Modeling financial crises: a schematic approach

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Modeling financial crises: a schematic approach

Abstract: John Maynard Keynes argued that crises were systemic and that, unless serious reforms were implemented, they would tend to grow in frequency and severity. The paper sets out to build a Keynes-style model of crises that captures both the unique characteristics of each type and their common roots. A schematic method is employed that traces the processes in time and shows how events become interrelated and mutually causal. This permits us, as much as possible, to see everything at once—a necessity when the buildup to a crisis may manifest itself in so many places.

Key words: financial crisis, Keynes, Minsky.

What is now known as Post Keynesian economics began with John Maynard Keynes’s efforts to explain the greatest crisis in the history of capitalism. Among his conclusions were that such incidents were systemic and that, unless serious reforms were implemented, they would tend to grow in frequency and severity. Today, we again find ourselves in the midst of global financial collapse. Addressing our current problems and protecting ourselves from repeat performances requires that we understand the essential character of crises.

The opening stage of a crisis may take a number of forms: collapsing currency prices, the bankruptcy of financial intermediaries, Minsky moments, stock market crashes, and so forth. It is the premise of this paper that all such events arise from a common set of fundamental factors but follow different paths. In addition, a crisis may build in one sector of the economy but not another, or developments may be parallel. And even if initially isolated, once realized, the crash may trigger similar events in otherwise sound areas of the economy.

The goal of this paper is to build a model of crises that captures both the unique characteristics of each type and their common roots. A schematic

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method is employed that traces the processes in time and shows how
events become interrelated and mutually causal. This permits us, as much
as possible, to see everything at once—a necessity when the buildup to
a crisis may manifest itself in so many places. In addition, the paper
highlights an overlooked factor arising from Keynes’s explanation of the
business cycle in chapter 22 of the *General Theory* (1964): the impact
of the saturation of demand for physical capital.

**Stages of crisis**

A financial crisis is a sudden, catastrophic, and far-reaching economic
event. Crises are systemic. They arise time and again not as a result of
stochastic shocks or “outside interference,” but because the forces that
create them are integral parts of capitalism. Furthermore, although their
outward manifestations may vary, all such events have at their heart
the same cause: the development of increasingly optimistic forecasts
alongside economic forces that cannot justify those expectations. A crisis
consists of three stages:

\[
\text{shock} \rightarrow \text{negative repercussions} \rightarrow \text{contagion}.
\]

The first represents the point at which agents suddenly and dramatically
conclude that their expectations were significantly out of line with reality.
This leads to panic. In order for it to evolve into a crisis, however, the
affected agents must act on their disappointment by taking actions that
have negative repercussions for the economy. These may be the anxious
sale of a now presumably overvalued asset or currency or the declaration
to creditors that a scheduled debt repayment will not be met. Contagion
extends the panic and negative consequences to those not initially af-
fected. If sufficiently widespread, the crisis can threaten the stability of
the entire macroeconomy.

**Shock**

The first step in a crisis is shock. Its character is the same regardless of the
diverse paths crises may subsequently take, and it occurs because of two
parallel processes: (1) the formation of increasingly optimistic forecasts
on the part of economic agents and (2) the inability of the economy to
satisfy those expectations. The former is a function of the psychology
of the market, whereas the latter is tied to Keynes’s investment-capital
cycle. The discussion begins with the former.

Economic decisions are made in an environment of uncertainty. The
importance and implications of this are well known to Post Keynesian
scholars (see Dunn, 2001, for an extended discussion). For present purposes, the core issue is that, because of uncertainty, agents necessarily lack sufficient information to create objective forecasts:

The outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of prospective yield have to be made. Our knowledge of the factors which will govern the yield of an investment some years hence is usually very slight and often negligible. If we speak frankly, we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London amounts to little and sometimes to nothing; or even five years hence. (Keynes, 1964, pp. 149–150)

Forecasts are, therefore, “the outcome of the mass psychology of a large number of ignorant individuals” and are “liable to change violently as the result of a sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield” (ibid., p. 154). Agents have little confidence in their forecast because there are “no strong roots of conviction to hold it steady” (ibid., p. 154).

