

DRW INVESTMENT RESEARCH

Towards a Sustainable Retirement Plan X



**The Concept of Safe Savings Rates:
When am I saving enough?**

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May 2015

What is meant by “savings rates” in this context?

“Savings rate = net contribution towards a retirement plan, expressed as a percentage of gross income/salary p.a...this is not necessarily the same as one’s contribution rate towards a retirement fund...because retirement fund contributions are based on the concept of “gross retirement funding income” or “pensionable salary” and not necessarily your actual “cost to company” or gross earnings...

An example:

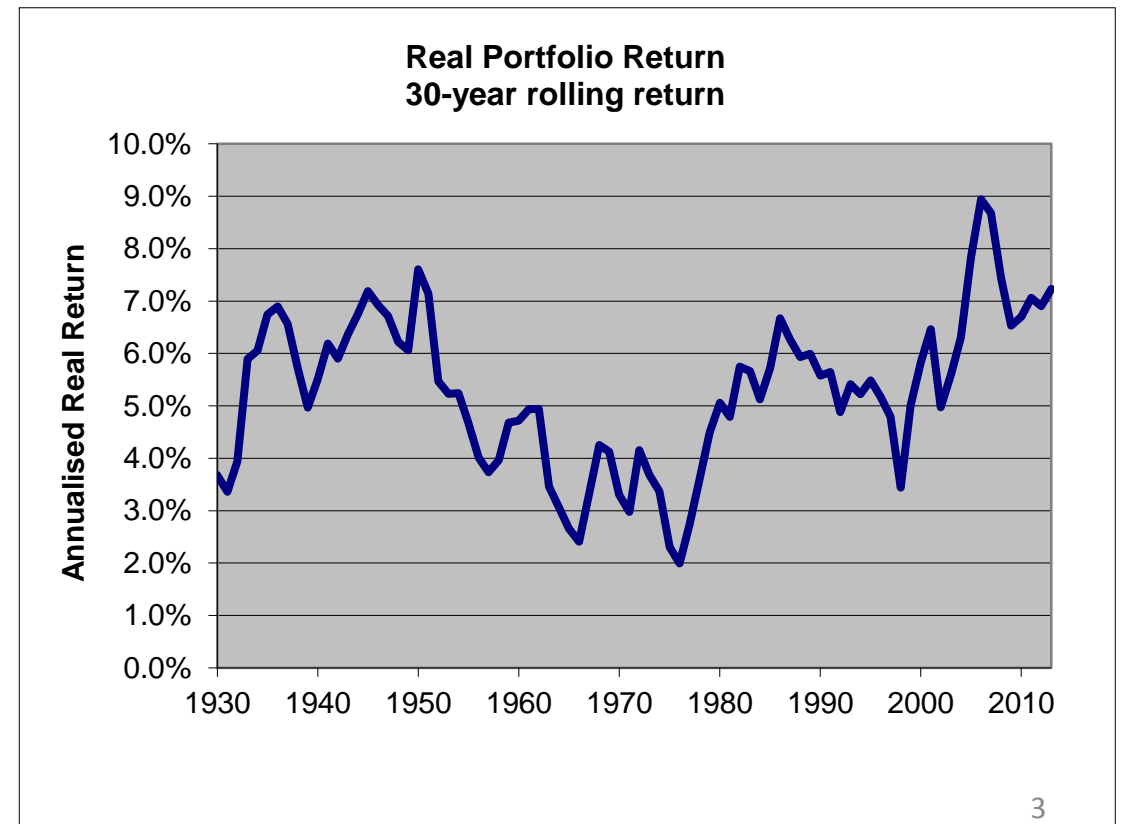
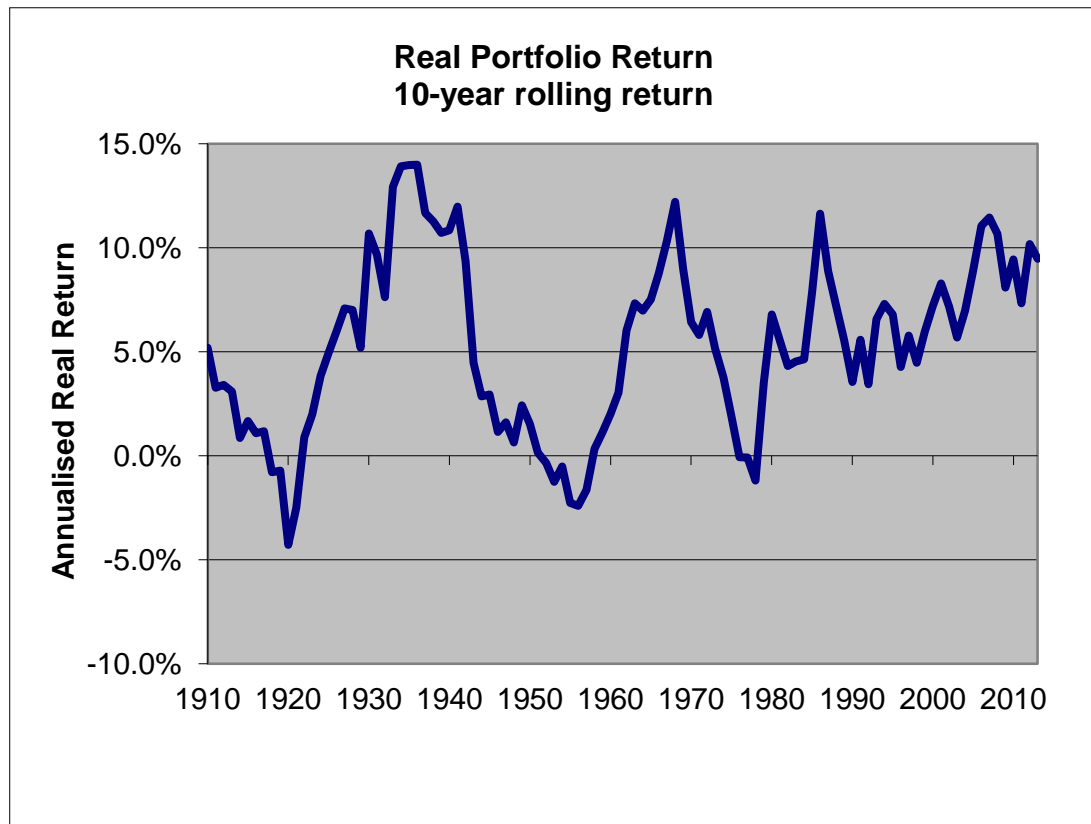
- Gross retirement funding income	R420,000 (a)
- Gross non-retirement funding income	R80,000 (b)
- Own contributions @7.5% based on gross retirement funding income	R31,500 (c)
Employer contributions @ 15% of gross retirement funding income	R63,000 (d)
but deduct 5% contributions towards risk benefits and fund admin,	-R21,000
thus, 10% net (effective) contribution	R42,000 (e)
-Total net contribution towards retirement fund	R73,500 (f = c + e)
- Gross earnings (“cost to company”) (a + b + d)	R563,000 (g)
Retirement savings rate as percentage of gross income (f)/(g)	13.1%

Thus, savings rate (13.1%) is **not** equal to contribution rate (7.5% + 15% = 22.5%)...one may easily have an inflated perception of one’s actual savings rate towards retirement...

Retirement planning: Planners beware!

A fact of (Investment) life, namely **cyclical real returns**; a long-term period of elevated real returns is more than likely to be followed by a lower real return period, i.e. it is dangerous to assume future returns will be the same as the past!

For example: consider a multi-asset investment portfolio consisting of 60% equities, 25% bonds, 15% cash; real returns based on historical market returns from 1900 – 2013 (portfolio rebalanced annually):

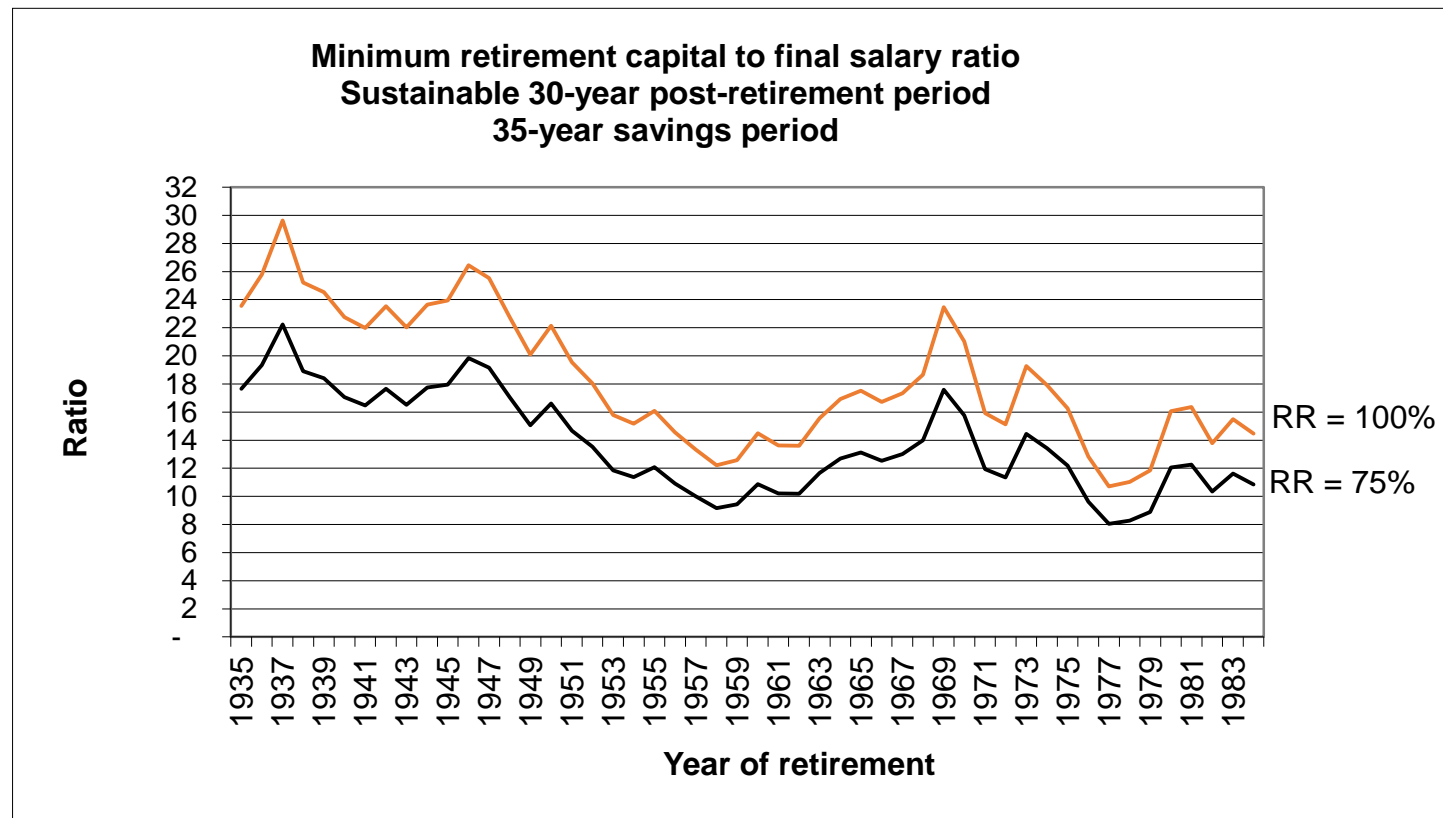


Retirement planning: Is it then reasonable to target certain retirement capital goals at retirement (retirement capital targets)?

