

## “TWO TYPES OF CRISES”

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### 1. INTRODUCTION

Most of the literature on macroeconomic policy theory deals with the cyclical problems of countries that have well-developed financial systems and enjoy at least a fair degree of monetary stability. When such conditions can be considered “normal”, the main issue of policy theory becomes “rules vs. discretion” -- i.e., whether one should conduct any policy at all. Thus, the first economic duty of government -- to avoid financial disaster -- tends to be rather overlooked.

There are two types of general financial disasters: deflation crises and (high) inflation crises. Both tend to damage the financial structure of the economy in characteristic ways which, however, have in common that they make vigorous economic growth impossible. Moreover, recovery from either type of crisis tends to be very slow, so the social costs are enormous. Consider, for example, the loss of 1-2 percentage points of growth cumulated over a decade!<sup>3</sup> Apart from the loss of growth, the social costs of the two types of crisis differ in nature. In high inflations, it takes the form of appalling inefficiency in the allocation of resources while deflation crises bring long-term unemployment on a large scale.

The key concepts in dealing with financial crises are *solvency* and *liquidity*. An economic unit is solvent if the present value of projected receipts minus disbursements is non-negative.<sup>4</sup> It is *liquid*, if all its payment commitments over the near future can be met without distress borrowing or distress sale of assets.[40]

A deflation crisis involves widespread solvency and liquidity problems within the private sector of an economy. An inflation crisis stems from the insolvency of the national government. Since the government creates money, it is not subject to liquidity constraints in the same way as private sector economic units.

The macroeconomic policy literature has made a curious about-face in the last 25 years or so. Up until the mid-1970's, macro policy was automatically thought of as *stabilization policy*. The private sectors of capitalist economies were thought to be

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<sup>2</sup> As so many times before, I am obliged to Daniel Heymann for many discussions of the problems dealt with below. The paper also draws freely on work we have done together.

<sup>3</sup> In 1990, after a decade of high inflation, the per capita real income of Argentina was 25% less than it had been in 1980.

<sup>4</sup> Admittedly, a somewhat unsatisfactory definition because it omits defining by whom the cash-flow is projected. The economic unit in question may be optimistic, but if its actual and potential creditors are pessimistic their projections rule. At this point, however, it is not necessary to be consistently subjectivist on the matter.

unstable, prone to market failures, and subject to waves of optimism and pessimism. At the same time, governments were supposed to be benevolent, competent, rational, dependable and time-consistent. This conception bore the strong imprint of the Great Depression. It was ultimately rooted in a world of failed firms, foreclosed farms, and busted banks, that is, in a world of insolvent private entities but solvent governments.

Since the '70's, this optimism about governments and pessimism about the private sector has turned into its diametric opposite. Macro policy has become the art of *constraining governments*. In the macroliterature of recent years, the private sector is seen as stable and as capable of keeping to an intertemporal general equilibrium growth path -- as long as it is not disturbed by erratic government policies. But governments are short-sighted and in their attempts to curry favor with voters apt to engage in sundry time-inconsistent policies, besides being chronically prone to deficit spending and the accumulation of debts that will sooner or later be monetized. It is now the public sector whose solvency is in doubt.

## 2. MONEY AS SOCIAL BOOKKEEPING

The assertion that inflation and deflation crises result in lost growth amounts to saying that, in the wake of a financial crisis, an economy fails to realize the wealth that it is in some sense capable of. Economic growth is usually modeled in strictly real terms. But here we are saying that monetary developments can cause wealth to differ very significantly from what an economy's production possibilities would allow (and from what the preferences of its people would then dictate).[41]

To understand the issue a bit better, start from the following question. In the representative agent models that have been influential in the macroeconomics of recent years, it is always assumed that the representative agent knows his wealth. He knows of course his entire intertemporal opportunity set for all sequences of contingencies, but it helps fix our ideas to suppose that we may reduce all of that to knowledge of a single number -- his net worth. Now, in an actual economy with many millions ( $n$ ) of agents, how can we be confident that their individually calculated, subjective estimates of wealth will sum to some reasonably close approximation to ( $n$  times) this number? If it were not to do so -- if it were to fail badly to do so -- the behavior of the actual economy would obviously not resemble the optimal time-path that the theoretician calculates for his "rational" representative agent.

