

DEPRESSION IN A ONE-GOOD BARTER ECONOMY

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There are many theories what cause economic depressions - such as overinvestment, underconsumption, or monetary policy. In order to shed some light on this question, we will look at a very simple economy, which has only one good and does not have money, and see how it can fall into depression.

The Model

Consider a one-good economy where money is not used and only barter holds. As is traditional, the unique good can be exchanged for labor, which itself is used to produce the good; and there are capitalists, who own the means of production, who contract for the labor and keep whatever of the good is left from production after paying the workers. The only unusual feature of the economy is that the various economic agents can also make promises of future delivery of the good, and barter these promises against the good itself.

We assume that either some capitalists, as their profit, or some workers, as remuneration for their labor, receive more of the good than they need in order to survive. These people may consume the extra goods, in order to have a more affluent life. Or they may set aside or invest the proceeds, in order in the future to have or to produce more goods. Or they may do both. Still, there may be extra goods after pursuing (or, indeed, not pursuing) one or both of these options. Whatever the case, we assume that some in the population have extra goods, which for whatever reason or reasons they choose to barter against promises of the future delivery of the good, and that some of the population, either capitalist or worker or other, choose to promise future delivery in exchange for some of the good now. There are, then, those who own other's debt and those in debt, lenders and borrowers.

The promise of a future delivery of the good is like a good, since it may be bartered. However, it has other characteristics which make it unlike a real good. For instance, it does not have any production constraints, since there is no limit to the number of promises of future delivery that an individual can make.

At some point so many promises may have been made by a particular borrower, indeed by many of the borrowers, that their new promises may no longer have any value. It may be for real reasons - so many promises have been given that they just cannot be reasonably kept - or for reasons of confidence or "animal spirits" - the lenders of the good no longer trust that the promises will be kept even though they in fact could. Below more detail will be forthcoming on possible mechanisms; what is important for the moment is only that many borrowers are no longer able to make new valuable promises.

The excess in goods cannot then all be exchanged for promises, and there is a glut of the good. There is a scarcity of promises, not because no promises can be produced - they can, because they *always* can -, but because not enough can be produced which have exchangeable value. The situation corresponds to the so-called “general glut” which certain variations of Says’ Law say is impossible. In our model it *is* possible, unless one redefines promises of future delivery, a derivative, to be an actual good. In brief, it is possible for an economy to have a general glut of goods, where what is scarce is new valuable promises of future delivery of goods.

Once a glut of goods develops, the capitalist may cut back production, to reduce it. This lowers the amount which can be paid to labor and taken as profit, which means the new promises of more individuals may become or may be seen as valueless. This creates a further glut, further cutbacks in production, and the emergence of a vicious cycle. In short, the economy is in depression.

How It May Happen that New Promises Become Valueless

Borrowers do not always stay borrowers, nor lenders lenders, but the narrative becomes simpler if we suppose that one group of the community continually has an excess of goods, while another part constantly borrows, for instance because there is persistent and large inequality of income and little real economic mobility. Over time, the lenders trade their excess goods to the borrowers, who accumulate more and more debt, like a bath filling with water. The water may even rise in a constant, steady fashion, which can give the process a semblance of equilibrium over a long period of time.

However, water can only rise in a constant, steady fashion *until it reaches the top*, after which it overflows. That is, there is, of course, a limit to the number of promises a borrower can keep - a top of the bath. A single person who promised to deliver ten times more than the economy’s current total production is unlikely to be able to live up to his obligations, and so at some point, if he makes too many promises, a person will not be able to fulfill all of them. It is, of course, true that an individual’s reception of goods today, in exchange for promises, may alter his limit. He may, after all, invest it in productive capacity. Or he may consume it in a quasi-investment way, for instance by paying for medicine which prevent health problems which would stop him from having enough vitality in the future to deliver any promised goods. Nonetheless, we will assume that borrowers are really consuming most or all of the goods they are receiving and that past a certain point more consumption does not lead to greater, or at least significantly greater, future production; the present goods are just consumed, with no or little investment impact, no impact on the possibility to deliver future goods. Because the future is uncertain, any limit is obviously indefinite. Still, to make our discussion clearer, suppose there is a known, fixed number L of promises (one promise for the delivery of one good), up to which a borrower can keep, but past which he cannot. Let us forget collateral and the like and suppose that, past the limit, promises are fulfilled on a pro rata basis. That is, if N promises have been made, then when $N \leq L$, each

