The Commerce Commission's Approach to Estimating the Tax-Adjusted Market Risk Premium: Some Further Thoughts on the Siegel 1 Method

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1 Background

1. On 10 March 2026, the New Zealand Commerce Commission (NZCC) published a draft decision (NZCC, 2026) on the cost of capital input methodologies (including the Tax Adjusted Market Risk Premium TAMRP) to be used in future determinations. In response, Incenta (2026) argued that the Siegel 1 approach used to estimate TAMRP is flawed and should not be used by NZCC. This led NZCC to ask us (Sapere, 2026) to consider the case put forward by Incenta, which we concluded had merit. In its revised draft decision (NZCC, 2026), NZCC proposed removing Siegel 1 from its suite of TAMRP estimators. Most recently, Capital Financial Consultants (CFC, 2026) has criticised that decision, arguing that (p2) "many of the criticisms raised by Sapere do not seem to be correct and none of the others undercuts its merits." NZCC has, therefore, asked us to respond to CFC.

2. To provide some context, we begin with a brief description of the Siegel 1 estimator, show that its empirical implementation contradicts asset pricing theory, and reinforce the point that the analysis underlying Siegel 1 has received essentially no academic support. Turning to the specific rebuttals made in CFC (2026), we first examine its dismissals of our concerns about the unanticipated inflation underpinning of Siegel 1 and explain why these are incomplete. Second, we reassess the case for Siegel 1 in NZ data and agree with some points raised by CFC while disagreeing with others. We also note additional interpretations of the data that differ from those considered by CFC. Third, we explain why the failure of Siegel 1's out-of-sample predictions cannot be dismissed as readily as CFC suggests. Fourth, we consider a new argument raised by CFC – that high excess returns were due to interest rate ceilings – and note its theoretical and empirical weaknesses.

Finally, we assess CFC's argument that the Ibbotson method is systematically biased upwards and conclude that this is extremely tenuous.

2 Background, History, Theory and Reception of Siegel 1

2.1 The bond premium puzzle

3. The Siegel 1 estimator can be written as:

$$\hat{TAMRP}_t^{S1} = TAMRP_t^I + \frac{1-\tau}{t+1}\sum_{s=0}^{t}((R_{fs} - \pi_s) - R_{fs}^r) \quad (1)$$

where $TAMRP_t^I$ is the Ibbotson estimator, τ is the tax rate,R_{fs} is the date s yield on the riskless nominal bond, π_s is the date s rate of inflation, and R_{fs}^r is the date s (real) yield on the riskless real bond. So the Siegel 1 estimator equals the Ibbotson estimator plus an adjustment equal to a bond premium: the after-tax difference between the average real yield on a nominal government bond and the average real yield on a real government bond.

4. Whether relying on a simple Fisherian world with risk or a more general asset pricing framework (e.g., Boyle and Young, 1988), the expected real return on a nominal bond is greater than the real return on a real bond due to the latter being a better hedge against inflation risk. So the adjustment term in (1) should be positive. Empirically, this premium is typically small, but non-trivial. For example, Shen (1998) finds that the premia averages around 1% for 10-year bonds in the UK for 1996-97 (a period of low inflation risk); Chen et al (2010) report a 5-year premium of 0.3% in the US for 1998-2007; while using a longer data series (1960-2000), Buraschi and

Jiltsov (2005) estimate a 10-year premium that averages 0.7% but which varies considerably over time (0.2% - 1.4%).

5. This observation has two implications for the Siegel 1 estimator. First, Siegel 1 equals Ibbotson plus a positive-valued (and possibly time-varying) bond premium. So if the Ibbotson estimator is an unbiased estimator of the unconditional TAMRP, as it should be in a long time series, then Siegel 1 is biased upwards by an amount equal to the bond premium (say, roughly, 1 percentage point). Second, however, in the NZ applications of Siegel 1, precisely the opposite is true: in Lally and Marsden (2004), the difference is *minus* 1.5 - 2.0 percentage points, while the updated value in Lally (2023) is *minus* 1.4 percentage points.

6. One response to this latter point is that the lower liquidity of real bonds, and their associated higher liquidity risk premium, more than offsets their lower inflation risk premium. But because real bond yields are only recently available in NZ data, CFC's implementation of Siegel 1 primarily uses the "average real yield on nominal bonds over earlier periods in which inflation was stable" (Lally and Marsden, 2004, p95). That is, the estimates of R^r_{fs} are drawn from nominal bonds, so liquidity risk differences do not apply.