If this is true, why would anyone in their right mind undertake anything more significant than a street vendor’s cart? They would not, except for the influence of our animal spirits, or our spontaneous optimism, or urge to action rather than inaction (ibid., p. 161). These overcome our misgivings and impel us to act despite the lack of a firm basis. It is akin to thinking, “it can’t happen to me.” And while this enables economic activity to take place despite uncertainty, it also inspires agents to anticipate increasingly favorable economic outcomes in times of plenty. For this contention, not only do we have Keynes’s conjecture but a wealth of research from modern psychology. Kahneman and Lovallo write, for example, that people tend to anchor forecasts to “plans and scenarios of success rather than on past results, and are therefore overly optimistic” (1993, p. 17). Closer to the subject of this paper, Weary cites research that shows that Wall Street professionals consistently overestimate future returns (1998, p. 54), and Oberlechner and Osler provide direct evidence of overconfidence based on their survey of currency market professionals (2008). This appears to be part of the basic character of those socialized in Western-style, industrial-capitalist cultures, if not homo sapiens in general, and it plays a key role in the creation of crises.

This is obviously not the first time the above observations have been made, but in explaining this stage of crisis, most theories go little further. They imply that the ever-rising optimism is sufficient because eventually
even a mundane event is capable of bursting the bubble. This is certainly a distinct possibility and it is true that if expectations become progressively more positive, then it is inevitable that reality must eventually disappoint; however, this and-then-something-happens method both detracts from the theme that crises are systemic and is completely unnecessary given Keynes’s argument that, over the business cycle, realized profits tend to fall as physical investment opportunities are exhausted. Emerging events are not merely stochastic, they become increasingly negative.

At the core of this sequence is physical investment. As is well known in Post Keynesian economics, it is the primary driver of economic activity and the force that creates expansions and recessions. What determines investment is firms’ expectation of profit from undertaking such projects. When the economy first emerges from recession, entrepreneurs are encouraged, and they begin to upgrade their forecasts, leading to increasing levels of investment. This causes a general rise in the level of economic activity. This is destined to end, however, as capital can be built far faster than it depreciates or tastes and technology change. Realized profits decline because as one adds to the stock of capital, (1) firms can be expected to undertake the most profitable projects first, leaving less profitable ones as the expansion matures, and (2) the general rise in the stock of physical capital means that capacities are reaching the point that demand can be supplied and further additions are unnecessary.

Figure 1, the investment-capital cycle, illustrates this process.\(^1\) In the diagram, \(\pi^e\) is entrepreneurs’ expectation of profit from investment, \(I\) is investment, \(K\) is the stock of capital, \(K_T\) is the stock of capital that would objectively enable firms to meet current demand, \(K_D\) is the amount by which capital depreciates each time period, and GDP is gross domestic product.\(^2\) Assume we are at a point where expectations of profit are rising and this is driving investment higher. On one hand, this is creating economic expansion (see the effect on GDP); on the other hand, it is eating away at the profitability of the remaining projects and leading inevitably to a fall in investment and GDP. The sequence (based on the investment-capital cycle outlined in Figure 1) is shown in Figure 2. The top row illustrates the near-term relationships and the positive effect on economic activity, and the bottom traces the background forces that lead eventually to recession.

\(^1\) Note that because the primary goal of the paper is to highlight what is going on elsewhere, this part of the model is fairly simple. For a more in-depth analysis, see Harvey (2002).

\(^2\) Arrows indicate causation from the base to the head, and the positive or negative sign shows the direction of impact.
Together with the psychological factors discussed earlier, the investment-capital cycle creates the conditions for shock. Expectations become increasingly optimistic while prospects for profits from real economic activity decline. This leads to disappointment, sometimes catastrophic. Note that this explicit tying of shock to the investment-capital cycle is not meant to imply that crises occur solely as the product of the business cycle. The catalyst can instead be some exogenous boost to expectations. A dramatic event such as capital market liberalization can serve to jump-start expectations. Still, even in this scenario, the financial market boom is invariably accompanied by at least some uptick in the level of real economic activity. Therefore, even when a crisis is not directly related to the peak of a business cycle, the tendency of physical investment projects to become saturated nevertheless comes into play. Realized nonfinancial returns eventually fail to justify forecast financial ones because systemic forces lead the former to decline over precisely the same period that the latter rises. It is therefore vital to include the investment-capital cycle in any theory of crisis. Figure 1 will serve at the core of the larger schematic.