promise will entitle its owner to receive 1 good in the future; but if $N \geq L$, then only L/N will be received. So when $N \leq L$, the total value of promises is N (in units of goods delivered at the future date), while when $N \geq L$, the total value is L . Thus L is the value of total promises, whatever the total number is (so long as this total number is greater than or equal to L). If there already exist N promises and $N \geq L$, and if n new promises are made, then, the total number of promises becoming $(N + n)$, each promise and thus each new promise is worth $L/(N + n)$. The new promises look like they have non-zero value, but they achieve this only by subtracting from the value of already existing promises, whose unitary value decreases from L/N to $L/(N + n)$. In fact lenders, as a whole, receive no new value from new promises; which is normal, since, as we've said, the value of the total number must be L , no matter how many new promises are made.

Of course if one assumes that there are different agents among the lenders, it may seem to be to a particular agent's advantage to accept new promises. For instance, if one lender does not hold any promises, it may seem to be in his advantage to accept new promises, because it is the stock of promises held by other lenders which will decrease in value, while he receives something of non-zero value. This may, indeed, keep the system of accumulation of debt going further, past L . But presumably at some point all lenders will see that a debtor is not only unable to sustain his promises but is unable or unwilling to stop selling new promises; in which case any new promises, while today superficially having value, will lose their value in the future, as even more promises are made.

That is, in order for new promises to have value, a lender must have confidence that further new promises will not be made. But this confidence will obviously be broken if further new promises are made. So either confidence is warranted and further new promises stop; or further new promises are made and confidence collapses. In either case, no new promises with exchangeable value are available.

The situation sketched is not necessarily psychological, of lenders losing confidence when they should have it. This may be the case, as perhaps lenders are deciding that new promises are worthless before any actual limit has been reached, indeed well before it has been reached. But it is also possible that lenders react tardily, after the limit has been breached, in which case they are losing confidence which they *shouldn't* have had. There can be a *real* problem, not simply a loss of "animal spirits" - there just may be too much debt, so much that it cannot all be paid back and more cannot be taken on. Indeed, in a world with different lending agents and uncertainty, lending is likely to go on until the agent with the most expansive notion of L finally decides that a borrower is not capable of making new valuable promises, which is then likely to exceed, rather than fall short, of his real capacity.

Whatever the case, confidence or reality, a scarcity of promises and so a glut of goods develops. Production drops and fewer goods are made and thus earned. This will have the effect of lowering L for some individuals, who in turn are unable or perceived to be unable to keep their promises, with the result that production drops even more.

Crisis

Debtors may not only have sold promises to others; they may also have bought others' promises, and thus have both assets and liabilities on their balance sheets. In this case, when lenders realise or arrive at the belief that certain debtors are unable to support their promises, it is natural that the former try to recover from the latter those promises which are a better credit and are more likely to be kept. If the debtor redeems his own promises for those of others at face value, this creates a situation where lenders who try to recover first are better off. A financial panic, potentially, ensues.

It is often thought that a financial panic creates or causes or at least is the final straw leading to a depression. Perhaps there are situations where it does or is, most notably when the problem is "animal spirits" rather than real; but, according to our model, it is not necessary. On the contrary, in terms of our model it looks as though financial panics are simply co-incident with the start of a depression - they occur at the moment lenders realize that debtors are overextended and so when a glut begins to develop - rather than causing it. That is, a financial panic is an effect of the same underlying conditions which cause depressions. Because it is one of the earliest events in the unfolding scenario, it is confusedly taken as a cause itself of depression, when it is not.

