunity for bilateral relationships to form. (Or, if people do meet again, they forget what happened in the past -- that is, all meetings are anonymous.)

Hope this clears things up.

Josh September 5, 2012 at 12:49 PM

I had assumed that you stated that these were one period meetings. In re-reading the post, I see that this is not the case. We are in agreement then.

Anonymous September 17, 2012 at 3:06 PM

David and Josh,

Apologies for commenting so late.

I am not sure that I follow your discussion. In the example that David constructed, there are bilateral gains from inter-temporal trade, but there is no double coincidence of wants at the spot market. The latter is what is generally understood as important in the literature. So, I don't think that this is merely semantic.

Perhaps I am missing something totally obvious, but barter will be used if there is a double coincidence at the spot market. There would be no need for money. So, it seems to me that unless one can construct an example with a coincidence at the spot market where money is used, then both Evil (in some form) and the absence of a double coincidence (at the spot market) appear necessary.

Martin

David Andolfatto September 17, 2012 at 6:39 PM

Martin:

The latter is what is generally understood as important in the literature.

No, that is not what is important at all. An Arrow-Debreu market structure handles the "lack of double coincidence of wants in the spot market." Indeed, a simple credit market does the same thing: you scratch my back today, and I'll scratch yours tomorrow. There is no need for money in these exchanges.

The need for "money" arises when there is a lack of commitment and a quid pro quo swap of goods for an asset (that circulates) enhances commitment power.

Hope this helps a bit.

Reply

Anonymous September 4, 2012 at 1:35 PM

Hi David - perhaps I have misunderstood but in my rudimentary analysis of your post it seems that you might be suggesting that money's predominant function as a MOE is to eliminate/minimize counter-party rik. If this is so, many assets with "low" counter-party risk could be termed money-like to varying degrees based on their individual level of such risk; however, they would presumably have widely varying liquidity premiums. How can this be reconciled in the context of your argument (perhaps it needn't be)? It seems difficult to isolate money's function as a device that minimizes counter-party risk from its function as a device that normalizes a liquidity premium.

Thank you.

Reply

Replies

David Andolfatto September 4, 2012 at 2:25 PM

Anon,

Yes, that's a good way of putting it. And yes, there are many assets that potentially reduce counterparty risk. The one's that concern monetary theorists are the assets that serve this purpose whilst cirulating, like the AAA MBS securities which did so in the repo market prior to the crash. As Gorton points out, the very same thing used to happen to monetary instruments issued by banks prior to FDIC.

Not sure if I understood your last sentence. Feel free to elaborate.

Anonymous September 5, 2012 at 6:57 AM

Hi David,

Thank you for your reply. I will try to better articulate my last sentence (disclosure: I am only an armchair economist...and even that is probably much too generous a definition!!).

It seems to me that money exists to minimize transaction costs. Transaction costs include discounts imbued into the value of bartered goods because the recipients of the bartered goods agree to assume certain risks by entering into the transaction. Counter-party risk, as you describe, is one of them. Liquidity risk (which I consider, perhaps erroneously, a manifestation of the double coincidence problem) is another. Money seems to effectively eliminate both risks, which in turn results in a minimization of the transaction costs that would otherwise be inherent in a non-monetary, barter-based market. In so doing, money would also seem to maximize utility (a discussion for another day). In sum, I think it might be fair to say that money exists not only to secure commitments, but more broadly, to minimize transaction costs, which I would suggest include the two foregoing risk premia, and likely others.

This paper seems to best illustrate my point (at pp. 38-42):

http://research.stlouisfed.org/publications/review/00/01/0001dt.pdf

Ironically, it was written by a colleague of yours, and it begins with the following quotation:

...Even in the relatively
simple and so often recurring case,

where an economic unit, A, requires a commodity possessed by B, and B requires one possessed by C, while C wants one that is owned by A—even here, under a rule of mere barter, the exchange of the goods in question would as a rule be of necessity left undone."
— Carl Menger, "On the Origin of Money," The Economic Journal (June 1892), p. 242.

David Andolfatto September 5, 2012 at 7:16 AM

Anonymous,

I think I better understand what you mean. And thank you for the link to my colleague's paper! I will put it on my class reading list!

