The Frontier Line

Spending policies and investment strategy

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About us

Frontier Advisors has been at the forefront of institutional investment advice in Australia for over 25 years and provides advice on over $630 billion of assets across the superannuation, charity, public sector, insurance and university sectors.

Our purpose is to empower our clients to advance prosperity for their beneficiaries through knowledge sharing, customisation, technology solutions and an alignment and focus unconstrained by product or manager conflict.

Anthony Luxford
Consultant

Anthony joined Frontier Advisors as an Associate in 2021 and was promoted to the role of Consultant in 2023. His role at Frontier sees him as part of several client teams in the charities, universities, family offices, private wealth and superannuation space.

Prior to joining Frontier, Anthony worked in financial advisory at West Carr and Harvey and was the lead student reporter for EQUIS accreditation at Deakin University. Anthony holds a Bachelor of Commerce from Deakin University where he was named the best graduate in Economics. He also holds a BCom (Hons) in Economics from Monash University, graduating with First Class Honours, and is a CFA level III candidate.

Sarkis Tepeli
Principal Consultant

Having joined Frontier in 2007, Sarkis is a Principal Consultant at Frontier. His experience includes working across multiple client segments and research teams including close to 15 years as a member of Frontier's Equities Team. He is the segment head for Frontier's business segment servicing charities, foundations, higher education, community trusts, family office and private wealth clients, and also leads several client service teams. Sarkis was a founding member of Frontier's Responsible Investment Group and is also member of the Manager Ratings Committee, which signs off on each of Frontier's new manager ratings.

Before joining Frontier, Sarkis was employed by WorleyParsons as an Electrical Engineer/Consultant. Sarkis holds a Masters of Applied Finance from Macquarie University. He also holds a Bachelor of Commerce and Bachelor of Engineering (Electrical) (Honours) from the University of Melbourne.

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Introduction

This paper introduces a framework containing straightforward metrics to assess the outcomes of various spending policies, noting the various trade-offs between metrics. It also explores the interaction between a spending policy and asset allocation, which aims to help asset owners in the development of their overall investment strategy.

Investment strategies are not simply about returns – endowments, charities, and family offices often consider the trade-offs around risk, intergenerational equity, liquidity, and other factors specific to the organisation. A formal spending policy will not only instil spending and budgeting discipline, but will allow for the development of an investment strategy which satisfies the organisation's aspirations within a tolerable risk framework. Furthermore, while there is a body of research about spending policies globally, we have written this paper from the perspective of an Australasian institutional investor, incorporating Frontier's various databases.

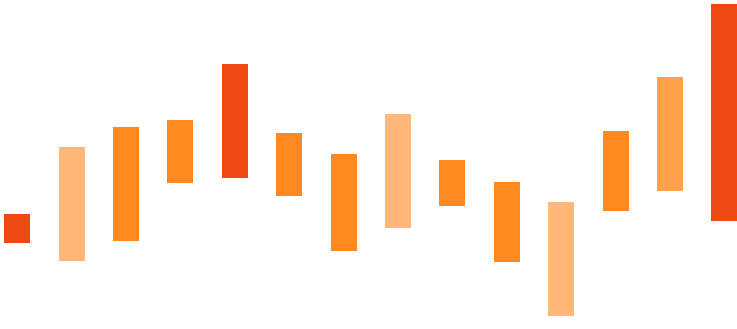
The role of an investment portfolio supporting an endowment with spending obligations is, most often, to generate sufficient returns for spending commitments while maintaining the real value of the corpus. Generally, the underlying aspiration is to achieve intergenerational equity in the management of the portfolio; meaning not favouring the present generation at the expense of future generations (or vice versa). Clearly, there is a trade-off implicit between current spending and long-term purchasing power which ideally should be considered as part of the investment strategy.

Acknowledging the existence of this intergenerational trade-off, the 'just right outcome' for a typical organisation recognises that spending should not be so profligate that capital is exhausted in one generation, nor so restricted that nothing is accomplished, and capital accumulation becomes an end in itself. The former favours the current generation, while the latter, which grows the corpus at the expense of the current generation, avails more capital to future generations.

This delicate balance is complicated by a general desire to maintain a level of year-on-year consistency with respect to the spending amount, as this could be critical for funding operational budgets or market agnostic programs sponsored by a given organisation. Donations and bequests will also be a more significant contributor to funding programs in some organisations than in others. Furthermore, an endowment should also be cognisant of the potential perception by stakeholders that it is hoarding wealth, which could be disruptive to the operations of the organisation.

A formal spending policy will therefore seek to align the utility preferences and constraints of the organisation, help navigate the intergenerational trade-off, and support the smooth functioning of the organisation.

In this paper, we use the word 'endowment' to represent any organisation which has a need to develop or monitor a formal spending policy, be that a charity, family office, university endowment or the like.



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Spending rules

Spending rules were made popular primarily by the success of US Ivy League universities. Over time, investment strategies and spending policies adapted to changing economic landscapes, leading to more diversified approaches which could accommodate various endowments' needs. While there are many policies now in use, they typically adhere to a few key principles:

- Spend no more than the real return of the endowment through time – so it won't compromise the longevity of the fund.
- Maintain an appropriate level of spending.
- Aim for a consistent level of spending.
- Focus on the balance between current spending and future spending in real terms.
- Develop an easily understood policy that is consistently applied.

Table 1 provides a summary of commonly adopted spending policies.

Table 1: Spending policies

Spending policy	Description
Simple rules	
Constant X% of portfolio	Spend a pre-defined percentage of beginning portfolio value.
Income-based	Spend all (realised) income return for the year.
Inflation-based rules	
Inflation adjusted	Spending increases by inflation each year.
Banded inflation	Spending increases by inflation each year, subject to pre-defined upper and lower bounds.
Smoothing rules	
Constant X% of average portfolio	Spend a pre-defined percentage of average portfolio value across preceding years (i.e. a three-year moving average).
Spending reserve	Segregate a percentage of the portfolio to a separate cash account. Draw on these funds when endowment performance is less than spending target.
Hybrid model (Yale/Stanford)	Spending in the current period is equal to the weighted average of 1) the previous year's distribution adjusted for inflation and 2) the beginning market value of the portfolio times the spending rate. The weights of 1) and 2) are typically 80% and 20%, respectively, although can be adjusted to accommodate the needs of a given endowment.
Other	
Asymmetric	Define a spending rate (as per the typical % of beginning portfolio value) but spend a different % amount of portfolio depending on trailing one-year return. If trailing one-year return is +/- 1 standard deviation of ex ante expected returns, spend half the defined rate. Otherwise, spend the defined spending rate. This policy was developed by Frontier as a tool to help articulate comparisons across spending policies.

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A simple spending rule of a *constant X% of portfolio* has clear benefits for the development of an investment strategy. For example, where we assume inflation will average 2.5% p.a. and the drawdown or spending is 4% p.a. the investment objective is to earn a return of 6.5%, or CPI+4%. Well established portfolio construction analysis and modelling tools can then be used to develop the optimal strategy. Using the results of the modelling, the Board can assess whether the risk implicit in the strategy is acceptable and, if necessary, finesse either the strategy or the spending rule. Note that the contribution to the spending budget is dominated by the outcome of the investment strategy in this spending model. Such a policy may not satisfy all the principles outlined above. For example, when using this rule, a consistent level of spending cannot be assured where there is volatility in the market value of the endowment.

The policy can be adapted so that spending is equal to the nominated rate multiplied by an average of the market values of previous periods, say three years. A policy based on portfolio averages reduces the volatility of (or smooths) distributions from year to year.

Portfolio averaging is not the only way to smooth returns such that the contribution from assets to the spending budget is moderated. The creation of spending reserves and stabilisation funds also serve this purpose. A spending reserve is typically invested short-term and drawn down when the fund fails to generate the required return for the period. In contrast, a stabilisation fund is typically invested longer term to manage the long-term growth of the fund and to ensure international longevity. These policies function to maintain the size of the corpus overcoming the otherwise lower returns from a diminished corpus in the event of a market rebound.

An alternative and common spending policy, particularly for organisations which operate with a shorter-term focus, is last year's spending adjusted by inflation. This policy begins with a set dollar amount, typically determined by a certain percentage of beginning market value and is adjusted each year by the prevailing inflation rate. This approach achieves stability of spending. However, in circumstances where the growth in the endowment exceeds inflation by some margin, future generations would receive a lower level of spending as a percentage of the total portfolio than the current generation, and vice versa. Furthermore, in times when inflation remains very high (above central bank bands), and endowment returns are modest/moderating, there may be a need for flexibility to be built in to account for this. Defining spending bands to form a banded inflation policy is one way to manage high/low inflation.