Some people will make mistakes in evaluating their wealth. Moreover, individual evaluations are contingent on one another, that is, if A's calculation is predicated on B, C, D... estimating their wealth correctly, A will arrive at the wrong answer if some of the other have made (non-offsetting) errors. If we cannot exclude the possibility that individuals will make errors, we must rely on the *system* of which they are part to have certain *error-correcting* properties that, at a minimum, present these errors from getting arbitrarily large. The general nature of these error-correcting mechanisms are of course well understood. If, for instance, widespread over-estimates of personal wealth cause excess demands for some consumer goods, then prices of these goods will rise and people will come to realize that they are not as wealthy as they thought they were. The systemic error-correction operates through modifying individual budget constraints. Note,

however, that although it may force individual demands for *current* consumption into overall consistency with supply, this will not suffice to ensure that individual estimates of (intertemporal) wealth are similarly consistent since inconsistencies of plans and expectations with regard to all the "missing" future markets need not give rise to the requisite error-correcting price movements.

For present purposes, it is useful to view the monetary system as a complex of institutions that have evolved to enforce budget-constraints and maintain the consistency of individual constraints. Although this does not guarantee that individual wealth-estimates are kept consistent with one another, it presumably will prevent errors from growing indefinitely large. By "institution", we mean then a set of *rules* that specify how people are to act or interact under various circumstances. We want to understand, first, how these institutions normally help "solve" this problem and, second, how in abnormal circumstances they may make it worse. In focusing on the wealth-estimation problem, we may abstract from various aspects [42] of "money" that do not seem essential for the problem at hand. In particular, money's role as a medium of exchange that facilitates trade is not essential in the present context.

Let us imagine an economy with a centralized bookkeeping agency (CBA) where all credits (claims) and debits (debts) created in the course of sales and purchases of goods and services are registered as they occur. All sales outlets are connected to the CBA's computer which is supposed to check that all transactors obey their budget constraints. Thus we suppose that the agency will prevent the accumulation of debits in excess of credits on individual accounts. As a first conceptual experiment, assume that promises to pay in the future are not acceptable. So there will be no borrowing and lending but transactors must have accumulated a net credit balance *in the past* in order to be permitted to buy in the present.

In this system, therefore, agents would operate under a binding "cash-in-advance" constraint of sorts -- except that the central computer substitutes for hand-to-hand currency or, indeed, for any other form of means of payment. In a system of this sort, it would not matter whether debit balances were ever extinguished by payment. As long as the CBA sees to it that no one gets away with appropriating goods and services from the economy without having contributed equal value, insisting on payments would be to little purpose. Ignoring any cost of processing or memory storage in CBA's computer, balance sheets could be left to grow to indefinite length as long as net credits on individual accounts were kept non-negative. In a Modigliani-Miller spirit, the total volume of uncleared debits and credits could not matter.

How would the price level be determined in this system? If all transactors start out with zero credits and debits, the system as a whole has a "first mover" problem. No one could make the first purchase. So the system would have to begin operating with agents endowed either with a limited overdraft right or with a positive balance of credits. These credits would serve, in effect, as the *outside money* of the economy and the demand for them by people who would like the option on any given morning to act as first movers would ensure a determinate price level.

Consider then a first example of how monetary institutions act to correct errors in wealth perceptions in the system. Suppose that some agent finds a way to create credits to his account that have no counterparts in debits to other accounts in the economy. This agent will then be able to appropriate goods or services from society at large without

making a social contribution of equal value. He is in effect violating the budget constraint. If, at that point in time, people were to calculate their net worth at last night's price level, they would arrive at values which, if [43] added up, would be inconsistent with the production possibilities of the economy.<sup>5</sup> The price level must rise in order to bring estimates of wealth into line with what is feasible. Two cases need to be distinguished.

