

Andrew G Haldane: The short long

Speech by Mr Andrew Haldane, Executive Director, Financial Stability, and Mr Richard Davies, Economist, Financial Institutions Division, Bank of England, at the 29th Société Universitaire Européenne de Recherches Financières Colloquium, Brussels, 11 May 2011.

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1. Introduction

Is the world becoming short-sighted? As individuals, it sometimes feels that way. Information is streamed in ever greater volumes and at ever rising velocities. Timelines for decision-making appear to have been compressed. Pressures to deliver immediate results seem to have intensified. Tenure patterns for some of our most important life choices (marriage, jobs, money) are in secular decline.¹ Some have called this the era of “quarterly capitalism”.²

These forces may be altering not just the way we act, but also the way we think. Neurologically, our brains are adapting to increasing volumes and velocities of information by shortening attention spans. Technological innovation, such as the world wide web, may have caused a permanent neurological rewiring, as did previous technological revolutions such as the printing press and typewriter.³ Like a transistor radio, our brains may be permanently retuning to a shorter wave-length.

If these forces are real, they might be expected to be particularly important in capital markets. These are a key conduit for choice over time. An efficient capital market transfers savings today into investment tomorrow and growth the day after. In that way, it boosts welfare. Short-termism in capital markets could interrupt this transfer. If promised returns the day after tomorrow fail to induce saving today, there will be no investment tomorrow. If so, long-term growth and welfare would be the casualty.

Yet, despite its potential importance for long-term growth, studies of short-termism in capital markets are relatively thin on the ground. There is a sharp disconnect between popular perception of rising myopia, driven by technology and neurology, and empirical evidence.⁴ This paper aims to provide some evidence on short-termism drawing on equity market experience. It is planned as follows.

Section 2 reviews existing evidence on short-termism. Section 3 describes the theory underlying our test of short-termism and its adverse implications for investment choice. Section 4 presents the empirical results, drawing on cross-sectional and time-series data. Section 5 draws out the investment implications of the results and sets out a potential menu of policy options.

¹ Haldane (2010).

² Barton (2011).

³ Carr (2008).

⁴ A recent interim report on short-termism by a UK government department concludes thus: “Overall, respondents believe that short-termism exists in equity markets, but provided little evidence to demonstrate the scale of the consequences for companies and investors” (Department for Business, Innovation and Skills (2011)).

Our evidence suggests short-termism is both statistically and economically significant in capital markets. It appears also to be rising. In the UK and US, cash-flows 5 years ahead are discounted at rates more appropriate 8 or more years hence; 10 year ahead cash-flows are valued as if 16 or more years ahead; and cash-flows more than 30 years ahead are scarcely valued at all. The long is short. Investment choice, like other life choices, is being re-tuned to a shorter wave-length. Public policy intervention might be needed to correct this capital market myopia.

2. The short-termism debate

The short-termism debate is not new. Excess discounting of future outcomes was a familiar theme among Classical economists. For Jevons, “the untutored savage, like the child, is wholly occupied with the pleasures and troubles of the moment; the morrow is dimly felt; the limit of his horizon is but a few days off”.⁵ For Marshall, people acted like “children who pick the plums out of their pudding to eat them at once”.⁶ For Pigou, it demonstrated a “defective telescopic faculty” such that “we see future pleasures on a diminished scale”.⁷

And nowhere were these problems more acute than in financial markets. Keynes, himself part-time speculator, was well-aware of the perils of short-termism in investment choice, both moral and financial: “It is from time to time the duty of a serious investor to accept the depreciation of his holdings with equanimity without reproaching himself. Any other policy is anti-social, destructive of confidence and incompatible with the working of the economic system”.⁸

In the US, these sentiments were echoed in the immediate post-war era by Benjamin Graham, the original “value investor” and yesteryear investment guru to today’s investment guru, Warren Buffett: “A serious investor is not likely to believe that the day-to-day or even month-to-month fluctuations of the stock market make him richer or poorer”.⁹ And, famously, “in the short run, the market is a voting machine but in the long run, it is a weighing machine”. Whether an untutored savage, defective telescope or anti-social voting machine, something sounded amiss.

Thus far, however, this evidence was largely anecdotal. It was not until the 1960s that the short-termism hypothesis was first tested empirically. This drew on survey evidence from investing firms. It found that investors typically expected full pay-back on an investment within 3 to 5 years. At the time, the average life of plant and equipment was often 10 times that.¹⁰ Firms played short even when they desired long.