Another way to deal with changing inflation rates in spending is to utilise a hybrid spending policy, similar to that currently used by Yale and Stanford. This policy combines the inflation adjusted policy and X% of portfolio policy at predetermined weights, for example 80%/20%. This type of policy aims to balance the outcomes of the investment strategy (i.e. endowment returns) and the inflation adjusted spending requirements. The policy also provides the function of a weighting lever, so if inflation is too high (low) and returns too low (high), the weight towards last year's spend can be adjusted lower (higher).

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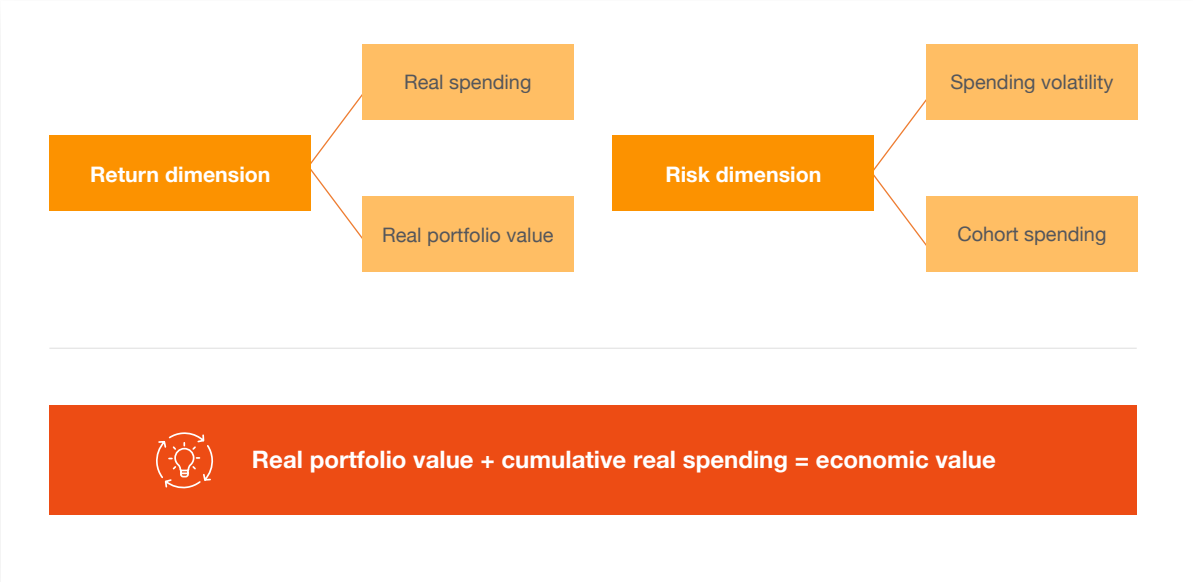
Endowment spending outcomes framework

While there are various trade-offs for an endowment to consider, determining the overall portfolio outcome for an endowment with a spending policy can be distilled into four metrics:



Based on our experience, we view these four metrics as key to assessing portfolio outcomes, not only because they (or some variant thereof) are typically of high importance to an endowment, but also because prioritising one over another will typically result in a trade-off. Needless to say, there is no one optimal approach suitable for every investor. Each investor needs to carefully consider the trade-off in arriving at the most suitable spending policy for its own unique purpose and situation.

The first two metrics can be thought of as forming part of the return dimension of endowment spending, which we have defined as:

- **Real portfolio value:** The end portfolio value of a given year, discounted back to the start period.
- **Real spending:** The spending for a given year discounted back to the start period, with the sum of real spending from the beginning to a given year denoted as cumulative real spend.

As part of this framework, we will refer to the sum of *real portfolio value* and *cumulative real spending* as *economic value.* This is essentially to reflect the total real value that has, or could be spent, on the ultimate beneficiaries of the endowment. We consider this to be a useful measure in comparing different spending rules over time.

Why use real (or present) values instead of nominal values? The answer is twofold:

- To quantitatively reflect the endowment's qualitative objectives and/or constraints.
- To isolate the effect of time as to facilitate comparison across generations.

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A discount rate can take on different interpretations in different contexts, for which in the context of endowment spending, it can be interpreted as a time preference (or patience) factor across time.
Once an endowment determines a need for spending, then not spending, or spending too little in relation to its beneficiaries' needs comes at an opportunity cost, which can be reflected via the use of a discount rate. Thus, the higher the need for an endowment to spend, the higher its discount rate should be. Conversely, an endowment with no need to spend affords itself a lower discount rate and is not punished for its retention of funds. Spending, in this sense, is a constraint on the endowment's operations that needs to be accounted (or discounted) for appropriately.

The higher the need for an endowment to spend, the higher its discount rate should be.

Spending volatility and cohort spending can be thought of as forming the risk dimension of endowment spending.

- **Spending volatility:** Statistically, we have defined spending volatility as the standard deviation of the percentage change in spend from one year to the next. Perhaps more intuitively, the inverse of spending volatility, which can be thought of as the spending stability, is a more appealing way to frame this metric.
- **Cohort spending:** Although stated easily in a qualitative sense, intergenerational equity (not favouring one generation over another) is perhaps the trickiest metric to define quantitatively. For our analysis, we take the cumulative real spending for each time cohort, (i.e. seven years) and compare this against other cohorts. The closer the cumulative spend is across each specific cohort relative to other past and future cohorts, the higher the intergenerational equity. The idea is that each cohort receives a comparable amount of purchasing power. Even this comes with its drawbacks, as equalising real spend for one cohort against another using the prevailing inflation rate would imply no real growth in spending across generations.

A helpful way to think about how to measure and determine which spending policy delivers better outcomes is via the notional use of constrained optimisation. This essentially means defining a goal for an endowment (i.e. spending $x in real terms over a xx-year period), treating this as a constraint for forward looking analysis, and seeing which spending policy maximises other objectives (i.e. real portfolio value). This can then be tempered to accommodate the risk dimension of spending, such that any preferences regarding spending volatility or cohort spending are met. Two example scenarios are:

- An endowment has decided their primary objective is to spend $1 billion in real terms over the next 30 years. This $1 billion is clearly an objective of the endowment, but for the purposes of modelling the decision about asset allocation and/or spending policy, it is entered as a constraint. This means whatever asset allocation or spending policy is chosen, the real spending outcome will be equal to at least $1 billion under that scenario.
  Thus, to optimise, a decision would be made based on which spending policy and/or asset allocation delivers the best outcome in the other set of secondary objectives (i.e. end portfolio value, spending volatility, cohort spending differences).
- Inversely, an endowment valued at $500 million could decide they want their portfolio to be worth at least $1 billion in real terms in 30 years, while maximising the spending over this period. Again, the problem translates to maximising real spending subject to the real portfolio value being $1 billion in 30 years. Thus, the spending policy and/or asset allocation would be selected on this basis.

Said another way, an endowment essentially wants to maximise its value to beneficiaries (in whichever way this may be defined), subject to mitigating the risk dimensions of the portfolio and spending, of which are considered according to the endowment's preferences. Table 2 shows how a typical endowment may view these objectives.

Table 2: Metrics and objectives

Metric	Objective
Real spending	Maximise
Real portfolio value	Maximise
Spending volatility (or inversely spending stability)	Minimise
Cohort spending (intergenerational equity)	Equalise

Of course, each metric's objective cannot be met simultaneously. For example, if an endowment wanted to get portfolio volatility down to zero, this could be done by investing the entire portfolio in a simple bank account. However, doing so will generate lower returns and hence be sub-optimal in terms of real spending and real portfolio value being maximised.

Table 3 reflects the trade-offs between metrics, which assumes one metric's objective is prioritised and other metrics are held constant. Spending stability is used instead of spending volatility because of it being a metric to pursue (like the other three metrics) to facilitate comparison. Using the 'Real spending' column as an example, i.e. prioritising real spending), there is a trade-off with real portfolio value, a neutral impact to spending stability, and a trade-off with cohort spending (or intergenerational equity, as more will be spent on the current generation). Therefore, the decisions relating to which metrics to prioritise will always tie back to the needs/objectives of the endowment.

Table 3: Trade-off matrix

		Prioritise			
		Real spending	Real portfolio value	Spending stability	Cohort spending
Interaction	Real spending		⌄	-	⌄
	Real portfolio value	⌄		⌄	⌄
	Spending stability	-	⌄		⌃
	Cohort spending	⌄	⌄	⌃	

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The table further accentuates the very important point that there is no optimal approach suitable for every investor. On the contrary, each investor with a spending remit should carefully consider its broader purpose, objectives, and the trade-offs outlined in arriving at a unique and fit-for-purpose approach to establishing its spending policy.