How much retirement capital (expressed as a factor of final salary at retirement) would have been required to provide sustainable post-retirement income (replacement rates equal to 75% and 100%) for thirty years?

Sustainable post-retirement income = retirement income adjusted each year for inflation for the full duration
Replacement rate (RR) = the percentage of pre-retirement income that will be substituted by post-retirement income

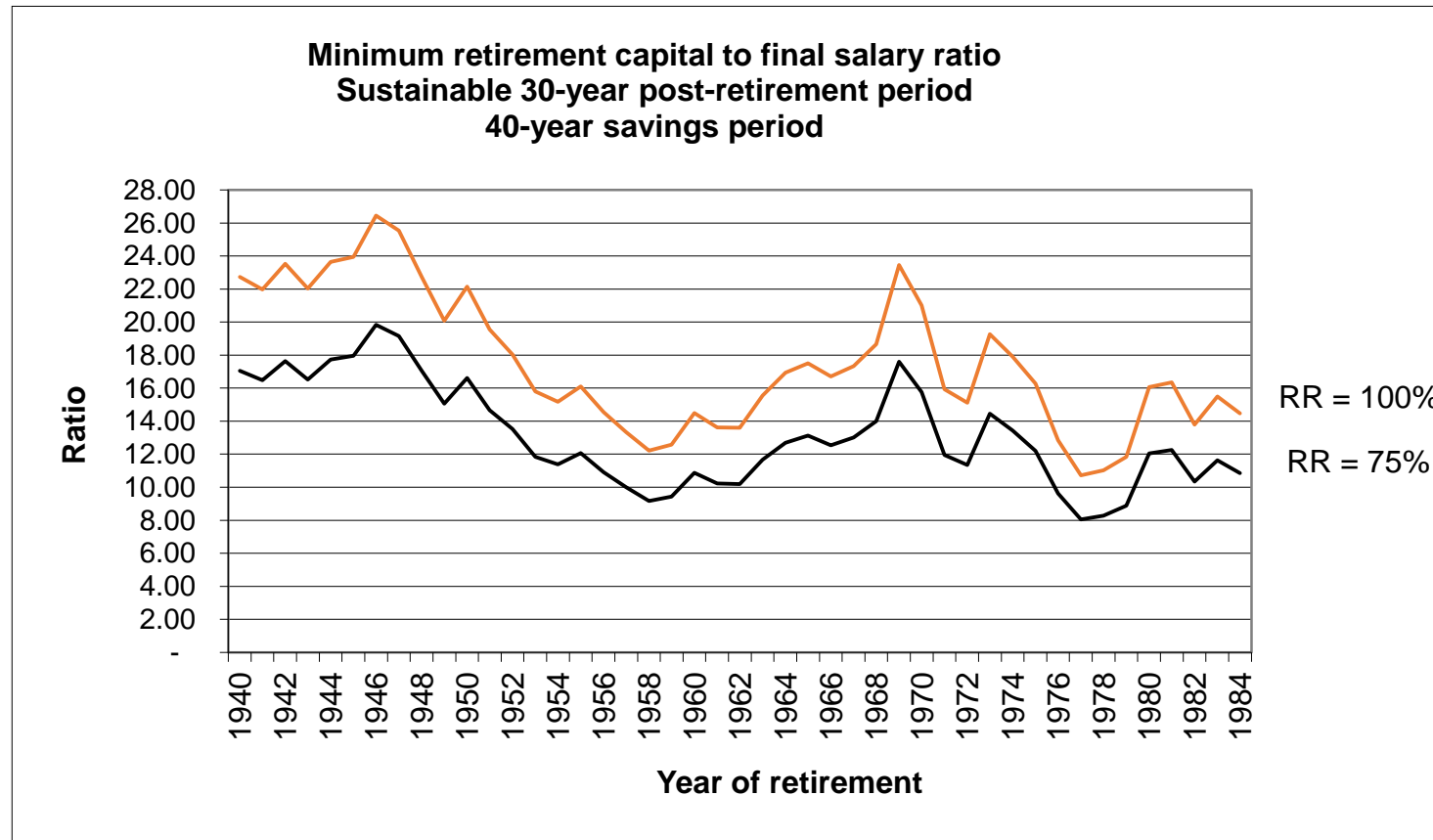
35-year savings period



Retirement planning: Retirement capital targets

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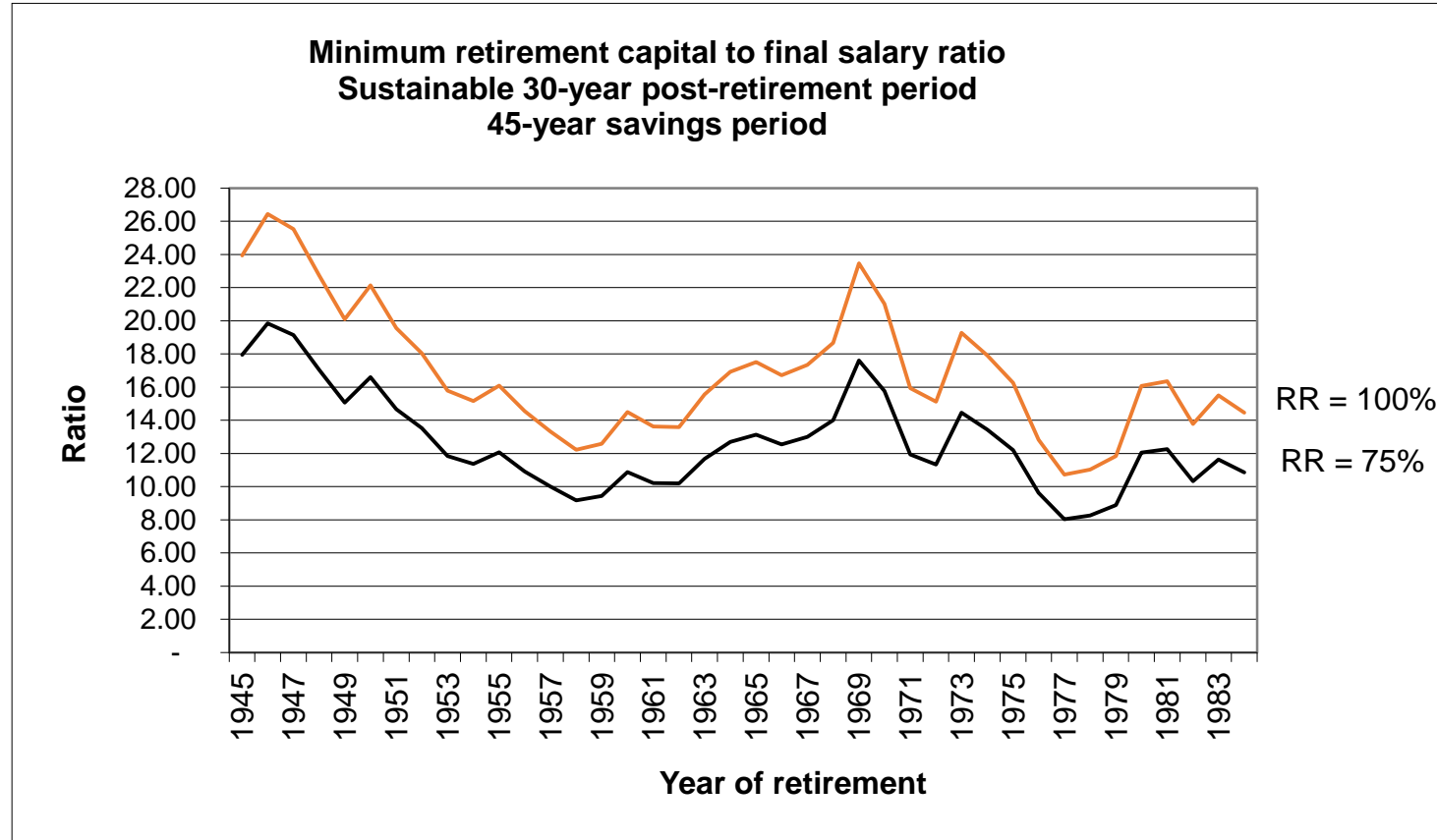
40-year savings period



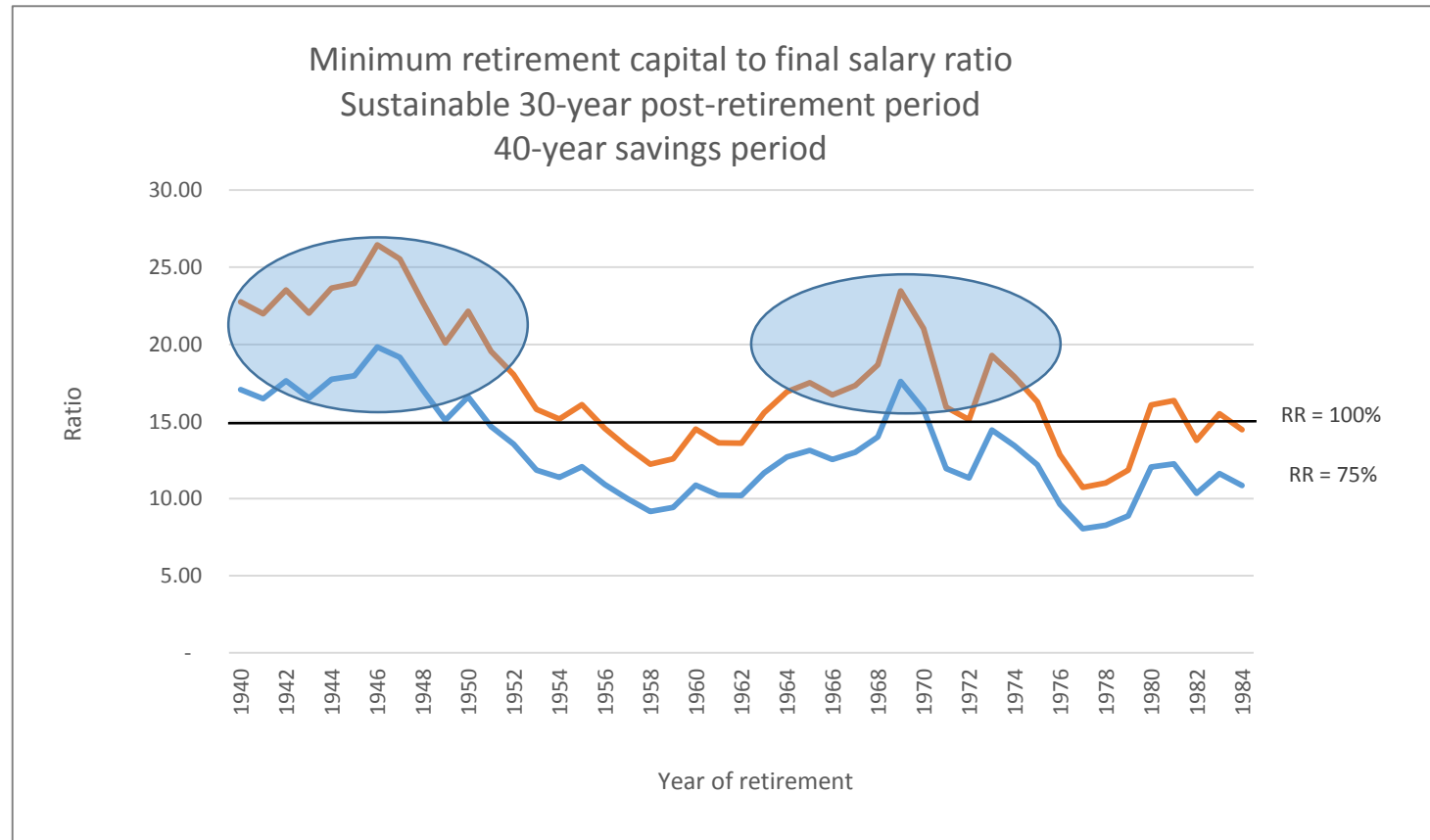
Retirement planning: Retirement capital targets