7. Advocacy of the Siegel 1 estimator thus faces a high hurdle: any economic phenomena cited for its use in NZ data must be of sufficient force to not just reduce the magnitude of the estimated bond premium, but also cause it to reverse sign.[1]

[1] The phenomena advanced by CFC are unanticipated inflation and financial repression, which we consider in detail below.

2.2 Academic Acceptance

8. In Sapere (2026), we pointed out that the analysis underlying Siegel 1 has failed to convince other academic researchers. CFC has not responded to this issue, but we feel it is worth revisiting in more detail.

9. The first point is that Siegel (1992) was a response to the "Equity Premium Puzzle" of Mehra and Prescott (1985), who found that the average excess return in US data was an order of magnitude greater than what could conceivably be rationalised by the standard asset pricing model. This motivated a tsunami of potential explanations; see Mehra (2008) for a summary.

10. Siegel's contribution to this literature argued that the average excess return observed in the data was artificially high due to unexpected inflation between 1926 and 1990 driving a wedge between actual real bond returns and those that were expected when prices were set. Using a longer (but lower quality) time series of data, Siegel found a lower average risk premium. He did not, however, match this to the theoretical premium implied by the additional data, or offer an alternative method for estimating the equity premium; and nowhere in his 1992 paper is the adjustment now known as Siegel 1 raised or calculated.

11. Siegel (1999) revisits the issue and again makes no mention of the Siegel 1 approach to estimating the equity premium.[2] Instead, the Siegel 1 estimator seems to have been first raised by Lally and Marsden (2004), who justify it on the grounds that it is (p95) "entirely consistent with Siegel's belief that

[2] He does mention, in passing, what is known in NZ regulatory circles as Siegel 2: in a single paragraph on p12, he notes that subtracting prevailing yields on 10- and 30-year indexed bond yields from the historical average of real stock returns results in a significantly lower equity premium estimate than that obtained by Mehra and Prescott (1985).

unexpected inflation has reduced the average real yield on bonds but not equities, thereby inducing bias in the Ibbotson estimate."

12. Independent of who deserves credit for developing the Siegel 1 estimator, subsequent researchers do not appear to have been persuaded by Siegel's proposed explanation for the equity premium puzzle itself. In the 14 chapters and 592 pages of Mehra (2008) reviewing research on the equity premium puzzle, written by a wide range of leading asset pricing researchers, Siegel (1992, 1999) is not mentioned once, never mind the Siegel 1 adjustment.[3]

13. Most research activity on the equity premium puzzle has focused on refining the theory in order to generate a larger model premium, as opposed to modifying the data to obtain a lower empirical premium. To the extent there is a consensus, it is probably that the best explanation comes from the Campbell and Cochrane (1999) model which, with non-time-separable preferences and habit formation, successfully matches the high premium observed in post-war US data. Adjusting these data for low real bond returns during part of that period is not part of this solution.[4]

14. In summary, the Siegel 1 approach is essentially an ad-hoc response to a largely-ignored empirical phenomenon.

15. We now turn to CFC's specific arguments. In doing so, we focus primarily on his points relating directly to TAMRP (or the equity premium more generally) rather than bond yields, since the former is the parameter of ultimate interest to NZCC.

[3] A later work, Siegel (2002), is mentioned in one chapter, but as part of descriptive data, not as a puzzle explanation.

[4] As Campbell and Cochrane (1999) point out, it is actually much easier to match the model to a longer data series beginning in 1873, so the real challenge is to reconcile it with post-war data.

3 (Ir)rational Expectations

16. One point raised by Incenta (2026) is that, citing Seqwater (2021), "(m)aking adjustments to historical data, particularly where it relates to market expectations is unorthodox and likely to introduce errors". In Sapere (2026), we agreed with this point, noting that the abandonment of historical market data amounted to a rejection of rational expectations, which would be inconsistent with NZCC's use of the CAPM (since this relies on rational expectations). CFC (p6) rejects this conclusion on the basis that low returns are not inconsistent with rational expectations.

17. A brief review may be useful here. The concept of rational expectations is a modelling device that assumes investors know the true distribution of a random variable of interest (in this case future returns or future inflation). As a result, they do not make systematic expectational errors and over time average actual outcomes conform to the true mean of the distribution. This is one of the motivations for the use of historical averaging of market returns.

18. The Siegel 1 approach proposes dispensing with historical averaging of bond returns (as is used in the Ibbotson approach) and replacing these returns with an alternative series that are deemed to better reflect actual (but unobserved) market expectations. That is, the market of investors is assumed to have made systematic forecast errors; specifically, in setting bond prices, they consistently under-estimate inflation for 40 years (NZ) or 64 years (US). This is a clear rejection of rational expectations.

