

WHAT HAPPENED TO ASIA?

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It seems safe to say that nobody anticipated anything like the current crisis in Asia. True, there were some Asia skeptics - including myself - who regarded the claims of an Asian economic miracle as overstated, and argued that Asia was bound to run into diminishing returns eventually. And some people - again including myself - raised warning flags a year or two before the Thai crisis, noting that the current account deficits of Southeast Asian countries were as high as or higher than those of Latin America in 1994, and arguing that Asian economies had no special immunity to financial crises. But even pessimists expected something along the lines of a conventional currency crisis followed by at most a modest downturn, and we expected the longer-term slowdown in growth to emerge only gradually. What we have actually seen is something both more complex and more drastic: collapses in domestic asset markets, widespread bank failures, bankruptcies on the part of many firms, and what looks likely to be a much more severe real downturn than even the most negative-minded anticipated.

Also surprising has been the vulnerability of some (but not all) of the Asian economies to crisis contagion. The commonality of experience among the "MIT" economies (Malaysia, Indonesia, Thailand) may perhaps be understandable in terms both of their direct linkages and the extent to which they are exporting competing products. But South Korea is both far away from Southeast Asia - with minor direct economic linkages - and structurally quite different, having long since graduated from the highly labor-intensive products that still dominate MIT exports. How, then, did Southeast Asia's crisis infect Korea - indeed, how did "bahtulism" apparently mutate into an even more virulent strain by the time it reached Northeast Asia?

As is all too often the case, we find ourselves playing theoretical catchup - trying, after the fact, to develop a framework for thinking about events that have already happened. Yet this is by no means a pointless exercise. For one thing, this crisis is still unfolding at the time of writing, and policy is being made on the fly; any clarity we can bring to the discussion is bound to be helpful. Moreover, while this crisis did not play exactly in the way posited by standard currency crisis models, nonetheless those models were helpful in providing at least a first-pass framework for both understanding and policy formation - and those who knew those models were better forecasters than those who did not. The point is that while any model we may make of the 1997 Asian crisis will surely miss some crucial features of the next crisis to come along, it will still be helpful.

Anyway, enough apologies. The purpose of this paper is to sketch out a framework for understanding the nature of the Asian crisis. (It is an informal version of a more technical companion piece, Krugman 1998). I will argue that in order to make sense of what happened to Asia, it is necessary to adopt an approach quite different from that of traditional currency crisis theory. Of course Asian economies did experience currency crises, and the usual channels of speculation were operative here as always. However,

the currency crises were only part of a broader financial crisis, which had very little to do with currencies or even monetary issues per se. Nor did the crisis have much to do with traditional fiscal issues. Instead, to make sense of what went wrong we need to focus on two issues normally neglected in currency crisis analysis: the role of financial intermediaries (and of the moral hazard associated with such intermediaries when they are poorly regulated), and the prices of real assets such as capital and land.

The paper is in five parts. The first part lays out the basic hypothesis in an informal way. The second part briefly reviews the standard analysis of the problem of moral hazard in financial intermediaries, then shows how it can lead to over-investment at the aggregate level. The third part shifts focus to asset pricing, showing how moral hazard can lead to over-pricing of assets; in the fourth part we then show how, with some plausible assumptions about government behavior, a moral-hazard regime with overpriced assets can become vulnerable to financial crises. A final section asks how reasonable a picture this is of the Asian crisis.

1. Thinking about the Asian crisis

Most international economists, myself included, initially viewed Asia's economic travails through the lens of conventional currency-crisis theory. This theory focuses mainly, sometimes exclusively, on the exchange rate - other asset prices are left in the background. What generates a crisis in this conventional theory? In the canonical "first-generation" crisis models (Krugman 1979; Flood and Garber 1984), a government with persistent money-financed budget deficits was assumed to use a limited stock of reserves to peg its exchange rate; this policy would, of course, ultimately be unsustainable - and the attempts of investors to anticipate the inevitable collapse would generate a speculative attack on the currency when reserves fell to some critical level. In "second-generation" models (Obstfeld 1994, 1995) policy is less mechanical: a government chooses whether or not to defend a pegged exchange rate by making a tradeoff between short-run macroeconomic flexibility and longer-term credibility. The logic of crisis then arises from the fact that defending a parity is more expensive (e.g., requires higher interest rates) if the market believes that defense will ultimately fail; as a result, a speculative attack on a currency can develop either as a result of a predicted future deterioration in fundamentals, or purely through self-fulfilling prophecy.