The first quantitative evidence that discount rates might be high began to appear in the early 1970s. For example, King (1972) examined investment in plant and machinery in the UK. Empirical estimates suggested the internal discount rate implied by firms’ corporate investment decisions may be up to 25%.¹¹ This literature failed to catch fire. Starting in the

⁵ Jevons (1871).

⁶ Marshall (1890).

⁷ Pigou (1920).

⁸ Keynes (1938).

⁹ Graham (1949).

¹⁰ Neild (1964) and the National Economic Development Office (1965) used questionnaire-based evidence. A large proportion of firms in the sample claimed to use a pay-back criterion and of these the modal pay-back period was 3–5 years. Census evidence from this period indicated that the average useful lifespan of machines was over 15 years. The distribution of plant and equipment lives in Dean and Irwin (1964) implied a mean economic life of 34 years.

¹¹ Sumner (1974) reaches similar conclusions.

mid-1970s, it was doused by a torrent of papers testing – and typically failing to reject – the efficient markets hypothesis.

This new wave swamped empirical finance for the better part of a decade. In the late 1970s and early 1980s, the efficient markets paradigm appeared all-conquering as a description of asset price movements in practice.¹² Research on the inefficiencies of capital markets became something of a backwater. The voting machine appeared to be delivering outcomes both democratic and socially beneficial.

But beginning in the 1980s, a whole sequence of “puzzles” in empirical finance began to emerge. These were puzzles only in the sense of being deviations from efficient markets. For Mr Keynes and the Classicists, they would have been anything but.¹³ For example, an early set of papers found “excess volatility” in asset prices relative to future dividends and earnings.¹⁴ Investor myopia was one interpretation, with too great a weight on near-term dividends causing even transitory changes to affect valuation.¹⁵

Using an augmented version of this basic asset pricing framework, Miles (1993) tested formally for excessive discounting of future cash-flows using company-level equity price data from the UK between 1980 and 1988, finding evidence of short-termism over this period. Similar approaches applied to longer time-series across a range of countries reached broadly similar conclusions.¹⁶

Yet, latterly, the quantitative evidence appears, as in the mid-1970s, to have dried up. This time the efficient markets hypothesis cannot be held responsible, for it has come under increasingly critical scrutiny. Instead we have seen scraps of evidence drawn from the types of surveys familiar from the 1960s. For example, among asset managers, a 2004 MORI survey of members of the Investment Managers Association (IMA) and the National Association of Pension Funds (NAPF) asked if investment mandates created short-termism. A third of NAPF members and two-thirds of IMA members agreed.

In 2006, a CFA (Chartered Financial Analyst) symposium of financial institutions concluded “the obsession with short-term results by investors, asset management firms, and corporate managers collectively leads to the unintended consequences of destroying long-term value, decreasing market efficiency, reducing investment returns, and impeding efforts to strengthen corporate governance”. Echoes, here, of Graham’s anti-social voting machine.

Short-termist behaviour among investors appears to have rubbed-off on companies. Poterba and Summers (1995) surveyed Chief Executive Officers (CEOs) at Fortune-1000 firms. They found that the discount rates applied to future cash-flows were around 12%, much higher than either equity holders’ average rate of return or the return on debt. This excessive discounting implied that some firms were rejecting positive net present value (NPV) projects. Echoes, here, of Pigou’s defective telescope.

Graham, Harvey and Rajgopal (2005) surveyed 401 executives. They found three striking results. First, managers would reject a positive-NPV project if that lowered earnings below quarterly consensus expectations. Second, over 75% of the sample would give up economic value in order to smooth earnings. Third, managers said that this was driven by the desire to satisfy investors. Echoes, here, of Marshall’s plum pudding problem.

¹² Fama (1970) provides a survey of the early papers.

¹³ Hicks (1937).

¹⁴ The important papers are LeRoy and Porter (1981), Shiller (1981) and Campbell and Shiller (1988).

¹⁵ Several other of the empirical finance “puzzles”, including the dividend smoothing and serial correlation puzzles, can also potentially be attributed to myopia (Haldane (2010)).

¹⁶ Cuthbertson, Hayes and Nitzsche (1997), Black and Fraser (2002).

Most recently, in 2011 PriceWaterhouseCoopers conducted a survey of FTSE-100 and 250 executives, the majority of which chose a low return option sooner (£250,000 tomorrow) rather than a high return later (£450,000 in 3 years). This suggested annual discount rates of over 20%. Recently, Matthew Rose, CEO of Burlington Northern Santa Fe (America's second biggest rail company), expressed frustration at the focus on quarterly earnings when locomotives lasted for 20 years and tracks for 30 to 40 years. Echoes, here, of “quarterly capitalism”.