19. CFC disputes this with an example where the true distribution of real returns is discrete uniform: -2%. 4% or 10%, each occurring with equal prob-

ability, so the expected return is 4%. CFC notes that a realised return of -2% (which is below expectations) does not imply that investors have failed to perceive the true distribution. We agree with this point, which is obviously true, but it has nothing to do with rational expectations. Nowhere does that concept state that realised returns in every, or even any, given year must equal the expected return, only that, *over time*, the average of the realised annual returns will equal the expected return.

20. In short, the Siegel 1 approach is predicated on the belief that observed "high" excess returns were due to bond market investors, both in NZ and the US, making systematic expectation errors across lengthy time periods.

21. One caveat here. If the only bonds available had maturities of 30-40 years, then CFC's argument would be more valid. Investors purchasing such bonds in the 1940s and 1950s would undoubtedly have been surprised by the high inflation of the 1970s and 1980s. In this case, CFC's example could be interpreted as corresponding to a single investor holding period extending over many years (rather than one year) and it would be correct to state that a single low return for that holding period tells us nothing about the rationality of investor expectations. However, low real bond returns are observed in US data for a variety of maturities, including short-term T-Bills (see, for example, Mehra and Prescott, 2008), for which the sudden arrival of high inflation is of little consequence. So the caveat is of little practical relevance.

4 Inflation Asymmetry

22. In Sapere (2026, para 10), we noted that the Siegel 1 approach implicitly assumes stock investors were consistently able to correctly forecast inflation

while bond investors were not, a seemingly-implausible asymmetry. This is a problem previously acknowledged in Lally and Marsden (2004, p98):

> "However, the Siegel methodology has its shortcomings. It is implicit in the methodology that unexpected inflation reduces real bond returns but has no impact upon real equity returns."

That is, bond investors experienced low returns because they systematically under-estimated future inflation while stock investors suffered no such adverse consequences.

23. But CFC (p7) rejects this reasoning on the grounds that stocks are claims on real assets and hence offer better protection against unexpected inflation than do nominal bonds.[5] That is, stocks are better hedges against inflation risk than bonds. This is a contested area (see, for example, Boyle and Young, 1988, for a theoretical treatment, along with the empirical references cited therein), but it seems plausible. However, when it comes to the market risk premium, its consequences are unhelpful to CFC's argument.

24. According to modern finance theory, investors price assets by first forming expectations of real cash flows on any asset and then pricing those cash flows so that they receive an expected return commensurate with the cash flow risk, i.e., the lower the risk, the lower the expected return and the higher the price. If stocks are a better hedge against inflation risk than bonds, then they become relatively more attractive to investors in high and uncertain inflationary periods. This greater attractiveness causes their prices to rise relative to bonds, and hence their relative expected returns to fall. That is, if stocks are a superior inflation hedge, the market risk pre-

[5] In effect, stock investors make the same inflation-forecasting errors as bond investors, but are rescued by the firms whose assets stocks are a claim on.

mium *falls* when inflation risk rises, and so subsequent returns are *lower* on average, except in the very short run.[6] In fact, the observance of higher average excess returns requires that stocks be inferior inflation hedges; the higher average returns then reflect compensation for the greater inflation risk stocks carry.

25. In short, we agree with CFC that pricing flexibility possessed by firms means that stock cash flows are likely to move in tandem with inflation. But investors are not stupid: recognising this potential they bid up stock prices. So while future cash flows may indeed be higher, *returns* are lower.

5 The Siegel Effect in Historical NZ Data

26. In Sapere (2025) and Sapere (2026, paras 13-14), we expressed some scepticism that, based on the data in Lally and Marsden (2004), the 1941-1980 period was really that unusual, particularly with respect to excess returns. In response, CFC (p7) undertakes two analyses of the Lally and Marsden data that he claims refutes our caution. We deal with these in what seem to be reverse order of importance.[7]

27. First, focusing solely on real bond yields, CFC disagrees with our claim that average returns in the assumed low-return lustrums (i.e., 1941-80) typically deviate less in absolute value from the sample mean (and median) of 0.015

[6] When investors become aware of the heightened inflation risk, they bid up the relative price of stocks which, temporarily, leads to high realised excess returns. However, once this re-pricing is bedded in, excess returns will be lower on average reflecting the smaller risk premium built into prices.