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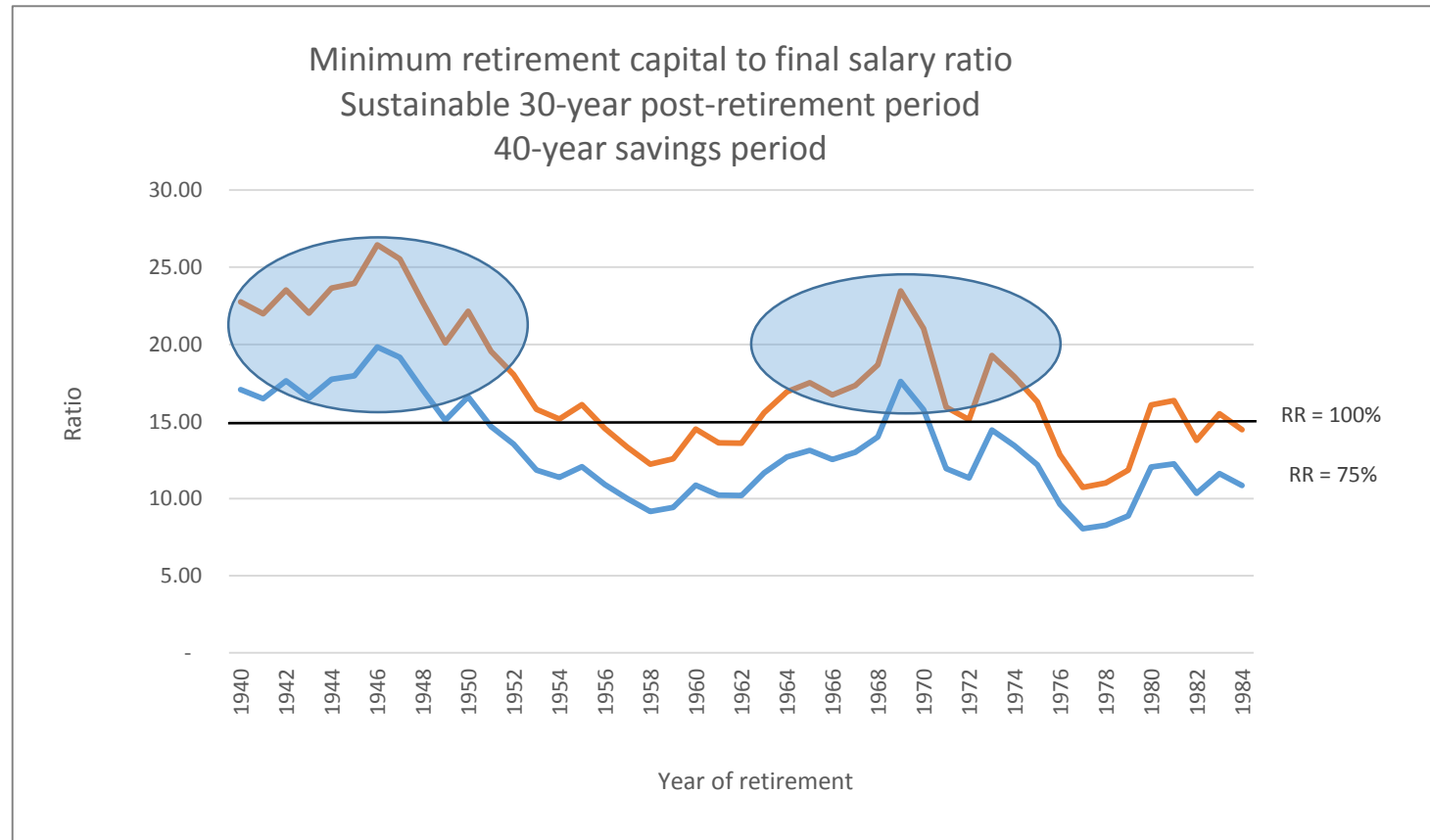
45-year savings period



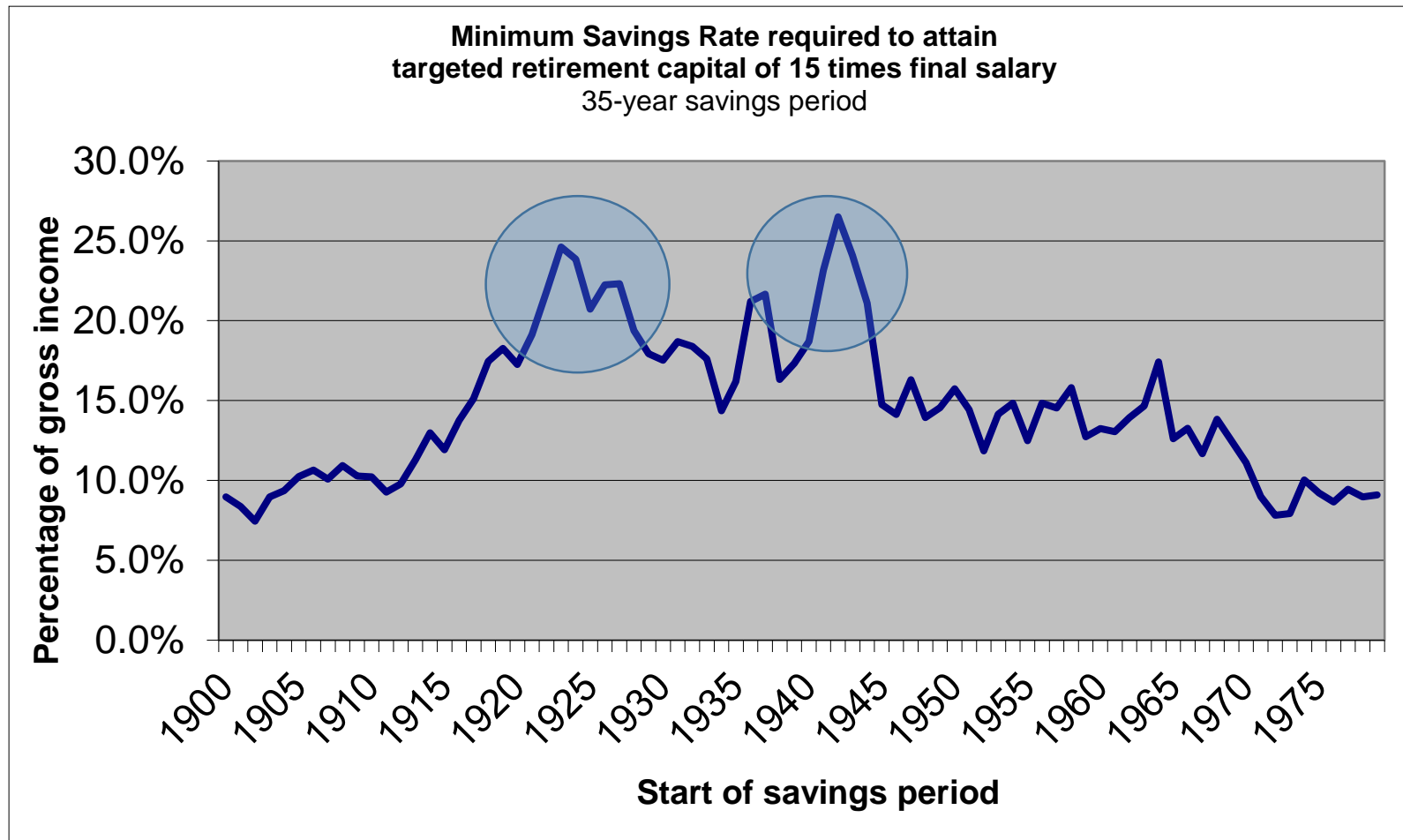
For example, if one used historical real returns over the last thirty years as a proxy for future real returns, one would assume that a retirement capital target of approx. 15 times final salary would be sufficient to provide sustainable post-retirement income for the next thirty years...but that's not necessarily true, it is possible that future returns will be below par (what we've become used to), thus making the capital target too low to yield sustainable post-retirement income!