In the first case, it is the government that creates the additional "outside" credits. The rise in the price level will then be permanent. The "inflation tax" on the purchasing power of initial net credits held by transactors brings wealth estimates back into line. The second case is one of criminal counterfeiting (electronic counterfeiting in our imaginary case). As long as the counterfeiting is not discovered, it will of course have the same consequences as inflationary financing by the government. When it is discovered, however, the legal consequences are different. In the usual instance of counterfeiting of bank notes, the loss has to be taken by whoever holds such notes when the forgery is detected. In our CBA case, we must imagine that the law dictates that the first person to accept the forged credits bears the loss. The inflationary impulse would then be reversed.

The electronic cash-in-advance economy would be incapable of growing rapidly. Knowledge of investment opportunities is dispersed and subjective, but without credit and capital markets the resources needed to realize them cannot be obtained in exchange for a share in future income prospects. The system is backward-looking -- only past earnings can finance present investment. (Our two types of crises both tend to bring the economy back to this primitive state.)

So the next step is to allow borrowing and lending. Entrepreneurs sell their IOU's, for instance, in order to gather up enough of other people's accumulated credit balances to finance sizeable investments. The prime mover problem is attenuated. Promises to transfer credits in the future substitute for such transfers today. Credit obviates cash-in-advance. Organized *inside* credit markets will reduce the demand for "outside credits", therefore, and in a closed system raise the price level.

The possibility is also opened up of an all-around credit expansion with everyone extending credits to their customers and taking credits from their suppliers. By an all-around balanced extension of accounts payable and accounts receivable, unchanged aggregate quantities of goods and services can be exchanged at a higher [44] price level. (The demand for outside credits will be an uncertain brake on such an "inside inflation", particularly since outside balances become subject to the inflation tax.)

Suppose, then, that the rules under which the CBA operates were not changed when borrowing and lending transactions were introduced. Imagine, for a moment, that the economy keeps going with the CBA simply checking that net credits recorded to individual accounts are always non-negative -- but that it is kept going *without an operating payments mechanism*. Balance sheets are always lengthening by the accumulation of debits and credits, never shortened by credits extinguishing debits, i.e.,

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<sup>5</sup> <sup>4</sup>Cf., Leland Yeager (1960), p. 59 "Precisely one of the characteristics of a disequilibrium situation, and one of the reasons it cannot endure, is that real incomes appear different to people from what they can actually be." For general discussions of disequilibrium wealth perceptions and macroeconomic outcomes, cf., Leijonhufvud, 1968, Chapter IV:4 Heymann, 1983, pp. 13-17 and Chapter 4, and Heymann, Kaufmann and Sanguinetti (2001).

by payment.

Now, however, suppose that, after the system has been operating in this manner for quite some time, so that people's balance sheets contain long lists of claims on and debts to one another, it is discovered that, because of fraud or miscalculation of returns to investment, many of the outstanding IOU's will not be honored. Just before this discovery, people believed themselves wealthier in the aggregate than is consistent with the system's production possibilities. There were more claims to current and future output than could be met. To bring individual estimates of wealth into line with what is feasible, the current holders of the defaulted IOU's should be made to bear the loss, just as in the case of counterfeits. But the CBA has allowed them to borrow or buy ("on credit") on the presumed strength of the IOU's they held -- and some of them at least will be unable to assume the entire loss as a consequence. The CBA would then have to track down the agents who had sold to them on credit in order to make these people take the loss, and so on. In a system where (by assumption) debts are never extinguished by final payment, all transactions in effect involve the extension and the acceptance of credit. A's ability to honor his commitments is conditional on B's, whose ability to pay is similarly conditional on C's, and so on. Thus there is no telling where the process of locating the ultimate losers will end up. The financial structure that we are imagining is a dense web of such endless chains of conditional promises. Hence everyone would be at risk. It is an endogenous risk, not the exogenous risk of Arrow-Debreu constructions. The system is *financially fragile*.<sup>6</sup>