Figure 1 The investment-capital cycle

Figure 2 Investment-capital cycle in action

Note that were it not for the volatility of expectations, the investment-capital cycle might settle into a stable equilibrium wherein investment stayed at the level just sufficient to offset any changes in \((K - K_T)\) caused by \(K_D\). That this does not happen is due to the fact that when the shock occurs, \(\pi^e_i\) collapses, leaving the current \((K - K_T)\) well above that which agents believe is profitable (oscillation requires a negative feedback loop and a delay (Sterman, 2000, p. 114). This is true even if further investment would, in an objective sense, have been worthwhile. We must then wait for \((K - K_T)\) to deteriorate to the point that \(\pi^e_i\) can recover, at which point the latter will tend to rise to
Negative repercussions and contagion

To this point of the paper, the conditions necessary for the first stage of crisis—shock—have been outlined. In particular, the tendency of expectations to become increasingly optimistic while realized nonfinancial profits declined was discussed. To proceed to an explanation of negative repercussions and contagion, it is necessary to begin tracing out the specific routes by which these forces are manifesting themselves. All crises begin with overly optimistic expectations, but of what? In this paper, events have been divided into four types based on the focal point of the forecast. These are, as shown in Table 1, Minsky, asset market, flexible exchange rate, and fixed exchange rate crises. The first represents a type of crisis wherein agents’ unrealistic expectations of manageable debt loads end with default; in the second, overly optimistic forecasts of asset prices lead to a collapse in those prices; and in the last two, currency prices are bid higher and higher until they come crashing down (the process is somewhat more complicated with a pegged exchange rate, but the same forces are at work). As each is explained below, a new schematic will be developed. These will eventually be combined into a single diagram so that the interrelationships and mutually causal factors can be seen and understood.

A Minsky crisis is one in which economic agents, encouraged by lenders, repeatedly revise upward the level of debt they think they can safely manage. This puts them closer and closer to default (Minsky 1982; 1992). Because production takes time, firms, consumers, financial institutions, and governments undertake massive amounts of debt-financed spending. This creates layers of interlocking debt such that if one set of agents fails to meet its payments, this may set into motion a wave of default and create the potential for financial collapse.

In a Minsky crisis, the relevant expectations are those of “safe” debt levels (see Table 1). Minsky hypothesized that as agents (particularly during an economic expansion) find that they are able to meet the repayment schedule dictated by their current debt levels, they increase their ratios of debt to income. Unfortunately, however, because they do so out of proportion to their past successes, they find themselves moving from hedge to speculative to Ponzi debt-income structures:

unsustainable levels, thereby setting up the next disappointment and collapse. In that sense, the investment-capital cycle is, in itself, driven by the similar forces to financial crises, a fact that is not surprising given Keynes’s belief that asset markets and that for new capital must be related. This is modeled using a computer simulation in Harvey (2002).
### Table 1
#### Types of crises

<table>
<thead>
<tr>
<th>Crisis type</th>
<th>Focus of expectations</th>
<th>Negative repercussion</th>
<th>Initial contagion</th>
<th>Secondary effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minsky</td>
<td>Manageable debt load</td>
<td>Default</td>
<td>Chain default</td>
<td>Credit crunch</td>
</tr>
<tr>
<td>Asset market</td>
<td>Asset price</td>
<td>Collapse in asset price</td>
<td>Downward revision of related price forecasts</td>
<td>Fall in expectation of profit from investment, fall in aggregate expenditures, fall in marginal propensity to consume</td>
</tr>
<tr>
<td>Flexible exchange rate</td>
<td>Currency price</td>
<td>Currency depreciation</td>
<td>Capital flight</td>
<td>Inflation, foreign exchange loan default, fall in aggregate expenditures</td>
</tr>
<tr>
<td>Fixed exchange rate</td>
<td>Currency price</td>
<td>Currency devaluation</td>
<td>Capital flight</td>
<td>Inflation, foreign exchange loan default, fall in aggregate expenditures</td>
</tr>
</tbody>
</table>
Hedge financing units are those that can fulfill all of their contractual payment obligations by their cash flows; the greater the weight of equity financing in the liability structure, the greater the likelihood that the unit is a hedge financing unit. Speculative finance units are units that can meet their payment commitments on “income account” on their liabilities, even as they cannot repay the principle out of income cash flows. Such units need to “roll over” their liabilities: (e.g., issue new debt to meet commitments on maturing debt). Governments with floating debts, corporations with floating issues of commercial paper, and banks are typically hedge units.