[7] We accept CFC's point (p8) that the 20-year moving averages in Figure 1 of Lally and Marsden (2004) are largely uninformative about what happens after 1990.

than average returns in the high-return lustrums.[8] CFC claims otherwise, arguing that the average absolute difference for the first group is 0.033 versus 0.024 for the second group.

28. We are unable to replicate these calculations.[9] In Table 2 of Lally and Marsden (2004), the average annual yields of the 5-year blocks from 1941-80 are 0.009, -0.012, -0.014, 0.017, 0.024, -0.001, -0.042, -0.036, which correspond to absolute deviations (from 0.015) of 0.006, 0.027, 0.029, 0.002, 0.009, 0.016, 0.057, 0.051, or an average of 0.024. For the remaining 5-year blocks (and 2001-2), the average annual yields are 0.076, -0.006, 0.017, 0.049, 0.062, 0.053, 0.039, which correspond to absolute deviations (from 0.015) of 0.061, 0.021, 0.002, 0.034, 0.047, 0.038, 0.024, or an average of 0.029.[10]

29. CFC also compares the real bond yield averages for 1941-80 with the other years in the sample, reporting -0.007 for the former and 0.042 for the latter, this difference being statistically significant. We agree with these calculations, but note that the corresponding inflation averages are 0.061 and 0.041. So even if none of the higher inflation during 1941-80 had been anticipated by bond market investors, this can only explain less than half ($\frac{0.061-0.041}{0.042+0.007} = 0.41$) of the lower real bond yields.

30. In any event, our scepticism (para 13) was primarily directed towards excess

[8] The point of our claim is that such a pattern, if it existed, is arguably inconsistent with low bond returns being more of an outlier than high returns.

[9] One possibility is that CFC misinterpreted our reference to "low-return lustrums" as lustrums with negative returns, as opposed to lustrums occuring during 1941-80. If so, this was a drafting error on our part – mea culpa.

[10] The latter, and also the overall yield average of 0.015, is calculated on a weighted average basis to reflect that the last sub-period contains only two years; eschewing such weighting makes no difference to our conclusion.

returns, not bond yields. CFC does not address excess returns, but it is possible to do so in part using the data in Table 2 of Lally and Marsden (2004). In their Table 1, those authors report a market risk premium estimate of 0.055, which we are able to replicate from the 5-yearly data in their Table 2 (other than for a small rounding error). However, the estimate for the 1941-80 period is only 0.052, less than 0.055 (the corresponding estimate for the remaining years is 0.056 > 0.052). So the average excess return between 1941 and 1980 is actually *lower* than in the rest of the 1931-2002 period, contrary to the motivation advanced for the Siegel 1 approach.[11] The same appears to be true in Australia, where the average excess return is relatively *low* between 1940 and 1990 – see Incenta (2026, para 26). Such findings are difficult to reconcile with the justification for Siegel 1; claiming that abnormally high excess returns in one period warrant a change in estimation procedure is problematical when those excess returns are not in fact abnormally high.

31. But suppose this were not the case, and that the average excess return is in fact significantly higher in NZ data between 1941 and 1980 (perhaps as the result of the tax adjustments used in the Brennan-Lally CAPM). Would this buttress the case for Siegel 1? That depends on the reason for the phenomenon. CFC's interpretation is that such high excess returns are the result of either unanticipated inflation that drove down bond yields (see above) or market frictions that did the same thing (see below). As a result, historical average estimates of the TAMRP are mechanically biased upwards. One way to mitigate this problem is the Siegel 1 adjustment.

[11] The difference is almost certainly statistically insignificant, but the standard error cannot be accurately estimated from the 5-year data in Lally and Marsden. Regardless, the point remains that the 1941-80 period is not associated with greater excess returns on average.

32. However, other interpretations of seemingly-high excess returns in the 20th century are possible. One possibility, alluded to in Sapere (2026, para 8), is that stock and bond data in the early- and mid-1800s were of poor quality, potentially under-estimating the true equity premium.[12] According to this view, it is the 19th century data that are biased, not the 20th century data.

33. Another explanation is that economic conditions prevailing in 1940 induced a high *conditional* TAMRP and that subsequent high excess returns simply reflect those initial expectations being realised. In 1940, the Great Depression was only just fading away, World War II was in its early stages, the threat of fascism was knocking down one door, and communism was knocking down another; fast forward a few years and nuclear bombings had to be added into the mix. Stock market investors in NZ and the US at the time must surely have been pessimistic about the futures of their respective economies and priced stocks to yield high returns. Over time, these high returns were realised because the world economy did not slump back into Depression, Germany did not win the hot war, Russia did not win the cold war, and the threat of nuclear armageddon, while not completely disappearing, at least faded somewhat into the background.

