



Price Risk, Assets of Various Terms

By Dr. Mason Gaffney

Article citation:

Gaffney, Mason. "Price Risk, Assets of Various Terms." December 1993. Working paper.

Fair Use Disclaimer

The Robert Schalkenbach Foundation, a non profit private foundation, is publishing this article, at no cost, pursuant to the Fair Use provisions of Section 107 of the Copyright Act which states that under certain circumstances, the fair use of a copyrighted material for purposes of criticism, comment, teaching, scholarship and research is not an infringement of copyright. If you have any concerns about the publication of this article, please contact us at info@schalkenbach.org.

The Robert Schalkenbach Foundation's Digital Collections and Archives is an extension of the Robert Schalkenbach Foundation's Engel Georgist Library. It collects, organizes, preserves, and provides free online access to researchers and the general public of Georgist literature including books, newspapers, pamphlets, scholarly articles and archival materials.

RSF is particularly proud to offer free online access to the works of the late Georgist scholar Mason Gaffney, made possible through the generosity of the Danica Foundation and with the consent of the Mason and Letitia Gaffney Trust.

Robert Schalkenbach Foundation: <https://schalkenbach.org/>

Engel Georgist Library: <https://www.librarycat.org/lib/EngelGeorgistLibrary>

RSF Digital Collections and Archives: <https://schalkenbach.starter1ua.preservica.com/>

Price risk, assets of various terms

Notes by M. Gaffney, Dec. 1993

The "total yield" of a security in a given year is its cash yield ("current yield") plus the rise (or minus the fall) of its price over the year. The price, or Present Value (PV), is determined by discounting all future payments to the present. In the present model we assume future yields are fixed and certain. So is the redemption value (R), of \$100, due after n years. There is still price risk, however, because discount rates (i) may change. A rise of i lowers PV. For a short handle, let us label this as "Rate-Rise Risk" (RRR).

Currently (12/93), i is very low,¹ and the flow of domestic investing seems too meager to employ everyone at good income levels. One reason seems to be the caution of potential investors who are staying on the sidelines, waiting for i to rise.² In terms of old assets (like land and common shares and old bonds), they are waiting for prices to fall. In terms of new investing, they are waiting for anticipated or promised yields to rise. To understand this balking, let us look at it from their viewpoint.

To illustrate RRR, and get some feel for its strength, Table 1 shows the fall in present value resulting from a rise of i from 8% to 9%, and the passage of one year. For simplicity, it is based on a redeemable bond selling at par of \$100, yielding a coupon of 8%. It shows the effect of a rise of i to 9%, and the passage of one year.

¹ i is low from the lenders' viewpoint. At the same time, collateral requirements and down payment requirements are very high, so for many refused borrowers, i is very high.

²We have been here before. The nightmare of Keynesian economics was the impasse occurring when i fell so low that no one would invest for fear of RRR. This was based on experience during the Great Depression of the 1930s, as interpreted by Keynes, and accepted by most economists for a long time. Liquidity preference was supposed to be so great that people simply saved without investing: they sat on the sidelines with their money. Thus, below some floor, lowering i was supposed to fail to stimulate investing, so idle funds simply piled up. It is not the present purpose to support or refute this hypothesis of Keynes. It may have been overdrawn as a bogey. The present point is, it has enough substance, and carried enough conviction so that for a time it dominated thinking in macro-economics, and served to rationalize active use of fiscal policy for demand management.

Table 1: Loss of PV of redeemable bond caused by rise of i from 8% to 9%, and passage of one year

Table shows PV^3 , loss due to rise of i , % loss, & total yield⁴

Panel 1: Redeemable bonds, coupon = \$8/year

n^5	@8%	@9% ⁶	Loss	% loss	Total yield ⁴
	\$	\$	\$	%	%
1	100.00	100.00	0	0	8.00
2	100.00	99.08	0.92	0.92	7.08
5	100.00	96.76	3.24	3.24	4.76
10	100.00	94.01	5.99	5.99	2.01
20	100.00	91.05	8.95	8.95	-.95
30	100.00	89.80	10.20	10.20	-2.20
40	100.00	89.28	10.72	10.72	-2.72
60	100.00	88.96	11.04	11.04	-3.04

Table 1 is continued on next page

³PV is found from this formula:

$$PV = \$8\{1 - (1+i)^{-n}\}/i + \$100(1+i)^{-n}$$

⁴Total yield = current yield less % loss of PV during the first year. Discrepancies due to rounding. "Total yield" is strictly current, i.e. for the given year only. It is not to be confused with Yield-to-Maturity (YTM), which remains at its original 8%. Cf. fn. 12.

⁵ n = remaining term of annuity of \$1.

⁶This column is evaluated at $(n-1)$. For $n=1$, it is after the last coupon, but just before redemption. Thus, for $n=1$, its value is exactly \$100.