If anything a financial panic looks like the economic system trying to right itself, by forcing weaker debtors into bankruptcy and forcing lenders to realize their losses rather than pretend about paper wealth. Stopping a panic has real costs and raises questions of fairness; for instance, having the government step in to provide guarantees, which didn't exist before, that all or many promises will be repaid, forces losses onto the government, to the advantage of lenders, who by and large are wealthier than the rest of the population. It might seem that it would be difficult to rationalize such a move, but this kind of intervention, on the contrary, appears to be the first instinct. Partially this is because it is thought that panics cause a depression, rather than, as we claim, being an early effect of the the same underlying forces producing one, and so stopping a panic is supposed to have wider benefits. Partially it is because, after years of apparent prosperity, it is difficult for those in power, both political and ideological, to understand the economy has fundamental problems, precisely because believing in the system has become a prerequisite for getting into political or ideological power. Partially it is because there are two problems with the economy: one is that there are promises which have been made which will not be able to be kept, and lenders will need to suffer losses, and the second, and more fundamental, difficulty is that the economy is not structured in a sustainable way - in order for production to continue as before, the economy *needs* for some in the population to make promises and take on debts. Allowing losses solves the first, but does not solve the second, at least in the short-term. So even if the chips are allowed to fall where they may, the economy will find itself in difficulty. Since, on top of that, wealth holders lose defaulted promises and feel poorer, allowing defaults is clearly a bad outcome. Because of optimism, procrastinating

tendencies, or incapacity to make hard decisions, few willingly choose an option which is known to lead to a bad outcome. Finally, there can of course be more selfish reasons, for instance, the elite classes, and in particular politicians and opinion makers, are traditionally, and almost universally, biased to the interests of the wealthy.

Possible Reactions and Their Possible Effects

Once the debt limit has been reached, what is to be done? How can the cut in production and reduction in employment, with the consequent vicious spiral, be avoided? It seems so simple and obvious just to continue the status quo, when lenders were happy because they were accumulating wealth, and borrowers were happy because they were able to consume more than they otherwise could have. Even though the status quo ante may have had real problems - inequality, political corruption, a delusional economic ideology and class of elites - nonetheless, it at least had full or fuller employment, so it might seem desirable to return to it. It might seem, if only lenders can be prevented from losing the promises they hold, then they will continue to lend it, and the cycle can continue, or at least not deteriorate.

Other than the unfairness, already mentioned, of stopping lenders from losing money which they should lose, continuing the cycle will bring temporary, but presumably not sustainable, relief. Building higher walls to a bath, so that more water can flow in, will temporarily mean that no overflow occurs. But, unless one can build ever higher walls, at some point one will arrive at a point when the water still overflows. Returning, or trying to return, to the status quo, looks to be a fundamental error. The status quo economy suffers from a mismatch, as it rewards, consistently over time, a certain group with more of the produced good than they want to consume and others with not enough. Unless that is changed, the same depressive dynamic will, presumably, eventually occur. This is not to say that, in the short term, the economy may not benefit by such action; simply that, in the medium term, it will not.

Now there may not simply *be* an acceptable solution. A classical 19th century solution was for there to be a lower population, with people dying off from want, disease and malnutrition, as well as choosing to have fewer children; after all, one way to achieve an economy with no unemployment is for there to be no one at all. But it is hardly acceptable, especially to those doing the dying. Eliminating this and the status quo ante as solutions thus raises, validly, the ontological question, whether an acceptable solution even exists. An economy produces its goods and employs as it does only by providing its actors a certain distribution, so that they are willing to manage, hire and work in the degree that they do. *Any fiddling with that distribution and the complex network of beliefs, motivations, incentives, and implicit and explicit contracts may simply mean that the previous production and economy, with the resultant employment, is no longer possible.* In these circumstances reasoning by elimination - of the type, "X isn't a solution; therefore we should not do X" - or the close variant, "X produces a bad outcome; therefore we should not do X," is specious. If there are no acceptable solutions, even if X produces a bad outcome, we may still want to pursue X, because it may produce the *best* result, the best of the worst. For instance, while allowing a panic

to run its course admittedly produces a bad outcome, it still may be the best of all possible ones. Whatever the case, here we will review several possible measures, and their more evident drawbacks.

