#

#

01 March 2016

**Are you interested or Discounted?
Long –term Social Finance**

Professor Alderman Michael Mainelli

Good afternoon Ladies & Gentlemen, and welcome to the Long Finance 2016 Conference.

Discounted Cash Flow (DCF) and Net Present Value (NPV) analyses have long been part of the financial analyst's toolbox. By deciding on a discount rate and using that discount rate in some exponential equations it can be argued that future generations will be richer than us, so we can spend wantonly now. Or that something expensive is really quite cheap if we make a very small change in the discount rate. This conference will examine the implications of discount rates on society's long-term decisions such as health, education, infrastructure, and the environment.

All around us in the UK, we find ourselves relying on Victorian infrastructure for water, sewage, roads, ports and railways. Paraphrasing the “Life of Brian” (1979) film joke, “what have the Victorians ever done for us?” In London, more than half of the water mains are more than 100 years old, and around a third are over 150 years old. So what’s been going on the past 100 years? In fact, Thames Water, the London water company, even implies that the Victorians are at fault – “London’s Victorian water works need to be modernised”.

Water supplies may seem boring, but don’t forget that sewage and clean water are all that separate us from cholera or typhoid. Because of our ignorance of Victorian efforts, the water privatisations of the late 1980’s were problematic. Years and years of repairs under the intervening public sector system, where the asset values were irrelevant, had led to decades and decades of not bothering to record asset changes. This led to situations where contemporary observers were unable to find the assets, such as an added sewer or new valve, or to discover that things didn’t flow as you’d think. In one case I remember, we could only find 40% of the pumping, valves and piping during a random sample of the asset base for one water company. So what was being privatised? Quite a few customers and a lot of hope that the Victorians built things properly in the first place.

One of the hardest things for the Victorians to avoid was over-engineering. Over-engineering is when something is designed to last longer or in worse circumstances than is needed. Planned obsolescence from an engineering perspective is when everything fails at once. Consider an automobile. We would like the engine, social acceptance of the interior, the periodic cycle of the tyre replacements and everything else to collapse at a specific time. Nothing is wasted. The car fails when everything coincides with its own obsolescence. The ultimate engineer would plan that everything collapsed at some specific point on the odometer, say 150,000 miles. In the ideal situation, the fuel tank would be empty and the car would coast into the scrapyard.

If so many things they build lasted too long, were the Victorians engineering idiots? The Victorians stole from themselves to bequeath us an over-engineered infrastructure, not just in water and sewage, but also in roads, railways, public buildings and many other facilities. The Victorians over-engineered, intervening politicians took credit for cost savings that were really under-maintenance and everybody tried to hand the problem on to the next generation if at all feasible. So yes, in a sense, we stole from the Victorians; our parents stole from them and from us, while we try to steal from our own children.

But how should we make decisions about long-term investments? Economic and financial theory claims to have an answer, compare long-term investments with short-term decisions using the concept of net-present-value (NPV).

You know what an interest rate is, e.g. the percentage applied to your deposit every year in a simple deposit account. The underlying assumption is that cash today is worth more than the same amount of cash tomorrow. We need to be paid for saving or investing today, which is equivalent to deferring gratification till tomorrow. The ‘discount rate’ is a financial concept based on the future cash flow in lieu of the present value of the cash flow. The discount rate gives you an idea of the present value of future cash. So the interest rate and the discount rate are linked. If a bank offers you an interest rate of 25% and you place £8 in the account, you expect to retrieve £10 next year. If a bank offers you £10 next year for £8 today, the discount rate is 20%, i.e. the percentage that brings the value back to today’s terms. So if anyone offers you something worth more than £10 a year from now for £8 today, that is a better deal for you. Interest rates go forward to the future; discount rates come back to the present.

Over the years, interest rates have been lower than most people think. The real interest rate is calculated by subtracting inflation. In both the UK and the USA that means a 50 year moving average of interest rates has been below 2% since before World War II.

Discounting future consumption can lead to conundra (a conundrum of a plural), particularly over finite resources. Marine fishing is a $55 billion global industry, possibly on its way to extinction. When should you throw a fish back? Taken to the extreme, eating a $6 fish tonight can be calculated as worth more than consuming all the fish in the world a couple of millennia from now at a discount rate of 1%. At a discount rate of 10%, tonight’s $6 is worth all the world’s commercial fish stocks 260 years from now. At a discount rate of 50%, just 35 years.

