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Triple-A Failure

By ROGER LOWENSTEIN

The Ratings Game

In 1996, Thomas Friedman, the New York Times columnist, remarked on “The NewsHour With [Jim Lehrer](#)” that there were two superpowers in the world — the United States and [Moody's](#) bond-rating service — and it was sometimes unclear which was more powerful. Moody's was then a private company that rated corporate bonds, but it was, already, spreading its wings into the exotic business of rating securities backed by pools of residential mortgages.

Obscure and dry-seeming as it was, this business offered a certain magic. The magic consisted of turning risky mortgages into investments that would be suitable for investors who would know nothing about the underlying loans. To get why this is impressive, you have to think about all that determines whether a mortgage is safe. Who owns the property? What is his or her income? Bundle hundreds of mortgages into a single security and the questions multiply; no investor could begin to answer them. But suppose the security had a rating. If it were rated triple-A by a firm like Moody's, then the investor could forget about the underlying mortgages. He wouldn't need to know what properties were in the pool, only that the pool was triple-A — it was just as safe, in theory, as other triple-A securities.

Over the last decade, Moody's and its two principal competitors, Standard & Poor's and Fitch, played this game to perfection — putting what amounted to gold seals on mortgage securities that investors swept up with increasing élan. For the rating agencies, this business was extremely lucrative. Their profits surged, Moody's in particular: it went public, saw its stock increase sixfold and its earnings grow by 900 percent.

By providing the mortgage industry with an entree to Wall Street, the agencies also transformed what had been among the sleepest corners of finance. No longer did mortgage banks have to wait 10 or 20 or 30 years to get their money back from homeowners. Now they sold their loans into securitized pools and — their capital thus replenished — wrote new loans at a much quicker pace.

Mortgage volume surged; in 2006, it topped \$2.5 trillion. Also, many more mortgages were issued to risky subprime borrowers. Almost all of those subprime loans ended up in securitized pools; indeed, the reason banks were willing to issue so many risky loans is that they could fob them off on Wall Street.

But who was evaluating these securities? Who was passing judgment on the quality of the mortgages, on the equity behind them and on myriad other investment considerations? Certainly not the investors. They relied on a credit rating.

Thus the agencies became the de facto watchdog over the mortgage industry. In a practical sense, it was Moody's and Standard & Poor's that set the credit standards that determined which loans Wall Street could repackage and,

ultimately, which borrowers would qualify. Effectively, they did the job that was expected of banks and government regulators. And today, they are a central culprit in the mortgage bust, in which the total loss has been projected at \$250 billion and possibly much more.

In the wake of the housing collapse, Congress is exploring why the industry failed and whether it should be revamped (hearings in the Senate Banking Committee were expected to begin April 22). Two key questions are whether the credit agencies — which benefit from a unique series of government charters — enjoy too much official protection and whether their judgment was tainted. Presumably to forestall criticism and possible legislation, Moody's and S.&P. have announced reforms. But they reject the notion that they should have been more vigilant. Instead, they lay the blame on the mortgage holders who turned out to be deadbeats, many of whom lied to obtain their loans.

[Arthur Levitt](#), the former chairman of the Securities and Exchange Commission, charges that “the credit-rating agencies suffer from a conflict of interest — perceived and apparent — that may have distorted their judgment, especially when it came to complex structured financial products.” Frank Partnoy, a professor at the University of San Diego School of Law who has written extensively about the credit-rating industry, says that the conflict is a serious problem. Thanks to the industry's close relationship with the banks whose securities it rates, Partnoy says, the agencies have behaved less like gatekeepers than gate openers. Last year, Moody's had to downgrade more than 5,000 mortgage securities — a tacit acknowledgment that the mortgage bubble was abetted by its overly generous ratings. Mortgage securities rated by Standard & Poor's and Fitch have suffered a similar wave of downgrades.