I have emphasized the role of monetary exchange (broadly defined to include phenomena like repo transactions) as a method to (in your words) minimize counterparty risk.

You are wondering whether money may be playing other roles. I think the answer is likely yes. I have reference a literature (Ostroy, Kocherlakota) that emphasizes money as a record-keeping device. Nick Rowe, in a comment above, reminds me of Alchian's argument that money minimizes transactions costs because it is "easily recognizable."

If you read Dan's piece through, you'll see that he is using the Alchian hypothesis.

As far as I can tell, however, Alchian basically assumes the answer. The argument goes like this. Assume that monetary exchange reduces transactions costs. Then money will be useful.

Yes, that's right. But what *are* these transaction costs? As Nick pointed out, "evil" is still necessary in this explanation, because if people were trustworthy, they would not lie about their ability to discharge a debt.

Dan takes the Alchian line that some objects are more easily recognizable than others and that these are the objects that will naturally circulate as money. I think that's right. On the other hand, I'm not quite sure how this theory rationales the use of highly complicated and opaque MBS products as collateral in repo markets.

Unknown September 5, 2012 at 8:02 PM

the Alchian line that some objects are more easily recognizable

I hate to say obvious, but did not one here read Twain and is marvelous stories about biting coins?

Reply

Unknown September 4, 2012 at 6:34 PM

David, fascinating post. Thanks.

Here's a slightly different take on the problem. It's the opaqueness of human intention rather than the lack of trust that's a necessary condition for the emergence of money. If I can tell who will, and who will not, keep their promises, I'll just trade with the promise-keepers.

In the Discourse on the Arts and Sciences, Rousseau, writing about primitive man, speculates that "human nature was not at bottom better then than now; but men found their security in the ease with which they could see through on another, and this advantage, of which we no longer feel the value, prevented their having many vices" (not the least of which is the art of disguising our real intentions).

Reply

Replies

Unknown September 5, 2012 at 5:48 AM

having to judge intention is a time wasting friction; did we really learn nothing from Coase?

beyond that, all the science shows that we are very bad judges of others, especially when it comes to future promises. How many marriages end in divorce?

How could it possibly matter what Rousseau thought about primitive man? Money exists and works because it, like the firm, reduces transaction costs. Second, money and finance permit the illusion of confidence and confidence is what makes the world go around. Who could possibly know the value of a piece of real estate in 30 years? And, yet, we have 30 year or longer mortgages. How? Rather than worrying about primitive man we should be thinking about how we are able to do such, today?

David Andolfatto September 5, 2012 at 7:26 AM

Greg Hill:

If I can tell who will, and who will not, keep their promises, I'll just trade with the promise-keepers.

This reminds me. One thing that is interesting about the Wicksell model I describe above is that even untrustworthy people will trade with each other. BUT, they will only use the promises of the credible agent to facilitate their transactions.

In the context of the ABC model above, think of A as being trustworthy, and B,C untrustworthy. Then B will still sell their output to A for A-money, use that A-money to buy B output. B will then take A-money earned and redeem it for night bread.

If I interpret Rousseau correctly here, he might be saying that people know each other pretty well in small, primitive, communities. And as I mentioned above, these are typically gift-giving societies. Somehow, as societies grow, people become more "anonymous" (opaque). And anonymity springs forth the need for monetary exchange. Indeed, one branch of the literature focuses on money as a record-keeping device in anonymous settings.

Unknown September 5, 2012 at 4:58 PM

Mr. Hamilton,

You ask, "How could it possibly matter what Rousseau thought about primitive man?" I think you'll find the beginnings of an answer to your question in David's last paragraph above. Rousseau was actually a very good information economist who described some of the consequences of transparent and opaque intentions (read: asymmetric information).

Regarding your point about "science showing that we are bad judges of others [intentions]," Rousseau argues that the success we have in judging others' intentions varies according to the kind of society we inhabit. This claim, if true (and I think it is), would seem to have important economic implications, e.g., the relative importance of trust and contract in the conduct of business.

Unknown September 5, 2012 at 7:57 PM

Mr. Hill,

First, you will find no one more concerned about the importance of trust to economics than myself.