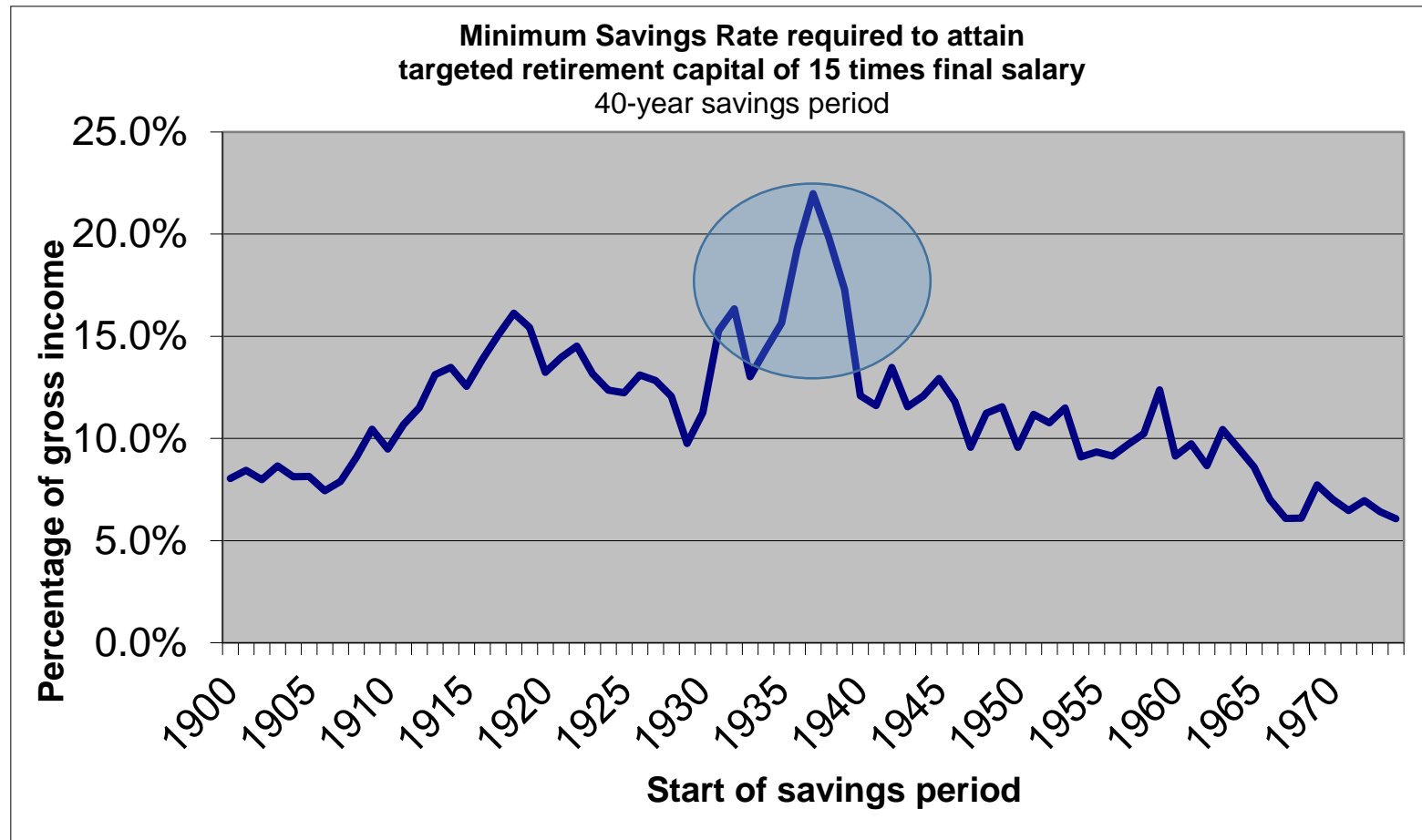
In that case it would have been more plausible to aim for a retirement capital target of 20-27 times one's final salary before retirement (considering bad patches of long-term real returns in the past)...



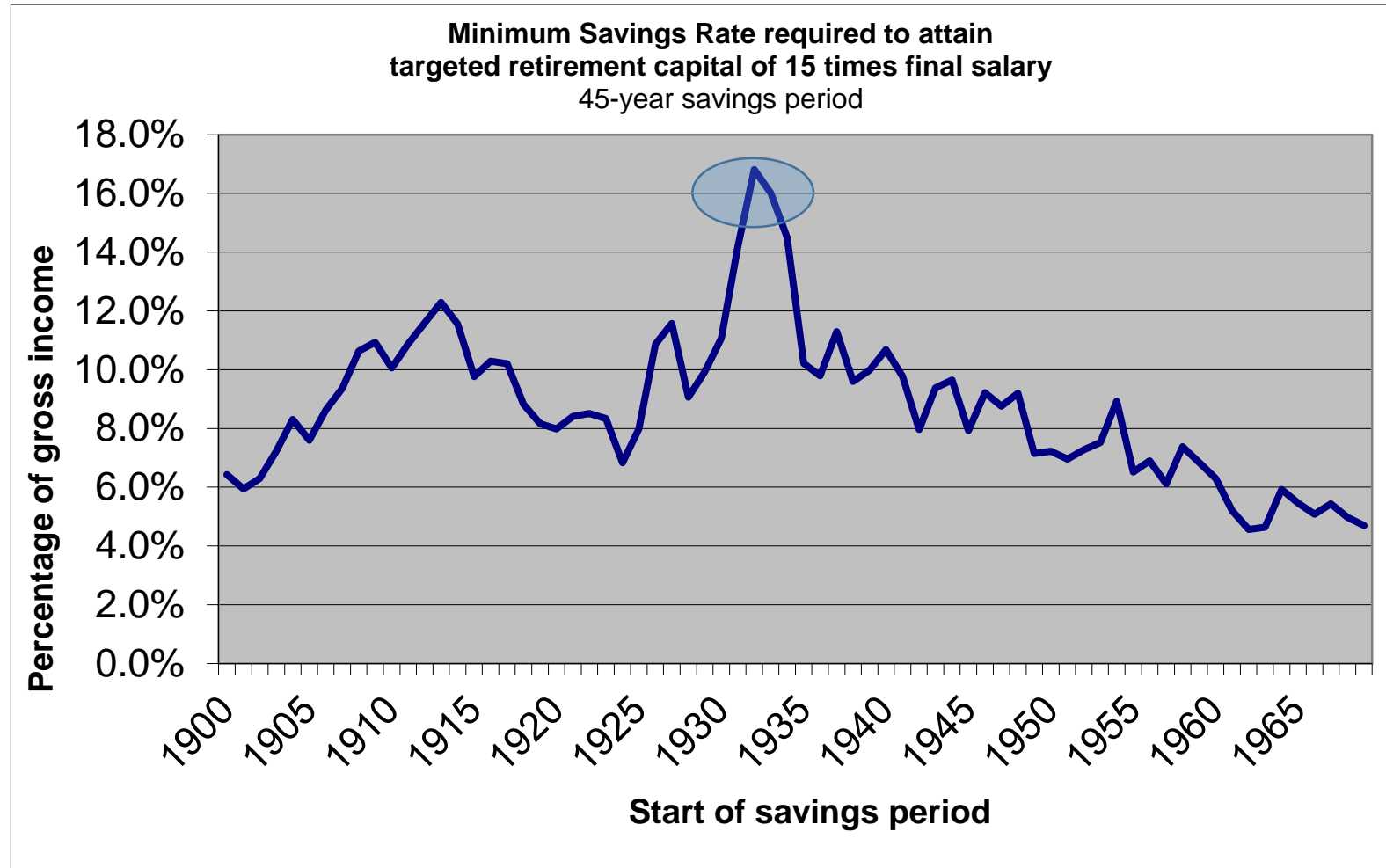
Moreover, because of variable real market returns, it is difficult to know beforehand exactly how much retirement capital will be accumulated ...or how much one would need to save (savings rate required) or the contribution (savings) period to reach that target!



Even a savings rate of 15% of gross income p.a. for a forty-year savings period would not have been sufficient for poor real return scenarios!

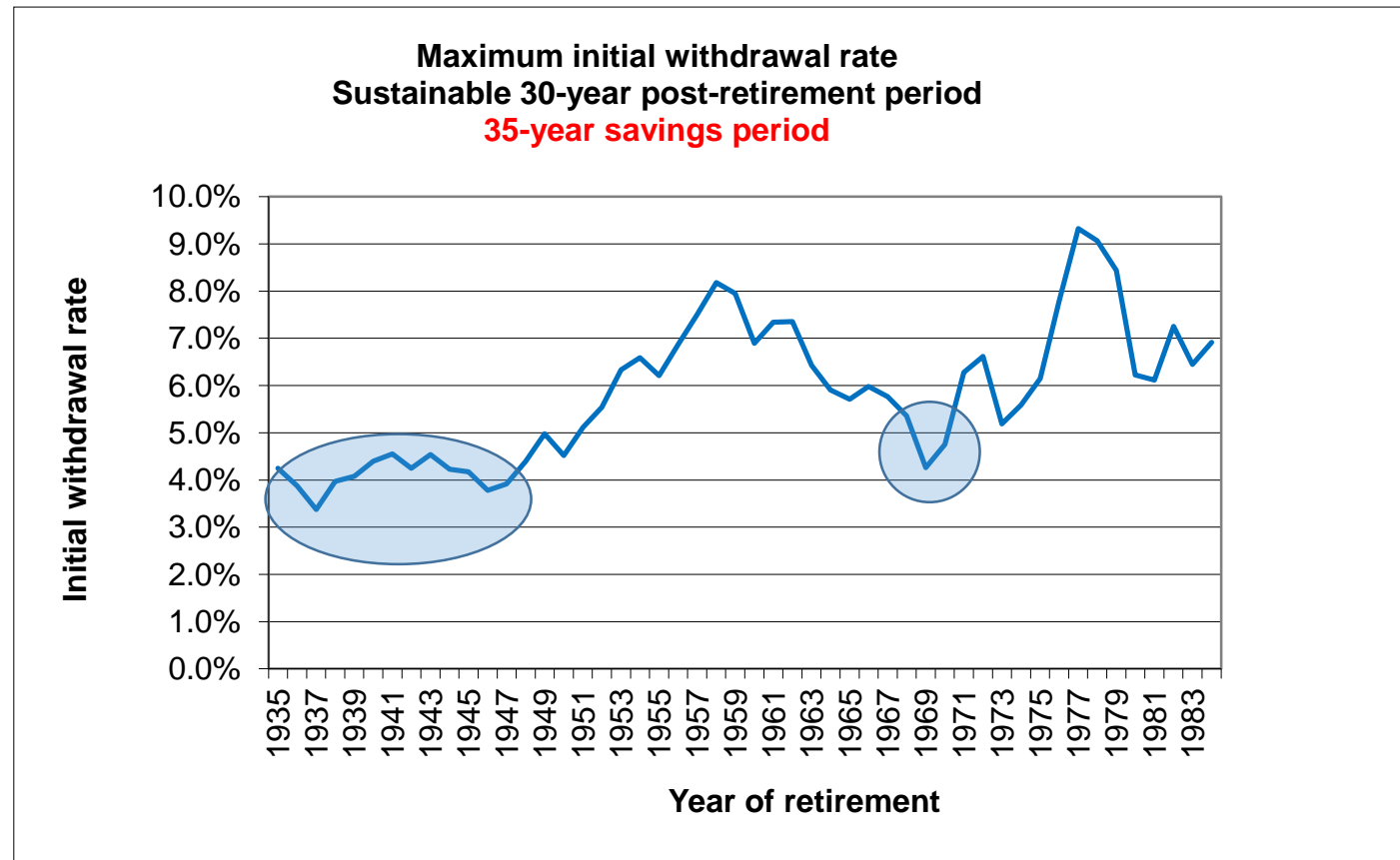


And just about adequate for a forty-five-year period...