From a macro-perspective the problem is one of making individual wealth perceptions "add up" to the aggregate wealth made feasible by the economy's production possibilities. For this basic *adding up problem*<sup>7</sup> to be solved correctly, [45] however, agents must first find out who is and who is not solvent and what commitments, therefore, are or are not good. Our hypothetical CBA might perhaps be able to establish this through some process of enforced multilateral clearing. But when widespread fraud is discovered or miscalculation revealed in a financially fragile economy, where such centralized policing of budget constraints is not to be obtained, sorting the good credit risks from the bad ones can only be accomplished by shortening the chains of promises-conditional-on-promises until an overview of the situation is achieved. This is done, of course, by demanding payment from debtors and prospective customers. The possession of outside money will then be at a premium.

Under conditions of financial fragility, however, the switch from credit expansion to credit contraction will not just sort out the negative net worth balance sheets from the positive ones. It is likely to lump the merely illiquid with the bankrupt. The demands for payment now rather than later will bring down also many of those who have borrowed short to lend long or to invest in capital with long payback periods. There is bound to be many such agents because any well-developed financial system has as one of its most important functions the piecing together of large, durable investments from many small and short-lived acts of saving.

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<sup>6</sup> *The theme of many writings by Hyman Minsky. Cf. e.g. his (1977).*

<sup>7</sup> *I have borrowed liberally from the discussion of the adding-up problem in Daniel Heymann and Axel Leijonhufvud (1995) pp. 150-54*

In such a credit crash, therefore, the system goes from one wrong answer to the adding up problem to the opposite one. In my example, aggregate wealth was overestimated initially. The miscalculation is discovered but, in the decentralized economy, the *monetary* process of ascertaining its magnitude and determining the incidence can easily fail to screen the sound but illiquid debtors from those who have been overoptimistic or fraudulent. Aggregate wealth is then underestimated. This error can be both large and persistent if *debt-deflation* sets in. The way to insulate oneself from the contagion of a credit collapse is to demand payment on one's claims and to pay off one's debts, so as to cut oneself out of the collapsing web of conditional promises. When the representative agent<sup>8</sup> decides to take this course, he will increase the excess supply of goods and services and the excess demand for final means of payment in the economy. By increasing the real value of outstanding debts and claims, the ensuing deflation reinforces the prevailing uncertainty about who will and who won't be able to pay in full. This deviation- [46] amplifying process can keep the system away from its equilibrium price level and equilibrium aggregate wealth estimate for a considerable time.

The lesson from the exercise is that financial crises result when the representative agent cannot do his arithmetic right. Finding his errors and correcting them, so that people can once again know what they and those they deal with are worth, can take a long time. When they are large, the process of correcting them brings grave political risks and great social costs.

### 3. HIGH INFLATIONS AND THE FINANCIAL SYSTEM

In our book (1995) on the subject, Heymann and I define inflations as "high" when people generally measure them in per cent *per month* and regard annual rates as meaningless for other than historical purposes. It is characteristic of these inflations that future price levels become highly uncertain beyond a horizon of a month or at most a couple of months. High inflations are unpredictable, generally speaking, because they are fueled by the money creation of governments that have lost control of their finances and are struggling fitfully to regain that control.

Once a country is mired in high inflation, its government is apt to find itself trapped in a most unenviable financial situation. It is not necessarily the case that these governments deliberately spend "too much". But they tax "too little". The legislated rates of income taxes or value added taxes may be roughly in the same range as in Western European countries, for instance. But they are shot through with exemptions and loopholes and are widely evaded. Collection is erratic, inefficient, and sometimes corrupt. Even were this not the case, they are collected late -- and when inflation is well into double digits per month, paying late is almost as good as never. Consequently, these general taxes only yield perhaps 3-5% of real GNP each - hardly enough to support a "nightwatchman state", much less a 20th century state.