One of the biggest issues in economics is deciding on the discount rate to use under various circumstances. In business, the correct discount rate is not necessarily obvious and can be the cause of heated discussion. Typically, business people calculate a “cost-of-capital” to arrive at a discount rate. Cost-of-capital can be a fairly complex calculation that employs the Capital Asset Pricing Model, which in turn depends on factors such as the risk-free rate of return, the equity rate, the bond-rate, and the debt/equity structure of the organization. We’ll ignore inflation adjustments and taxation. Some taxation systems favour expenditure over capital investment, or vice versa. Some taxation systems favour debt over equity, or vice versa. The Stern School in New York calculates that as averaging over 6% for US companies (http://people.stern.nyu.edu/adamodar/ New\_Home\_Page/datafile/wacc.htm). More crucially, we have ignored risk, whether the projects achieve their objectives at the cost stated when the decision is made, or achieve their objectives at all.

Businesses have to use something close to their cost of capital, but governments have more leeway. For governments it’s different. In 2002 HM Treasury stated that, “The current discount rate is being ‘unbundled’ so that the new rate reflects only one factor (the social time preference rate), set at 3.5%.” Using the “Rule of 72”, that is dividing 72 by 3.5 gives us a twenty year doubling factor. An investment of £100 for a 2016 baby today needs to be worth more than £200 by 2036 to be worth doing.

Engineering and infrastructure cycles tend not to coincide with political cycles, despite all the talk of prudence over the economic cycle. Matthew Parris, writing in the Times brought to my attention an open letter of 4 July 2004 from a former rail regulator, Mr Tom Winsor, to his successor. Mr Winsor notes:

“...Politicians will talk about decades of underinvestment and putting right the mistakes of the past, but in general — and with some honourable exceptions — they are simply not programmed to make decisions which put the long-term interests of the industry and the public ahead of the short-term political imperatives of the moment. If the fire-alarm is ringing, the tendency is often to break the bell and stop the noise; not to put out the fire.”

So I’ll leave you with this little joke about the difficulty of setting time periods:

A prisoner had just been sentenced for a wicked crime and was returning to his cell. His guard was most curious about the outcome.

Guard: “What was the sentence?”

Prisoner: “I could choose life or 100 years.”

Guard: “So which did you choose?”

Prisoner: “Well, life, obviously. Statistically speaking that is shorter.”

We have a full afternoon ahead, so let’s look at our lineup…

**Closing Remarks**

Lord Stern places ethics at the heart of climate change economics. He believes that future generations should be protected from harm, that future generations should have a right to a standard of living no lower than the current one, and that the world should be passed on in at least as good a state as inherited from the previous generation. [Stern, 2006, pages 46-48]

His 2006 report suggested committing 1% of GDP each year to cut carbon emissions. By comparison Bjørn Lomborg claimed that “Spending just a fraction of this [Stern Review] figure - $75 billion - the UN estimates that we could solve all the world’s major basic problems. We could give everyone clean drinking water, sanitation, basic health care and education right now. Is that not better?” Arguments here are as much about equality as intertemporal transfer. If global population keeps on growing, do we owe future generations a planet as good as the one we have on an absolute or a per capita basis?

However, projects are sometimes essential and incomparable. Another way of looking at this is that you can use the discount rate to evaluate a game of Russian roulette, but you have to accept the chance of dying. If you don’t want to die under any circumstances, then discount rate analysis is useless. Stern again, “the pure time discount rate applying to the existence or non-existence of the planet should be much lower than that applying to the existence or non-existence of a project in terms of a possible new environment (from unforeseen policies or technical change, for example) which would render that project irrelevant.”

So, eminent economists disagree wildly about an important subject. Pure rate of time preferences for intergenerational transfer and discount rates for investment decisions are not the same thing, Quite rightly, Stern says, “Thus the question ‘what is the discount rate’ is badly posed. There will be many discount rates depending on the period of time and the path.” [Stern rebuttal, 2007]

So we understand that a high discount rate means we don’t care about the future, while a low discount rate means we do. We learn that before subjecting a range of outcomes to discount rate analysis, we have to be capable of accepting all the possible outcomes. We realise that discount rate or cost-benefit analysis can only show that the benefits of a policy exceed the costs. There will be winners and losers. If the winners don’t wish to compensate the losers for their losses, the policy may not be politically achievable. Finally, if we want to apply fair intergenerational transfer, we may need a very low, near zero, discount rate. Perhaps those Victorians weren’t so foolish after all.

Given all this uncertainty, it probably helps to know that there are two types of economists:

(1) those who cannot calculate the correct discount rate, and

(2) those who do not know that they cannot calculate the correct discount rate.

Before we can argue about discount rates, we have to argue about priorities. After we agree priorities and the relative ranking of goals, we can use discount rate analysis to help us choose options within each goal. Until we agree our priorities, you can count me in on the political discussions, and count me out of the economic discussions.

© Professor Alderman Michael Mainelli, 2016