Presto! How 2,393 Subprime Loans Become a High-Grade Investment

The business of assigning a rating to a mortgage security is a complicated affair, and Moody's recently was willing to walk me through an actual mortgage-backed security step by step. I was led down a carpeted hallway to a well-appointed conference room to meet with three specialists in mortgage-backed paper. Moody's was fair-minded in choosing an example; the case they showed me, which they masked with the name “Subprime XYZ,” was a pool of 2,393 mortgages with a total face value of \$430 million.

Subprime XYZ typified the exuberance of the age. All the mortgages in the pool were subprime — that is, they had been extended to borrowers with checkered credit histories. In an earlier era, such people would have been restricted from borrowing more than 75 percent or so of the value of their homes, but during the great bubble, no such limits applied.

Moody's did not have access to the individual loan files, much less did it communicate with the borrowers or try to verify the information they provided in their loan applications. “We aren't loan officers,” Claire Robinson, a 20-year veteran who is in charge of asset-backed finance for Moody's, told me. “Our expertise is as statisticians on an aggregate basis. We want to know, of 1,000 individuals, based on historical performance, what percent will pay their loans?”

The loans in Subprime XYZ were issued in early spring 2006 — what would turn out to be the peak of the boom. They were originated by a West Coast company that Moody's identified as a “nonbank lender.” Traditionally, people have gotten their mortgages from banks, but in recent years, new types of lenders peddling sexier products grabbed an increasing share of the market. This particular lender took the loans it made to a New York investment bank; the bank designed an investment vehicle and brought the package to Moody's.

Moody's assigned an analyst to evaluate the package, subject to review by a committee. The investment bank provided an enormous spreadsheet chock with data on the borrowers' credit histories and much else that might, at very least, have given Moody's pause. Three-quarters of the borrowers had adjustable-rate mortgages, or ARMs — “teaser” loans on which the interest rate could be raised in short order. Since subprime borrowers cannot afford higher rates, they would need to refinance soon. This is a classic sign of a bubble — lending on the belief, or the hope, that new money will bail out the old.

Moody's learned that almost half of these borrowers — 43 percent — did not provide written verification of their incomes. The data also showed that 12 percent of the mortgages were for properties in Southern California, including a half-percent in a single ZIP code, in Riverside. That suggested a risky degree of concentration.

On the plus side, Moody's noted, 94 percent of those borrowers with adjustable-rate loans said their mortgages were for primary residences. “That was a comfort feeling,” Robinson said. Historically, people have been slow to abandon their primary homes. When you get into a crunch, she added, “You'll give up your ski chalet first.”

Another factor giving Moody's comfort was that all of the ARM loans in the pool were first mortgages (as distinct from, say, home-equity loans). Nearly half of the borrowers, however, took out a simultaneous second loan. Most often, their two loans added up to all of their property's presumed resale value, which meant the borrowers had not a cent of equity.

In the frenetic, deal-happy climate of 2006, the Moody's analyst had only a single day to process the credit data from the bank. The analyst wasn't evaluating the mortgages but, rather, the bonds issued by the investment vehicle created to house them. A so-called special-purpose vehicle — a ghost corporation with no people or furniture and no assets either until the deal was struck — would purchase the mortgages. Thereafter, monthly payments from the homeowners would go to the S.P.V. The S.P.V. would finance itself by selling bonds. The question for Moody's was whether the inflow of mortgage checks would cover the outgoing payments to bondholders. From the investment bank's point of view, the key to the deal was obtaining a triple-A rating — without which the deal wouldn't be profitable. That a vehicle backed by subprime mortgages could borrow at triple-A rates seems like a trick of finance. “People say, ‘How can you create triple-A out of B-rated paper?’ ” notes Arturo Cifuentes, a former Moody's credit analyst who now designs credit instruments. It may seem like a scam, but it's not.

The secret sauce is that the S.P.V. would float 12 classes of bonds, from triple-A to a lowly Ba1. The highest-rated bonds would have first priority on the cash received from mortgage holders until they were fully paid, then the next tier of bonds, then the next and so on. The bonds at the bottom of the pile got the highest interest rate, but if homeowners defaulted, they would absorb the first losses.