On the other side of the ledger, one finds no systematic and comprehensive budget

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<sup>8</sup> In the present context, of course, the representative agent is *not* to be construed as having a per capita share in the *consolidated* balance sheet of the closed economy, but rather as having accounts receivable and payable of average size -- and commensurably "average" worries about the creditworthiness of others.

process to allocate planned expenditures rationally and to control the actual ones. Government departments, nationalized industries, and other organizations operate under "soft budgets", that is, they are able to spend beyond their allocated budgets, because these are rendered meaningless by high inflation while the functions that these agencies perform retain their social legitimacy. The national government is then faced with irregularly recurring demands for supplemental appropriations many of which cannot be refused. The consequence is that not even the [47] central bank can predict what the rate of money creation will be some weeks into the future. The policy makers share the general uncertainty of the public.

Both the average level of inflation and its uncertainty have consequences for the country's financial structure. A high rate of inflation strangles intermediation. At inflation rates in the double digits per month, the demand for bank deposits is reduced to a small fraction of what is normal under monetary stability. The stock of M2, for instance, might fall below 4% of one year's GNP whereas it might exceed 20% under more normal circumstances.<sup>9</sup> Thus, the basic banking function of collecting small and temporary savings to finance commerce and industry is hardly performed at all. Nonetheless, employment in the banking sector usually balloons. Running the payment system at TOP SPEED and helping everyone to minimize their holdings of money is a labor-intensive business. Besides, genuine cost-control is exceedingly difficult under high inflation conditions and for the banks it is all too easy to let it slip since they continue to "make money" (in a purely nominal sense) even as, behind this nominal veil, their real capital positions erode. The banking sector, therefore, ends up in less than healthy shape.

The uncertainty about future nominal prices "blows up" very rapidly with distance from the present under high inflation conditions. The effects on the financial system are dramatic.

In contracting, this kind of uncertainty leaves people three options:

- (i) they can attempt to control the added uncertainty by means of contingency clauses,
- (ii) they can replace long-term agreements with a sequence of shorter contracts, or
- (iii) they can simply avoid certain categories of transactions.

In practice, the first option means *indexing*. We observe its use in those kinds of time-spanning agreements where frequent renegotiations are particularly costly, that is, in housing rentals, certain recurrent customer-supplier relationships and, in particular, labor contracts. Since in a high inflation, expected errors in predicting the price level over periods of a couple of months are large, there is practically no alternative to indexing for contracts as "long" as these two categories tend to be.

There are several problems with indexing, however. One of them, obviously, is the choice of the price-index basket when several proxies for "the" price level [48] are available. Before the introduction of the new *real*, some three dozen different contract indices were in more or less widespread use in Brazil. As an example, one large corporation was said to use eleven different indices in its various contractual

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<sup>9</sup> The volume of savings intermediated, moreover, may be even less than 1/5 of what is normal. If -- as has been a fairly common practice -- reserve requirements are also raised in order to force the banking system to help finance the government.

relationships. The reporting lag is another complication. Indexing is backward looking: it corrects for last month's inflation, not the current inflation. When the inflation rate fluctuates widely from month to month, therefore, considerable uncertainty attaches also to the purchasing power of payments on index contracts. There are, of course, prices (such as the exchange rate) that are almost continuously measured, but "dollarization" of contracts has the disadvantage that the real exchange rate is extremely volatile in high inflations. For most people, maintaining constant purchasing power over a basket of foreign goods is of little use if, in so doing, their command over the domestic goods that are the stuff of daily existence is rendered more variable.<sup>10</sup>

The second option, shortening the length of contracts, is a natural response when information about future conditions is very unreliable. But so doing, of course, is not a safe strategy for levering investment in long-lasting assets. When people are forced into very short-term contracts, therefore, a low level of fixed investment is a corollary to be expected.