For Ponzi units, the cash flows from operations are not sufficient to fulfill either the repayment of principle or the interest due on outstanding debts by their cash flows from operations. Such units can sell assets or borrow. Borrowing to pay interest or selling assets to pay interest (and even dividends) on common stock lowers the equity of a unit, even as it increases liabilities and the prior commitment of future incomes. (Minsky 1992, p. 7)

If they move steadily toward becoming Ponzi units, at some point agents must default.

It is not necessary for everyone to go to the extreme for this to occur, however, because (as shown in Figure 1) the economy is simultaneously moving to a point where real returns and, therefore, incomes are bound to decline. Thus, even hedge and speculative units can find themselves in trouble if the economy contracts. Shock results because the rising expectations and falling profits and income are thrown into dramatic contrast. The negative repercussion, as noted in Table 1, is debt default. Depending on the level of interlock and the fragility of the system at the point of collapse (determined by the relative hedge/speculative/Ponzi position of agents in the macroeconomy), this can lead to chain defaults and a severe restriction in the ability/willingness of the financial sector to make loans—a credit crunch. Because, as Keynes said, banks play a key role in allowing the level of economic activity to move to a higher level, this can cause an economy-wide contraction.

Figure 3 illustrates a Minsky crisis. On the right, it shows that rising GDP will increase incomes (both household and business). As incomes rise, agents find that they can meet debt obligations successfully. With an accumulation of successive on-time payments, debtors begin to believe that their current debt–income ratios are unnecessarily conservative. They therefore, with banks’ cooperation, take on more debt. Because the link between “successive debt repayments” and “estimated ability to service debt” is strongly affected by the animal spirits/spontaneous optimism discussed above, margins of safety (as represented by debt/income) tend to be eroded with more enthusiasm than is warranted. A point of ten-
sion then emerges between agents’ debt burden and their income. As the former rises or the latter falls, it is more likely that agents find that they cannot meet their debt repayment schedule. A crisis then occurs. Note that it ultimately does not matter which half of the tension point is the culprit. With debt burden rising on one side and agent income destined to fall on the other, a crisis will eventually (ceteris paribus) emerge. Overly optimistic expectations combine with the investment-capital cycle to create shock.

This is not the only sector in the economy where spontaneous optimism and the saturation of the market for physical capital sow the seeds of collapse. Indeed, the arena that captures the most attention is the asset market. In this paper, assets will be anything used to save, and hopefully grow, purchasing power. This would include stocks, real estate, commodities futures, and derivatives, for example. Here, the role of unfounded optimism in the formation of forecasts creates a positive feedback loop that can move prices well out of line with those justified by profits in the real economy. This is shown in Figure 4. Rising GDP increases the profitability of various real undertakings ($\pi_{real}$). This causes a bump (see “initial impulse”) in the value of their financial counterparts ($P_{financial}$). The latter could be stock prices increasing because the issuers’ profits have risen, real estate prices moving up with new demand, commodities (spot or futures) becoming more expensive as the economy shifts into higher gear, and so on. At this point, however, the overly optimistic expectations of speculators take over and price increases begin to feed on themselves, moving them out of line with what $\pi_{real}$ would reasonably suggest. In Figure 4, the positive feedback loop linking $\pi_{financial}$ to $P_{financial}$ (where the former is the rate of profit agents expect from holding financial assets) represents the process by which this takes place. The
boost in $P_{\text{financial}}$ created by the initial impulse from $\pi_{\text{real}}$ leads agents to expect further increases in the profitability of holding financial assets, which, of course, raises $P_{\text{financial}}$ again because market participants act on those expectations.

The tension point that is created is in the gap between the rate of profits agents expect to earn from their speculative activities ($\pi_{\text{financial}}^e$) and that are actually earned by asset issuers ($\pi_{\text{real}}$). While the former is driven up by the positive feedback loop made possible by animal spirits, the conditions creating the initial rise in the latter are steadily deteriorating due to the operation of the investment-capital cycle. At some point, an indicator of nonfinancial profits (a corporate quarterly report, a decline in the demand for housing in some key market, etc.) will show results so far out of line with what was expected of the financial counterpart, $\pi_{\text{financial}}^e$, that shock will result. Agents, whose confidence was always shaky because of fundamental uncertainty, then hurriedly dump the presumably overvalued assets and the feedback loop quickly reverses direction (and overreacts in the opposite direction). This leads, as shown in Table 1, to a collapse in the expectations of profit from investment and a further decline in aggregate demand, the latter both from a decrease in household consumption and an additional collapse of investment as animal spirits are now longer adequate to offset firms’ uncertainty. Just as with a Minsky crisis, expectations have become too optimistic given the inevitable fall in economic activity created by the investment-capital cycle.