One possible solution is simply to force, by command or by threat, capitalists and workers to continue behaving and working as before, and suffering whatever failure in the distribution of goods or promises which might befall them. In the clear light of day, such a response would normally be rejected because of the curtailment of economic and political freedom and rights, never mind the eventual loss to economic dynamism.

One measure is to reduce the pay of some or all workers, so that production can be kept up. This is unlikely to work if these workers are the ones accumulating debt in the first place, since logically it would mean that the debt-holders and promise-makers are receiving even less of production, and the asset-holders and promise-keepers are keeping even more. This appears to accentuate, rather than to alleviate, the problem of surplus. Reduction of pay would have more beneficial effect if the workers receiving less pay were those who had been accumulating promises - so long, of course, this does not consequently change their work habits for the worse.

The Keynesian solution is to keep up production by introducing a new agent, the national government, who is still able to take on more debt. This indeed keeps up a new version of the status quo, as those with a surplus of goods are able to trade them with the government in exchange for promises, and the government either consumes the goods itself or distributes them to be consumed. This works, so long as the government does not reach its own debt limit, or at least so long as beneficial changes in the economic flow are realized before the limit is attained. Unfortunately, our model is too simple to decide the question whether the limit will be breached. Like individuals, a society's production capacity is not fixed. Future capacity may increase by borrowing more today and investing it (wisely), or indeed it may increase naturally, via inevitable technical progress or by a normal, or encouraged, growth in the population. Unlike for individuals, the government's limit may have additional flexibility, in the following way. The more it borrows, that is the more promises it makes, the more promises will be held; since these held promises are wealth, they can be objects of future taxation, so that future taxation may raise more money with more borrowing, and the debt limit can thereby increase. That is, the more a government borrows, the more it may tax in the future, and so the more it may eventually pay back. However, a number of difficulties should be noted with this possible circuit. First, some lenders may be untaxable, at least in a traditional way; for instance, they may be foreign and outside the reach of the taxation net. Secondly, there may be political obstacles to installing sufficient taxation on promises, i.e. on wealth rather than income, and so creditors may doubt whether the needed taxation can be implemented. One need only note the current resistance in the U.S. to an estate tax. Thirdly, tax avoidance would presumably kick in at some level, so the limit perhaps cannot be indefinitely moved higher. And fourthly, and on the other hand, if creditors thought that taxation on promises would actually be implemented, then an unwillingness to lend to the government might result, and create the same glut in production as before. In brief, while the limit is somewhat flexible, it does not seem

indefinitely so. Whatever the case, at some point, the more the government borrows, the more likely that a limit will be reached. And our model says that if the government does reach its limit, then the economy is roughly in the same position as before its intervention, if not worse; and if depression would have been the outcome before, it will likely be the outcome as well, perhaps even with more dire consequences, as now the government itself will be required to cut back, perhaps including reducing social spending necessary to alleviate the miseries of the least well off.

Instead of financing by debt, the government could finance by immediately raising taxes. These taxes would most sensibly be targeted on that part of the population which has surplus - taxing away, rather than borrowing, their surplus, and then, as before, either consuming itself or distributing it. Problems with future taxation apply equally well to the present. In particular taxation can be difficult if the population which is doing the saving cannot be taxed - if, for instance, it resides in a foreign country.