It was this segregation of payments that protected the bonds at the top of the structure and enabled Moody's to classify them as triple-A. Imagine a seaside condo beset by flooding: just as the penthouse will not get wet until the lower floors are thoroughly soaked, so the triple-A bonds would not lose a dime unless the lower credits were wiped out.

Structured finance, of which this deal is typical, is both clever and useful; in the housing industry it has greatly expanded the pool of credit. But in extreme conditions, it can fail. The old-fashioned corner banker used his instincts, as well as his pencil, to apportion credit; modern finance is formulaic. However elegant its models, forecasting the behavior of 2,393 mortgage holders is an uncertain business. “Everyone assumed the credit agencies

knew what they were doing,” says Joseph Mason, a credit expert at Drexel University. “A structural engineer can predict what load a steel support will bear; in financial engineering we can’t predict as well.”

Mortgage-backed securities like those in Subprime XYZ were not the terminus of the great mortgage machine. They were, in fact, building blocks for even more esoteric vehicles known as collateralized debt obligations, or C.D.O.’s. C.D.O.’s were financed with similar ladders of bonds, from triple-A on down, and the credit-rating agencies’ role was just as central. The difference is that XYZ was a first-order derivative — its assets included real mortgages owned by actual homeowners. C.D.O.’s were a step removed — instead of buying mortgages, they bought bonds that were *backed* by mortgages, like the bonds issued by Subprime XYZ. (It is painful to consider, but there were also third-order instruments, known as C.D.O.’s squared, which bought bonds issued by other C.D.O.’s.)

Miscalculations that were damaging at the level of Subprime XYZ were devastating at the C.D.O. level. Just as bad weather will cause more serious delays to travelers with multiple flights, so, if the underlying mortgage bonds were misrated, the trouble was compounded in the case of the C.D.O.’s that purchased them.

Moody’s used statistical models to assess C.D.O.’s; it relied on historical patterns of default. This assumed that the past would remain relevant in an era in which the mortgage industry was morphing into a wildly speculative business. The complexity of C.D.O.’s undermined the process as well. [Jamie Dimon](#), the chief executive of [JPMorgan Chase](#), which recently scooped up the mortally wounded [Bear Stearns](#), says, “There was a large failure of common sense” by rating agencies and also by banks like his. “Very complex securities shouldn’t have been rated as if they were easy-to-value bonds.”

The Accidental Watchdog

John Moody, a Wall Street analyst and former errand runner, hit on the idea of synthesizing all kinds of credit information into a single rating in 1909, when he published the manual “Moody’s Analyses of Railroad Investments.” The idea caught on with investors, who subscribed to his service, and by the mid-’20s, Moody’s faced three competitors: Standard Statistics and Poor’s Publishing (which later merged) and Fitch.

Then as now, Moody’s graded bonds on a scale with 21 steps, from Aaa to C. (There are small differences in the agencies’ nomenclatures, just as a grande latte at [Starbucks](#) becomes a “medium” at Peet’s. At Moody’s, ratings that start with the letter “A” carry minimal to low credit risk; those starting with “B” carry moderate to high risk; and “C” ratings denote bonds in poor standing or actual default.) The ratings are meant to be an estimate of probabilities, not a buy or sell recommendation. For instance, Ba bonds default far more often than triple-As. But Moody’s, as it is wont to remind people, is not in the business of advising investors whether to buy Ba’s; it merely publishes a rating.

Until the 1970s, its business grew slowly. But several trends coalesced to speed it up. The first was the collapse of Penn Central in 1970 — a shattering event that the credit agencies failed to foresee. It so unnerved investors that they began to pay more attention to credit risk.

Government responded. The Securities and Exchange Commission, faced with the question of how to measure the capital of broker-dealers, decided to penalize brokers for holding bonds that were less than investment-grade (the term applies to Moody’s 10 top grades). This prompted a question: investment grade according to whom? The S.E.C. opted to create a new category of officially designated rating agencies, and grandfathered the big three — S.&P., Moody’s and Fitch. In effect, the government outsourced its regulatory function to three for-profit companies.