For short horizons, indexation is of little use since (given the lags in obtaining and using the indices) a simple adjustment of nominal payments using the past inflation rate will do as well. Short contracts, therefore, are written in nominal terms and incorporate the price expectations of the transactors.<sup>11</sup>

Long-lasting physical assets tend to have their markets dollarized. For the most part the alternative wealth-placements considered by owners are also abroad. The ownership of housing and real estate is the most important case. Moreover, [49] domestic stock-markets tend to wither away with no new issues and an exceedingly low volume of transactions. This deep malaise of equity markets is a bit of a riddle since economists used to presume that inflation would make investors flee nominal for the safe havens of "real" assets. The most plausible explanation is that the uselessness of the unit of account in high inflation makes it all but impossible to calculate and communicate reliable information about a corporation's net earnings. Market analysts have little meaningful information to work with.

In sum, high inflation economies tend to end up operating on a *triple standard*:<sup>12</sup>

- i) spot markets for long-lasting assets are dollarized;
- ii) housing rentals and wages are indexed or partially indexed;
- iii) wholesale and retail markets for consumer goods and services and intermediate products, etc. continue to use domestic money.

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<sup>10</sup> It is interesting to note that the markets that are first dollarized are in fact *not* the ones in which the continuous availability of an index-measure would be particularly beneficial. Dollarization tends to spread first in the sale or purchase of housing, for instance. i.e.. in markets where people are making major wealth-placements for some length of time

<sup>11</sup> While generalizing about high inflations, one must of course note that high inflation economies differ from one another with regard to the way in which contracts are typically made. What contracting strategies will predominate depend on the magnitude of the inflation, on the institutional structure of the country in question, and on its previous experience with monetary instability. For example, in Brazil and Israel, indexation was formally introduced in a wide variety of financial contracts, while in Argentina, although indexing was far from rare, it was much less widespread. Instead, financial assets were held mostly in the form of very short-run nominal instruments or foreign currencies.

<sup>12</sup> Unless we count each index-basket in use as a different unit of account - in which case we should recognize sundry *n-tuple* monetary standards!

Such triple standards are shot through with problems and inconsistencies of various kinds. The real estate market is in dollars, but there is no mortgage market in any currency. When the exchange rate moves it changes the relative price of dollarized houses and indexed rentals, causing huge excess demands in one market while the other dries up completely. This is one example of violation of arbitrage pricing. More generally, the excess variability of relative prices, which is another fundamental characteristic of high inflation processes, reflects a turbulence in the markets in which pricing inconsistencies are constantly being generated.<sup>13</sup>

Inflation makes investments in most types of productive assets riskier. But the main reason that high inflations reduce growth is simply that the accumulation of productive capital cannot be financed by any of the normal means. Neither the banking system, nor the bond markets (nominal or indexed), nor the stock market will function so as to channel substantial resources from savings into investment.[50]

#### 4. DEFLATION CRISES

A deflation crisis is the product of two factors, namely, the degree to which the financial system has become fragile and the nature and size of the shock that forces a downward revaluation of wealth in some part of the economy. Fragility is a matter of the interdependence of default risks. When the representative transactor can handle his payment commitments whether or not his receivables are paid, the system is of course quite solid. This would be the case, for instance, if agents typically held liquid reserves equal to their accounts payable.<sup>14</sup>

Fragility can build up in the system in various ways. The example I gave previously was of an all-around expansion of everyone's payables and receivables relative to (outside) money balances held. Beyond a point, such a process will make the system go *self-critical* in a way quite analogous to the famous "sandpile" case, that is, a small initial default will trigger an avalanche of defaults the extent of which one would not be able to predict without an impossible amount of systematic information about the interrelationships among balance sheets in the economy. But the interdependence of default may develop without such a dense web of indebtedness. The more common case is that of an asset price bubble fed by the lending of banks or other credit institutions. Such bubbles can build up to large amplitude when, on the one hand, investors start to extrapolate rates of capital gains and, on the other, lenders accept the inflated asset prices as collateral for ever-increasing credits. A slowing down in the rate of capital gain may suffice to prick such a bubble if it induces a subset of investors to get out of the asset class in question. The fall in collateral values then makes the banks refuse the roll-overs of short-term loans. If market prices fall far enough some borrowers will choose default and bankruptcy and distress sales of collateral assets then adds to the deflationary pressure. The macroeconomic consequences become serious if the solvency of the banks themselves is impaired in the process as happened, for example in Japan and in Sweden

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<sup>13</sup> The evidence on the financial consequences of high inflation is completely at variance with the picture given by contemporary finance theory where asset prices are first determined "in real terms" and then converted into nominal prices by attaching a money to the "real sector" by some device or other.