A second point to highlight is the priority of metrics may change over time for a given investor and should be reviewed on an ongoing basis. As an example, Table 4 highlights the evolution of priorities for a relatively new endowment as it transitions across its life. The contrived example presented is for a new endowment established to fund a program for a set period of time with a pre-determined wind-up date to show examples of priorities for a specific investor.

Table 4: Endowment phasing

	Establishment and growth phase	Maturity phase	Wind-down phase
Timeframe	First 10 years	30 years	10 years
Primary goal	Real portfolio value: To reach a size of $200 million within 10 years	Spending stability: Stable annual spending while maintaining real value of corpus	Real spending: Maximise real spending until wind-up
Secondary goal	Notional spending each year with minimal funding of several programs	Intergenerational equity	Spending stability

As this section outlined, there are many moving parts in terms of selecting and developing a spending policy, and in terms of measuring portfolio outcomes of spending policies. Given the complexities and various paths an endowment could take with its spending policy, it is safe to say there is no one-size-fits-all policy, nor is there one metric that reigns supreme in terms of measuring outcomes.

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Analysis

Having summarised key drivers and trade-offs in setting a spending policy, this section seeks to analyse various spending policies via the use of the endowment spending outcomes framework and historical back testing. We delve into the dynamics of spending policies, in particular how changing the assumptions such as asset allocation, volatility and discount rates impacts outcomes. For the analysis, the base set of assumptions are as follows:

Beginning portfolio value: $500 million

Spending policy rate (base rate for each policy analysed where applicable): 5%

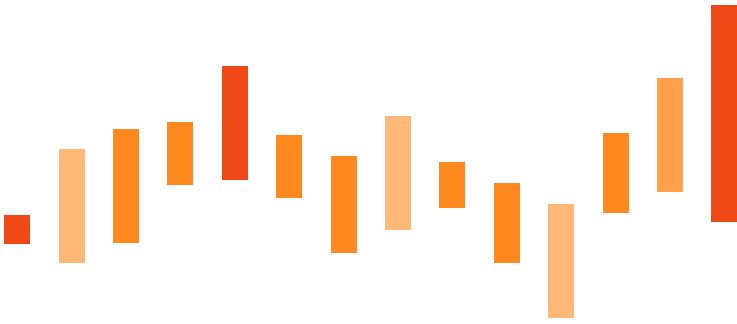
Period: 1 January 1990 to 31 December 2020

Discount method: Inflation (actual inflation rate for each year is used, which averaged ~2.5% for the historical period) – unless a different discount method is otherwise stated.

Table 5: Asset allocation

Asset	Allocation
Australian equities	25.00%
International equities	30.00%
Property	11.00%
Infrastructure	14.00%
Private equity	3.00%
Fixed income / Alternative debt	16.00%
Cash	1.00%
Annualised return for period	**9.05%**
Annualised volatility for period	**11.38%**
Illiquidity	**25.00%**
Growth	**87.00%**
Foreign currency	**23.00%**

Rebalancing: portfolio is rebalanced each year to SAA.



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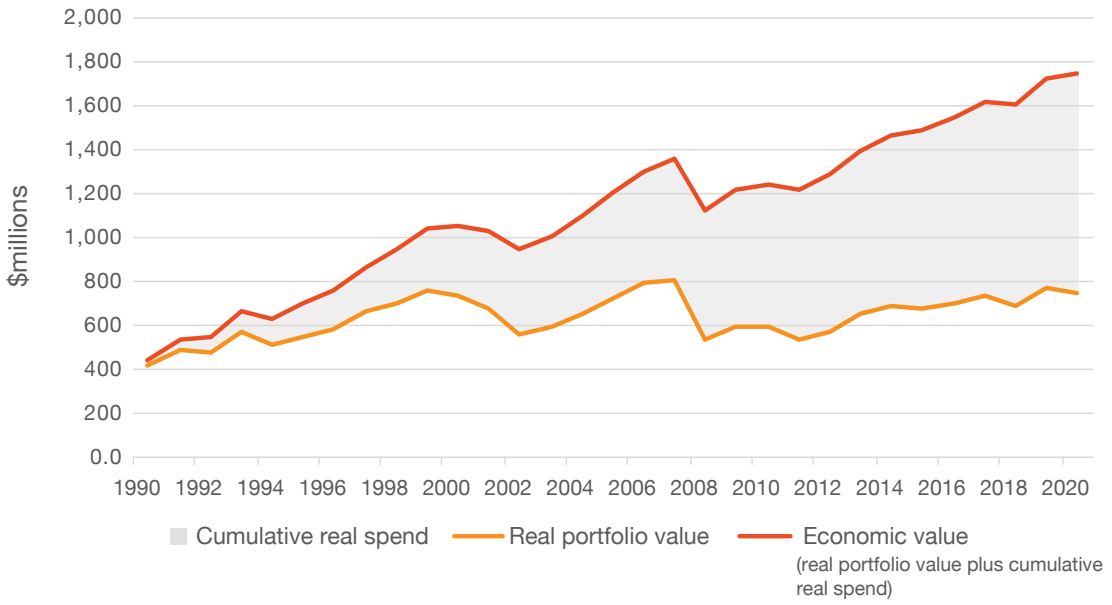
Simple analysis of one spending rule: Constant % (three-year average)

To begin analysing spending policies, Chart 1 shows the components of one spending policy, namely, spending 5% of the three-year average market value of the portfolio.

Over time, we can see real portfolio value increases because the portfolio's nominal return (~9%) exceeds the absolute hurdle set by inflation (~2.5%) and the 5% desired spending target. Economic value, which is defined as the sum of cumulative real spend and real portfolio value, also increases over time. The distance between real portfolio value and economic value is simply the cumulative real spend up to a given year. We can see the economic value created over time from implementing this spending policy is close to $1.75 billion in real terms over the 30-year period.

Chart 1: Economic value as the sum of real portfolio value and cumulative real spend: Constant % (average)



The outcomes of the risk dimension of spending policies are also shown. We can see how this spending policy broadly inherits the volatility of its portfolio, as spending across time does fluctuate (each cohort has a different real spend). For comparison, using average portfolio value results in a much smoother spending pattern compared to its counterpart of spending 5% of the beginning market value of the portfolio (Chart 3).

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Chart 2: Real cohort spend: Constant % (average)

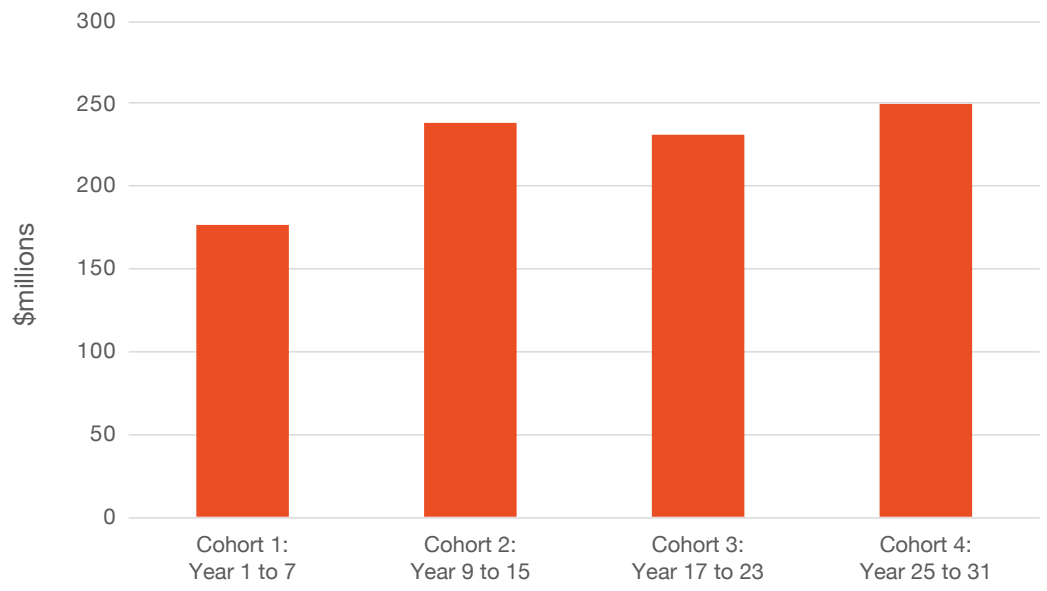
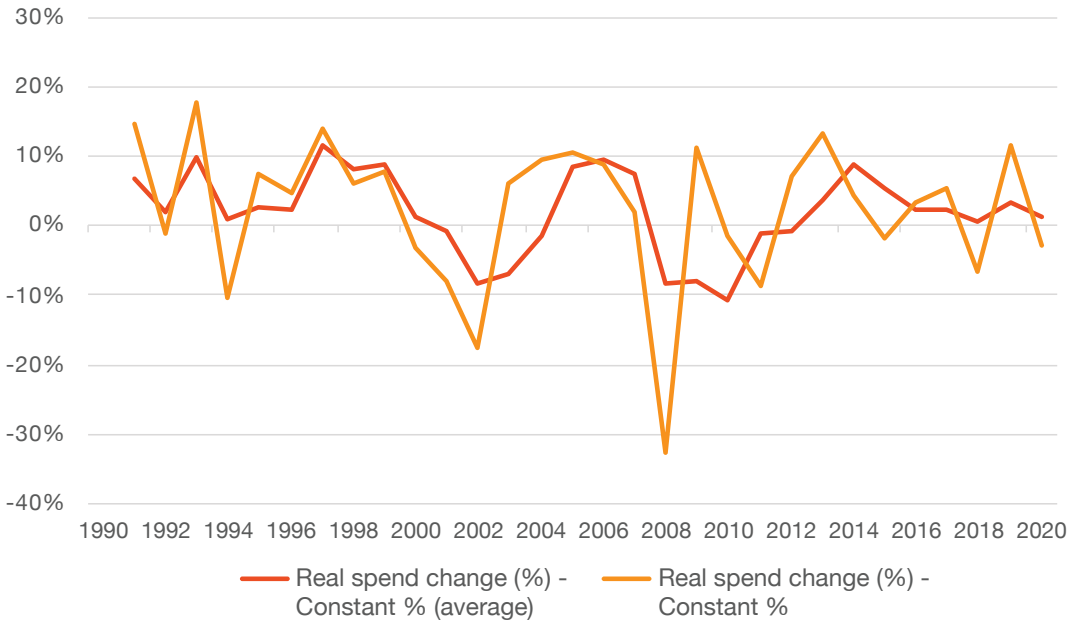