Exchange rates, too, may fall victim to this process. To see this, it must be understood that modern currency markets are driven primarily by financial capital flows. In 2005, for example, foreign exchange transactions were “enough to accommodate world trade 40 times over” (Harvey, 2009, p. 2). Trade flows are certainly a determinant of currency prices, but they are, without question, secondary. In fact, one sees more of a market reaction to the announcements of trade balances than to the balances themselves. The currency market is, therefore, simply a branch of the asset market discussed above. As a consequence, Figure 5, showing

\begin{figure}[h]
\centering
\includegraphics{figure4.png}
\caption{Asset-market crisis}
\end{figure}
flexible exchange rate crises, repeats a portion of Figure 4. In particular, the initial impulse from $\pi_{\text{real}}$ to $P_{\text{financial}}$ is still relevant. What has been added is the fact that a rise in the latter will likely attract foreign financial capital inflows ("foreign capital inflows") that then drive up the price of domestic currency (measured as FX/$, where the United States is assumed to be the home country). Similar to domestic asset markets, this sets into motion a positive feedback loop that permits overly optimistic expectations to inflate expected financial returns (which here manifest themselves in the price of domestic currency) out of proportion to non-financial returns. Financial capital inflows cause domestic currency appreciation, which encourages agents to believe that their earlier forecasts had been accurate. This leads to a new round of capital inflows, another appreciation, and so on. Although represented in a slightly different manner, it is essentially the same process as that shown in Figure 4. Market participants purchase an asset in anticipation of its appreciation, which causes it to appreciate. Flushed with their success, they buy more.

However, just as before, if the driving force underlying the rise in the currency price was the presumed profitability of the asset issuers, then that expectation will soon be disappointed. To understand this, imagine a non–financially determined value for a currency (nonfinancial FX/$) based on the underlying profitability of the nonfinancial sector ($\pi_{\text{real}}$). Although such a conceptualization might not yield a specific value for the nonfinancial FX/$, it would indicate (in precisely the same manner as in the asset market) that FX/$ can move well out of line with nonfinancial
FX/$. Once again, one side of the tension point (FX/$) tends to rise, while the other (nonfinancial FX/$) rises at a decreasing rate, then falls. Disappointment and shock result, followed initially by capital flight and eventually by inflation, default on foreign currency–denominated loans, and a general decline in aggregate demand (see Table 1).

Perhaps more common and spectacular is the collapse of a fixed exchange rate. Although Table 1 shows that it creates the same consequences as those associated with a flexible exchange rate regime and the underlying cause would not differ, the process is unique enough to warrant developing a separate schematic. That is shown in Figure 6. Note first that from GDP through to $\pi_{\text{real}}$, $p_{\text{financial}}$, foreign capital inflows, and FX/$, it is identical to Figure 5 (though the last variable is now called “unseen market FX/$”). In addition, the link from $\pi_{\text{real}}$ to nonfinancial FX/$ is the same. The major addition is “pegged FX/$.” The introduction of a fixed currency price creates two avenues by which instability may occur (though only one is associated with the phenomenon under study in this paper). First, there is the problem created by any gap that exists between the FX/$ that a float would have generated (“unseen market FX/$”) and that set by the government (“pegged FX/$”). The larger the difference between those two, the less likely the peg can be sustained because it requires greater levels of intervention. This becomes particularly problematic as foreign currency reserves (FX Reserves) dwindle, which is shown in Figure 6.