Even if taxation can successfully target the surplus, or even if it doesn't, there may of course be secondary effects, which are not determined by the model. Those taxed may alter their behaviour, so production, and thus employment and indeed every other economic variable, may change as a result. Still, the argument that this must proceed by lowering investment, is not born out by the model, on the assumption that taxation is correctly targeted. That is, we have supposed that a group of agents enjoy a surplus of the good, over and above investment and non-necessary consumption, which they then lend out, and it is this surplus which is taken or partly taken in taxation. There may admittedly be a difficulty in targeting, mirrored by the difficulty in making a clear distinction between productive capacity (which will produce future goods) and promises (which will deliver future goods). Nonetheless, higher taxation, even in the face of an economic downturn, should not be dismissed.

Another possible reaction is to take the promises held by the lenders and give them to the debtors - a debt holiday. Here there are a number of difficulties as well. A debt holiday would raise questions of fairness; undoubtedly, some of the lenders sacrificed present for future consumption, while some of the debtors overconsumed today in return for relinquishing future goods. There would be people about to retire who need the promises to survive or to improve their level of life when they no longer are able to work, and people further but still close to retirement who, if there were a debt holiday, wouldn't have enough time to re-accumulate a sufficient number of new promises before stopping work. Secondly, a debt holiday would change behaviours, in both foreseeable and unforeseeable ways, in production and employment. It is one thing for these debt holders to suffer their losses naturally, because borrowers default, quite another for the government or some other *deus ex machina* to step in and compel it. It is unlikely that lenders would now be willing to lend as they were willing before. So it is possible that the same outcome - a scarcity of future promises, glut, and cuts in production, will result.

Another solution is to encourage consumption by the surplus-holders. For whatever reason, they preferred to lend their surplus of goods in exchange for future promises. If

they could be convinced to consume, then it would seem there would be less lending, less of a glut, less reduction in production, and more employment. One drawback with this picture is that the surplus-holders may not *want* to consume any more; they may be sated. For instance, a good may be perishable and there's simply a limit how much they can consume in any given time. Another drawback is that, when the surplus-holders consume more, the debt-holders may no longer borrow as much and so must consume less, and thus the latter may no longer be willing or able to work as before. To take one example, in many geographical regions, if an individual cannot borrow to keep his car running, then he cannot work. Again, the production capabilities of the economy may depend on a particular distribution of goods, and there just may be no way to keep the production, and employment, constant should the distribution be changed. Indeed, taken to the extreme, by depriving some individuals of consumption which is necessary to survive, this solution can approach the Malthusian.

The last measure we will mention is encouraging surplus-holders to invest more in productive capacity. After all, it would seem, instead of exchanging goods for promises of future delivery of goods, they could achieve the same result by investing goods which then produce future goods. One difficulty is maturity mismatch. Productive capacity will churn out goods continually in the future, including periods, such as the near future, when there already will be a glut of goods. Promises of future delivery will, we can posit, be much further down the road, past the time when there is a glut. Another difficulty is that the good may have positional characteristics, so that it is its relative and not its absolute amount which is important to an individual. So increasing future capacity is not desired, just increasing one's proportion. Also, investing in productive capacity may have too much leakage, as management and labor look like they will extract the benefits from any increase. Or one may envision other production constraints, such as resources. This list is by no means exhaustive.

Conclusion

The one-good economy in our model is not suffering overproduction or overconsumption. It suffers from a mismatch. It rewards certain actors with more of the good than they are willing to consume or invest, and others with not enough. Unfortunately, this mismatch may be integral to how the economy functions, to the way it is structured and why the actors are willing or able to work and interact as they do. In the simple model drawn in this paper, one can see the drawbacks of simple solutions; it seems unlikely that in the real economy, which is obviously more complicated, a simple solution would fare any better. Muddling through, water under the bridge, letting the chips fall where they may, in particular not guaranteeing financial losses, along with measures to help the needy and others with necessities - food, lodging, education, and health care - and raising taxes to pay for them, produces a bad outcome; still, it may be the best one possible.