Table 1 (cont)

Panel 2: Perpetual annuities, described in footnotes

n^7	<u>@8%</u> \$	<u>@9%⁸</u> \$	<u>Loss</u> \$	<u>% loss</u> %	<u>Total yield⁴</u> %
fn ⁹	100.00	88.89	11.11	11.11	-3.11
fn ¹⁰	133.33	114.29	19.04	14.28	-6.28
fn ¹¹	21.45	15.86	5.59	26.06	-26.06
fn ¹²	28.61	20.39	8.22	28.73	-28.73

Panel 3: PV of point values of \$100, n years in future¹³

n	<u>@8%</u>	<u>@9%</u>	<u>Gain</u>	<u>Total yield</u>
1	92.6	100.00	7.41	8.00
2	85.73	91.74	6.01	7.01
5	68.06	70.84	2.78	4.09
10	46.32	46.04	-0.28	-0.60
20	21.45	19.45	-2.00	-9.33
30	9.94	8.22	-1.72	-17.35
40	4.60	3.47	-1.13	-24.56
60	0.99	0.62	-0.37	-37.45

Rate-rise Risk (RRR) is substantial, even for terms as short as 5 years. For longer terms, RRR rises, until total yield is

⁷ n = remaining term of annuity of \$1.

⁸This column is evaluated at $(n-1)$. For $n=1$, it is after the last coupon, but just before redemption. Thus, for $n=1$, its value is exactly \$100.

⁹Perpetual annuity of \$8/year, paid at end of each year.

¹⁰Annuity begins at \$8, rises at 2% annually in perpetuity.

¹¹Annuity is zero for 20 years, followed by perpetual annuity of \$8/year.

¹²Annuity is zero for first 20 years, followed by annuity beginning at \$8, rising at 2%/year.

¹³These are like zero-coupon bonds. Some physical assets have similar characteristics, e.g. timber; livestock; alcoholic beverages; marginal minerals held for the rise; or speculative acreage held for the rise.

actually negative. Panel 1 shows that, for redeemable bonds with terms of 20 years or more, the rise of i causes a fall of value greater than 8%. That results in a negative total yield.¹⁴ The negative yield reaches an asymptotic max of -3.11% for a perpetual bond, as shown in the top row of Panel 2, marked "fn⁷."

The rise of RRR with term of bond (or other asset) is generally believed to account for the normal "yield curve," wherein investors require higher yields to lure them into longer term debt instruments, or other assets.¹⁵ This is not, however, a simple relationship: sometimes the yield curve is inverted.¹⁶ We do not here pursue this interesting question further.

That is still not the upper limit of RRR, however. RRR is much higher for various kinds of deferred-yield securities, resembling those in Panel 2. The perpetually-rising annuity (fn⁸) resembles a growth stock. The annuities yielding nothing for the first 20 years (fn⁹, fn¹⁰) resemble speculative land holdings, and some venturesome growth stocks and flyers with deferred prospects. For these, RRR is so much greater than for any redeemable bond, it is in another class altogether.

High RRR is also incurred by those who invest in single-payment kinds of assets ("point values") where the point of payment is far off. Zero-coupon bonds are an example. Others

¹⁴The yield is negative only for the given year. This is following a strict convention of "marking to market," and recognizing the capital loss immediately when it accrues. In all later years the bond's Yield to Maturity (YTM) is 9%, based on its new, lower market value.

¹⁵This phenomenon redoubles the difficulty of financing long term projects. Timber culture is a good example. Even at a fixed i , the PV of \$100 expected 70 years in the future is very low: for example, at 6%, it is only \$1.69. Now add to this a "yield curve" effect, such that investors require 7%: the PV of \$100 falls to \$0.88.

¹⁶It seems likely that, for long terms, there are investors who accept the long wait, and illiquidity. In addition, over a period of 70 years, for those not needing liquidity but looking for opportunity, risk works both ways. There is a high probability of i falling (Rate-Fall Risk, or RFR), as well as rising, over the course of 70 years. Those who can "stay the course" when RRR makes the price of immature timber fall, can reasonably expect other years when RFR (i falling) makes the price rise. At such times they can take gains.

Who can "stay the course"? Those who are flush enough to accept illiquidity over long periods. These being few, unusual opportunities open up to them, with little competition.

are timber, livestock, alcoholic beverages ripening in storage¹⁷, fine cheeses, marginal minerals held for future resale, or speculative acreage held for future sale¹⁸. They also correspond, if more loosely, to stock values of corporations whose assets consist of such "point values."¹⁹

RRR is higher when i is lower. First, when i is low it is inherently more likely that i will rise back up to customary historical values. Second, the price-loss is greater from any given rise of i . The second point is shown in Table 2, where i rises from 4% to 5%.