Despite the usefulness of these models in making sense of many historical crises, however, it has become increasingly clear that they miss important aspects of the unfolding crisis in Asia. Of course, every crisis is different - but the Asian crises seem to have differed from the standard story in several fundamental ways.

First, none of the fundamentals that drive "first-generation" crisis models seems to have been present in any of the afflicted Asian economies. On the eve of crisis all of the governments were more or less in fiscal balance; nor were they engaged in irresponsible credit creation or runaway monetary expansion. Their inflation rates, in particular, were quite low.

Second, although there had been some slowdown in growth in 1996, the Asian victims did not have substantial unemployment when the crisis began. There did not, in other words, seem to be the kind of incentive to abandon the fixed exchange rate to pursue a more expansionary monetary policy that is generally held to be the cause of the 1992 ERM crises in Europe. (And of course the aftermath of devaluation has involved dramatic economic contraction, not expansion).

Third, in all of the afflicted countries there was a boom-bust cycle in the asset markets that *preceded* the currency crisis: stock and land prices soared, then plunged (although after the crisis they plunged even more).

Finally, in all of the countries financial intermediaries seem to have been central players. In Thailand a crucial role was played by so-called "finance companies" - nonbank intermediaries that borrowed short-term money, often in dollars, then lent that money to speculative investors, largely but not only in real estate. In South Korea more conventional banks were involved, but they too borrowed extensively at short term and lent to finance what in retrospect were very speculative investments by highly leveraged corporations.

What all of this suggests is that the Asian crisis is best seen not as a problem brought on by fiscal deficits, as in "first-generation" models, nor as one brought on by macroeconomic temptation, as in "second-generation" models, but as one brought on by financial excess and then financial collapse. Indeed, to a first approximation currencies and exchange rates may have had little to do with it: the Asian story is really about a bubble in and subsequent collapse of asset values in general, with the currency crises more a symptom than a cause of this underlying real (in both senses of the word) malady.

So what would a true account of the Asian crisis look like? Let me propose the following story: The problem began with financial intermediaries - institutions whose liabilities were perceived as having an implicit government guarantee, but were essentially unregulated and therefore subject to severe moral hazard problems. The excessive risky lending of these institutions created inflation - not of goods but of asset prices. The overpricing of assets was sustained in part by a sort of circular process, in which the proliferation of risky lending drove up the prices of risky assets, making the financial condition of the intermediaries seem sounder than it was.

And then the bubble burst. The mechanism of crisis, I suggest, involved that same circular process in reverse: falling asset prices made the insolvency of intermediaries visible, forcing them to cease operations, leading to further asset deflation. This circularity, in turn, can explain both the remarkable severity of the crisis and the apparent vulnerability of the Asian economies to self-fulfilling crisis - which in turn helps us understand the phenomenon of contagion between economies with few visible economic links.

Is this the full story of the Asian crisis? Surely not, and in the last section of this paper I discuss some other possible aspects. But the moral hazard/asset bubble view seems a strong contender for a leading role, and it is certainly worth laying out how it might work.

2. Moral hazard and overinvestment

It has long been known that financial intermediaries whose liabilities are guaranteed by the government pose a serious problem of moral hazard. The U.S. savings and loan debacle is the classic example: because depositors in thrifts were guaranteed by FSLIC, they had no incentive to police the lending of the institutions in which they placed their money; since the owners of thrifts did not need to put much of their own money at risk, they had every incentive to play a game of heads I win, tails the taxpayer loses.

The Asian situation is considerably more murky. In general, creditors of financial institutions did not receive explicit guarantees from the governments. However, press reports do suggest that most of those who provided Thai finance companies, South Korean banks, and so on with funds believed that they would be protected from risk - an impression reinforced by the strong political connections of the owners of most such institutions. In practice, moreover, these beliefs seem to have been for the most part validated by experience (at least at time of writing). For example, depositors in all Thai finance companies were protected; in some cases those who had merely lent them money were not, but these cases were exceptional, so that as a general rule the finance companies did in fact turn out to have guaranteed liabilities. Similarly, while South Korea may have the legal right to declare private bank debts a private issue and let default happen, in practice bank debt was at time of writing well along in the process of being nationalized.