This evidence – anecdotal, survey, quantitative – is broadly consistent with popular perceptions. Capital market myopia is real. It may be rising. For at least some of the jury, however, it remains inconclusive. In 2010, Richard Saunders (Chief Executive of the IMA) summed it up thus: “Now red lights start flashing for me when people talk about short-termism, particularly when shareholders feature in the same sentence. What do people mean when they claim that shareholders behave in a short-term fashion? And what evidence do they have for it? I have yet to hear a convincing answer to either question”.

3. Testing for short-termism

In the quest for some concrete, quantitative evidence, our test of short-termism uses the forward-looking asset price framework of Miles (1993). A simple example illustrates the basic approach to testing myopia and its implications for project choice.

(a) A simple example

Consider an investment project costing \$60. This investment is riskless and pays \$10 at the end of each of 10 years. The present value of the project is simply the sum of the cash-flows discounted by the risk-free rate, r :

$$(1) \quad PV_{\text{rational}} = \frac{\$10}{(1+r)} + \frac{\$10}{(1+r)^2} + \dots + \frac{\$10}{(1+r)^{10}}$$

With a discount rate of 9%, the project's cash-flows are worth \$65 today and its NPV is \$5. A firm or investor offered this project should rationally undertake the investment.

Short-termism implies that agents may discount “excessively” future cash-flows, over and above the risk-free rate. Denote that short-termism parameter, x . The present value under myopic discounting then becomes:

$$(2) \quad PV_{\text{myopic}} = \frac{\$10x}{(1+r)} + \frac{\$10x^2}{(1+r)^2} + \dots + \frac{\$10x^{10}}{(1+r)^{10}}$$

If x is less than unity, then the project's cash-flows are discounted too heavily. For example, assume $x = 0.95$ so that one period ahead cash-flows are underestimated by 5%. Even with this modest degree of myopia, NPV calculations are affected significantly. A \$10 return received at the end of year 5 should be worth \$6.65 today. With myopia, it is worth \$5.14. Discounted cash-flows on the project are now worth \$52, meaning that the NPV of the project is negative. A myopic investor would walk away from this NPV-worthy project.

Imagine instead that an investor were making choices based on average payback periods, rather than NPV. Under rational discounting, the project has a payback period of 9 years. Under myopic discounting, the payback period rises to 15 years. An investor might now think twice before investing their money, for their money is committed for almost twice as long.

So short-termism implies that projects with positive returns, or a relatively short payback, may be misperceived as being negative return or having a relatively lengthy payback. These projects would fail to receive financing. Investment and, ultimately, growth would be lower

than optimal. In fact, the potential capital misallocation problem is greater still. To see that, consider the three projects summarised in Table 1.

Project	A	B	C
Cash-flows (CF)	\$28 pa in years 6–10	\$10 pa every year	\$16 pa in years 1–5
Cumulative CF	\$140	\$100	\$80
NPV (rational)	\$73	\$66	\$63
Ranking (rational)	1	2	3
NPV (myopia)	\$49	\$52	\$55
Ranking (myopia)	3	2	1

In the absence of short-termism, project A is selected. Its payouts are back-loaded but significant; it generates a net excess return of 22%.¹⁷ Short-termism hits such long duration projects hardest. The impatient investor chooses project C. This project delivers lower cash-flows but these are front-loaded. In NPV terms, the project selected is the worst on offer, whereas the rationally optimal project ranks last. Capital allocation is not just sub-optimally low; it is also skewed towards sub-optimally short-duration projects.

(b) Asset pricing

Consider now a formal model of multi-period equity price determination. Finance theory typically assumes that investors care about both the level and uncertainty of their wealth and are risk averse. In this world, agents require a premium to invest in a company. More formally, the expected return can be written as the sum of the risk free rate and a company-specific risk premium for company j:¹⁸

$$(3) \quad E_t(R_{jt}) = R_{ft} + \pi_{jt}$$

The actual return on an investment is the sum of the capital gain and the dividend yield:

$$(4) \quad R_{jt} = \frac{P_{jt+1} - P_{jt}}{P_{jt}} + \frac{D_{jt+1}}{P_{jt}}$$

Assuming an efficient market, actual returns differ only from expected returns due to a forecast error which is uncorrelated with expected returns.¹⁹ Using this assumption, we can substitute (4) into (3) to give an equation for the equity price.