34. As explained in Sapere (2025), there is nothing about a time-varying conditional risk premium that precludes the historical averaging of market rates in order to estimate the unconditional risk premium, so long as excess returns are mean-reverting. In that case, temporarily high conditional risk premia in some periods are offset by temporarily low conditional risk premia in other periods and the long-run average converges on the true unconditional risk premium.

35. In summary, if excess returns are not higher on average for the 1941-80

[12] Dimson et al (2008) examine this issue in more detail.

component of the Lally and Marsden data, then the rationale for the Siegel 1 adjustment disappears. If excess returns are higher on average for the 1941-80 component of the Lally and Marsden data, and this is due to a time-varying conditional market risk premium, then the implication for regulatory purposes is that a maximum-duration time series of excess returns data should always be used when estimating the historical average, *not* that those data should be adjusted à la Siegel 1.

6 Out-of-Sample Predictions of Siegel 1

36. One useful aspect of Siegel 1 is that it makes a definite out-of-sample prediction: if in-sample excess returns are misleadingly high due to unanticipated inflation that adversely affected bond returns, then a subsequent easing of inflationary pressures should be associated with lower excess returns, at least on average.

6.1 US data

37. In Sapere (2026, paras 7-9), we noted that this prediction was not supported by subsequent US data: observed US excess returns were *higher* (7.4%) on average during the 1991-2025 period than during the supposedly elevated 1928-1990 (6.8%) period, obviously casting doubt on the Siegel 1 contention that excess returns were artificially high during the latter period.

38. In response, CFC (pp6-7) argues that this does not disprove Siegel's hypothesis due to that hypothesis being premised on "all other things being equal". We agree with the first part of CFC's rebuttal, insofar as working with economic data rarely *proves* anything, but are less sanguine about the second

part.

39. First, CFC provides no indication of what "other things" have changed in such a way that would otherwise have left Siegel's predictions unchallenged. Without some substantive hypothesis about what has changed and how, it is simply impossible to evaluate, and therefore give any credence to, this argument.

40. Second, Siegel himself invoked no qualifications about "all other things being equal". In Siegel (992), he states (p37):

> "In the future, the real return on fixed income assets may be closer to the historical norm of 3 to 4 per cent. While stock returns will probably continue to dominate bond returns, they *will not do so by nearly as wide a margin* as they have over the past 65 years." (emphasis added)

This is a simple if-then statement, i.e., "if I'm right about bond returns having been artificially low between 1928 and 1990, then an end of high inflation and financial repression means they'll be higher in future and excess stock returns *will* be lower." Since future excess returns have in fact been higher, the "then" part of Siegel's prediction is clearly wrong and so the "if" part (past bond returns being artificially low) must be rejected. Nowhere is there any suggestion of this being dependent on (unidentified) "other things" remaining the same.

41. Finally, "other things" changing illustrates a more fundamental point. Over every period of time, risk premia estimates reflect a multitude of factors: some have a positive impact on estimates, while others have the opposite effect. Adjusting the estimation procedure to take account of just one of these factors in isolation, while ignoring all others, seems difficult to justify.

6.2 NZ data

42. Turning to the issue of what should have been observed out-of-sample in more recent NZ data if the Siegel 1 reasoning is correct, CFC (p8) criticises our comparison of 1931-2002 with 2003-22 data (paras 15-16). We agree this is a contestable point, while maintaining that our comparison is a legitimate one. But in any event, the *important* point is that CFC's different, but also legitimate, comparison *leaves our conclusion unchanged*. He reports that the average excess return during the 1941-80 period was 7.0% while that for 1981-2022 was 8.8%, i.e., the average excess return in the supposed high excess return period was actually 1.8 percentage points *lower* than what has occurred since. The estimated standard error is, of course, high, but this just reinforces our point that, when it comes to excess returns there is no obvious difference, let alone a positive one, between 1941-80 and the rest of the sample period.[13] But as discussed in section 6.1, such a positive difference is a necessary condition for empirical validity of the Siegel 1 approach.

7 Market Frictions

43. Based on the work of McGrattan and Prescott (2003) cited in Sapere (2026), CFC (p9) argues that there is another reason, in addition to unexpected inflation, why real bond returns were low, and real excess returns high, for significant chunks of the 20th century: interest rate controls (what CFC refers to as "bond market repression"). According to this story, real bond re-

[13] Note there is a typo in the legend of Table 2 in Sapere (2026): Lally (2003) should be Lally (2023).

turns were mechanically low due to government-imposed ceilings on Treasury bond yields. Assuming average stock returns remained the same (or higher), this explains the observed high average excess returns.