As a first approximation, then, it does not seem too far off to think of Asian economies pre-crisis as having in existence a class of financial intermediaries that, like U.S. thrifts, were able to raise money at safe interest rates but lend that money at premium rates to finance speculative investments.

It is a familiar point that such intermediaries then have an incentive not merely to undertake excessively risky investments, but to pursue investments with low expected returns as long as they have "fat right tails" - that is, the owner of a guaranteed intermediary likes investments that could yield high returns if he gets lucky, even if there is also a strong possibility of heavy losses.

The logic of moral hazard for guaranteed intermediaries can be illustrated with a simple numerical example, suggested by Milgrom and Roberts (1992, 470-476). Table 1 shows the options facing the owner of a financial intermediary who has raised \$100 million from guaranteed creditors. I assume for simplicity that he is not required to put up any capital of his own, and that he can walk away from the institution at no personal cost if it goes bankrupt.

There are assumed to be two alternative investments available. One yields a known present value of \$107 million; the other will yield \$120 million if conditions are favorable, but only \$80 million if they are not. I also suppose that the "good state" and the "bad state" are equally likely, so that the expected returns on this risky investment are \$100 million.

Clearly, even a risk-neutral investor should prefer the safe asset in this case. However, the owner of the financial intermediary knows that while he can capture the excess returns in the good state, he can walk away from the losses in the bad state. So if he chooses the safe investment he gains a sure 7; but if he chooses the risky investment he gains 20 in the good state, loses nothing in the bad state, for an expected gain of 10. Thus his incentive is to choose the risky investment, *even though it has a lower expected return*. And this distortion of investment decisions produces a deadweight social loss: the expected net return on the invested capital falls from \$7 million to zero.

This story about how moral hazard distorts investment is, as already indicated, familiar. It is perhaps a less familiar proposition that over-guaranteed and under-regulated intermediaries can lead to excessive investment by the economy as a whole (although this point has been emphasized by McKinnon and Pill (1996)).

To see why, consider a simple two-period economy. In the first period firms purchase capital; in the second they produce using that capital. For the sake of simplicity let me assume that the production function has a quadratic form,

$$Q = (A+u)K - BK^2$$

where u is a random variable, introducing some uncertainty into the investment decision. Let me also for simplicity assume that this is a small open economy, able to borrow at a fixed world interest rate - and that the real interest rate is zero. (It is possible to redefine units so as to make this true in any case).

We know that in this economy capital will earn its marginal product - that is, the rental per unit of capital will be

$$R = A+u - 2BK$$

In the absence of any distortion capital will be invested up to the point where the expected return equals the cost of funds, which we have defined to equal 1; so in an undistorted economy we will have

$$K = (A+Eu)/2B$$

Now let us introduce guaranteed financial intermediaries. As in the example in Table 1, I suppose that these intermediaries embody a very stark form of moral hazard: their

liabilities are guaranteed, but their owners need not put up any capital, and can simply walk away if their institutions fail. Let me also make two further assumptions. First, I assume that there are many actual or potential intermediaries, so that they will compete away any economic profits. Second, I will simplify matters by assuming that intermediaries can directly own capital. In reality, even in Asia banks and bank-like institutions generally lend money rather than buying capital assets outright. However, lending to a very highly leveraged firm engaged in risky investment - especially a firm that is part of an industrial group that has effectively established a controlling interest in the lending institution (see Amsden 1989) - is de facto very much like buying the capital directly.

How would such intermediaries behave? From their point of view, any rate of return on capital in excess of the world safe rate of interest - that is, any $R > I$ - represents a pure profit. Thus there will be pure profits as long as there is *any* state of the world - any realization of u - in which $R > I$. But given our assumption of competition among potential intermediaries any such pure profit will be competed away. The only way this can happen is if:

- All capital ends up being purchased by guaranteed intermediaries. This is an extreme result, but it does capture the tendency of Asian businesses to become extremely leveraged by Western standards.
- Investment is pushed up to the point where $R = I$ in the *most favorable possible circumstance* - that is, given the maximum possible value of u . Again, this is an extreme result, but it does capture the obvious tendency of Asian firms toward over-optimistic investment.