¹⁷ The return is \$73 – \$60 = \$13, divided by the cost of investment.

¹⁸ This is the case with the capital asset pricing model (CAPM) (Lintner (1965), Sharpe (1964)) and arbitrage pricing theory (Ross (1976)). Under the CAPM, for example, the company specific risk premium is equal to the company specific beta multiplied by the market risk premium $\pi_{jt} = \beta_{jt} (R_{mt} - R_{ft})$. This means $E_t(R_{jt}) = R_{ft} + \beta_{jt} (R_{mt} - R_{ft})$.

¹⁹ That is, we assume that $R_{jt} = E_t(R_{jt}) + e_{jt}$.

$$(5) \quad P_{jt} = \frac{E_t(P_{jt+1} + D_{jt+1})}{R_{jt} + \pi_{jt} + 1}$$

So the price of the security is simply the expected price and dividend in the next period, discounted by the sum of the risk-free rate and the company-specific risk premium.

By repeated substitution, this asset pricing equation can be written as a generalised form of (1):

$$(6) \quad P_{jt} = \frac{\sum_{i=1}^N E_t(D_{jt+i})}{(1 + r_{t,t+i} + \pi_{jt})^i} + \frac{E_t(P_{jt+N})}{(1 + r_{t,t+N} + \pi_{jt})^N}$$

The current share price is a function of future discounted dividend streams and a discounted terminal share price, where we have used:

$$(7) \quad E_t(\pi_{jt+k}) = \pi_{jt} \cdot \forall k$$

$$(8) \quad E_t(R_{jt+k}) = r_{t,t+k} \cdot \forall k$$

Equation (7) says that the expected company-specific risk premium is constant and pre-determined based on period t information. Equation (8) says that expectations of future risk-free rates are defined by the path of the risk-free forward rate curve observed at time t.

Equation (6) can be modified with a myopia coefficient to give a generalised version of (2):

$$(9) \quad P_{jt} = \frac{\sum_{i=1}^N E_t(D_{jt+i})x^i}{(1 + r_{t,t+i} + \pi_{jt})^i} + \frac{E_t(P_{jt+N})x^N}{(1 + r_{t,t+N} + \pi_{jt})^N}$$

The null hypothesis – no short-termism – implies $x = 1$. Drawing on evidence across time and industrial sectors, it is this restriction we now test.

4. Testing for short-termism

The data comprises a panel of 624 firms listed on the UK FTSE and US S&P indices over the period 1980–2009.²⁰ These span a broad range of industrial sectors, as shown in Table 2.

Table 2

Number of firm level observations in each industry segment

Index	Consumer	Energy & Utilities	Financials	Health	IT	Industrials	Materials	Total
S&P	117	65	78	47	73	47	23	450
FTSE	52	14	42	5	34	18	9	174

²⁰ Data are from Thomson Reuters Datastream.

The core inputs to the analysis are firm-level measures of dividends and equity prices. The average dividend-price ratio in each industry segment is shown in Table 3. The mean dividend-price ratio across the panel is 2.6%. But there is a fairly significant degree of cross-sectoral and time-series dispersion. For example, dividend-price ratios are almost twice as high in the energy and utilities sector as the health and pharmaceuticals sector. And mean dividend-price ratios were two thirds third higher in the 1990s compared to the 1980s.

Table 3
Mean dividend-price ratio for firms in each industry segment

	Consumer	Energy & Utilities	Financials	Health	IT	Industrials	Materials
S&P	1.94	2.82	3.19	1.87	1.69	2.55	2.22
FTSE	4.12	3.96	2.63	1.38	2.92	3.81	3.16

To estimate (9), we require a selection of quantitative inputs. Taking these in turn:

(a) Company-specific risk premium

Following Miles (1993), the company risk premium is modelled based on firm-specific characteristics, in particular the company beta and the level of gearing:

$$(10) \quad \pi_{jt} = \alpha_1 \beta_{jt} + \alpha_2 Z_{jt}$$

where $Z = \frac{D}{E}$.²¹ Betas are estimated using daily return data for firms listed on the S&P 500 and FTSE, together with daily data for the indices themselves.²² Mean estimated betas are shown in Table 4. These average below one for both UK and US firms. As Charts 1 and 2 illustrate, however, the distribution of betas is fairly wide, with over a third of US firms and almost a fifth of UK firms having a beta in excess of unity.