To David's dismay, that is one of my constant themes here. The economic profession has worked itself into a position where no one trusts it and with good reason. Given your interest in the subject of trust, what don't you tackle the important economic implications of the lack of trust in economists. I would urge you to focus on that point.

As for Rousseau---well I am from Missouri and started reading Mark Twain at an early age. His marvelous stories about poker---and transparent and opaque

intentions---well need I say more? IOW, by 10 or 12 I had figured out transparent and opague intentions (bluffing, for one).

As a reader of Mark Twain you will also find that in one Chapter with one story of Life on the Mississippi he covered all of Hayek's attacks on big government. You really should read about Gov't Alligator boats and alligator reefs.

JP Koning September 6, 2012 at 9:49 AM

"If I can tell who will, and who will not, keep their promises, I'll just trade with the promise-keepers."

"One thing that is interesting about the Wicksell model I describe above is that even untrustworthy people will trade with each other. BUT, they will only use the promises of the credible agent to facilitate their transactions."

That's a good way of putting it. My long reply (September 4, 2012 6:38 AM) tried to show something like that. IOUs, as long as they are trustworthy, will become money-like. They will circulate in long chains. In this case, trust rather than evil is the root of money. Evil can not be the root of *all* money, only certain types of money.

Anonymous September 9, 2012 at 7:47 AM

"I would urge you to focus on that point."

I would urge you, John, to go away. People, don't feed the troll.

Reply

Mike M. September 5, 2012 at 9:15 AM

This comes up a lot in New York real estate rentals, which typically involve a broker, who might show up and demand a commission out of you even if you found the place on your own. Basically, you can't get in the door without a cashier's check -- a way for the broker to demand payment up front since most rational people would just laugh at the broker if invoiced once they're moved into the new place.

Reply

Anonymous September 5, 2012 at 11:23 AM

Does "evil is the root of all money" assume the the failure to meet commitments is always due to conscious action/inaction on the part of one person? What if a bread machine breaks? Does this have any impact on your theory?

Reply

▼ Replies

David Andolfatto September 5, 2012 at 12:02 PM

Answer to your first question: Yes. (It is what economists call "strategic default.")

Answer to your second question: No. I could accommodate securities whose payoff follows an exogenous (non-strategic) payoff. Would make no difference to my argument.

Reply

Anonymous September 5, 2012 at 11:59 AM

The what-ifs show that complete trust is elusive, not because the person is evil or has evil intent, but simply because of uncertainty of future outcome. I may have intended to do the right thing, but while I was collecting honey for the bread, I was mauled by a bear. Since you did not receive your bread when expected, you may ignorantly assume evil intent (perhaps, I lied, I am evil and thus deserved to be mauled). We may also declare bears evil and work to eradicate them, or perhaps honey is evil and should not be used in bread.

The theory need not breakdown if happenstance is acknowledged and accepted. With our without money exchange, you still go hungry for at least a brief period.

Reply

Replies

David Andolfatto September 5, 2012 at 12:02 PM

No, you are wrong. See my answer to the post above.

Reply

Anonymous September 6, 2012 at 12:13 PM

I do agree that lack of commitment (evil) seems to be the root of using something like money in an exchange. This reminds me of the historical "Balutedari" system that was prevalent in western parts of India. Uner the system exchange in a village unit would be guaranteed through a complex system of social and religious sanctions. Balutedars were basically village servants like blacksmith, goldsmith, potter, carpenter, etc. They would offer their services for payments mostly in kind (food grains, services, etc.) occasionally supplemented with cash (most likely some kind of specie). There was price dispersion as most of the exchange was based on bilateral bargaining.

You can find some details here: http://ier.sagepub.com/content/41/1/79.full.pdf+html

The important point is that exchange was regulated through social customs and sanctions ruling out the need for monetary exchange. Bilateral bargaining did not always yield results and then extensive government intervention would be required to solve the disputes. But the system would get going again. However, towards 1960's infrastructure improved, villages got fairly well connected and monetized and the old system was replaced by the modern day market system. So I guess the evil arose because the scale of economic activity changed and the need for localized exchanged systems ceased to be or enforcement of social customs on a larger scale did not seem feasible.