Chart 3: Real spend change (%): Constant % (average) versus constant %



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Comparison of two spending rules: Inflation adjusted versus constant % (average)

To build off the previous section, this section compares key outcomes of two straightforward policies – *inflation adjusted* and *constant % (average)*. While any set of policies can be compared using this framework, for simplicity we present two in the following analysis.

Chart 4 compares cumulative real spending across time for each policy, which shows the constant % (average) rule spends much more in real terms over time.

Chart 4: Cumulative real spend: Constant % (average) versus inflation adjusted

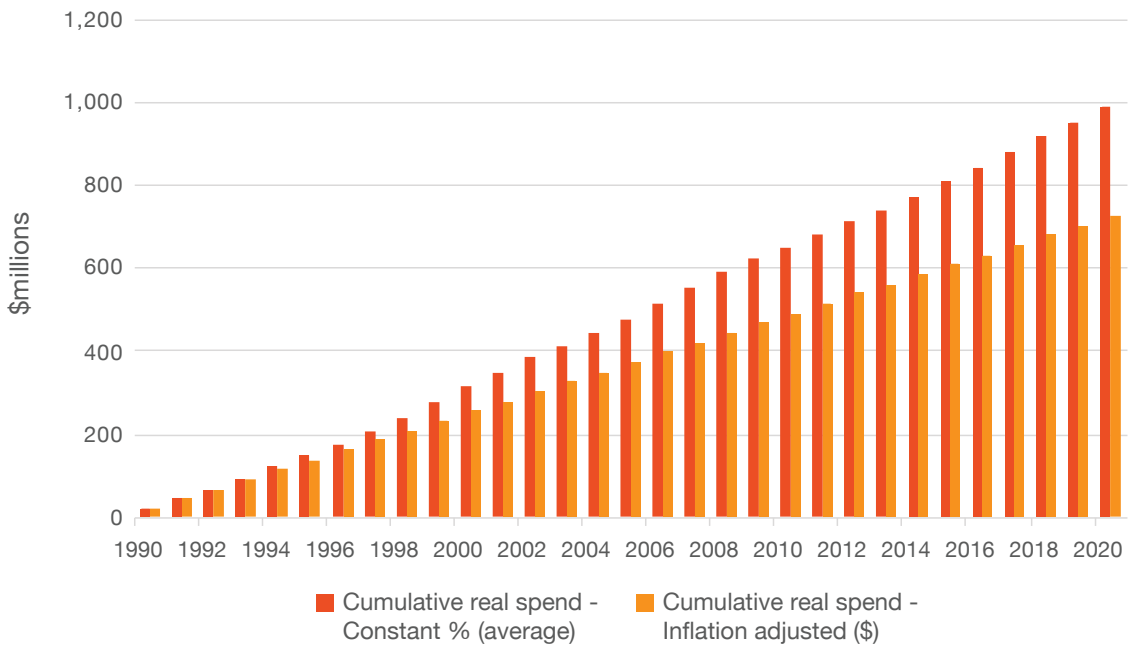

Chart 5 compares real portfolio value across time for each policy, which shows the inflation adjusted spending rule results in a higher real value over time.

Chart 5: Real portfolio value: Constant % (average) versus inflation adjusted

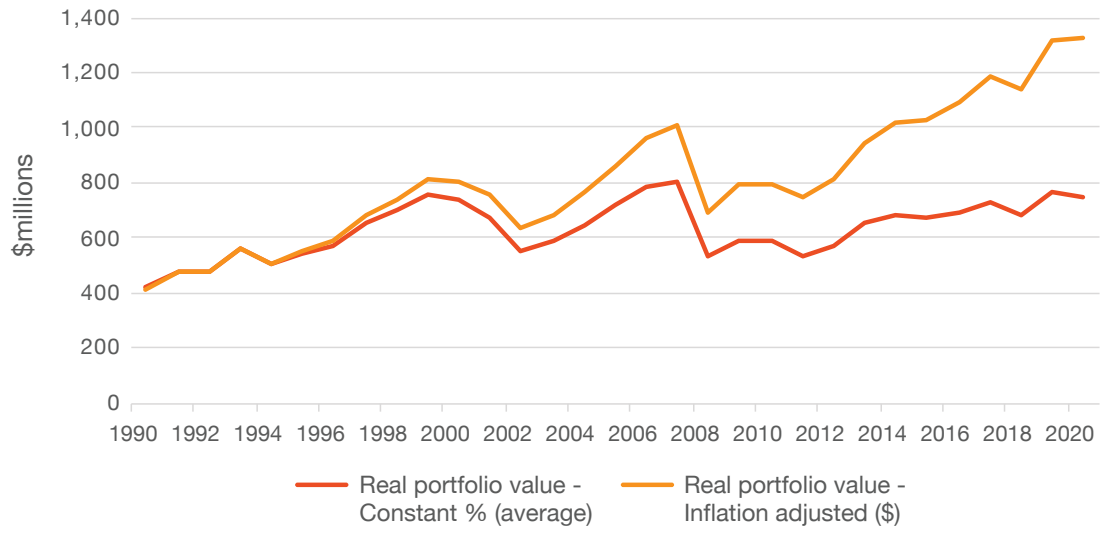

Chart 6 compares the economic value of each policy, which is effectively a summation of the preceding two graphs. It shows that over time, particularly about 15 years into the analysis, the inflation adjusted policy produces a higher economic value (assuming inflation as the discount rate).

Chart 6: Economic value: Constant % (average) versus inflation adjusted

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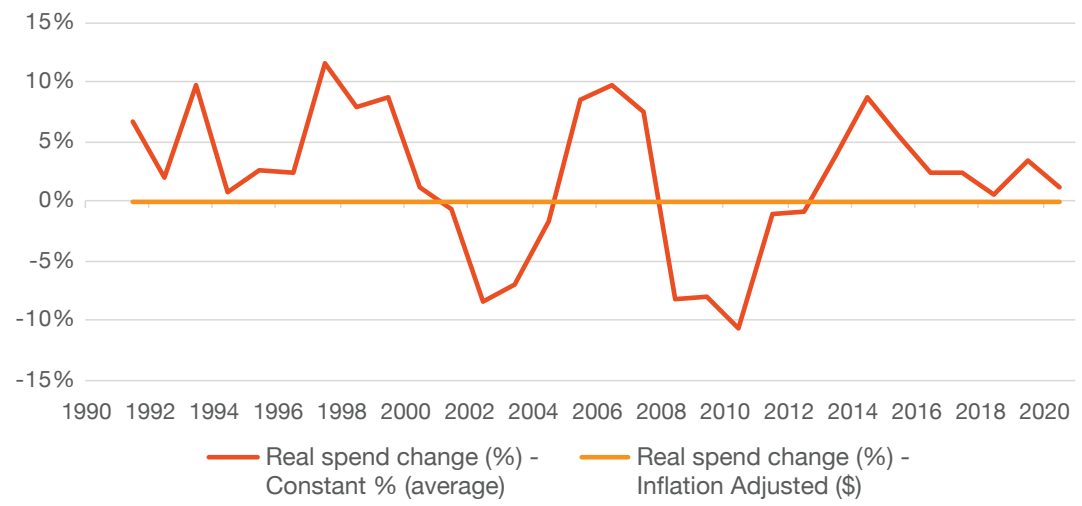
Chart 7 compares one of the elements of the risk dimension of spending – the percentage change in real spend. As expected, when discounting the inflation adjusted rule by inflation, there is no change in real spending over time, while there is considerable change of up to +/- 10% year-on-year associated with the constant % (average) rule. Taking the standard deviation of each of the below series computes each policy's spending volatility.