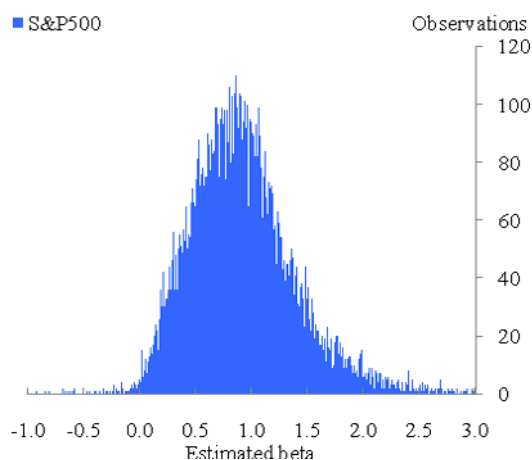
Table 4
Estimated betas

Index	Number of firms	Number of observations	Mean	Median	S.D
S&P	401	10,140	0.91	0.86	0.49
FTSE	168	3,765	0.63	0.62	0.45

²¹ Because a firm's beta ought also to be a function of its business and financing decisions, we also estimate a restricted version of (10): $\pi_{jt} = \alpha_1 \beta_{jt}$.

²² We exclude observations where the estimated beta is greater than 5 in absolute value, which in practice is only 7 firms.

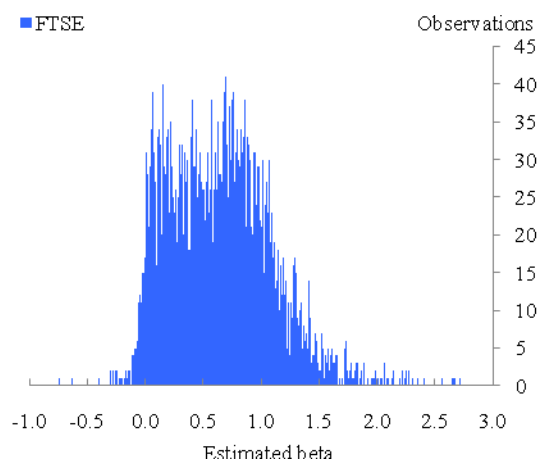
Chart 1
Distribution of betas – US



Sources: Thomson Reuters Datastream and Bank calculations.

Notes: Shows estimated betas for the US firms. The chart is drawn for betas lying between -1 and 3 with 400 bins.

Chart 2
Distribution of betas – UK



Sources: Thomson Reuters Datastream and Bank calculations.

Notes: As for Chart 1 but for UK firms.

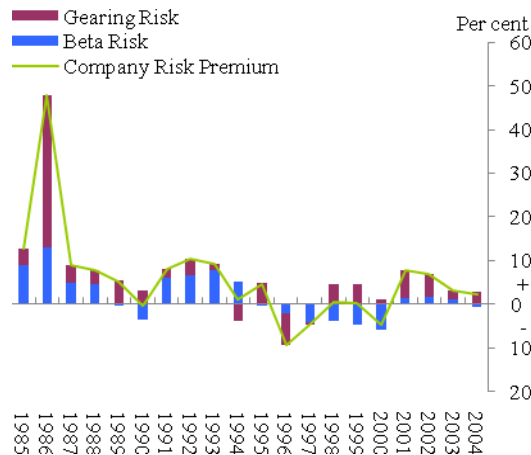
The second component of the firm-specific discount factor is company gearing. This was constructed using annual Thomson Reuters Datastream data for book value per share, the number of shares outstanding and debt outstanding. Other things equal, higher gearing would suggest a higher company-specific discount factor.²³ The final element in the firm-level discount factor calculation is the risk-free rate. The yield on government securities was used, based on data from the Federal Reserve and Bank of England.

Having estimated (10) using pooled US and UK regressions over 20 years, a firm-specific risk premium can be calculated. The average premium across the sample is 5.9%. As Chart 3 shows, both gearing and beta contribute to the company risk premium estimates.

²³ The gearing variable is of poorer quality than others in the data, leading to negative gearing observations for some firms. Any firm-year observations with negative gearing are excluded from the analysis (a total of 37 observations).

Chart 3

Estimates of company risk premium



Sources: Thomson Reuters Datastream and Bank calculations.

Notes: Uses the estimated coefficients from the pooled UK and US regression together with the mean annual values of beta and gearing for firms in the US and UK.