Reply

Matthew Martin September 6, 2012 at 1:35 PM

This is a fascinating interpretation of the role of money. However, the argument is still non-unique, since we engage in inter-temporal trades like the one in the Wiksell triangle all the time without relying on money. The best example is probably the employment contract: people do two weeks worth of work before getting any compensation for it at all. Some of that compensation (though not all) is in the form of money, but that doesn't change the fact that there is a two-week window for the employer to renege on it's end of the bargain and in effect "steal" people's labor.

My point is that in a world where we have state enforcement of private contracts, we don't need money for inter-temporal trades. It seems to me that the only unique reason for money is that it is highly liquid--we use money primarily because we have considerable uncertainty about what and when we want to buy.

Reply

Replies

Unknown September 7, 2012 at 5:33 AM

Matt,

You are merely making a chicken or egg observation. Money is just a way to either simplify or avoid numerous future promise contracts. Is the future promise to pay in money or in bags of tea? If the promise is in money, then you have made the cost of reaching a deal go down, because people have entered into many other "money" based contracts. The workers in you example have long term mortgages or apartment leases, payable in dollars. They want to be paid in dollars so that they can keep their known future promises to others.

Reply

Unknown December 23, 2013 at 2:31 PM

Someone sent me a xerox of what is in this link ("What is Money" by Alan AtKisson) back in the 1990's.

http://www.context.org/iclib/ic26/thomas/

Reply

Replies

David Andolfatto December 23, 2013 at 6:06 PM

Very cool. Thank you for sharing, Daniel.

Reply

Anonymous February 10, 2015 at 1:11 PM

Thanks for this post, David. Even if ancient, I enjoyed it.
However, I would like to comment.
I do not believe that evil is a necessary condition for the rise of money.
Let me I propose that complexity is sufficient for the rise of money and the rise of money is necessary for complexity (and, hence, development). I see no need to deal money in my exchanges with my wife, i.e. I do not charge (nor account) for taking out the trash, nor does she for her wonderful cooking. You may argue this is out of the absence of evil among us and you may be partially right, but the lower complexity pays a very large part as well.
But let's take a relatively small community of 676 (26x26) people, Aaron to Zzorah. Let's assume each can split their work time between two products each and that they all live twenty-two thousand days (Moody Blues?)
Not even the most anal retentive could lay out a matrix of 1,352 products times 22,000 days, run linear programming to optimize it and schedule all agreements and communications as a plan. And I am making no allowance for uncertainty. Money allows everyone to make choices along the way and communicate them to the community in a way that is unnecessary in a world of cooking and taking out the trash, but that is way better than stumbling blindly with a sheep in search of a seller of rice or haircuts.
In fact, evil may be the root of all barter, since we need to haggle over the fairness of reciprocal giving in the absence of altruism, but once trading is established, it is complexity that brings money into existence. That a giant round stone, a piece of paper or a handful of Kilobytes are better or worse than an oral unwitnessed promise, it is a matter of technology.
Finally, I would like to point your attention to Nick Szabo's clever piece (http://szabo.best.vwh.net/shell.html) to elicit your thoughts, since I assume you know it already.

Reply

Unknown May 31, 2017 at 3:20 AM

Professor Andolfatto,

thanks for the illuminating post (I am reading it after a while but it is still of great interest). Your reasoning, as well as the Kiyotaki-Moore reference, reminds me of Martin Shubik's work on the possible solutions of the "Hahn Paradox" and Ross Starr's emphasis on the importance of taxation in imposing a monetary equilibrium if it is sufficiently exacting.

Are you familiar with his 1974 Econometrica paper (https://www.jstor.org/stable/1913684) and the subsequent papers on this topic (such as https://ideas.repec.org/p/cdl/ucsdec/qt660465rm.html)?

The idea is basically that the value of fiat money in a finite-horizon economy arises from its acceptability in tax payments. I am trying to figure out a proper coordination game to describe the issue, but a first conclusion one might draw is that being taxation a coercive/non-market event, this obviates the notion of neutrality with regard to the currency.

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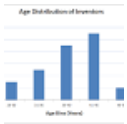

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