Bank regulators issued similar rules for banks. Pension funds, mutual funds, insurance regulators followed. Over the '80s and '90s, a latticework of such rules redefined credit markets. Many classes of investors were now forbidden to buy noninvestment-grade bonds at all.

Issuers thus were forced to seek credit ratings (or else their bonds would not be marketable). The agencies — realizing they had a hot product and, what's more, a captive market — started charging the very organizations whose bonds they were rating. This was an efficient way to do business, but it put the agencies in a conflicted position. As Partnoy says, rather than selling opinions to investors, the rating agencies were now selling “licenses” to borrowers. Indeed, whether their opinions were accurate no longer mattered so much. Just as a police officer stopping a motorist will want to see his license but not inquire how well he did on his road test, it was the rating — not its accuracy — that mattered to Wall Street.

The case of Enron is illustrative. Throughout the summer and fall of 2001, even though its credit was rapidly deteriorating, the rating agencies kept it at investment grade. This was not unusual; the agencies typically lag behind the news. On Nov. 28, 2001, S.&P. finally dropped Enron's bonds to subinvestment grade. Although its action merely validated the market consensus, it caused the stock to collapse. To investors, S.&P.'s action was a signal that Enron was locked out of credit markets; it had lost its “license” to borrow. Four days later it filed for bankruptcy.

Another trend that spurred the agencies' growth was that more companies began borrowing in bond markets instead of from banks. According to Chris Mahoney, a just-retired Moody's veteran of 22 years, “The agencies went from being obscure and unimportant players to central ones.”

A Conflict of Interest?

Nothing sent the agencies into high gear as much as the development of structured finance. As Wall Street bankers designed ever more securitized products — using mortgages, credit-card debt, car loans, corporate debt, every type of paper imaginable — the agencies became truly powerful.

In structured-credit vehicles like Subprime XYZ, the agencies played a much more pivotal role than they had with (conventional) bonds. According to Lewis Ranieri, the Salomon Brothers banker who was a pioneer in mortgage bonds, “The whole creation of mortgage securities was involved with a rating.”

What the bankers in these deals are really doing is buying a bunch of I.O.U.'s and repackaging them in a different form. Something has to make the package worth — or seem to be worth — more than the sum of its parts, otherwise there would be no point in packaging such securities, nor would there be any profits from which to pay the bankers' fees.

That something is the rating. Credit markets are not continuous; a bond that qualifies, though only by a hair, as investment grade is worth a lot more than one that just fails. As with a would-be immigrant traveling from Mexico, there is a huge incentive to get over the line.

The challenge to investment banks is to design securities that just meet the rating agencies' tests. Risky mortgages serve their purpose; since the interest rate on them is higher, more money comes into the pool and is available for paying bond interest. But if the mortgages are too risky, Moody's will object. Banks are adroit at working the system, and pools like Subprime XYZ are intentionally designed to include a layer of Baa bonds, or those just over

the border. "Every agency has a model available to bankers that allows them to run the numbers until they get something they like and send it in for a rating," a former Moody's expert in securitization says. In other words, banks were gaming the system; according to Chris Flanagan, the subprime analyst at JPMorgan, "Gaming is the whole thing."

When a bank proposes a rating structure on a pool of debt, the rating agency will insist on a cushion of extra capital, known as an "enhancement." The bank inevitably lobbies for a thin cushion (the thinner the capitalization, the fatter the bank's profits). It's up to the agency to make sure that the cushion is big enough to safeguard the bonds. The process involves extended consultations between the agency and its client. In short, obtaining a rating is a collaborative process.