(b) Expected dividends and prices

The right-hand-side of equation (9) defines the stream of future dividends and terminal prices. To generate these, consider a simplified version of (9) which abstracts from discount rates, company-specific risk premia and dividends:

$$(11) \quad P_{jt} = E_t (P_{jt+N})e^{-N}$$

Following Wickens (1982), the rational expectation $t+N$ periods ahead are formed on the basis of information available at time t . For each company j , these expectations differ from the realised values by a forecast error (U_{jt+N}) unpredictable at time t :

$$(12) \quad E_t (P_{jt+N}) = P_{jt+N} + U_{jt+N}$$

Adding and subtracting the average forecast error across all companies (\bar{U}_{jt+N}) gives:

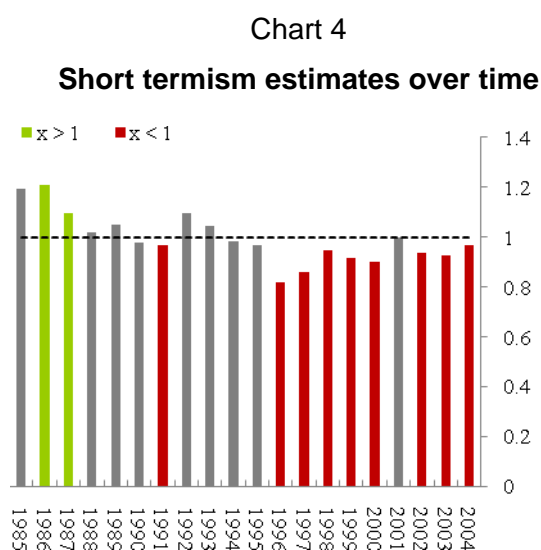
$$(13) \quad P_{jt} = E_t (P_{jt+N})e^{-N} = P_{jt+N}e^{-N} - \bar{U}_{jt+N}e^{-N} - (U_{jt+N} - \bar{U}_{jt+N})e^{-N}$$

Actual prices cannot be used in the estimation of (13) as these are not known at time t and are correlated with the error term ($U_{jt+N} - \bar{U}_{jt+N}$). But consistent estimation of (13) is possible using a set of instruments correlated with P_{jt+N} but which are independent of the company-specific excess forecasting errors. In the estimation, lagged share prices, lagged dividends per share and lagged earnings per share are used as instruments for future dividends and equity prices. These are known at time t but are uncorrelated with the error term. Five lags of each variable (price, dividends, earnings) are used as instruments.

(c) Generating estimates of short-termism

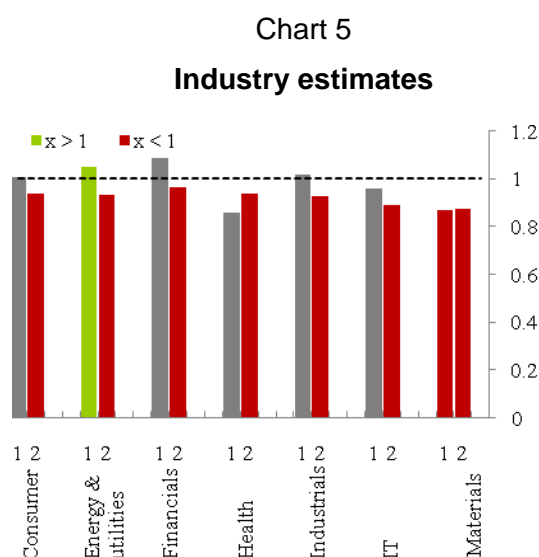
Given estimates of company beta and gearing, risk-free rates and the instrumented variables, equation (9) can be estimated to generate estimates of the short-termism parameter, x . This was achieved using non-linear least squares on a set of cross-sectional regressions for each of the years 1985 to 2004.²⁴

Chart 4 shows point estimates of x for each of these years. Short-termism estimates which are statistically significantly below unity (at the 5% confidence level) are shown in red. The simple average of x across the 20-year period is very close to one (0.9935). On the face of it, this does not suggest that short-termism has been a particular problem among this cross-section of firms.



Source: Bank of England.

Notes: Bars show the estimated x parameter for regressions for the UK and US pooled data. Estimates where the 95% confidence interval spans 1 are coloured grey.



Source: Bank of England.

Notes: Bars show the industry estimates for the sample split into (1) 1985–1994, and (2) 1995–2004 for each industry. S&P and FTSE industry classifications were used. Bars are coloured based on the significance of the estimates at the 5% level.

But this masks some important within-period variation. In 13 of the 20 years, x is lower than 1. And in 9 of these years, x is statistically significantly below unity. Moreover, there is evidence of a rising tide of myopia: 8 of these 9 years occur in the final decade of the sample.

