Wall Street Survival 101

by Joel Spolsky

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Yesterday, Dan Bricklin was interviewing me for his new podcast, and after a lot of questions about open source, which I'm afraid I answered in a way which will likely cause great consternation to people who think open source benefits programmers economically, but anyway, after all the open source questions, he asked me if I had anything to add.

"Yes!" I said. "Never, ever, ever buy bonds at retail from a full-service broker. Especially municipal bonds."

It wasn't really related to open source but it's pretty important that if you have a retail brokerage account and your broker tries to sell you bonds, you don't buy them. The typical commissions they take will tend to lop off a year of interest, so the day you buy the bond, you've lost money. But there's something even scarier with the retail bond market -- basically, a scam -- that Wall Street uses to make certain bonds look like really good investments to you, the average investor, when they're really bad investments.

Here's the puzzle I published on my website yesterday:

You have $100,000 to invest. Which government bond should you invest in?

Bond A, B or C?

Bond A pays 4.15%. If you buy this bond, you'll get a check for $4150 in interest at the end of every year for 10 years. With your last check, you'll get your $100,000 back.

Bond B pays 4.5%. You'll get a check for $4500 at the end of every year for 30 years, then with your last check, you'll get your $100,000 back.

Bond C pays even more! It's 4.75%, w00t. You will get $4750 at the end of every year for 10 years, then get your original investment back, unless the government decides they want to keep your money for a little longer, in which case you'll get *another* 20 years of $4750 before you get your money back.

Bond C is a little more complicated so let me explain. On the tenth anniversary, the government gets to decide whether to pay you your $100K back and owe you nothing, or keep your $100K for another twenty years and keep paying you the interest. The point being, the choice is up to the government.

But either way, with Bond C, you're getting MORE interest every year, whether they decide to keep your money for 10 years or 30.

So, it's stupid to buy bonds A or B, right? Bond C is obviously the better choice.

Right?

Hints: assume that you're a left-handed avocado farmer and therefore don't pay any tax. So ignore the tax implications. Then, assume that all the bonds are equally sound, backed by the "full faith and credit of the United States" which, in the financial world, means there is absolutely no chance of default. This is not a trick question.

Before I get started, let's clear off some distractions from the table.

1. It has nothing to do with compounding. The bonds I described do not compound. They just pay you interest once a year. What you do with that interest is your problem. You might buy some different bonds, but who knows what interest rate you're going to get? Interest rates change all the time and are unpredictable.
2. This is not a question about whether you're going to need the money in 10 years, or whether you're going to die in 20 years, or whether the government deficits are going to grow or shrink. I'm just asking, all else being equal, which bond is a better deal?

Now on to the answer.

Bond C looks, to almost everybody, to be a better deal. It's for a higher interest rate, so your broker can tell you little lies like, "You're getting 4.75% on that thing... tax free! What do you get at your bank? Maybe 2%?" Most people just look at the interest rate and try to invest in the thing with the highest interest rate. So for that reason alone, most people would just choose Bond C.

But a few brave intelligent investors actually try to work out the problem in their head and they reason as follows:

- If I take bond C, there are two possibilities.
    1. The government pays me back in 10 years, or
    2. The government pays me back in 30 years.
- In case #1 I make more money than I would have made with bond A... for ten years I'm making $4750 a year instead of $4150, and that's more!
- In case #2 I make more money than I would have made with bond B... for thirty years I'm making $4750 a year instead of $4500, and that's more money too!
- So in either case, I make more money!

- Mo money, mo money, mo money, give me the more money! What could be wrong with taking a risk where in EITHER situation I'm better off?

And these people buy bond C, too.

And they are getting ripped off.

I'll try to explain why.

The secret lies on that day, 10 years in the future, where the government decides whether to pay you back right now or keep your money for an extra 20 years.

How are they going to decide?

Some people think, "Well, it depends on whether we have a bad president who keeps running deficits, so they need more money, or if we have a good president who is paying off the national debt, and they don't need the money."

No. That's not what it depends on, actually. What it depends on is only one thing: what are the interest rates on that day in the future.

Here's why.

Lets say interest rates go down. So in ten years, the interest rate goes down below 4.75%.

In that case, the government is going to pay you back on the spot, because they can borrow the same money somewhere else for cheaper. For example, if the interest rate in ten years is only 4%, the government can save $750 a year by borrowing elsewhere and paying off your loan, so they'd be crazy not to do it.