Let me introduce a term for the kind of investment behavior predicted by a model with competition among intermediaries subject to extreme moral hazard. In economic models we normally think of investors as responding to *expected* values of the relevant variables. In the sort of model I am proposing, however, the owners of intermediaries will instead focus on what we might call *Pangloss values*: the values that variables would take on if it turns out that we live in what is (from their point of view) the best of all possible worlds.

So suppose, for example, that $A = 2$, $B = 0.5$, and u has an equal probability of equalling 0 or 1. The undistorted level of investment would set $K = 2.5$. However, if there are moral-hazard-prone financial intermediaries, they will drive out equity investment and push up the capital stock to 3. This excessive investment will lower expected welfare, because the increased return in the favorable state will not offset the increased losses in the unfavorable state.

It may also be worth noting that this is the sort of distortion whose consequences can easily be made worse by globalization. Suppose that this country did *not* have access to the world capital market - suppose, for example, that it had to rely on a fixed supply of domestic savings, unresponsive to the interest rate. Then the excessive investment

demand generated by the intermediaries would not in fact lead to excessive investment - all that it would do is drive up the interest rate. Offering such an economy access to the world capital market might then, in classic "second-best" fashion, actually make the economy worse off by allowing moral hazard in the financial sector to translate into real excess capital accumulation.

3. Asset prices

In the example above, I implicitly assumed that the supply of capital goods was perfectly elastic, so that all of the increase in investment demand due to financial excess translated into an increase in the actual volume of investment. In fact, of course, Asian economies experienced a noticeable boom-bust cycle not only in investment but also or even especially in asset prices. Presumably this reflected the fact that assets were in imperfectly elastic supply. So let us now go to the other extreme and consider a model in which the supply of assets is completely inelastic, and in which intermediaries therefore have their impact not on quantities but on prices.

The easiest way to do this is to imagine that the only available asset is land, which cannot be either created or destroyed. Again, let us initially consider a two-period model. In the first period investors bid for land, setting its price. In the second period they receive rents, which are uncertain at the time of bidding.

A numerical example is sufficient to make the point here. Suppose that the rent on a unit of land could be either 25, with a probability of $2/3$, or 100, with a probability of $1/3$. Risk-neutral investors would then be willing to spend $(2/3)H25 + (1/3)H100 = 50$ for the rights to that land.

But now suppose that there are financial intermediaries, once again able to borrow at the world interest rate (again normalized to zero) because they are perceived as being guaranteed. And also as before, we assume that owners need not put any of their own money at risk, but that competition among the intermediaries eliminates any expected economic profit.

The result is obvious: intermediaries will be willing to bid on the land, based not on the expected value of future rent but on the *Pangloss value* - in this case 100. So all land will end up owned by intermediaries, and the price of land will be double what it would be in an undistorted economy.

Does the one-shot nature of this game affect the results? At first it might seem that it does not. Suppose that we turn from a two-period to a three-period economy, again with random land rents of 25 and 100 with probabilities $2/3$ and $1/3$ in both the second and third periods. And let us continue to assume a zero interest rate (which is now more than a mere normalization, but still makes no essential difference to the results). In an undistorted economy we can solve backwards for the price. The expected rent in period 3, and therefore the price of land purchased at the end of period 2, is 50. The expected return on land purchased in period 1 is therefore the expected rent in period 2 (50) plus

the expected price at which it can be sold (also 50), for a first-period price of 100. This is also, of course, the total expected rent over the two periods. (In this example, the price of land declines over time, from 100 to 50, even in the undistorted case. This is merely an artifact of the finite horizon and should simply be regarded as a baseline).

Now suppose that intermediaries are in a position to borrow with guarantees. Again working backward, at the end of period 2 they will be willing to pay the Pangloss value of third-period rent, 100. In period 1 they will be willing to pay the most they could hope to realize off a piece of land: the Pangloss rent in period 2, plus the Pangloss price of land at the end of that period. So the price of land with intermediation will be 200 in period 1 - again, twice the undistorted price.