To illustrate, Table 5 shows point estimates of x over two decadal sub-samples (1985–1994 and 1995–2004) and over the full sample. Estimates are significantly below unity in the second sub-sample, but not the first. The point estimate of x over the second sub-sample is 0.94.²⁵

²⁴ Because the estimation expected values up to five periods ahead, the estimates only run to 2004.

²⁵ Various robustness checks were conducted. These included dropping gearing from the estimation of the risk premium and varying the effects of taxes. These did not alter significantly the empirical estimates.

Table 5
Short-termism estimates for the US and UK

Year	x	Standard error	Evidence of short-termism?
Full sample (1985–2004)	0.937	(0.004)	Yes
1985–1994	1.001	(0.008)	No
1995–2004	0.938	(0.005)	Yes

Notes: The significance column refers to a test of $x < 1$ at the 5% confidence level.

Table 6 shows estimates of x over the same three samples on a sectoral basis. It echoes the message from Table 5. There is statistically significant evidence of short-termism in the second half of the sample for all seven industrial sectors. And in all of these sectors except health and materials, x is lower in the second half of the sample than the first – in those two sectors x is below unity throughout the sample.

Although short-termism appears to be a consistent theme across industrial sectors, there are nonetheless some interesting patterns in the degree of short-termism across sectors. For example, the financial sector does not appear especially short-termist over the full sample. By contrast, the health and materials sectors exhibit short-termism throughout.

Table 6
Sectoral short-termism estimates for the US and UK

Industry	Full Sample 1985–2004		1985–1994		1995–2004	
	x	Significant?	x	Significant?	x	Significant?
Consumer	0.939	Yes	1.007	No	0.94	Yes
Energy and Utilities	0.939	Yes	1.05	No	0.934	Yes
Financials	0.965	Yes	1.087	No	0.963	Yes
Health	0.940	Yes	0.857	No	0.940	Yes
IT	0.902	Yes	0.957	No	0.892	Yes
Industrials	0.926	Yes	1.018	No	0.925	Yes
Materials	0.875	Yes	0.871	Yes	0.874	Yes

Notes: The significance columns refer to a test of $x < 1$ at the 5% confidence level.

5. Short-termism and public policy

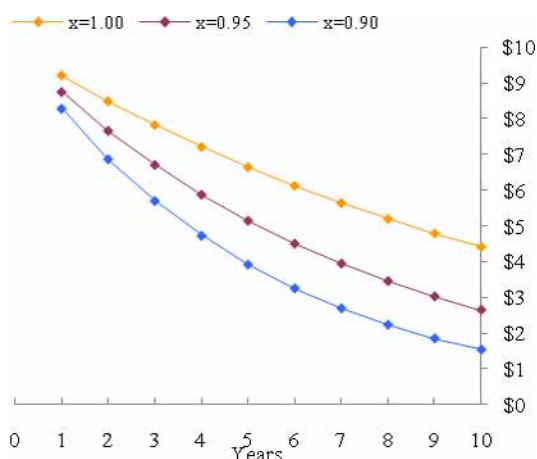
These tests of short-termism point to two key conclusions. First, there is statistically significant evidence of short-termism in the pricing of companies' equities. This is true across all industrial sectors. Moreover, there is evidence of short-termism having increased over the recent past. Myopia is mounting.

Second, estimates of short-termism are economically as well as statistically significant. Empirical evidence points to excess discounting of between 5% and 10% per year. To illustrate the impact of this on investment choice, consider the earlier project with an annual income stream of \$10.

Chart 6 shows the present value of those income streams under three counter-factual assumptions: rational discounting; myopic discounting – lower bound (5%); and myopic discounting – upper bound (10%). The cumulative impact is fairly dramatic. Ten-year ahead cash-flows under rational discounting are valued similarly to between six-year (lower bound) and four-year (upper bound) ahead cash-flows under myopic discounting. The long is shortened.