The evidence on whether rating agencies bend to the bankers' will is mixed. The agencies do not deny that a conflict exists, but they assert that they are keen to the dangers and minimize them. For instance, they do not reward analysts on the basis of whether they approve deals. No smoking gun, no conspiratorial e-mail message, has surfaced to suggest that they are lying. But in structured finance, the agencies face pressures that did not exist when John Moody was rating railroads. On the traditional side of the business, Moody's has thousands of clients (virtually every corporation and municipality that sells bonds). No one of them has much clout. But in structured finance, a handful of banks return again and again, paying much bigger fees. A deal the size of XYZ can bring Moody's \$200,000 and more for complicated deals. And the banks pay only if Moody's delivers the desired rating. Tom McGuire, the Jesuit theologian who ran Moody's through the mid-'90s, says this arrangement is unhealthy. If Moody's and a client bank don't see eye to eye, the bank can either tweak the numbers or try its luck with a competitor like S.&P., a process known as "ratings shopping."

And it seems to have helped the banks get better ratings. Mason, of Drexel University, compared default rates for corporate bonds rated Baa with those of similarly rated collateralized debt obligations until 2005 (before the bubble burst). Mason found that the C.D.O.'s defaulted eight times as often. One interpretation of the data is that Moody's was far less discerning when the client was a Wall Street securitizer.

After Enron blew up, Congress ordered the S.E.C. to look at the rating industry and possibly reform it. The S.E.C. ducked. Congress looked again in 2006 and enacted a law making it easier for competing agencies to gain official recognition, but didn't change the industry's business model. By then, the mortgage boom was in high gear. From 2002 to 2006, Moody's profits nearly tripled, mostly thanks to the high margins the agencies charged in structured finance. In 2006, Moody's reported net income of \$750 million. Raymond W. McDaniel Jr., its chief executive, gloated in the annual report for that year, "I firmly believe that Moody's business stands on the 'right side of history' in terms of the alignment of our role and function with advancements in global capital markets."

Using Weather in Antarctica To Forecast Conditions in Hawaii

Even as McDaniel was crowing, it was clear in some corners of Wall Street that the mortgage market was headed for trouble. The housing industry was cooling off fast. James Kragenbring, a money manager with Advantus Capital Management, complained to the agencies as early as 2005 that their ratings were too generous. A report from the hedge fund of [John Paulson](#) proclaimed astonishment at "the mispricing of these securities." He started betting that mortgage debt would crash.

Even Mark Zandi, the very visible economist at Moody's forecasting division (which is separate from the ratings

side), was worried about the chilling crosswinds blowing in credit markets. In a report published in May 2006, he noted that consumer borrowing had soared, household debt was at a record and a fifth of such debt was classified as subprime. At the same time, loan officers were loosening underwriting standards and easing rates to offer still more loans. Zandi fretted about the “razor-thin” level of homeowners’ equity, the avalanche of teaser mortgages and the \$750 billion of mortgages he judged to be at risk. Zandi concluded, “The environment feels increasingly ripe for some type of financial event.”

A month after Zandi’s report, Moody’s rated Subprime XYZ. The analyst on the deal also had concerns. Moody’s was aware that mortgage standards had been deteriorating, and it had been demanding more of a cushion in such pools. Nonetheless, its credit-rating model continued to envision rising home values. Largely for that reason, the analyst forecast losses for XYZ at only 4.9 percent of the underlying mortgage pool. Since even the lowest-rated bonds in XYZ would be covered up to a loss level of 7.25 percent, the bonds seemed safe.

XYZ now became the responsibility of a Moody’s team that monitors securities and changes the ratings if need be (the analyst moved on to rate a new deal). Almost immediately, the team noticed a problem. Usually, people who finance a home stay current on their payments for at least a while. But a sliver of folks in XYZ fell behind within 90 days of signing their papers. After six months, an alarming 6 percent of the mortgages were seriously delinquent. (Historically, it is rare for more than 1 percent of mortgages at that stage to be delinquent.)

Moody’s monitors began to make inquiries with the lender and were shocked by what they heard. Some properties lacked sod or landscaping, and keys remained in the mailbox; the buyers had never moved in. The implication was that people had bought homes on spec: as the housing market turned, the buyers walked.

By the spring of 2007, 13 percent of Subprime XYZ was delinquent — and it was worsening by the month. XYZ was hardly atypical; the entire class of 2006 was performing terribly. (The class of 2007 would turn out to be even worse.)