Chart 7: Year-on-year real spend change: Constant % (average) versus inflation adjusted



The second element of the risk dimension of spending, cohort spending, is shown in Chart 8. Each cohort receives the same spend in real terms for the inflation adjusted rule, while in comparison, there are some differences in real terms between cohorts for the constant % (average) policy.

Chart 8: Cohort spending: Constant % (average) versus inflation adjusted ($) spending rule

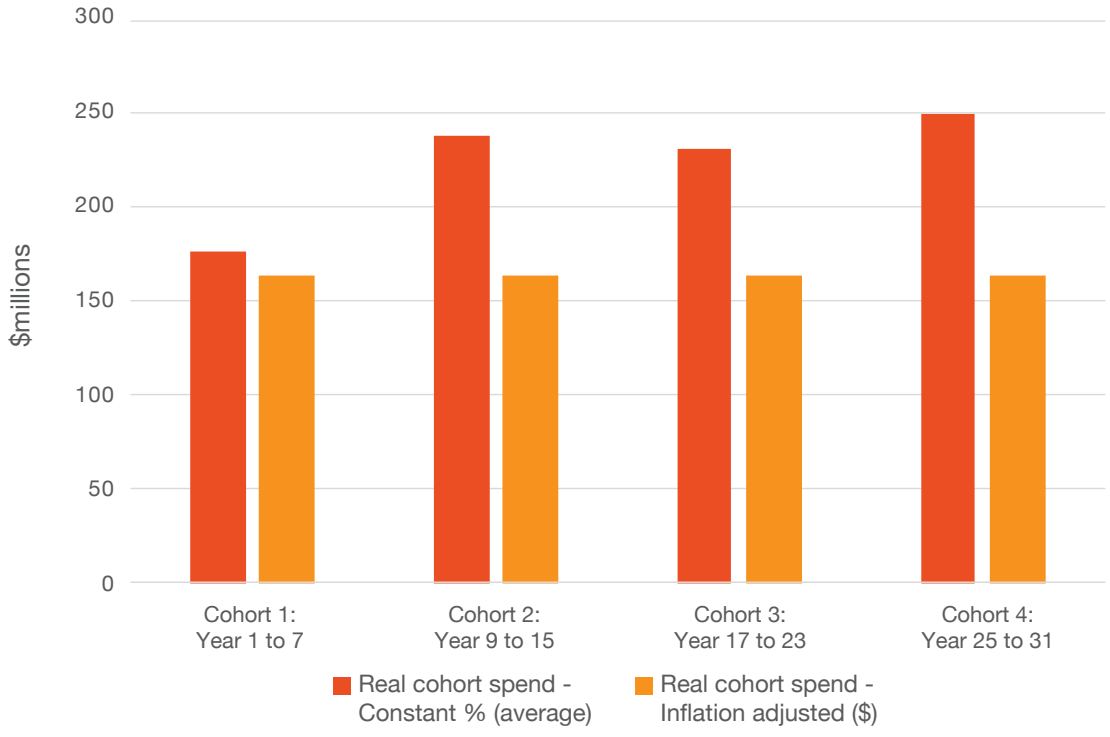


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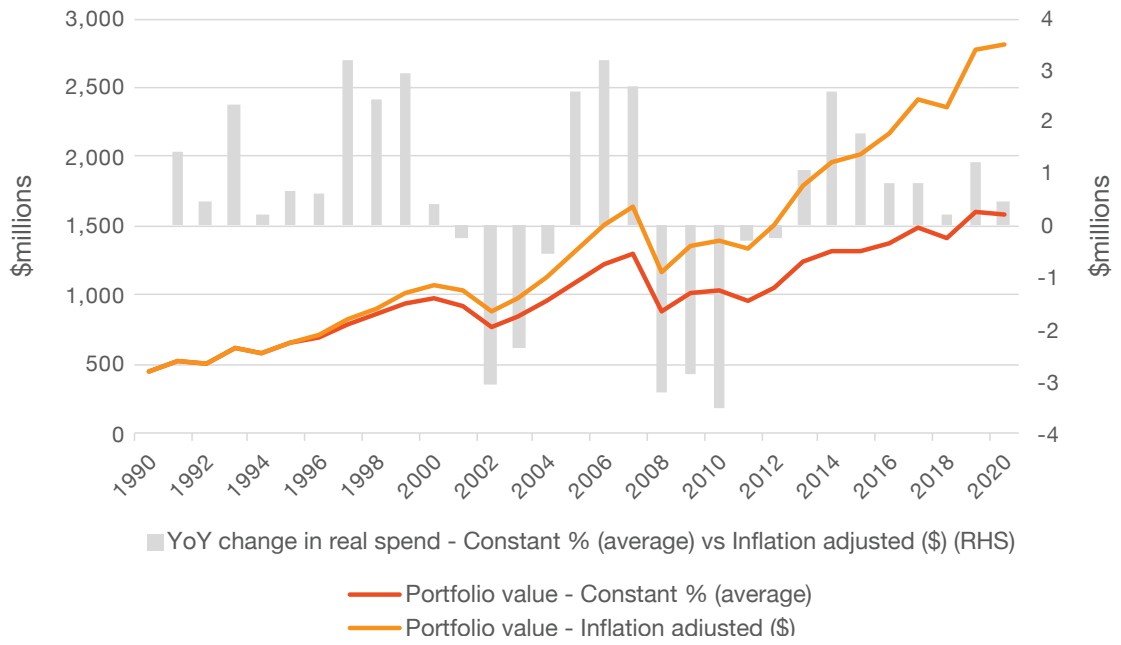
Chart 9 of this section is also interesting, as it sheds light on relative spending in market downturns (and market rallies). It shows that in periods like 2008, the inflation adjusted policy which is not tied to the market value of the portfolio, maintains its spending, whereas the constant % (average) spending rule results in a relative reduction in real spending. This could have implications for endowments that have a need to spend in market downturns, a need that is perhaps greater than in stable market environments. This should also be considered as part of assessing spending policy outcomes.

Chart 9: Relative spending and portfolio value: Constant % (average) versus inflation adjusted ($)



The conclusion drawn from these comparisons is the composition of economic value at a given point in time can be quite different under different spending rules (i.e. may be majority made up of real spending or real portfolio value). On this point, there is an inherent advantage to economic value if an endowment's nominal rate of return over time exceeds the sum of inflation (or the discount rate) and the spending amount. This allows such a portfolio to compound at a greater rate in real terms, and thus benefits from the retention of capital over time. This, however, is usually a result of lower spending, and may impede analysis of an endowment that wants to compare overall economic value across policies, assuming real spend is constant. For the preceding analysis, the inflation adjusted rule spends less in real terms, which results in a higher economic value than constant % (average) rule due to it being able to compound retained funds over time. To circumvent the issue of different levels of real spending, we can hold cumulative real spending constant and analyse outcomes across spending policies. This is done in the proceeding section.

Broad comparison of spending policies

The analysis in this section considers a slightly different angle – that is to set a target cumulative real spend over a 30-year timeframe, in our case, $1 billion. This exercise is intended to compare the impact of spending flexibility with economic value over a 30-year period. Tables 6 and 7 present these results.

Table 6: Results comparison - Economic value and spending volatility

Spending rule	End cumulative real spend ($ million)	End real portfolio value ($ million)	End economic value ($ million)	Real spending volatility (%)
Inflation adjusted	1,000.0	517.3	1,517.3	0.0%
Constant % (average)	1,000.0	688.8	1,688.8	6.0%
Constant %	1,000.0	693.0	1,693.0	10.6%
Yale (changing policy rate)	1,000.0	741.7	1,741.7	2.3%
Asymmetric	**1,000.0**	**979.7**	**1,979.7**	**50.8%**

Table 7: Results comparison - Cohort real spend ($ million)

Cohort real spend	Cohort 1: Year 1 to 7	Cohort 2: Year 9 to 15	Cohort 3: Year 17 to 23	Cohort 4: Year 25 to 31
Inflation adjusted	225.8	225.8	225.8	225.8
Constant % (average)	184.0	243.4	232.2	245.3
Constant %	187.2	238.4	223.3	247.9
Yale (changing policy rate)	173.0	230.4	252.1	248.3
Asymmetric	**130.9**	**234.5**	**237.0**	**304.2**

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The results show when holding cumulative real spending constant at $1 billion, a broad pattern emerges, which is those spending policies with greater flexibility of spend (spending volatility) tend to produce higher economic value. Spending stability is inversely proportional to economic value, or put in another way, spending stability typically has a cost, which is a lower overall economic value. This is best observed when comparing two extremes, the inflation adjusted spending rule (which locks in consistent real spending over time) and the asymmetric spending rule (which is designed to have the highest volatility in year-on-year spending). As observed from the results, the asymmetric spending rule produces the highest economic value, albeit with a substantial level of spending volatility, while the inflation adjusted spending rule has perfectly consistent spending albeit at a cost of lower economic value.