Chart 6

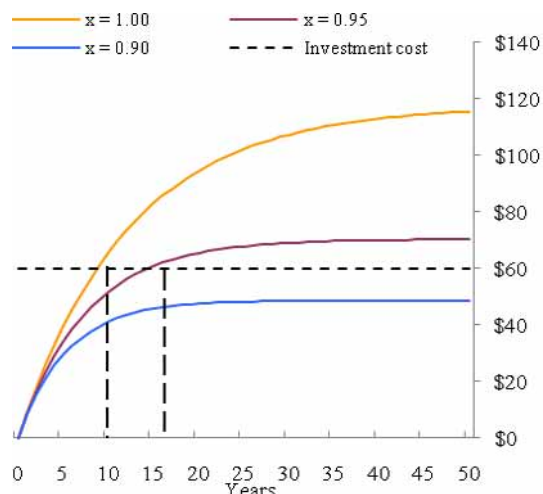
Present value of future cash-flows



Notes: The chart assumes \$10 is paid at the end of each year. The rational discount rate used is 1.085.

Chart 7

Cumulative present value of future cash-flows



Notes: The cumulative NPV of \$10 cash-flows rises to \$61 in year 9 under rational discounting. With mild myopia ($x=0.95$) it only passes \$60 at year 15. With severe myopia ($x=0.90$) the investor calculates that payback is not achieved.

Table 7

Point in future at which residual discounted cash-flow falls below (years)

	10%	1%	0.1
Rational ($x = 1$)	29	57	85
Mild myopia ($x = 0.95$)	18	35	52
Strong myopia ($x = 0.90$)	13	25	37

Notes: The number in the table refers to the first year that a \$10 cash-flow falls below 10%, 1% and 0.1% of its actual value in present value terms. The rational discount uses an average risk free rate from our cross sectional data sample (1.085).

This is illustrated even more clearly if we consider payback periods. Under rational discounting, payback occurs in 9 years (Chart 7). Under upper bound myopic discounting, the investor today would erroneously assume that payback would never be made. These differences have the potential to alter radically project choice. The net present value of this

project evaluated over 50 years falls from \$56 under rational discounting to a loss of \$11 under extreme myopia. In other words, a NPV-positive project would be resoundingly rejected.

To put the point more starkly, Table 7 asks at what point in the future the residual value of a future cash-flow hits a level of 10%, 1% and 0.1% of its face value, under rational and myopic discounting. Under rational discounting, cash-flows even 50 years ahead retain more than 1% of their face value. Under strong myopic discounting, this residual threshold is reached after 25 years. Virtually zero weight – less than 1000th of the face value of the cash-flow – is placed on projects with income streams much beyond 35 years. The long is dramatically shortened.

This is a market failure. It would tend to result in investment being too low and in long-duration projects suffering disproportionately. This might include projects with high build or sunk costs, including infrastructure and high-tech investments. These projects are often felt to yield the highest long-term (private and social) returns and hence offer the biggest boost to future growth. That makes short-termism a public policy issue.

But what would be an appropriate public policy response to this capital market failure? A number of proposals have been suggested by various authors. These include:

- (a) **Transparency:** The lightest touch approach would be to require greater disclosures by financial and non-financial firms of their long-term intentions – for example, their long-term performance, strategy and compensation practices.²⁶ For financial firms, this might include metrics of portfolio churn. This could be accompanied by a programme of educating managers, investors and advisors of their fiduciary responsibilities.
- (b) **Governance:** A more intensive approach would involve acting directly on shareholder incentives through their voting rights. For example, fiduciary duties could be expanded to recognise explicitly long-term objectives.²⁷ More concretely, shareholder rights could be enhanced for long-term investors, perhaps with a duration-dependent sliding scale of voting rights.²⁸
- (c) **Contract Design:** There have been various attempts over the past few years to make compensation contracts more sensitive to long-term performance and risk. This includes employment contracts conditioned on long-term performance, or with deferral or clawback. Changes in the compensation instrument can also help – for example, remunerating in equity is better than in cash and remunerating in junior or convertible debt might be better than either.²⁹
- (d) **Taxation/Subsidies:** Authors have suggested a variety of ways in which government could penalise short-duration holdings of securities, or incentivise long-duration holdings, using tax and / or subsidy measures. These measures differ in detail, but the underlying principle is to link them to the duration of an investor's holdings or the length or nature of a company's investment.³⁰

Some of these initiatives have been tried and tested in differing degrees, at different times and in different countries. They have not obviously arrested the short-termism trend. It might be time to increase the level of policy ambition if the telescope is to be corrected, the voting

²⁶ Aspen Institute (2009), CFA (2006).

²⁷ Duruigbo (2011).

²⁸ Securities and Exchange Commission (2010), Aspen Institute (2009).

²⁹ Haldane (2011).

³⁰ Aspen Institute (op.cit.), Poterba and Summers (1995).

machine socialised, the savage civilised. Public policy could help keep the plums in the pudding. Without intervention, the long could become shorter still.

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