In April 2007, Moody’s announced it was revising the model it used to evaluate subprime mortgages. It noted that the model “was first introduced in 2002. Since then, the mortgage market has evolved considerably.” This was a rather stunning admission; its model had been based on a world that no longer existed.

Poring over the data, Moody’s discovered that the size of people’s first mortgages was no longer a good predictor of whether they would default; rather, it was the size of their first and second loans — that is, their total debt — combined. This was rather intuitive; Moody’s simply hadn’t reckoned on it. Similarly, credit scores, long a mainstay of its analyses, had not proved to be a “strong predictor” of defaults this time. Translation: even people with good credit scores were defaulting. Amy Tobey, leader of the team that monitored XYZ, told me, “It seems there was a shift in mentality; people are treating homes as investment assets.” Indeed. And homeowners without equity were making what economists call a rational choice; they were abandoning properties rather than make payments on them. Homeowners’ equity had never been as high as believed because appraisals had been inflated.

Over the summer and fall of 2007, Moody’s and the other agencies repeatedly tightened their methodology for rating mortgage securities, but it was too late. They had to downgrade tens of billions of dollars of securities. By early this year, when I met with Moody’s, an astonishing 27 percent of the mortgage holders in Subprime XYZ were delinquent. Losses on the pool were now estimated at 14 percent to 16 percent — three times the original estimate. Seemingly high-quality bonds rated A3 by Moody’s had been downgraded five notches to Ba2, as had the other

bonds in the pool aside from its triple-A's.

The pain didn't stop there. Many of the lower-rated bonds issued by XYZ, and by mortgage pools like it, were purchased by C.D.O.'s, the second-order mortgage vehicles, which were eager to buy lower-rated mortgage paper because it paid a higher yield. As the agencies endowed C.D.O. securities with triple-A ratings, demand for them was red hot. Much of it was from global investors who knew nothing about the U.S. mortgage market. In 2006 and 2007, the banks created more than \$200 billion of C.D.O.'s backed by lower-rated mortgage paper. Moody's assigned a different team to rate C.D.O.'s. This team knew far less about the underlying mortgages than did the committee that evaluated Subprime XYZ. In fact, Moody's rated C.D.O.'s without knowing which bonds the pool would buy.

A C.D.O. operates like a mutual fund; it can buy or sell mortgage bonds and frequently does so. Thus, the agencies rate pools with assets that are perpetually shifting. They base their ratings on an extensive set of guidelines or covenants that limit the C.D.O. manager's discretion.

Late in 2006, Moody's rated a C.D.O. with \$750 million worth of securities. The covenants, which act as a template, restricted the C.D.O. to, at most, an 80 percent exposure to subprime assets, and many other such conditions. "We're structure experts," Yuri Yoshizawa, the head of Moody's' derivative group, explained. "We're not underlying-asset experts." They were checking the math, not the mortgages. But no C.D.O. can be better than its collateral.

Moody's rated three-quarters of this C.D.O.'s bonds triple-A. The ratings were derived using a mathematical construct known as a Monte Carlo simulation — as if each of the underlying bonds would perform like cards drawn at random from a deck of mortgage bonds in the past. There were two problems with this approach. First, the bonds weren't like those in the past; the mortgage market had changed. As Mark Adelson, a former managing director in Moody's structured-finance division, remarks, it was "like observing 100 years of weather in Antarctica to forecast the weather in Hawaii." And second, the bonds weren't random. Moody's had underestimated the extent to which underwriting standards had weakened everywhere. When one mortgage bond failed, the odds were that others would, too.

Moody's estimated that this C.D.O. could potentially incur losses of 2 percent. It has since revised its estimate to 27 percent. The bonds it rated have been decimated, their market value having plunged by half or more. A triple-A layer of bonds has been downgraded 16 notches, all the way to B. Hundreds of C.D.O.'s have suffered similar fates (most of Wall Street's losses have been on C.D.O.'s). For Moody's and the other rating agencies, it has been an extraordinary rout.