Maintaining a fixed currency price when private market forces may choose to challenge the official position is certainly an issue that can create crisis and collapse, and it is duly marked on the relevant portion of the schematic with “GAP.” However, such difficulties are not a function of overly optimistic expectations versus the investment-capital cycle and so are not the subject of this paper. More interesting in the current context is what happens when foreign capital drives up the erstwhile invisible unseen market FX/$ and the government decides to shift the pegged rate along with it so as to maintain a stable GAP. They may do this to satisfy foreign investors, allow domestic borrowers to gain better terms, or for prestige. In any event, the government’s overly optimistic fixing of the rate, made possible by the overly optimistic expectations of the private sector, operate just as in the flexible exchange rate scenario. The tension point emerges between “nonfinancial FX/$” and “pegged FX/$,” with the former linked to a variable that will inevitably decline while the latter continues to rise. Again, at some point, the fixed rate will be shown to be well out of line with that justified by a more objective evaluation. The result will be a rapid exit from the currency via a
decline in “foreign capital flows” and a consequent collapse in “unseen market FX/$” that makes GAP too large to defend. A speedy devaluation must take place. This is followed, as noted in Table 1, by all the same contagion factors as with a flexible exchange rate collapse: capital flight, inflation, default on foreign currency–denominated loans, and a decline in aggregate demand.

A general schematic of financial crises

This completes the process of developing a schematic for each of the four possible types of financial crises. Although the particular manner in which they manifest themselves varies, in each case, the underlying cause is overly optimistic expectations in the financial market versus declining realized outcomes in the nonfinancial sector. The key factors are uncertainty, animal spirits, and the investment-capital cycle. The first creates an environment in which agents’ expectations are held with little confidence and thus are prone to sudden and catastrophic revision. The second provides the courage necessary to nevertheless act under these circumstances and, unfortunately, to spur agents on to increasingly optimistic expectations. By itself, such a process is bound to create disappointment at some point. The investment-capital cycle, with its steady
undermining of the profitability of nonfinancial projects, ensures that point comes sooner rather than later.

Although shown on individual schematics, these processes do not occur in isolation. Indeed, when an economy is building up to a financial crisis, it is likely that a number of the tension points are coming into play simultaneously. In the end, which one becomes the tipping point is in some ways merely incidental. Expectations were going to be disappointed somewhere in the economy and events merely conspired to make it a Minsky, asset, or currency crisis. Thus, to truly understand the developments leading up to the collapse, one should really examine the economy all at once so that attention is not unduly focused only on the sector where the crisis happened to emerge first. Figure 7 makes this possible.

What is shown is basically a combination of the schematics for the investment-capital cycle and the Minsky, asset market, and flexible exchange rate crises. Because each shared the variable GDP, this created a point at which they could be combined. Putting everything together also creates the opportunity to include some new factors. For example, “real $\pi$ opportunities” above ($K - K_T$) shows the relationship between the existing stock of capital (relative to the saturation point) and the opportunities for profit that exist in the nonfinancial sector. This has two important consequences. First, as real opportunities diminish, firms may shift activities more toward wealth management than the production of goods and services. (This is shown on the right where “‘real’ $\pi$ opportunities” connects, via “wealth management,” to $P_{\text{financial}}$.) As these new funds flow into the asset market, they will tend, ceteris paribus, to bid financial asset prices ($P_{\text{financial}}$) higher. Note the perverse logic here in that the drying up of real profit leads to a boost in the paper value of the issuing agents. Second, as the nonfinancial sector slows, banks and other financial institutions find that their opportunities for new lending decline. This may lead them to more aggressively market debt (see “debt marketing” on the diagram), further contributing to the rise in debt/income hypothesized by Minsky. Also new on the diagram is the possibility that rising domestic currency prices, FX/$, could lead agents to take on increasing levels of foreign debt at “cheap” rates; something they are simultaneously encouraged to do by their revised estimated ability to carry debt. This, too, adds to debt/income and makes the financial system more fragile.

Now imagine this system in motion. Early in the process, little pressure emerges at the tension points. However, once expectations become sufficiently optimistic and the nonfinancial economy begins to slow, disappointment is inevitable. To take a specific example, suppose we
Figure 7 Tension points in a flexible exchange rate regime

have an expanding economy as evidenced by a rise in physical investment. Such a scenario is sketched in Figure 8, based on the model from Figure 7. The rising investment is shown on the top left. Directly to the right are all the asset market processes put into motion. Rising physical investment will increase the profitability of nonfinancial undertakings ($\pi_{\text{real}}$) and provide a boost to financial asset prices ($P_{\text{financial}}$). This causes the expectations of market participants ($\pi_{\text{financial}}$) to become increasingly positive, setting into motion the positive feedback loop on the far right of the top line (note $\pi_{\text{financial}}$ being marked as a key element in the tension point). Early in this process, it is likely that the gap between $\pi_{\text{real}}$ and $\pi_{\text{financial}}$ will be fairly small (particularly if the latter started fairly depressed), causing little stress to the system.