Spending policies with greater flexibility of spend (or spending volatility) tend to produce higher economic value

We can further reference the general trade-offs between policies when assessing these outcomes, whereby higher economic value (due to higher real portfolio value) was typically traded-off against cohort spending. The Yale spending policy stands out as a slight outlier in terms of the spending volatility/economic value trade-off. However, it can be argued cohort spending (or intergenerational equity) was traded off for its economic value, as the range between its cohort's real spend (i.e. Cohort 4 – Cohort 1) is second only to the asymmetric policy, and it spends much less than other policies for Cohort 1.

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Yale rule caveat – change in spend pattern

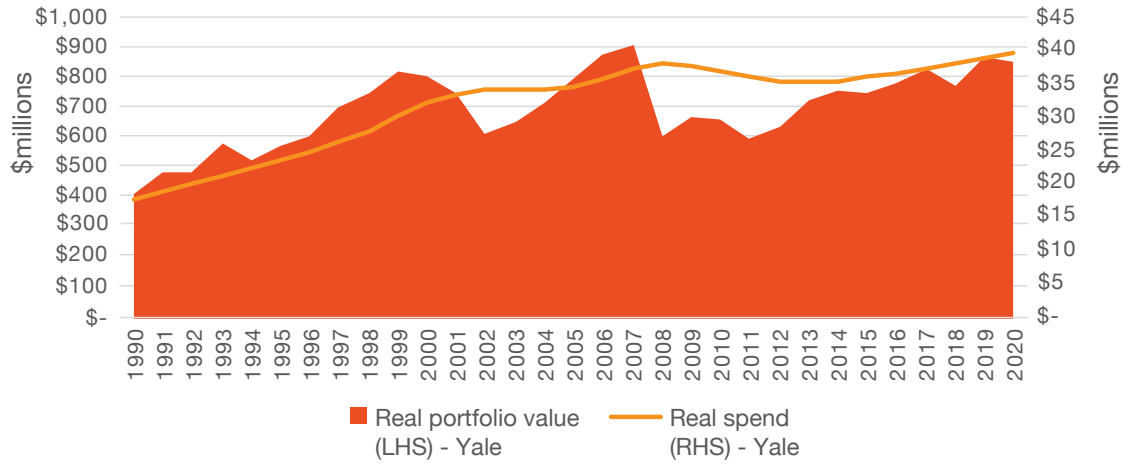
As an interesting caveat to the Yale rule, if we were to hold the policy rate constant for the Yale rule and adjust the initial spend value to arrive at a cumulative real spend of $1 billion over 30 years, there is a material increase in real portfolio value and hence economic value (Table 8). Also, consistent with the Table 7, the higher economic value corresponds to higher spending volatility (i.e. has a positive relationship).

Table 8: Yale rule - $1 billion real spend via change in initial spend amount

Spending rule	Year 30 cumulative real spend ($ million)	Year 30 real portfolio value ($ million)	Year 30 economic value ($ million)	Annual real spending volatility (%)
Yale (changing initial year spend)	1,000.00	860.4	1,860.4	3.0%

This is because in the early years, funds are compounded and saved up in order to achieve higher spending in later years. This is represented in Chart 10 by the monotonic increase (i.e. build up) in spending over the first decade, as the initial spend amount is much below the 5% policy rate in dollar terms.

Chart 10: Yale rule spending pattern via change in initial spend amount



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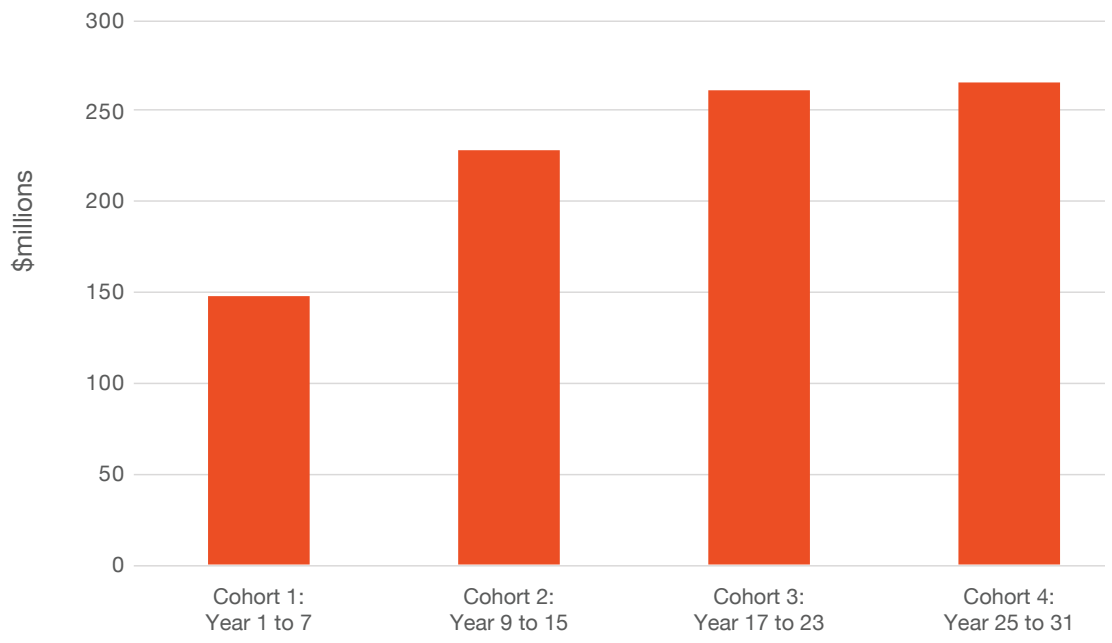
However, this is no free lunch. The cost is considerably less spending by the endowment in the first eight years, which accentuates the trade-off.

Chart 11: Yale rule - Cohort real spend via change in initial spend amount



We can see from these results that due to a low spending base across Cohort 1 (first seven years), there is positive real growth in spend in the first decade which flattens out over time. Accompanying this greater growth rate is a higher spending volatility, which consistent with Table 7, corresponds to higher economic value over time.

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Change in discount rate – and the impact on the competitiveness of different spending rules

The preceding sections demonstrated when discounting by inflation, those policies which exhibited higher spending in later years and lower spending in earlier years tended to have higher economic value over the long-term. This is predominantly because using the prevailing inflation rate as the discount rate is favourable to such spending patterns when nominal returns are sufficiently high relative to inflation. Discounting by inflation, in our view, is a starting point to evaluating spending and portfolio outcomes. To quantitatively reflect the qualitative needs and objectives of an endowment that cannot afford to not spend sufficiently in an early period, a higher discount rate should be used. As stated in the outcomes framework section, *the higher the need for an endowment to spend, the higher its discount rate should be.*

The four charts repeat the comparison from the *Comparison of two spending rules: Inflation adjusted versus constant % (average) section*, but uses a 10% discount rate instead of the prevailing inflation rate. Note the value of the discount rate here is not meant to be prescriptive but serves as an analytical preference lever for spending sooner rather than later.

Chart 12 shows the constant % (average) spends more in real terms over time, which is consistent with the initial analysis. The noticeable concave shape of cumulative real spend simply represents the effect of the discount rate, in which each marginal dollar spent in later years is worth markedly less in real terms compared to earlier years.