It seems, then, that the multi-period version of the model, in which part of the return to investment depends on the future prices of assets, makes no real difference to the distortion of those prices imposed by guaranteed intermediaries. However, this result changes in a dramatic way once we allow for the possibility of changes in the financial regime - that is, if we believe that moral hazard may be a sometime thing.

4. Disintermediation and crises

Let us continue to focus on our three-period economy, with random rents on land in periods 2 and 3. And let us also continue to assume that in the first period competition among intermediaries with guaranteed liabilities causes asset prices to be determined by Pangloss rather than expected returns. However, let us now introduce the possibility that this regime may not last - that liabilities carried over from period 2 to period 3 might *not* be guaranteed.

As a first step, let us simply posit that the regime change is exogenous - that from the point of view of investors there is simply some probability p that the government will credibly announce during period 2 that henceforth creditors of intermediaries are on their own. (Perhaps this reflects the election of a reformist government that is no longer prepared to tolerate "crony capitalism"; or perhaps the end of moral hazard is imposed by the International Monetary Fund).

Again, we work backward, and consider the price of land in the second period. If liabilities of intermediaries are not guaranteed, then nobody will lend to them (the moral hazard will remain, but its burden would now fall on investors rather than on the government). So intermediation will collapse, and the price of land will reflect only its expected return of 50. On the other hand, if intermediaries are guaranteed, the price will still be 100.

What about the price of land in the first period? Investors now face two sources of uncertainty: they do not know whether the rent in the second period will be high or low, and they do not know whether the price of land in the second period will reflect expected values or Pangloss values. However, as long as there is competition among intermediaries in the first period, the price of land will once again be driven to a level

that reflects the most favorable possible outcome: rents of 100 and a price of 100. So even though this is now a multi-period world in which everyone knows that disintermediation and a decline in asset prices is possible, current asset prices are still set as if that possibility does not exist!

Now let us get to the really interesting part: examining what happens when the change in regime is endogenous.

In reality, of course, throughout Asia's arc of crisis there has indeed been a major change in financial regime. Finance companies have been closed, banks forced to curtail risky lending at best and close their doors at worst; even if the IMF were not insisting on financial housecleaning as a condition for aid, the days of cheerful implicit guarantees and easy lending for risky investment are clearly over for some time to come. But what provoked this change of regime? Not an exogenous change in economic philosophy: financial intermediaries have been curtailed *precisely because they were seen to have lost a lot of money*.

This suggests that a more or less realistic way to model the determination of implicit guarantees is to suppose that they are available only until they have had to be honored (or more generally until honoring them has turned out to be sufficiently expensive - the criterion used in Krugman 1998). In the context of our three-period example, this criterion can be stated alternatively as the proposition that creditors of financial intermediaries will be bailed out precisely once.

To see what this means, first suppose that in period 2 rents are disappointing - 25, not 100. Given the structure of our model, in the absence of intermediaries this should have no effect on the price of land at the end of the second period, since it does not change the probability distribution of future rents. But a less-than-Panglossian rent in period 2 means that creditors of intermediaries need to be bailed out in that period, and therefore that future creditors can no longer expect the same. So the intermediaries collapse, and the price of land drops from 100 to the expected rent 50.

Notice that this means that there is a magnification effect on the losses of the intermediaries established in the first period. The "real" news about the economy is that rents in period 2 were 25, not the hoped-for 100. But land bought for 200 will now yield only 25 in rents plus 50 in resale value, a loss of 125 rather than merely 75. The magnification effect is caused, of course, by the circular logic of disintermediation: the prospective end to intermediation, driven by the losses of the existing institutions, reduces asset prices and therefore magnifies those losses.

And now we come to the possibility of multiple equilibria. Suppose that in fact intermediaries have been lucky, and that second-period rents do turn out to be 100. Now if everyone then expects that the government will continue to guarantee intermediaries in the future, the land price at the end of the second period will also be 100. In that case no bailout will be needed; and so the government guarantee for intermediation will in fact continue.

But on the other hand, suppose that despite the high rents in the second period potential creditors become convinced that there will be no guarantee on newly incurred liabilities of intermediaries. Then they will not be able to attract funds, and the price of land in the

second period will be only 50. That means, however, that intermediaries that borrowed money in the first period based on Pangloss values, including the Pangloss value of 100 for land sales, will require a bailout - and since the government's willingness to provide for bailouts is now exhausted, investors' pessimism is justified.