44. There are, however, a number of problems with this story. First, in US data, the repression lasted only 5 years (1942-47) for short-term bonds and 9 years (1942-51) for long-term bonds. It is obviously difficult to attribute high excess returns prior to this time, or in the 1970s and 1980s, to such regulations.[14]

45. Second, as we pointed out in Sapere (2026), such regulations cannot easily explain persistently high excess returns. Ceilings on interest rates may lower the observed returns on bonds, but should also make stocks relatively more attractive, pushing their prices up and expected returns down, leaving the difference between the two largely or completely unchanged. CFC argues that the substitution towards stocks magnifies the excess return increase, and we agree – but only as a one-off. That is, the interest rate regulations induce a rise in stock prices, and a fall in stock expected returns, around the time of their introduction, but once that occurs there is nothing further to adjust. To explain high average excess returns over 60+ years, investors would have had to drip-feed the effect of the regulations into stock prices , including long after the regulations had ceased to exist.

46. Third, as pointed out by Cochrane (2008), financial market frictions of this kind cannot explain a high average return premium for stocks over bonds because a similar premium is observed on different stock classes, e.g., the value premium of Fama and French (1992, 2021). If a phenomenon is observed in a situation where there is no repression, it is obviously difficult

[14] Restrictions on deposit rates (Regulation Q) lasted much longer, but these are have little relevance to excess returns relative to government bonds.

to argue that repression is the primary cause of the same phenomenon elsewhere.

47. Fourth, to the extent that financial repression can explain high excess returns, the obvious solution is, as noted by Mehra and Prescott (2008), to exclude such regulatory periods from the estimation exercise (the average riskless rate component), rather than replace the market data from those periods with subjectively-chosen data from other periods, as is the case with Siegel 1.

48. Fifth, all this relates to the US. To be relevant to estimation of the NZ TAMRP, what is required is information on what similar regulations were in force in NZ, and when. Obviously, if such regulations existed but were in force only for a small portion of 1941-80, or extended well beyond that period, it would be difficult to sustain an argument that they were responsible for high excess returns within that period.

49. Sixth, with respect to NZ data, CFC (p10) argues that the out-of-sample failure of the central Siegel 1 prediction – lower observed excess returns should follow the removal of repression (i.e., para 36 adapted for repression) – is because this deregulation was accompanied by other liberal reforms that had a more-than-offsetting positive impact on stock prices. While not disagreeing that 1980s reforms had a positive impact on the NZ stock market, we are doubtful that this in any way rescues the case for Siegel 1.

50. One reason is that the argument can work only to the extent that the end of bond repression coincided with the other reforms; but, as noted in para 48, CFC provides no evidence on this, stating only that the other reforms "were very unlikely to have occurred without also terminating bond market repression.". This by no means rules out the possibility that bond market

repression effectively ceased at some earlier time and so is irrelevant to 1980s stock market returns. CFC is silent on this and its argument seems to simply assume that both types of reform occurred simultaneously.

51. More importantly though, suppose the reforms did occur simultaneously, as CFC assume, and the argument that excess returns remained high after the cessation of repression due to the effect of other reforms is correct. All this reveals is a *temporary* reason for the failure of the Siegel 1 prediction. It cannot explain why, in contrast to that prediction, excess returns continued to be relatively high decades later; as we noted in para 16 of Sapere (2026), average NZ excess returns for 2003-22 are indistinguishable from those during 1931-2002 (which includes both the repression and 1980s periods of ostensibly high returns). In short, the other 1980s reforms cannot explain the *long-run* out-of-sample failure of the Siegel 1 prediction.

52. CFC (p11) claims that financial repression must constitute at least part of the explanation for low real bond yields in NZ during the 1941-80 period. Possibly so, but for the reasons outlined above its ability to explain high excess returns during that period, which is what matters, is not compelling.

8 Is Ibbotson Systematically Biased Upwards?

53. CFC (pp12-13) also makes the stronger claim that the Ibbotson (historical average) estimator is not just biased upwards during the 1941-80 period, but more generally, thereby necessitating the use of Siegel 1. This argument consists of three main steps:

    (i) Generic government actions “always” make stock market investment more attractive.

(ii) As a result, any such action drives up stock prices and drives down expected returns and TAMRP. This causes a rise in realised stock returns and hence in the Ibbotson estimate, at the same time as the true TAMRP has fallen.