Chart 12: Cumulative real spend (using 10% p.a. discount rate): Constant % (average) versus inflation adjusted

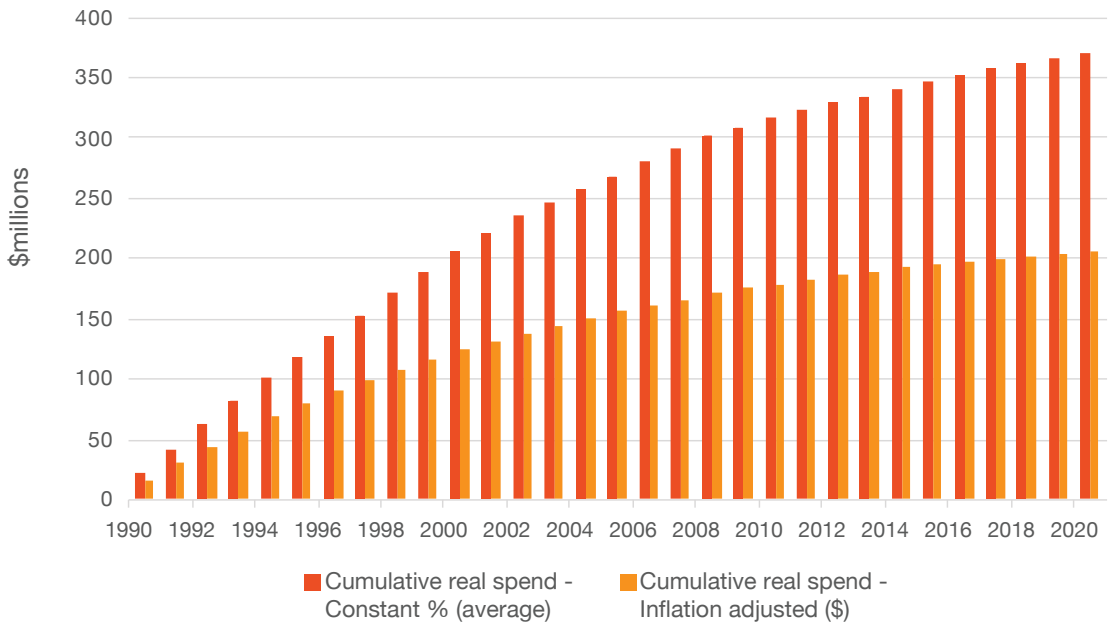

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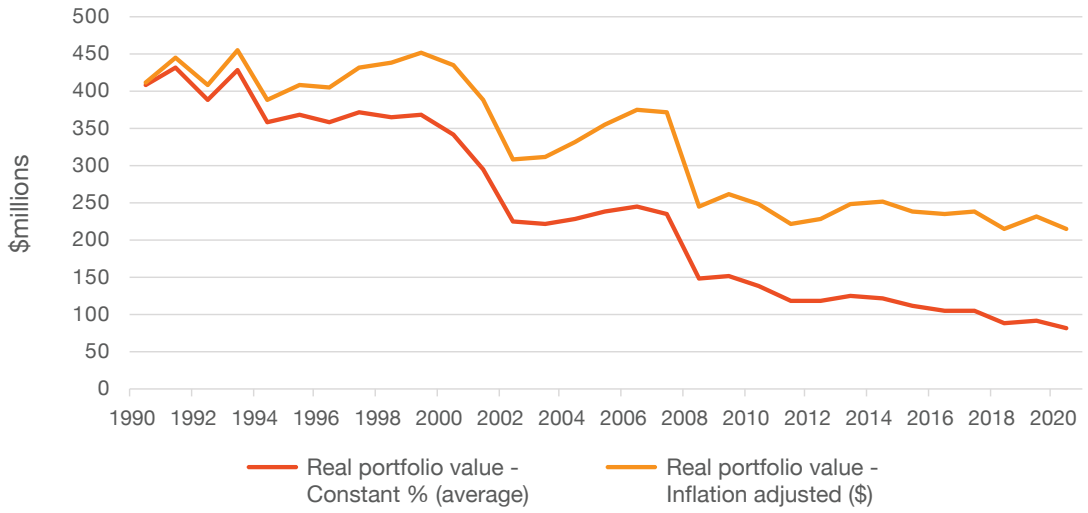
Chart 13 shows the comparison of real portfolio value under the new discount rate, which results in inflation adjusted as having a higher value, although by a lesser margin.

Chart 13: Real portfolio value (using 10% p.a. discount rate): Constant % (average) versus inflation adjusted



We now see that because of the analysis incorporating a higher discount rate, a reversal in the outcome of economic value, whereby the constant % (average) policy results in a higher economic value compared to the inflation adjusted policy toward the end of the back test period (Chart 14).

Chart 14: Economic value (using 10% p.a. discount rate): Constant % (average) versus inflation adjusted

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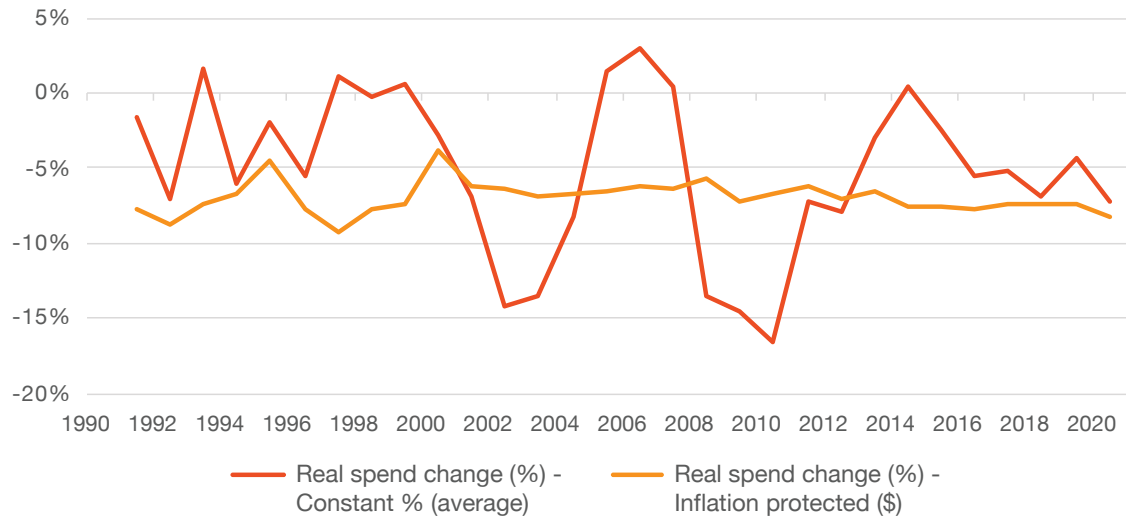
As a result of the higher discount rate, Chart 15 shows there is a shift down in the % change of real spend, which again is reflective of lower marginal benefit of spending in later years. It also shows now that the inflation adjusted policy results in some spending volatility (and its % change now averages ~-7.5%), as the prevailing inflation rate for each year differs from the discount rate of 10% p.a.

Chart 15: Real spend change % (using 10% p.a. discount rate): Constant % (average) versus inflation adjusted



The cohort spending (intergenerational equity) chart (Chart 16) also shows a similar story, whereby the spend in later years is valued much less in real terms compared to earlier years due to the higher discount rate.

Chart 16: Real cohort spend (using 10% p.a. discount rate): Constant % (average) versus inflation adjusted