In short, our stylized little model appears to generate a story about self-fulfilling financial crises, in which plunging asset prices undermine banks, and the collapse of the banks in turn ratifies the drop in asset prices.

We now have the necessary elements in hand to tell a story about the Asian crisis. Recall from section 1 of this paper that the crises have seemed baffling because of :

- The absence of the usual sources of currency stress, whether in the form of fiscal deficits or macroeconomic difficulties;
- The pronounced boom-bust cycle in asset prices prior to the currency crisis;
- The severity of the crisis given a lack of strong adverse shocks, and the spread of the initial crisis to countries that seemed to have few economic links with the initial victims.

We now have an admittedly primitive but still illuminating way to make sense of these paradoxes. The reason that traditional measures of vulnerability did not signal a crisis is that the problem was off the government's balance sheet: the underlying policy mistake was, like the guarantees that created the S&L fiasco, not part of the government's visible liabilities until after the fact. The boom-bust cycle created by financial excess preceded the currency crises because the financial crisis was the real driver of the whole process, with the currency fluctuations more a symptom than a cause. And the ability of the crisis to spread without big exogenous shocks or strong economic linkages can be explained by the fact that the afflicted Asian economies were in a sort of "metastable" state in any case - highly vulnerable to self-fulfilling pessimism, which could and did generate a downward spiral of asset deflation and disintermediation.

It is all very neat, and therefore surely too neat. In the final section of this paper, then, let us state some qualifications to the story.

5. Questions and qualifications

Any attempt to develop a simple model of a complex economic issue raises the question of what has been left out. I am aware of five main issues whose absence from the model bothers my reality sense.

First, the model assumes that financial intermediation serves no useful purpose, that it is a pure rent-seeking device. This assumption helps focus on the problem of moral hazard, but may miss an important aspect of financial crises. Mishkin (1992) has argued

forcefully that financial crises have such severe effects on growth precisely because they disrupt the productive activities of financial intermediaries.

Second, the one-sector, one-asset nature of the model abstracts from an important aspect of moral hazard, recognized only in my first example: the bias in the *type* of investment undertaken. (Indeed, standard discussions of moral hazard in lending focus on the type, not the quantity). In practice at least some of the Asian crisis was associated with unwise investments (office towers, auto plants) rather than with excessive investment per se.

Third, a striking feature of the actual experience has been large changes in relative prices. Even if monetary factors are not really crucial, the huge *real* depreciations that have been associated with the crises in Asian countries are probably an important aspect of the story; among other things, they probably play a crucial role in explaining why the financial crises produce such large declines in output.

Fourth, this model makes an extreme assumption for analytical simplicity: intermediaries do not invest any capital of their own, nor (because of free entry) do they have any "franchise value". This produces the extremely useful simplifying result that the intermediaries care only about Pangloss values, allowing us to bypass what might otherwise be a complex analysis of option values. The price of this simplification is that the model predicts that intermediaries will "almost always" require a bailout, since competition pushes them to the point where they do not earn economic profits in any state of the world, and cover their costs only in the most favorable possible state. An obvious next step is to bite the bullet and try to model moral hazard when the owners of intermediaries do have something to lose.

Finally, it is clearly wrong to blame all of the overinvestment and overvaluation of assets in Asia on domestic financial intermediaries. After all, private individuals - and foreign institutional investors - did buy stocks and even real estate in all the economies now in crisis. This suggests that other kinds of market failure, notably "herding" by investors, still have some explanatory role to play.

This model, then, is only a preliminary effort. Nonetheless, it does tell a story that seems to bear some resemblance both to the runup to the Asian crisis and to the mechanics of that crisis when it took place. If this story is right in its essentials, those of us who have been trying to make sense of that crisis in terms of conventional currency-crisis models have been on the wrong track: the Asian crisis may have been only incidentally about currencies. Instead, it was mainly about bad banking and its consequences.

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Table 1: Moral hazard and investment decisions

	Safe investment-----	Risky investment
Return in good state -----	107 -----	120
Return in bad state -----	107 -----	80
Expected return -----	107 -----	100
Expected return to owner -----	7-----	10