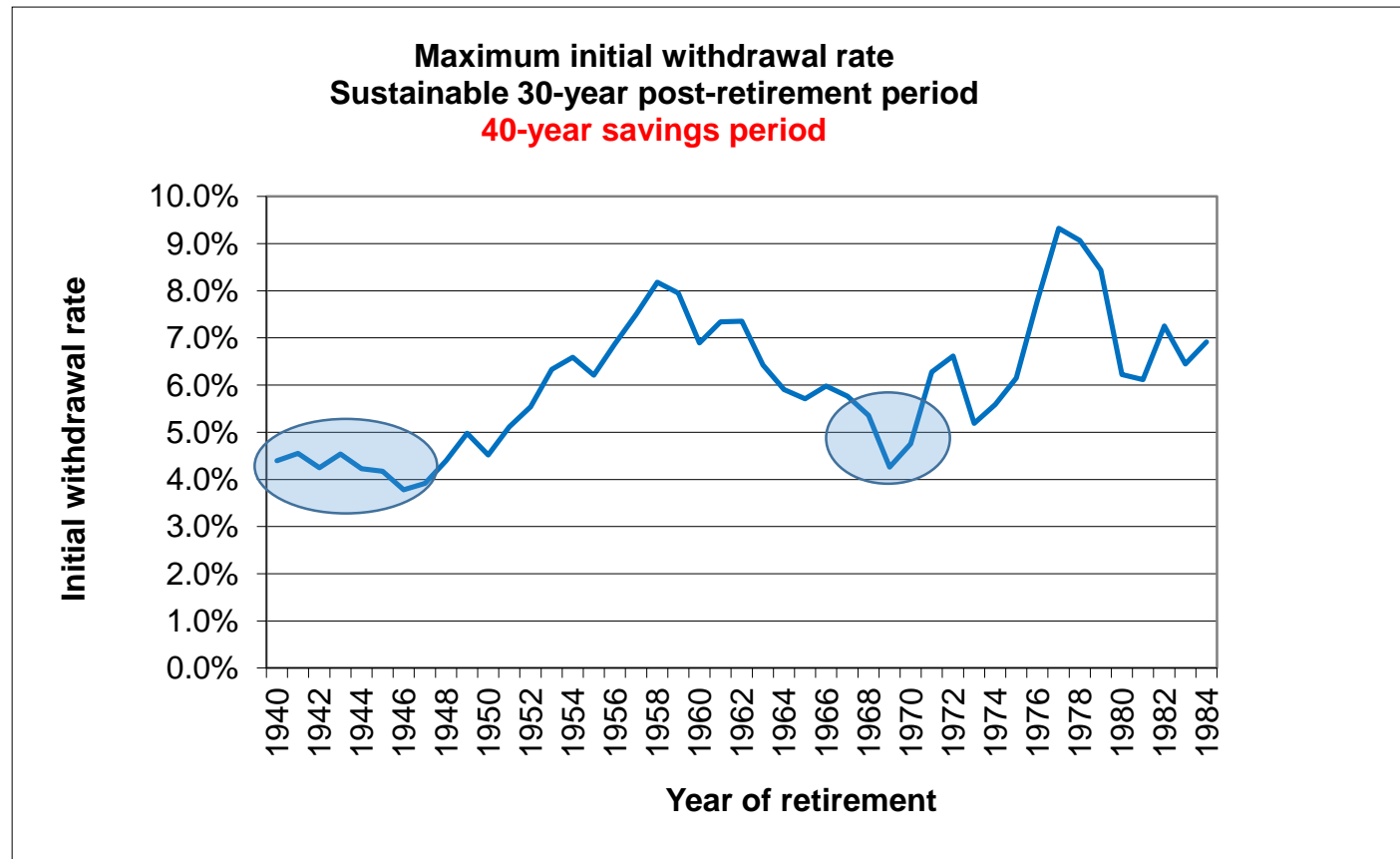
Post-retirement planning: At retirement – The initial withdrawal rate decision...

What is really a safe withdrawal (drawdown) rate; i.e. that retirement capital available will provide sustainable inflation-adjusted income for a thirty-year post-retirement period? 6%...5%...4% of retirement capital?



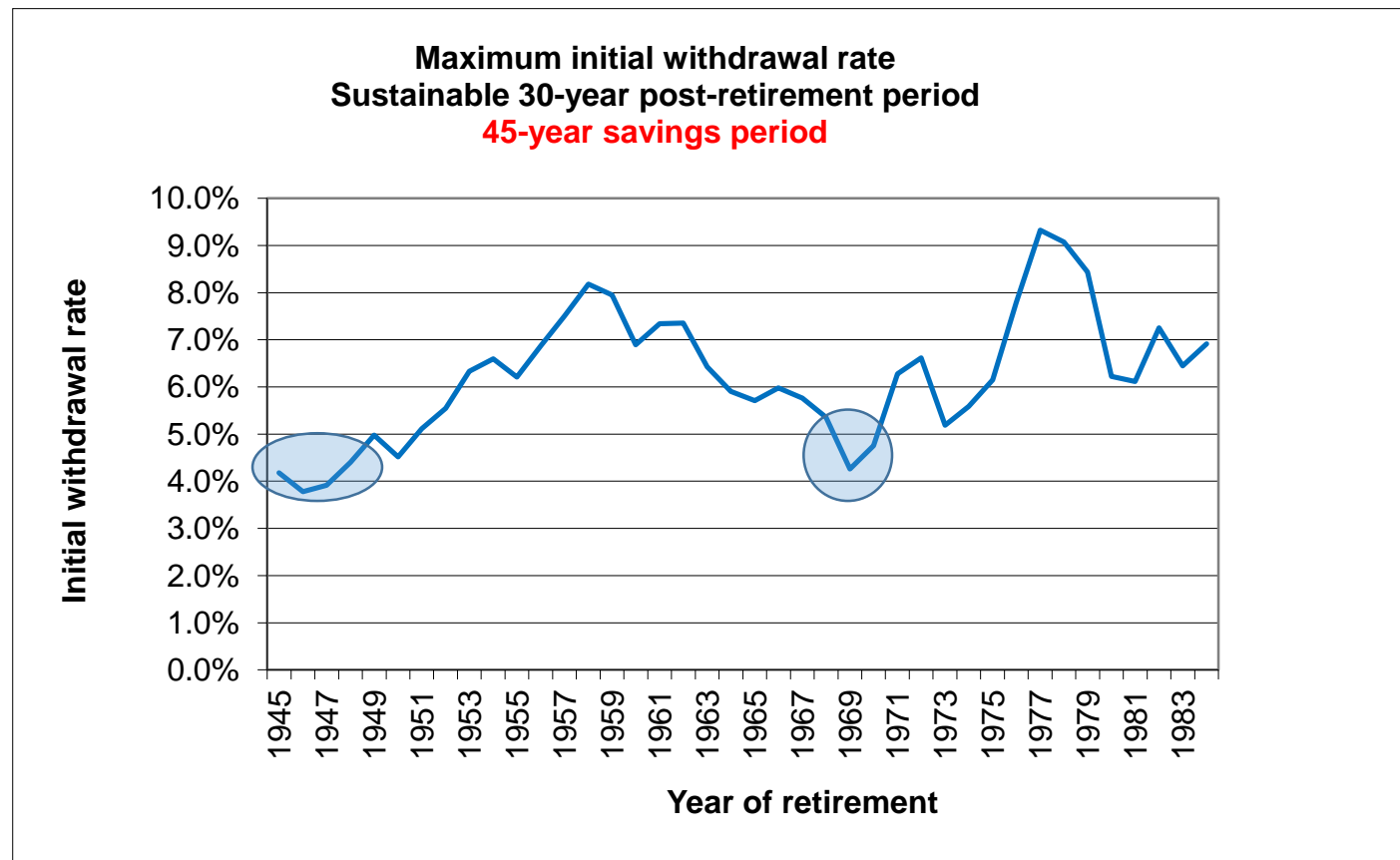
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Retirement planning: What do (or don't) we know?

We simply don't know what future returns will be like...hence what is deemed "enough" today, may not be "enough" tomorrow...

One is giving oneself a much better chance by extending the contribution or savings period as far out as possible (starting earlier and/or retiring later), i.e. a savings period of 45 years is always better than 35 years...

The more one saves (i.e. a higher savings rate) towards retirement, the better the chances for a sustainable retirement plan...

And once at retirement, limit your initial withdrawal rate between 4% and 5% of retirement asset value...

But, targeting a specific retirement capital amount (or ratio) only may be a bad idea, especially if assuming relatively high real market returns will continue indefinitely!

Retirement planning: An alternative perspective

But what if one places much less emphasis on retirement capital targets and focus solely on the aspects that are mostly within one's control, namely the **savings rate** and **contribution period**...i.e. the contributions and the period required to accumulate sufficient retirement capital providing sustainable retirement income for a thirty-year post-retirement period...thus, consider the full retirement cycle, namely the accumulation phase and drawdown phase of the retirement plan when solving the savings rate required for a specific contribution period, given historical real market returns (1900-2013).

The actual capital amount at retirement is not the major focus since we don't know for sure whether that amount will be sufficient to provide income for the next 30 years. We are interested only to know how much one should save as a percentage of gross income that historically would have provided sufficient retirement income for an extended retirement period, and thus also considering the worst historical market return periods and not only the most recent return experiences.

Calculating the safe savings rate

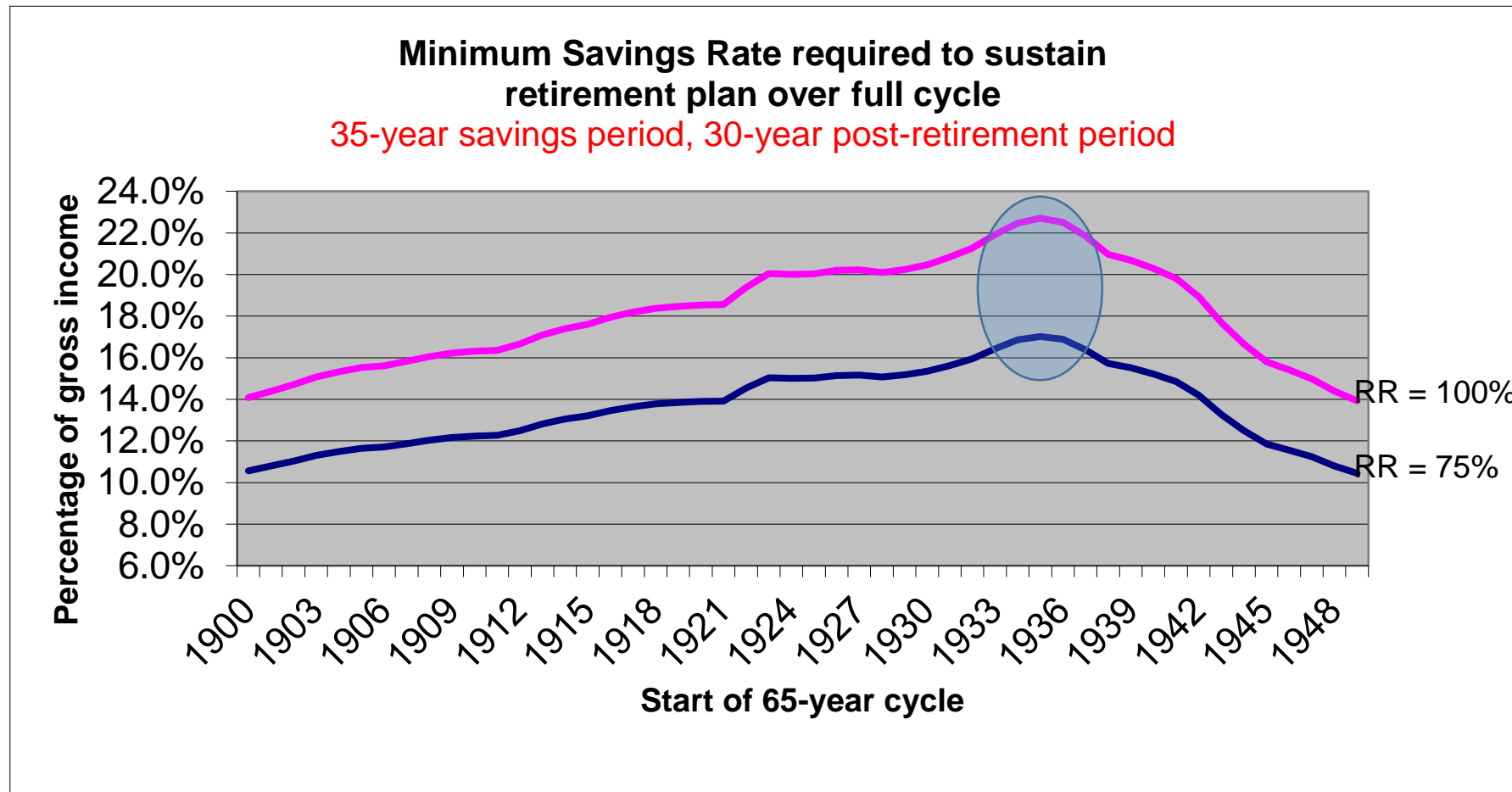
“Safe savings rate” refers to the minimum savings rate that is required to yield sustainable post-retirement income for a thirty-year post-retirement period for a specific contribution period (35, 40 and 45 years), tested against all real market returns experienced from 1900 to 2013...