<sup>14</sup> A moment's reflection will tell, of course, that few firms ever do and banks never do.

in recent years.

Debt-deflation in the sense of Irving Fisher extends this process to the general price level. In this case, a deflationary shock to the system becomes endogenously self-amplifying so as to bring about a great depression. If, initially, the economy had the volume of inside credit with which all parties were satisfied, a fall in the price level will make its real value larger than either debtors or creditors desire. The attempt by debtors to improve their cash-flow so as to avoid default [51] will increase excess supplies in all goods markets. This, in turn, exacerbates the deflation and the real value of outstanding debts grows still larger. The individual debtor will not take into account the consequences for the real burden borne by other debtors of his own attempts to get "out from under". This externality means that the feedback is deviation-amplifying, carrying the system further and further away from a Modigliani-Miller equilibrium, sweeping greater and greater numbers of firms and of quite ordinary people into foreclosure and bankruptcy.

Fisher's original theory pertained to a closed system with a single currency. A variant, updated for our times, would put debt-deflation in a multiple currency, flexible exchange rate context. Consider the case where the capital inflow to a particular country reverses so that its exchange rate starts to depreciate significantly. This may happen for a number of reasons -- one being fears about the solvency of the private sector in the wake of an overinvestment boom. If at this juncture the private sector is heavily indebted in dollars (or D-marks), a scramble for dollars (or marks) in order to liquidate it before the exchange rate falls further may ensue. This will amplify the decline of the exchange rate and make matters worse. Foreign lenders, acting individually and watching the solvency of debtors erode, will not stabilize the situation. "Sauve qui peut"-- and the devil take the hindmost. This process will take the exchange rate -- of the baht or the rupiah or the won, for example -- far below the level consistent with trade fundamentals.

The evolution of the international financial system over recent decades has made this new form of debt-deflation a far more likely occurrence than the original Fisherian one. An excess supply of domestic product on the scale seen in the United States in the 1930's will occur very rarely -- and when it does occur, the GNP deflator will "sag" rather than plummet. Moreover, although a recurrence of a Great Depression cannot be altogether ruled out, we do know a good deal about how to guard against and how to counter a domestic debt-deflation. In contrast, when speculation against the currency of a net debtor country overwhelms the resources for its stabilization, the exchange rate can fall like a stone in a single day. And methods to control the free international capital movements of today's magnitude have yet to be developed.

The debt-deflation process leads to a kind of bifurcation of the financial system, splitting it into one camp of solvent and very liquid units, willing to accept exceedingly low nominal yields as long as default risk is nil, and a second camp of units with balance sheets of doubtful solvency (Leijonhufvud, 1973). The first camp won't lend to the second. The trouble is that, in the nature of the case, a high proportion of society's producers will be in this second camp. Funds flow to safety and *away from* the sectors where the real rate of return is high. Interest rates on safe [52] and risky assets diverge and their eventual convergence to normal differentials for risk may be abnormally delayed.<sup>15</sup>

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<sup>15</sup> In the early phase of the American Great Depression the rate on Baa-rated bonds shot up dramatically as the yield of safe and liquid

The resulting situation has two characteristics. First, pushing more liquidity into the system by conventional monetary policy means will have little effect. The additional money ends up in the portfolios of already liquid units and aggregate velocity is seen to fall while the liquidity constraints on firms and households stays unchanged. Witness the inability of the Bank of Japan to stimulate bank lending to business by providing the banks with reserves at interest rates of a fraction of one percent! Second, deficit spending targeted on the liquidity constrained sectors will have significant multiplier effects. This is the kind of situation where very traditional Keynesian policies show to best advantage. But they had better be executed by a government whose solvency is not in doubt.