But what if interest rates go up?

In that case, the government is not going to pay you back, even if they have extra money burning a hole in their government pockets! If they don't *need* the money, they can just loan it to someone *else*. For example, if the interest rates in ten years are 6%, then the government can loan your $100,000 to someone else at 6%, making $6000 a year, and paying you your $4750 a year, and they're making a $1250 profit which they can use to give tax refunds to rich Texasshire oilmen and bomb third world countries, or whatever they want to do.

But the important point is:

- If rates go down they *will* prepay.
- If rates go up they *will not* prepay.

Notice it has nothing to do with whether the government "needs" your money or not in ten years. The only thing it depends on is interest rates.

Now, let's reexamine Bond C from your perspective.

You buy the bond.

Rates go up.

Now you're screwed, because you're stuck with your crappy low-interest rate bond even though everybody else is getting high interest rates.

Or let's say rates go down.

Now you're screwed, because the government pays you back, and you have all this money, and you can only invest it at the new, sucky, lower rate.

You're screwed either way. The only way you're not screwed is if rates stay approximately the same.

When you buy Bond C, you're giving up something valuable. You're giving the government an option to call your bond.

This option has monetary value, because you're agreeing to take a hit if interest rates change. And people on Wall Street can actually calculate this value.

In fact, Bond C, as of today, "at today's rates and implied volatility," was worth about $2000 less than Bonds A or B, which were of equal value "at today's rates and implied volatility."

"Implied volatility" is a fancy word to mean "the bond market's collective opinion, as reflected in the prices they are willing to pay for various things, as to how likely interest rates are to move up or down in the future.

Let me translate. Bond C, which looks like a better deal to almost everyone who doesn't know how to trade bonds, is worth $2000 *less*.

If you took all three of these bonds and tried to sell them today on the bond market, you'd get $100,000 for Bond A and Bond B, while you would only get $98,000 for Bond C.

How did I calculate that?

Well, I didn't. I have no idea how to calculate it. Jared calculated it for me (he works on Wall Street) by going into his office, closing the door, and banging away for the computer for a while. He was doing weird and complicated things with his Bloomberg terminal ($1500/month), spreadsheets (free with Microsoft Office), and the latest Green Day album ($8/month paid to Rhapsody). He needed a yield curve, he needed to know the implied volatility, and all kinds of math things. Smoke came out from under the door to his office. After a while he came out, rumpled of hair and shirt, and announced that Bond C was worth $2000 less.

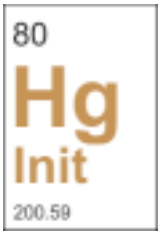
So the retail brokers selling these bonds have snuck a sneaky derivative into the bond, and you can't calculate what it's worth unless you do this for a living, but I assure you that they have calculated it to the nearest penny and are helping themselves to a couple of percent of your money there, and the long and the short of it is that you're getting ripped off in a way you can't possibly be sophisticated enough to calculate.

This is the scam.

Most bonds sold to investors at retail by full service brokers are disguised to look like they pay a lot of interest when the truth is that the high interest rates never really compensate you for the option you're implicitly selling.

This is not a coincidence. It's by design. All else being equal, the people who sell these bonds love to sneak in prepayment options because it enables them to make it look like you're getting a higher rate of return. These bonds are *designed* to rip off retail investors.

But then again, full service brokers, in this day and age of low cost mutual funds and discount brokers, are really nothing more than machines for ripping off retail investors, so don't be surprised!



Have you been wondering about Distributed Version Control? I wrote a tutorial for my favorite DVCS, Mercurial. It's called Hg Init—check it out!

Want to know more? You're reading Joel on Software, stuffed with years and years of completely raving mad articles about software development, managing software teams, designing user interfaces, running successful software companies, and rubber duckies.

About the author. I'm Joel Spolsky, founder of Fog Creek Software, a New York company that proves that you can treat programmers well and still be highly profitable. Programmers get private offices, free lunch, and work 40 hours a week. Customers only pay for software if they're delighted. We make FogBugz, an enlightened project management system designed to help great teams develop brilliant software, Kiln, which provides distributed version control and code reviews, and Fog Creek Copilot, which makes remote desktop access easy. I'm also the co-founder of Stack Overflow.