(iii) The Ibbotson estimator is therefore upwardly biased and needs to be mitigated by the Siegel 1 estimator (or some other approach having a similar effect).

We are doubtful about (i) and (iii), but agree with the substance of (ii); the problem is that its interpretation is ambiguous and hence so is its implications for Ibbotson.

54. CFC uses a hypothetical numerical example to illustrate these points. Specifically, following 1980s removals of restrictions on foreign participation in local stock markets, the expected return on the NZ market portfolio is assumed to fall from 11% to 9%, with a corresponding reduction in the TAMRP from 7% to 5%.[15] However, the Ibbotson estimate is 6.6%, from which CFC concludes that the Ibbotson estimate is biased upwards.[16] Unfortunately, there are a number of problems with this example.

55. First, there is no compelling reason why expanding foreign investor access in all markets should reduce the *New Zealand* stock market required return. Greater cross-border collaboration may increase expected cash flows, which would raise stock prices independent of any discount rate effect.

[15] CFC uses a riskless interest rate of 5% and hence obtain a current TAMRP of 4%, but elsewhere it states that that rate remains unchanged at 4%. We therefore assume that 5% is a typo and the true Ibbotson "bias" is 1.6% rather than 2.6%.

[16] Since there are 96 observations in the numerator of CFC's p12 calculation of $\bar{R}_m$, the denominator should presumably be 96 rather than 95 and so the correct Ibbotson estimate is 6.5% rather than 6.6%.

With respect to the latter, this could in principle go either way and the net effect depends on who the marginal investor turns out to be and the correlation of NZ returns with returns on that investor's overall portfolio. At a minimum, this requires detailed modelling and cannot simply be assumed.

56. Second, the example assumes that the riskless interest rate remained unchanged at 4% following market liberalisation. This seems like a very strong assumption, since freeing up capital markets should also allow governments to borrow more cheaply. This is in fact exactly what happened, as illustrated in Figure 1: bond yields began a steady decline from the early/mid-1980s. So even if the NZ expected stock market return did fall as assumed by CFC, the effect on the TAMRP could be positive or negative.

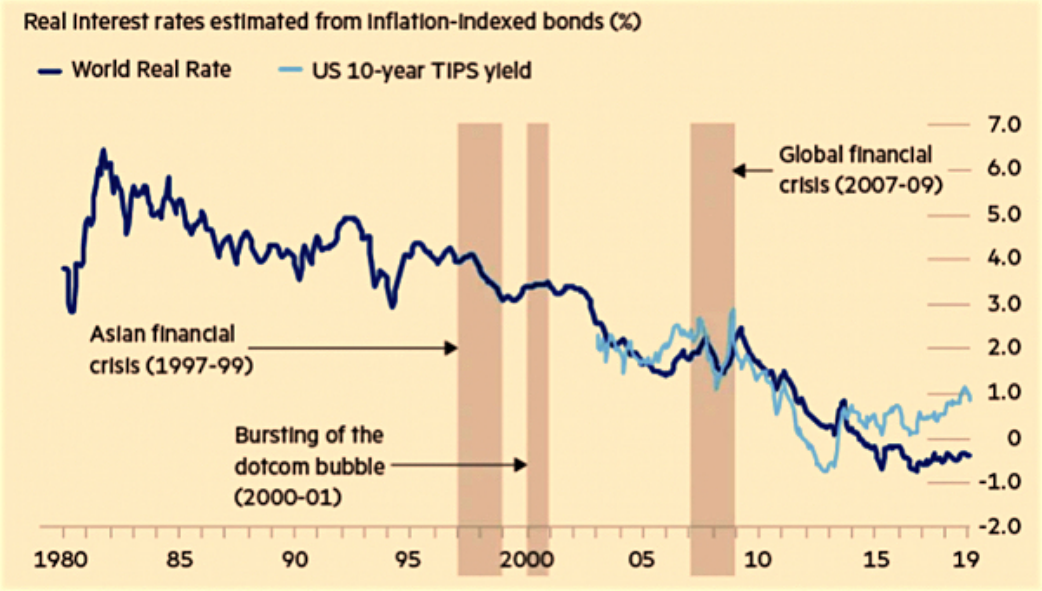


Figure 1: Interest rates 1980-2020. Source: Financial Times, based on King and Low (2014)

57. Third, even if NZ expected returns did fall and interest rates did remain the same in reponse to financial market liberalisation, other government actions would have had the opposite effect. For example, the 2019 introduction of the RBNZ dual mandate (simultaneously increasing the risks of

higher inflation and a subsequent recession, both of which stock investors fear), the 2008 rejection of a Canadian bid for 40% of Auckland Airport (partly reversing the liberalisation reforms), and the 2008-11 forced breakup of Telecom (raising concerns about the security of property rights). In these cases, CFC would have concluded that Ibbotson *under-estimated* the true TAMRP.