## 5. LES EXTRÊMES SE TOUCHENT

Unfortunately, it is often governments of doubtful solvency that find themselves grappling with deflation crises. The solvency problems may not always be apparent *ex ante*. The official budget of the state may be balanced for all to see. But a widespread solvency crisis in the private sector is likely to reveal "contingent liabilities" that the government can no more refuse because they were not anticipated in existing law.<sup>16</sup> It may, for example, have to step in to guarantee bank deposits even though no legislated deposit insurance program exists. Or it may be faced with a politically powerful coalition of big borrowers who cannot pay and big lenders who cannot collect jointly demanding the "nationalization" of their losses -- at the expense of the less powerful general tax payer. But the little man may not vote the additional taxes to pay for the mistakes of the "big shots". In that case, the inflation tax becomes the only way to make him pay.

When government spending is generally seen not to be covered by taxes, present *or future*<sup>17</sup>, inflation is the unavoidable outcome. When a government near [53] the limits to its capacity to raise taxes tries to alleviate widespread insolvency in the private sector by assuming the burden of private debts or by other forms of deficit spending, the immediate deflation crises will turn into a long-lived high inflation. Whether incurring large deficits is the best thing to do under such circumstances can be very difficult to determine. If private sector defaults are not too large and widespread, it is of course preferable to let private agents bear the costs of their own mistakes. But if the defaults are likely to cascade, it is dangerous to be overly concerned with the perverse incentive effects of "bailouts." Letting the deflation run its course is dangerous. No one can foresee where it will stop and who at that point will still be left standing.

In an actual crisis situation, nice economic present value calculations of the social costs of depression versus high inflation are not likely to be essayed in any case. Crises make the relevant time horizons short and in a solvency crisis it is unemployment that counts in the short run. An inflationary policy will help to reduce unemployment -- as

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securities plunged to record lows. A piece of old history that Long Term Capital Management would have done well to remember!

<sup>16</sup> Cf. Vaz (1998) who provides a number of examples from banking crises in Uruguay (1965 and 1982), Argentina (1980) and Chile (1982).

<sup>17</sup> In the terms of our "social bookkeeping" section above, additional government spending in this situation is seen to create added "outside credits."

long as the bad loans are in the domestic currency. Inflating helps, *not* because of sticky wages (wages are certainly not sticky in high inflations), but because it reduces the real burden of indebtedness of enterprises and makes it financially feasible for them to continue operating. In the worst of all circumstances -- if the defaults are on international loans denominated in a foreign currency -- the government may still be forced into large and persistent deficits, but it may be almost completely incapable of improving the domestic situation in the absence of foreign aid.

## 6. A CONCLUDING NOTE: CRISES AND FINANCE THEORY

In modern finance theory, the economy's investment prospects exist as objectively knowable probability distributions of future cash-flows. Financial market participants know the knowable. Thus, these future prospects are as much part of the economy's wealth as already existing assets or resources. The theory is entirely forward-looking -- the valuation of assets and investment prospects is arrived at by backwards induction.

Financial crises reduce economic growth because they prevent the realization of a great part of the economy's potential investment projects. We are used to assuming that, under normal conditions in an industrialized country, the prospective future returns to investment projects can be exchanged for the present resources required for their realization. This is precisely what cannot be done in the wake of [54] financial crises. In a high inflation economy, the intertemporal (credit) markets have disappeared. It is an economy in which finance generally speaking *cannot be forward-looking*. In the wake [of a deflation crisis, the financial system actually becomes *backward-looking* in the sense that funds will only flow to economic units that now possess sizeable net worth accumulated in the past. Thus both types of crises undermine the financial conditions necessary for the realization of vigorous economic growth.

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