Meanwhile, as shown in the line immediately below, the rising financial asset prices will attract foreign capital, causing an appreciation of domestic currency. Again, at this point the actual price may not be too far from that justified by the rates of return on nonfinancial returns (i.e., the nonfinancial FX/$), but the seeds have been sown. Moving to the Minsky side of the discussion, note first that the falling price of foreign currency will encourage agents to borrow in those monies, particularly as they decide they can carry more debt. The latter will be occurring because rising GDP meant that agent incomes rose, allowing them to
make successive debt repayments and therefore downwardly revise their margin of safety. All of this results in higher debt-to-income ratios and a rise in overall debt burdens. Once again, however, at this stage, the tension point may not be a cause of great concern as agent incomes will likely be adequate.

As these processes continue, however, problems begin to emerge. On the expectations side, the continued good times have the effect of encouraging agents to expect increasingly favorable outcomes (with perhaps even professionals announcing the birth of a “new economy”). In terms of Figure 8, this is manifested in progressively more powerful cyclings of the two positive feedback loops at the ends of the “Asset Market” and “Currency Market” lines (those connecting $P_{\text{financial}}$ and $\pi^{e}_{\text{financial}}$ and “foreign capital inflows” and FX/$$) and in increases in “estimated ability to service debt” that become far more optimistic than “successive debt repayments” can really justify. These factors are likely to be particularly potent when associated with a dramatic event, because animal spirits will become overly excited much earlier in the sequence. Under some circumstances, this alone can be enough to create disappointment; if not, the slowdown in the investment-capital cycle will soon make itself felt.

The latter is shown on the bottom line of Figure 8. Eventually, increases in physical investment saturate the stock of physical capital and bring on recession (see Figure 2). At first, the rise in $(K - K_I)$ is insufficient to lower $\pi^{e}_{I}$ to the point where it actually causes a fall in investment.
Eventually, however, it will do so. This has a number of consequences. First, as \((K - K_T)\) rises, opportunities for profit in the nonfinancial sector become more scarce (see “‘real’ \(\pi\) opportunities” in Figure 8). This may lead businesses to shift their attention away from the production of goods and services and toward wealth management. If so, this influx of funds into the asset market will have a tendency to drive \(P_{\text{financial}}\) up, meaning that at the very time when \(\pi_{\text{financial}}\) should be moderated, it is actually encouraged to higher levels. Because \(P_{\text{financial}}\) will encourage foreign capital inflows, the shift toward wealth management also contributes to the tension point in the currency market. Last, the fall in “‘real’ \(\pi\) opportunities” forces financial institutions to find different customers. Such “debt marketing” may involve loans to agents active in the asset market boom, financial institutions caught up in the cycle of rising debt, and other high-risk opportunities. These create a number of problems, not the least of which is the higher debt/income noted in Figure 8.

The most obvious and important effect of the fall in investment is the decline in GDP. Because GDP contributes directly to one-half of every tension point, as it declines, the likelihood of crisis is rapidly increased. “Debt burden,” \(P_{\text{financial}}\), and FX/$ will all be reaching cyclic highs just as GDP declines, pulling down with it “agent income,” \(\pi_{\text{financial}}\), and “nonfinancial FX/$.” Precisely which one breaks first is largely coincidental; each tension point moves inevitably toward disappointment and shock.

Figure 9 is the fixed exchange version of Figure 7. The situations with respect to the Minsky and asset market tension points are identical. The new factor is the relationship between the pegged currency price and that which would be generated in a floating rate (“unseen market FX/$”) and the one implied by the rate of return on nonfinancial assets (“nonfinancial FX/$”). The analogue of the tension point in the flexible exchange rate regime is that between “pegged FX/$” and “nonfinancial FX/$.” Just as before, unrealistic expectations are likely to move the fixed rate to an unsustainable level. If this, by itself, is not sufficient to create shock, then the situation will become more critical when the economy slips into recession and GDP and \(\pi_{\text{real}}\) begin to fall. It will become evident to market participants that “pegged FX/$” is significantly out of line with “nonfinancial FX/$,” and there will be a collapse in “unseen market FX/$” so large that the peg can no longer be sustained given the size of GAP. To repeat a point made earlier, how the government decides to manage GAP in general is a fascinating and important question, but it is not discussed here because it is not directly related to the subject matter of this paper.
Lessons and conclusions