Whom Can We Rely On?

The agencies have blamed the large incidence of fraud, but then they could have demanded verification of the mortgage data or refused to rate securities where the data were not provided. That was, after all, their mandate. This is what they pledge for the future. Moody's, S.&P. and Fitch say that they are tightening procedures — they will demand more data and more verification and will subject their analysts to more outside checks. None of this, however, will remove the conflict of interest in the issuer-pays model. Though some have proposed requiring that agencies with official recognition charge investors, rather than issuers, a more practical reform may be for the government to stop certifying agencies altogether.

Then, if the Fed or other regulators wanted to restrict what sorts of bonds could be owned by banks, or by pension

funds or by anyone else in need of protection, they would have to do it themselves — not farm the job out to Moody's. The ratings agencies would still exist, but stripped of their official imprimatur, their ratings would lose a little of their aura, and investors might trust in them a bit less. Moody's itself favors doing away with the official designation, and it, like S.&P., embraces the idea that investors should not "rely" on ratings for buy-and-sell decisions.

This leaves an awkward question, with respect to insanely complex structured securities: What can they rely on? The agencies seem utterly too involved to serve as a neutral arbiter, and the banks are sure to invent new and equally hard-to-assess vehicles in the future. Vickie Tillman, the executive vice president of S.&P., told Congress last fall that in addition to the housing slump, "ahistorical behavioral modes" by homeowners were to blame for the wave of downgrades. She cited S.&P.'s data going back to the 1970s, as if consumers were at fault for not living up to the past. The real problem is that the agencies' mathematical formulas look backward while life is lived forward. That is unlikely to change.

Roger Lowenstein, a contributing writer, last wrote for the magazine about the Federal Reserve chief, Ben Bernanke. His new book, "While America Aged," will be published next month.

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Triple-A syndrome is associated with mutations in the AAAS gene, which encodes a protein known as ALADIN (ALacrimal Achalasia and Adrenal Insufficiency Neurologic disorder).[6][7] In 2000, Huebner et al. mapped the syndrome to a 6 cM interval on human chromosome 12q13 near the type II keratin gene cluster.[8] Since inheritance and gene for the association is. A mutant ALADIN causes selective failure of nuclear protein import and hypersensitivity to Triple redundancy works against some single failures. Dealing with two failures is a much harder problem. A number of aircraft and space vehicles are quad redundant (e.g., the Space Shuttle, the F-16, the 747, and Orbital's Cygnus). Finally, triple redundancy accomplishes nothing if every one of those triply-redundant systems exhibits the same common error. A good number of mishaps in space have been attributed to bad flight software or to bad commands issued to the flight software. Tech Log - A320 Triple IRS Failure - A320: In case of a Triple IRS Failure in flight (if possible) the NAV accuracy reverts to LOW. Do we continue. A320: In case of a Triple IRS Failure in flight (if possible) the NAV accuracy reverts to LOW. Do we continue navigation using GPS data or raw data ? I personally suppose that this scenario brings the pilots to fly by raw data only. Is the A320 approved to fly by GPS's only without any kind of NAV redundancy ? Thank you and Best regards. by captain87. There are several Unused Features for Five Nights at Freddy's VR: Help Wanted. They are mostly found hidden in the game files. The Blacklight Animatronics were blacklight versions of Freddy Fazbear, Bonnie, Chica, and Foxy from Five Nights at Freddy's: Help Wanted. These counterparts originated from the blacklight editions of Funko's merchandise products (except Foxy). They are found in the Main Hub area in the game when in blacklight mode, but are never seen by the player as the curtains for both On the x86 computer architecture, a triple fault is a special kind of exception generated by the CPU when an exception occurs while the CPU is trying to invoke the double fault exception handler, which itself handles exceptions occurring while trying to invoke a regular exception handler. x86 processors beginning with the 80286 will cause a shutdown cycle to occur when a triple fault is encountered. This typically causes the motherboard hardware to initiate a CPU reset, which, in turn, causes the