58. Fourth, even if the CFC example is accepted at face value, it is unclear how it should be interpreted, since CFC does not specify whether the expected return and TAMRP values are intended to be unconditional or conditional. One possibility is that the mid-1980s saw a structural break in NZ stock market required returns and so the true *unconditional* expected return fell from 11% to 9% at that time. But this has its own problems. First, as noted in para 57, financial liberalisation is unlikely to be the only such break. Second, and more fundamentally, changing unconditional means undermines the case for historical averaging of returns full stop, for Siegel 1 as well as Ibbotson.

59. The other possibility is that CFC's example refers to conditional means, i.e., the conditional expected return fell from 11% to 9% and the conditional TAMRP fell from 7% to 5%. But this mixes up apples and oranges, as the Ibbotson calculation provides an estimate of the *unconditional* TAMRP. That this differs from its conditional equivalent is no surprise; in fact, it can only ever be by random chance that the two are equal. Sometimes, when economic conditions are tough, the conditional TAMRP will lie above its unconditional counterpart; in brighter economic times, the reverse will be true. That CFC can come up with an example where the Ibbotson estimate exceeds the conditional TAMRP is exactly what one would expect and sheds no light on whether or not there is any bias in that estimate.

60. Finally, we are also doubtful about the logic of (iii). If the Ibbotson estimate is "always" biased upwards, then surely the solution is to ditch it completely, not to combine it with Siegel 1. If the latter is unbiased, then the resulting combination will still be upwardly biased. So CFC's argument is really a rejection of Ibbotson rather than a defense of Siegel 1.

9 Conclusion

61. Complex debates over the validity of the Siegel 1 TAMRP estimator are important for the the simple reason that the adjustment implied by this estimator is substantial – in the order of 1-2 percentage points lower than the standard Ibbotson estimator. Even when diluted by combining estimators, such a difference has an economically significant effect that CFC (2026, p13) notes can have a substantive impact on consumers.

62. CFC (2026) argues that the Siegel 1 approach is a vital component of the TAMRP estimation exercise, in contrast to the view of Incenta (2026). Having reviewed CFC's arguments, we remain of the opinion that Incenta has the better case, at least on the basis of evidence currently available. We have expounded a number of reasons for that view, including:

    (i) The limited theoretical underpinnings of Siegel 1 – high unanticipated inflation or bond market repression – are unconvincing. The unanticipated inflation story implies lower excess returns on average, not higher (section 4). Similarly, the repression story is inconsistent with persistent high excess returns, or with high premia also being observed for other assets where repression is not present (section 7). Neither seems large enough to explain the puzzle implicit in Siegel 1 applications: that the nominal bond premium has the wrong sign (section 2.1).

(ii) An alternative, and arguably more plausible, explanation of the data is that the 1941-80 high excess returns simply reflect a high conditional equity premium set at the beginning of the period when the economic future was highly uncertain (section 5). Unless this scenario is able to be explicitly ruled out, the Siegel 1 adjustment is unnecessary (and misleading).

(iii) CFC's contention that Ibbotson is systematically upwards-biased is tenuous, due to being based on a number of highly questionable, or special-case, assumptions (section 8).

(iv) Siegel's work has had essentially no impact on the research literature investigating the equity premium puzzle, the phenomenon it was advanced to explain (section 2.2). Presumably this reflects considerable professional scepticism about the validity of the hypothesis advanced by Siegel and, implicitly therefore, casts doubt on the Siegel 1 estimator.

(v) Perhaps most damningly, the out-of-sample predictions of Siegel 1 do not fare well with subsequent data. If the unanticipated inflation and repression stories are correct, then average excess returns should be lower in more recent data. But they are not (sections 6.1 and 6.2).

63. Some of these problems are arguably more important than others and, of course, as with many propositions in economics, none of them constitutes definitive proof against Siegel 1. And it could conceivably be argued that 20+ years of NZCC precedent places the burden of proof on those seeking to delete it from NZCC's suite of TAMRP estimators. Against this, repeating a past wrong does not make a right. If starting from a blank sheet, for the reasons highlighted in this report, our view is that the case for dispensing with Siegel 1, as suggested by Incenta (2026), is stronger than the case for retaining it.

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