Methodology of calculating the safe savings rate:

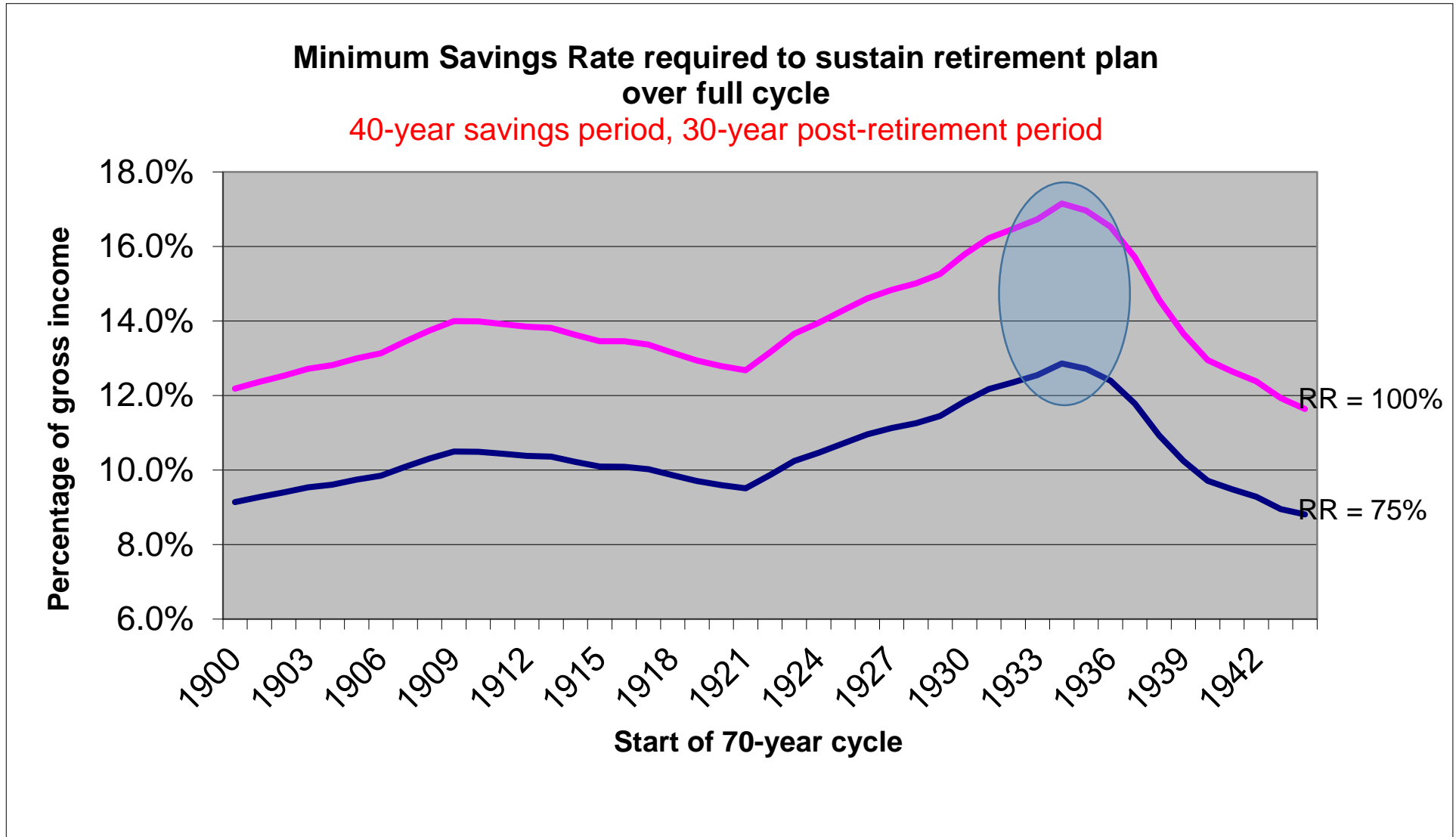
For example, consider a 35-year contribution period and 30-year post-retirement period, in total 65 years. Assume an investment portfolio consisting of 60% invested in equities, 25% bonds and 15% cash, re-balanced annually. The first full cycle would have started in 1900, the accumulation phase ended in 1934, thereafter retiree withdrew each year inflation-adjusted income for a post-retirement period of 30 years, thus the drawdown phase ended 1964. The first full cycle covered the years 1900-1964. The second full cycle started in 1901, ending 1965, and so forth until the last cycle that ended 2013. In total, 48 full cycles were evaluated. Then the highest savings rate required across all 48 cycles were identified as the “safe savings rate”, that is the savings rate that historically would have been the minimum rate required to yield a sustainable retirement plan under all historical/known market return conditions. The “safe savings rate” was then further tweaked to target a replacement rate of 75% and 100% respectively. The process was repeated for contribution periods of 40 and 45 years (70-year and 75-year full cycles). In each instance the “safe savings rate” was identified, and adjusted for targeting replacement rates of 75% and 100%....

Identifying the safe savings rate

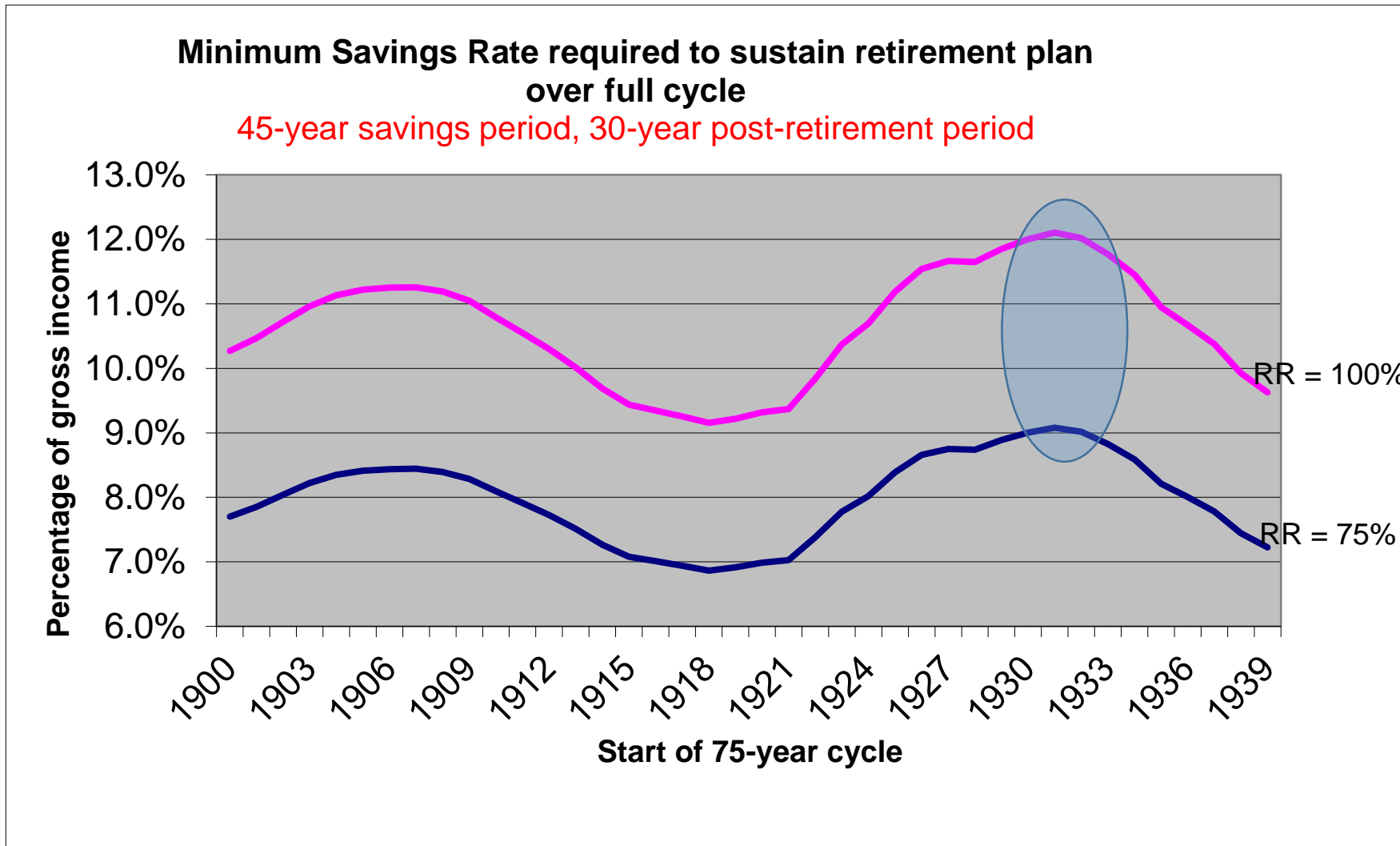
How much do I need to save towards my retirement plan for a contribution period of, say, **35 years** and an expected post-retirement period of 30 years? Assume the investment portfolio will have 60% exposure to equities, 25% bonds and 15% cash. Based on historical real market returns - when targeting a replacement rate of 75%, it seems a minimum savings rate of c. **17%** is required that will move up to c. **23%** when aiming for 100% replacement rate at retirement – a tough challenge indeed...



When one is contributing for **40 years** - targeting a replacement rate of 75%, it seems a minimum savings rate of c. **13%** is required that will move up to c. **17%** when aiming for 100% replacement rate at retirement – a much more realistic goal...



And when one is contributing for **45 years** - targeting a replacement rate of 75%, it seems a minimum savings rate of c. **9%** is required that will move up to c. **12%** when aiming for 100% replacement rate at retirement – definitely attainable...