¹⁷With alcohol, however, the maximum holding period in common practice is perhaps 16 years (for premium single-malt Scotch). Most holding periods are much less than that.

¹⁸With speculative acreage, actual holding periods are often surprisingly long, probably much longer than can be explained on any simply rational basis, or without recognizing elements of major market failure. The reasons for this warrant intensive examination, but the fact is hard to dispute.

¹⁹The quality and intentions of corporate management intrude, however, between the assets and the stock shareholder.

Table 2: Loss of PV of redeemable bond caused by rise of i from 4% to 5%, and passage of one year

Table shows PVs, loss due to rise of i , % loss, & total yield²⁰

Panel 1: Redeemable bonds

n^{21}	@4%	@5% ²²	Loss	% loss	Total yield ¹
	\$	\$	\$	%	%
1	100.00	100.00	0.00	0.00	4.00
2	100.00	99.05	0.95	0.95	3.05
5	100.00	96.45	4.33	4.33	-0.33
10	100.00	92.89	7.72	7.72	-3.72
20	100.00	87.91	12.08	12.08	-8.08
30	100.00	84.86	15.14	15.14	-11.14
40	100.00	82.98	17.16	17.16	-13.16
60	100.00	81.12	18.93	18.93	-14.93

Panel 2: Rising annuities, defined in footnotes

fn^{23}	100.00	80.00	20.00	20.00	-16.00
fn^{24}	200.00	133.32	66.68	33.34	-29.34
fn^{25}	45.64	30.15	15.49	33.94	-33.94
fn^{26}	91.28	50.25	41.03	44.95	-44.95

²⁰Total yield = current yield less % loss of PV.

²¹ n = remaining term of annuity of \$1.

²²This column is evaluated at $(n-1)$. It is after the last coupon, but just before redemption. Thus, for $n=1$, its value is exactly \$100.

²³Perpetual annuity of \$4/year, paid at end of each year.

²⁴Annuity begins at \$4, rises at 2% annually in perpetuity.

²⁵Annuity is zero for 10 years, followed by perpetual annuity of \$4/year.

²⁶Annuity is zero for first 20 years, followed by annuity beginning at \$4, rising at 2%/year.

Panel 3: PV of point values of \$100, n years in future

n	<u>@4%</u>	<u>@5%</u>	<u>Gain</u>	<u>Total Yield</u>
	\$	\$	\$	%
1	96.15	100.00	3.85	4.00
2	92.46	95.24	2.78	3.00
5	82.19	82.27	0.08	0.10
10	67.56	64.46	-3.10	-4.59
20	45.64	39.57	-6.07	-13.29
30	30.83	24.29	-6.54	-21.20
40	20.83	14.91	-5.92	-28.40
60	9.51	5.62	-3.89	-40.89

Inspection and comparison of Tables 1 and 2 indicates that RRR is significantly greater when $i=4\%$ than when $i=8\%$. For one example, the 60-year redeemable bond, the total yield in Table 1 is -3.04% , compared with -14.93% in Table 2. In addition, of course, the chances of having i move up from 4% are much greater than having it move up from 8% .

At 8% , in fact, there is a greater Rate-Fall Risk (RFR): it might well move down to 7% , resulting in a rise of asset prices. Thus, high i -values do not deter investing as much as simple math would suggest. Likewise, we saw that low i -values do not spur investing as much as simple math would suggest. These factors help account for the frustration of policy-makers who seek to regulate aggregate investing by controlling i .

At lower i , like the 4% in Table 2, all assets should become less liquid in the sense that RRR is higher, and RFR is lower. However, real markets do not always follow that kind of "logic." Rising markets often create their own logic, an opposite logic of projecting past trends. The trend-projecting tendency - aka the "greater fool" theory - has often characterized the culmination of long bull markets.

"Panic buying" is also common in the culmination of real estate market booms - we have had three cycles of it in southern California since 1970. It should be scouted with circumspection. Its logic is fundamentally disequilibrating: it would lead to infinite prices, and obviously cannot go on indefinitely. That is, to buy stock because it has gone up is to make it go up more, and so ad inf. It is a case of positive feedback, which we know must end because nothing grows to infinity.

Sometimes, nevertheless, panic buying develops its own internal inertia, pushing yields down (prices up) for several months or years after "smart money" has sold out. Fortunes have

been made in such times, by working the "greater fool" theory. Obviously, however, it is more than normally hazardous, and calls for insights into mass psychology as much as market fundamentals.

As an example, brokers selling mutual funds often rate them on their past "performance." The measure of performance is price rise coupled with cash yield. Data presented often fail to disaggregate the two. The implication given the customer is that past performance guarantees future performance. The trouble with price rise, of course, is that it is yesterday's good news. It is bad news for those who missed that party, and have to buy in at a higher price. This matter is not pursued here, but is obviously relevant to today's situation.