The root cause of financial crisis is the initially gradual and eventually rapid separation of expected returns from what the real economy can actually generate. Ultimately, evidence of the relative underperformance of the nonfinancial sector will become known. Shock, negative repercussions, and contagion result. Depending on the magnitude, the economic impact can be significant and even catastrophic. This phenomenon is, given the current structure of market economies throughout the world, systemic. It does not require “crony capitalism,” unique events, or government “interference” with the market mechanism—it is, in fact, the market mechanism that causes this outcome.

Viewed in these terms, the solution is to either dampen expectations or improve economic growth. The latter should be done regardless, given the inability of the profit motive to generate sufficient employment for all those willing to work (see, e.g., Wray’s 1998 employer-of-last-resort scheme). It would not, however, prove sufficient to prevent crisis because of the power of the positive feedback loops in the diagrams. Indeed, part
of our current (as of winter 2010) problem is that the economy did so well for so long. In the 1990s, the United States experienced the longest peacetime expansion in history, and from December 1982 through November 2007—a period of 300 months—the United States suffered a grand total of 16 months of recession. This only meant that once the day of reckoning arrived, expectations were simply that much higher and the fall that much deeper.

Ultimately, expectations are the problem. This is evident at all three of the tension points shown in Figures 7 and 9. In terms of solving this, simply educating people about the fact that inflation-adjusted financial returns cannot possibly be significantly out of line with real ones is unlikely to be terribly helpful. From experience, we know that the animal spirits of even professionals lead them to proclamations of “new” economies (as we saw in the late 1990s, when successive annual increases in stock prices ranged from 4.4 to over 6 times as large as GDP growth). The tension points must be defused by some other method or methods.

First, various “trip wires” can be set up that signal to policymakers that prices may be on an unsustainable trend (see Grabel, 2003). These can be absolute (based on a number of consecutive days of continuous appreciation at some preset rate) or relative (a function of the ratio between target financial and nonfinancial values). When tripped, they tell government officials that intervention may be necessary. This may range from verbal warnings to closing the market for some period—something to allow cooler heads to prevail and to create a cost to contributing to such booms. Second, taxes can be introduced to encourage agents to engage in long-term enterprise rather than short-term speculation. Something as simple as a sliding-scale fee system, wherein agents pay a tax for selling a financial asset, may be useful. As the time between purchase and sale is longer, so the tax is smaller, thus penalizing people who focus on the short term. There is no doubt that this would lower the volume of activity in asset markets, but those left would be the investors who follow fundamental factors related to the profitability of the issuing entities and not those to whom the activity is simply a form of gambling. By this method, the underlying goal of linking expectations to a more realistic anchor is accomplished. Third, one may simply apply very different rules of engagement to those participating in speculative activities. This is most useful in the case of currency markets. Foreign capital may face various restrictions in terms of inflow and outflow, all generally designed to discourage hot money and encourage the funding projects that create output and employment. By each of these means, it may be possible to reduce the likelihood of asset and currency crises.
In terms of Minsky crises, we must have significant financial reform. Wray writes,

The market has decisively spoken: It is not capable of self-regulation. It cannot tell who is credit-worthy. It cannot be trusted to innovate new financial products. It cannot be relied upon to determine compensation schemes. It makes terrible credit allocation decisions. It crises out for downsizing and heavy-handed regulation. (2009, p. 5)

Those who are borrowing do not know when to stop, and those who could refuse them do not do so. To address this, the financial system must be made more transparent, steps need to be taken to ensure that those who initiate loans actually care if they are repaid (which can be accomplished by making sure they are the ones to carry them to maturity), and we must remind central banks that it is their duty to monitor conditions in credit markets and step in if debt levels are getting dangerously high (again, trip wires would be useful here).

Today, we stand at our own tension point. Perhaps the biggest problem we face is that policymakers refuse to see the true nature of the problem. It appears that beyond an economic stimulus package and a few half-hearted reforms, little will be done to change the structure of our system. It is therefore inevitable that new crises will emerge.

REFERENCES