Summary: Safe Savings Rates required

Investment portfolio 50% equities, 30% bonds, 20% cash

Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	21.4%	28.6%
40 years	16.6%	22.1%
45 years	12.2%	16.3%

Summary: Safe Savings Rates required

Investment portfolio 60% equities, 25% bonds, 15% cash

Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	17.0%	22.7%
40 years	12.9%	17.2%
45 years	9.1%	12.1%

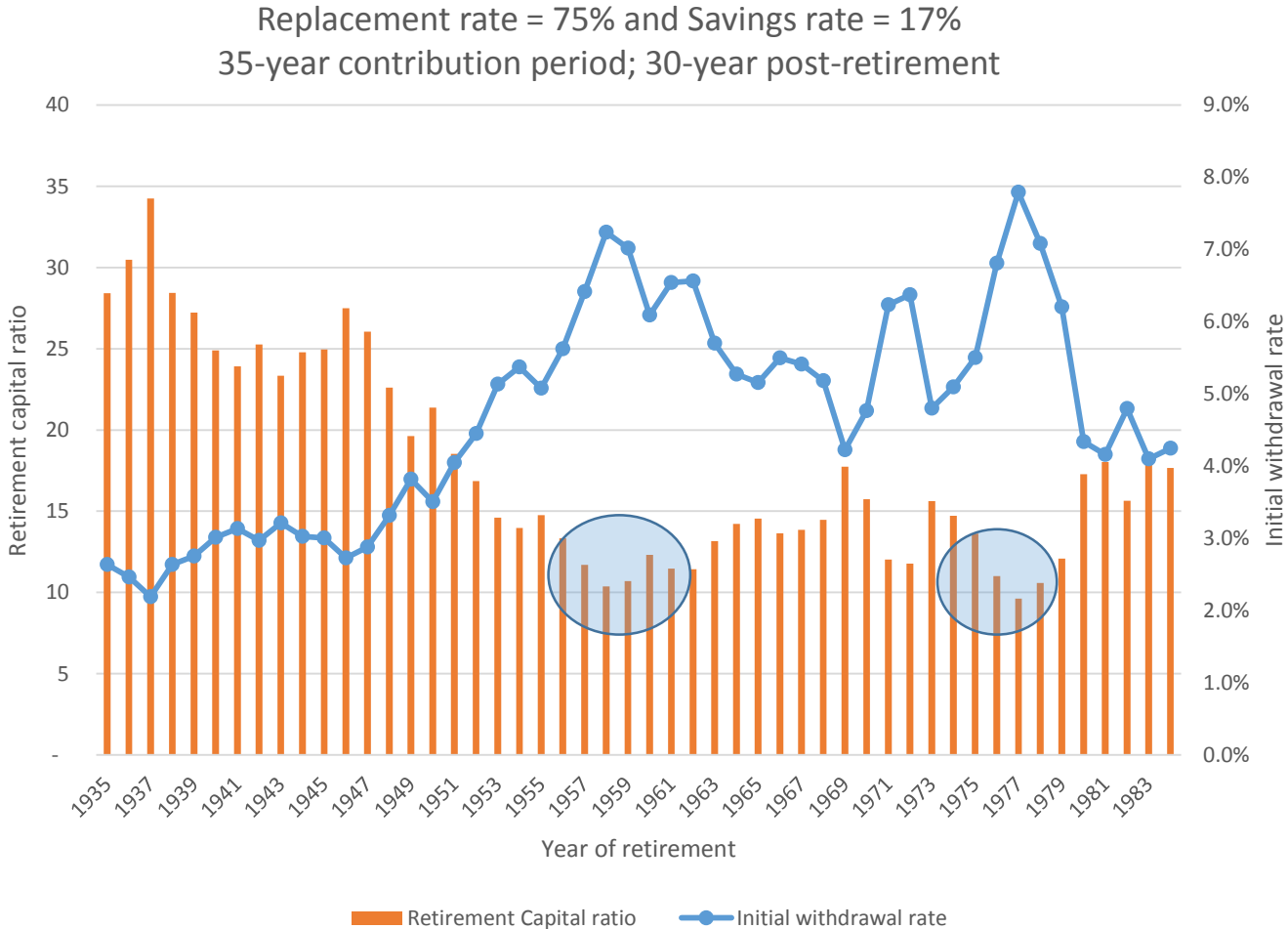
Summary: Safe Savings Rates required

Investment portfolio 70% equities, 20% bonds, 10% cash

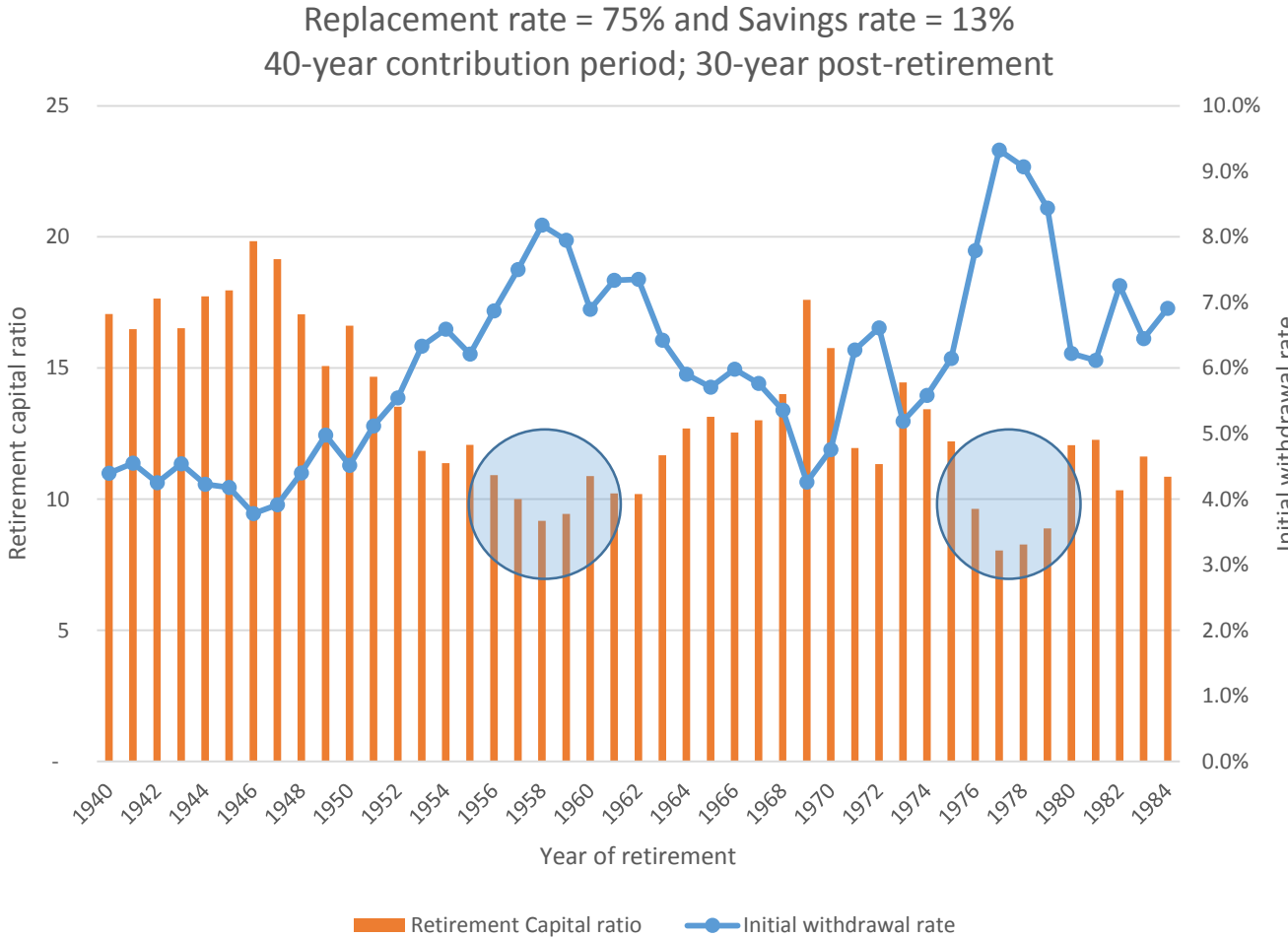
Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	13.7%	18.3%
40 years	10.1%	13.5%
45 years	6.8%	9.1%

Thus, it seems the real “game changer” is the **contribution period**, and to a lesser extent, the investment portfolio chosen; the longer one could sustain the savings effort (alternatively, postponing formal retirement), the easier it will be to attain the minimum or safe savings rates that will enable a sustainable retirement...or the easier it will be to replace a very high percentage of your final pre-retirement income with post-retirement income (replacement rate)

Beware: Targeting the minimum or safe savings rate will not always make the retiree feel comfortable. For example, consider a situation in which relatively poor real market returns were experienced in the years leading up to retirement. At retirement it would have necessitated a relatively a high withdrawal rate to meet income needs. Subsequently, however, real market returns during the post-retirement period improved significantly and made the plan sustainable. Conversely, someone that retired on the back of high real returns with supposedly more than enough capital, may have experienced poor returns during the post-retirement phase...



And it holds true for the other contribution periods....but in all cases the respective retirement plans would have been able to provide inflation-adjusted income for a post-retirement period of 30 years...



But how safe are the “safe savings rates”?

Historically (based on real market returns from 1900 – 2013) the **safe savings rates** would have been adequate to ensure sustainable post-retirement income for thirty years...but the past do not necessarily include all possible return scenarios that may pan out in the future...what if the future will yield worse outcomes than what we’ve experienced before...for this purpose I simulated real return scenarios based on three possible asset allocation portfolios and used the following assumptions (based on historical returns) in the simulations:

50% equities, 30% bonds, 20% cash:	expected real return = 5.7% p.a.; expected standard variation = 13.8%
60% equities, 25% bonds, 15% cash:	expected real return = 6.5% p.a.; expected standard variation = 15.7%
70% equities, 20% bonds, 10% cash:	expected real return = 7.3% p.a.; expected standard variation = 17.7%

Probabilities that “safe savings rates” are safe guidelines indeed when simulating possible returns; i.e. wider range of returns are possible than using historical returns only...

50% equities, 30% bonds, 20% cash portfolio

Contribution period	Safe savings rate proposed (historical returns)	Probability that safe savings rate will work under all simulated market return conditions
35 years	21.4%	76%
40 years	16.6%	76%
45 years	12.2%	73%

Probabilities based on the results of 5,000 simulations

Probabilities that “safe savings rates” are safe guidelines indeed when simulating possible returns; i.e. wider range of returns are possible than using historical returns only...

60% equities, 25% bonds, 15% cash portfolio

Contribution period	Safe savings rate proposed (historical returns)	Probability that safe savings rate will work under all simulated market return conditions
35 years	17.0%	70%
40 years	12.9%	70%
45 years	9.1%	67%

Probabilities based on the results of 5,000 simulations

Probabilities that “safe savings rates” are safe guidelines indeed when simulating possible returns; i.e. wider range of returns are possible than using historical returns only...