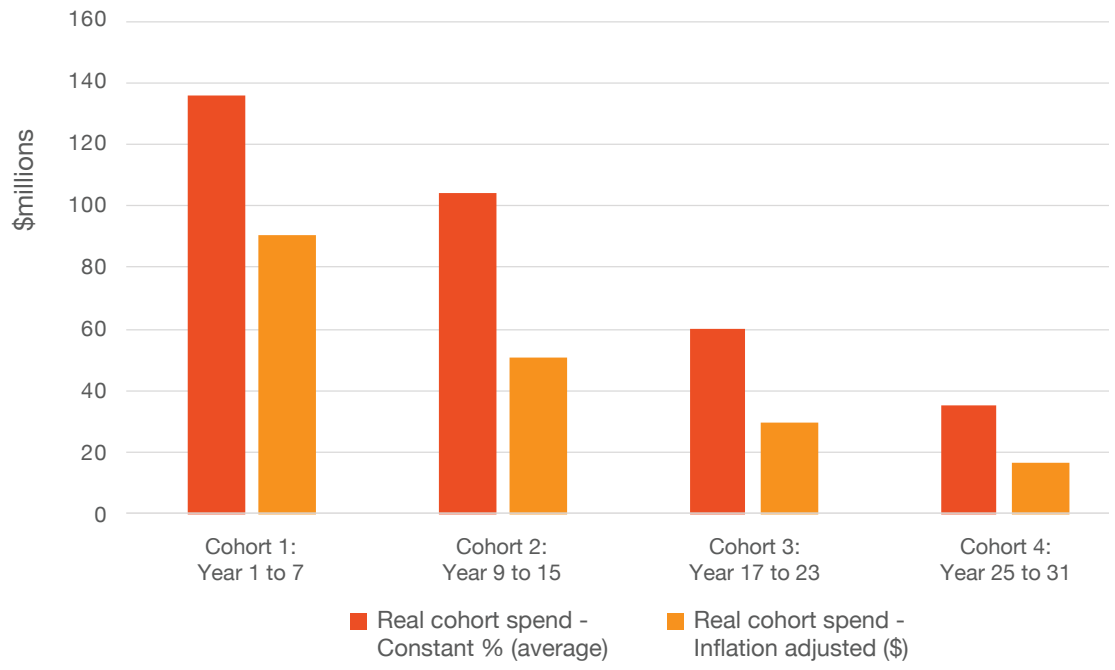
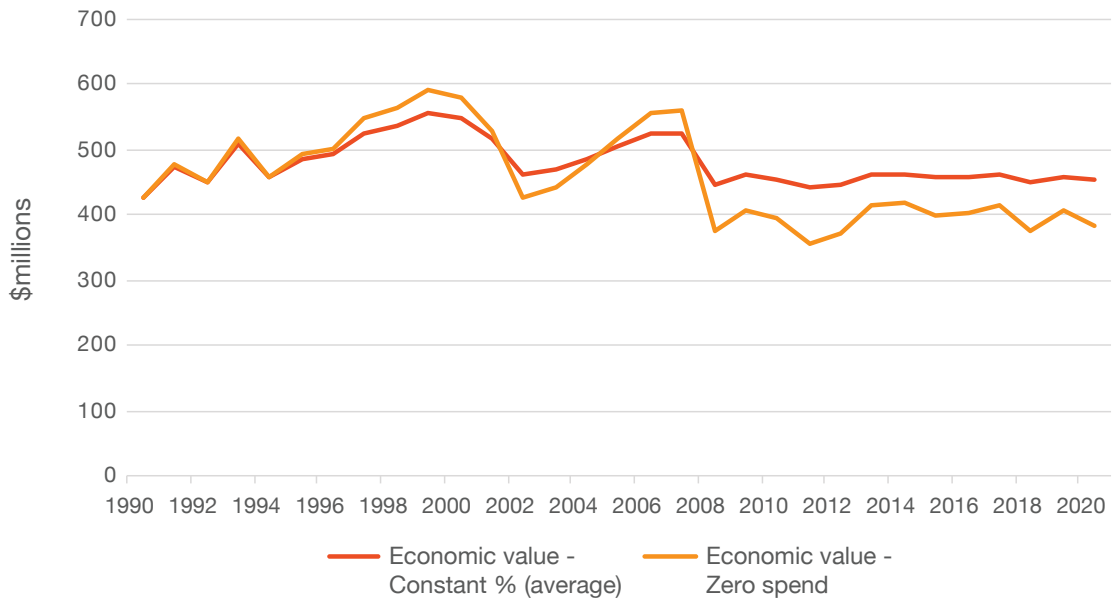


Chart 17 shows a comparison between the constant % (average) spend policy and no spending. Clearly, using a 10% discount rate when nominal returns are ~9%, spending in earlier periods is much more valuable than retained value in later periods, which again is reflective of the opportunity cost of not spending. This emphasises the importance of an appropriate discount rate when measuring portfolio outcomes.

Chart 17: Economic value (using 10% p.a. discount rate): Constant % (average) versus no spending



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Change in asset allocation – and the impact on the competitiveness of different spending rules

In this section we seek to determine the impact of underling portfolio volatility on spending rules, which we view as the core intersection of investment strategies and spending rules. This is achieved by constructing a portfolio with an identical expected return, but with a lower level of expected volatility. To achieve this more efficient portfolio (i.e. higher return for the same level of volatility), we have added in more complexity by way of illiquid investments.

Table 9: Change in asset allocation

Asset	Original allocation	Change	Illustrative new allocation
Australian equities	25.00%	-5.00%	20.00%
International equities	30.00%	-2.00%	28.00%
Property	11.00%	0.00%	11.00%
Infrastructure	14.00%	-3.00%	11.00%
Private equity	3.00%	0.00%	3.00%
Fixed income / Alternative debt	16.00%	+9.00%	25.00%
Cash	1.00%	+1.00%	2.00%
Annualised return for period	**9.05%**	**-**	**9.05%**
Annualised volatility for period	**11.38%**	**-**	**9.20%**
Illiquidity	**25.00%**	**-**	**32.00%**
Growth	**87.00%**	**-**	**69.00%**
Foreign currency	**23.00%**	**-**	**15.00%**

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For an investor with no spending obligations, one who only cares for maximising returns and hence portfolio (economic) value, portfolios that deliver the same compounded return over a given period will produce the same economic value[1]. However, for endowments and asset owners who are obliged to spend over time, economic value is typically higher under each spending rule for the lower volatility portfolio (provided the expected return remains unchanged).

Economic value is typically higher under each spending rule for the lower volatility portfolio (provided the expected return remains unchanged).

Note: this example assumes the lower volatility portfolio has the same expected return as the original portfolio. For this to be achieved we have a assumed a somewhat more complex portfolio, with more illiquid assets, higher expected running costs that will require a higher level of governance. In practice, having lower volatility is often accompanied by lower expected returns (assuming the complexity of the portfolio remains relatively unchanged) which may have significant impacts on the outcomes demonstrated in this section.

Table 10: Economic value - High versus low volatility portfolio

Spending rule	Real spending volatility (%)		Difference in economic value ($ million) – low versus high volatility	Difference as % of beginning portfolio value (%)
	Higher volatility portfolio	Lower volatility portfolio		
Inflation adjusted	0.0%	0.0%	39.9	8.0%
Yale	2.2%	1.7%	27.5	5.5%
Constant % (average)	6.0%	4.6%	15.8	3.2%
Constant %	10.6%	8.7%	12.5	2.5%
Asymmetric	72.0%	44.8%	-37.3	-7.5%

[1] For this analysis, however, the higher volatility asset allocation resulted in a slightly higher return when rounding to more digits, thus the asset-only (or zero-spend) investor would have actually produced slightly less economic value under the lower volatility regime.

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Table 10 is sorted by greatest difference made to end economic value from changing the asset allocation to a lower volatility portfolio. At the top of the table, the spending policies with lower spending volatility (i.e. greater spending rigidity) are shown to benefit the most from switching to a lower portfolio volatility. This is because with lower volatility there are fewer penalties incurred by this rigidity for example if markets were to fall (where a portfolio with higher volatility is likely to incur a larger fall and such fixed spending rules will then crystallise such losses). Inversely, those spending policies with a greater dependency on portfolio returns, and thus higher spending volatility (greater spending flexibility), are more robust under higher volatility regimes. The outlier, unsurprisingly, is the asymmetric policy, for which economic value is higher under the high volatility portfolio.

Spending policies with lower spending volatility (i.e. greater spending rigidity) are shown to benefit the most from switching to a lower portfolio volatility.

Although the differences in end economic value from switching to a lower volatility portfolio are relatively small, they are certainly not trivial. The average difference in economic value in real dollar terms is ~$11.7 million, which from a base of $500 million, amounts to 2.3%. The differences for traditional spending policies (i.e. excluding asymmetric) are much higher at ~$23.9 million (or 4.8%) in real terms!

The preceding analysis contains some implications for how endowments with different spending requirements may approach portfolio construction. Lower volatility is a desirable characteristic under all but one of the assessed spending rules. In investment parlance, this outcome is essentially an application of the Sharpe ratio. To achieve a higher Sharpe ratio, though, could potentially come at the cost of an increase in illiquidity, of which each endowment's circumstances may or may not permit such an increase.

The key findings from this analysis are:

- Spending rules that prioritise year-on-year spending stability typically achieve a better outcome when paired with a lower volatility portfolio. Endowments could consider accepting a lower level of return or higher level of complexity/ illiquids to achieve a lower volatility and better expected outcomes.
- Constructing a lower volatility portfolio has less of a benefit for endowments that have selected a spending rule that is very flexible in spending from year to year. Therefore, endowments that are afforded much flexibility in spending obligations can be more liberal in their portfolio construction, particularly with respect to volatility.

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The final word

Ultimately, spending rules are closely related to portfolio objectives and strategic asset allocation, and as such, should be considered as part of a holistic investment strategy review for each endowment.

Investment objectives, spending rules and strategic asset allocation should take into account an endowment's specific purpose, as well as preferences/tolerance for complexity and illiquidity to help deliver the best outcomes.

This paper illustrates the many dimensions involved in properly assessing a spending rule across multiple dimensions. These dimensions of assessment tend to recur for almost all endowment type entities, including charities, universities and family offices. What has been less common is for these entities to undertake a thorough, measurable examination of all these dimensions and to structure an investment strategy and a clear prioritisation plan cognisant of all of these areas. Particularly today, with significant changes in financial markets, this analysis is more important than ever.

Want to learn more?

If you want to learn more about spending rules and investment strategy or how we can help your organisation, please reach out to your consultant or a member of the Frontier Team.

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