70% equities, 20% bonds, 10% cash portfolio

Contribution period	Safe savings rate proposed (historical returns)	Probability that safe savings rate will work under all simulated market return conditions
35 years	13.7%	65%
40 years	10.1%	65%
45 years	6.8%	62%

Probabilities based on the results of 5,000 simulations

So, what if one wants to play it “super-safe”, ignoring the worst historical returns and consider perhaps even worse outcomes...e.g. what savings rates would have been required to have a 80% probability* under simulated real return conditions so that one’s retirement plan would have yielded sustainable post-retirement income for thirty years?

Minimum savings rate required

50% equities, 30% bonds, 20% cash portfolio:

Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	24%	31%
40 years	19%	25%
45 years	15%	20%

Probabilities based on the results of 5,000 simulations

* Why 80% probability, and not even higher probabilities (90%, 95%)?...Long-term investment returns tend to be positively-skewed (to the right) and better outcomes will be observed than expected purely from a normal statistical distribution. Simulated outcomes assume a normal distribution (perhaps portraying a bleaker result than what reality would yield). Moreover, in most instances the savings rates required under such high probability thresholds would be near-impossible to attain, i.e. impractical.

What savings rates would have been required to have a 80% probability under simulated real return conditions so that one's retirement plan would have yielded sustainable post-retirement income for thirty years?

Minimum savings rate required

60% equities, 25% bonds, 15% cash portfolio:

Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	22%	29%
40 years	17%	22%
45 years	14%	18%

Probabilities based on the results of 5,000 simulations

What savings rates would have been required to have a 80% probability under simulated real return conditions so that one's retirement plan would have yielded sustainable post-retirement income for thirty years?

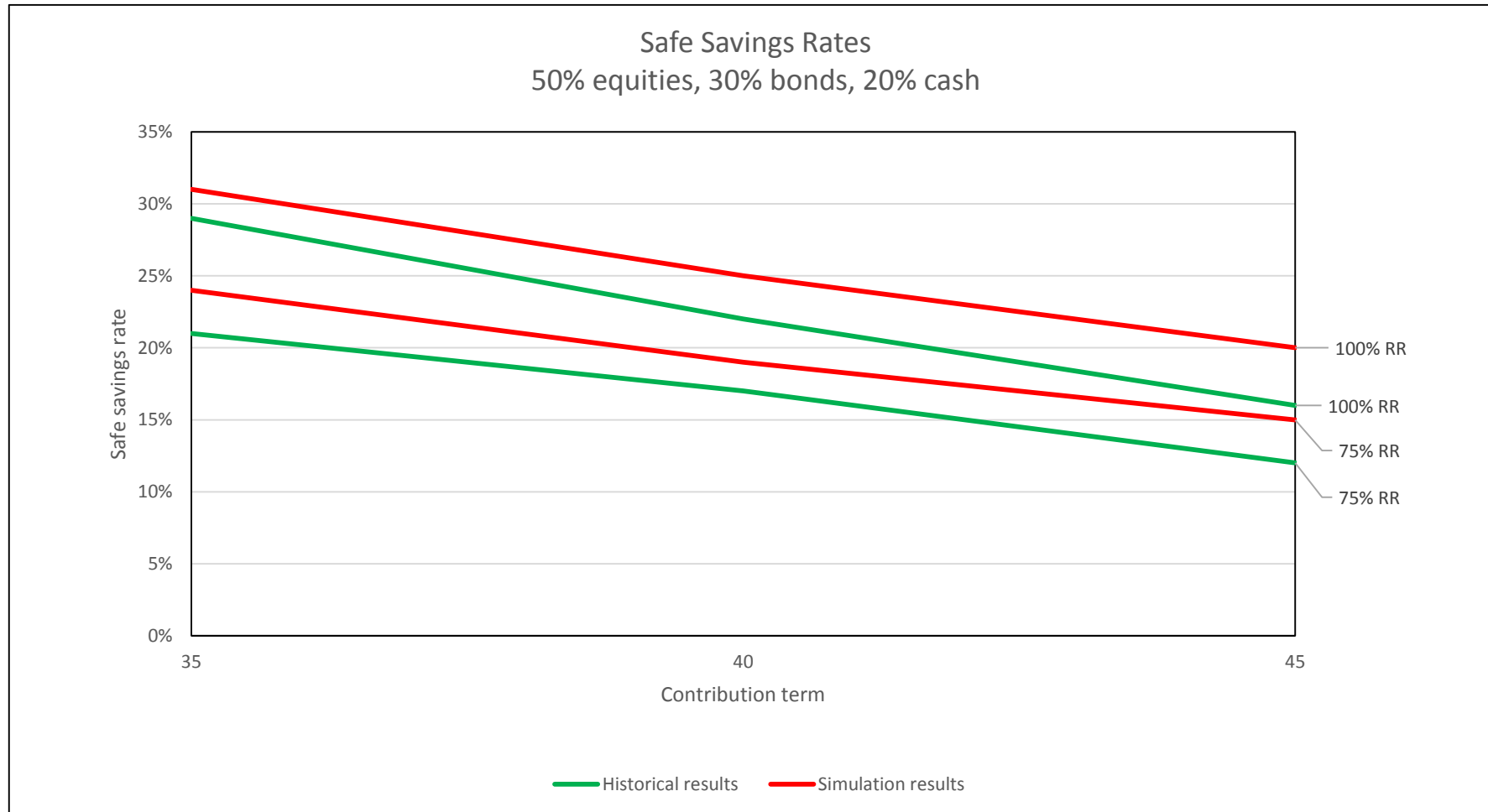
Minimum savings rate required

70% equities, 20% bonds, 10% cash portfolio:

Contribution period	Replacement rate = 75%	Replacement rate = 100%
35 years	20%	27%
40 years	16%	20%
45 years	12%	15%

Probabilities based on the results of 5,000 simulations

Summary: Safe Savings Rates (based on historical and simulated returns)



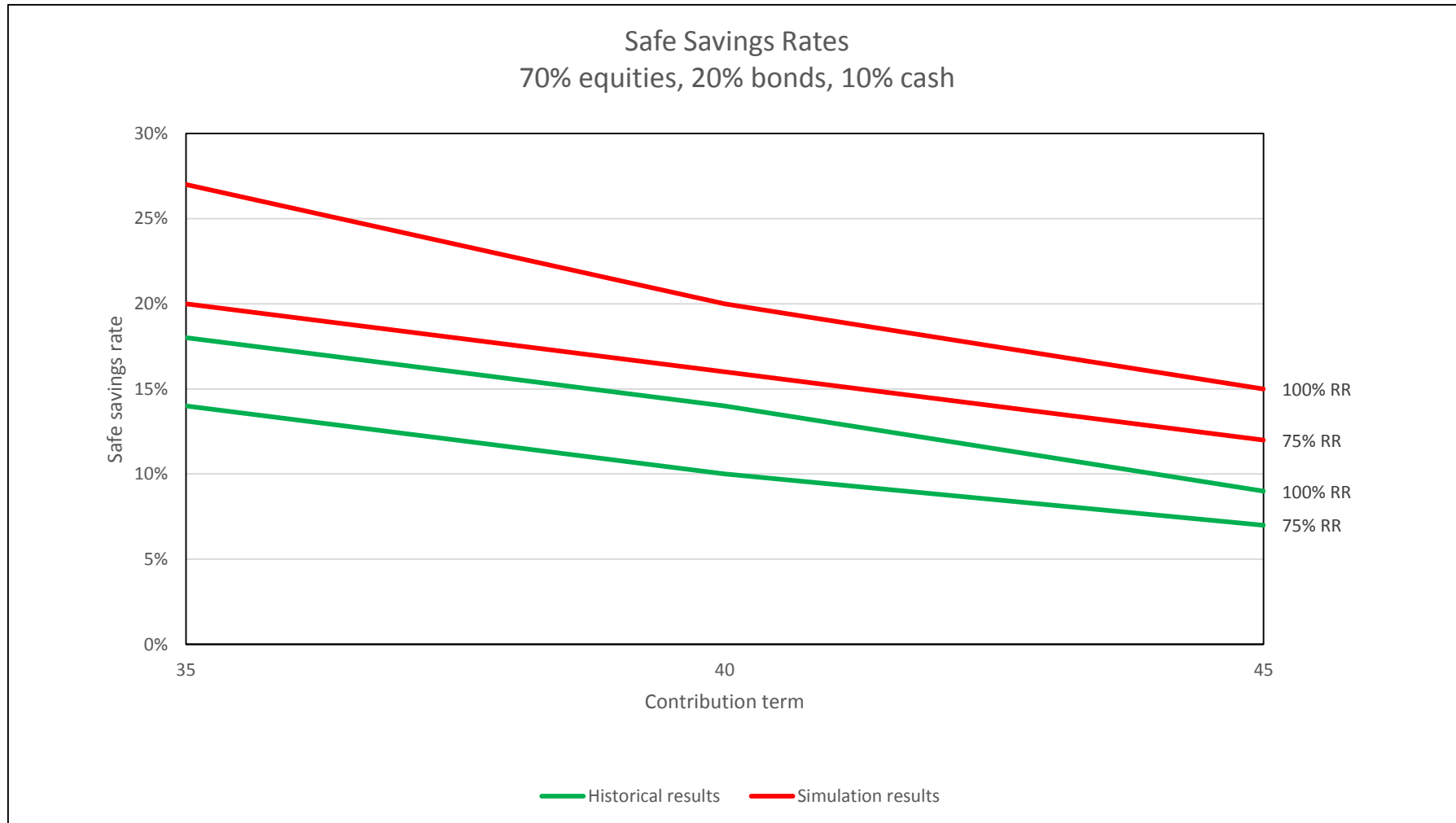
Summary: Safe Savings Rates

(based on historical and simulated returns)



Summary: Safe Savings Rates

(based on historical and simulated returns)



In Search of the Holy Grail of Successful Retirement Planning...

- Many factors will affect the outcome of one's retirement plan over time...savings, investment returns, contribution period...and once at retirement, one's withdrawal or drawdown rate and the period for which post-retirement income will be required (longevity risk). Of all these factors, the two most controllable/manageable are one's savings efforts and for how long one will save towards the retirement plan...but that requires financial discipline, the ability to look beyond instant gratification, to postpone some consumption, living within your means, and forsaking perhaps some lifestyle wants in the process...
- Perhaps the most important "tool" in the "retirement planning tool shed" is the contribution period, i.e. the length of time your savings will compound...then the actual savings effort required for a sustainable retirement plan will not be unattainable at all...
- Be very careful of planning for retirement by making use of elevated real market return assumptions as experienced in the recent past...
- Don't expect that extraordinary returns (much better than market returns) will save the (retirement) day...if it happens, be grateful and consider yourself lucky, not necessarily smart...
- Don't expect that the living standards you will maintain at retirement will be vastly different from the one you were used to before retirement...well, if you don't plan properly for it, and taking actions at the same time, it will be different...much worse!
- Retirement planning is not happening somewhere in the future, but now...



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