Long Commerce: Transactions across time

Professor Michael Mainelli

7 February 2011

[SLIDE: OUTLINE]

Good evening Ladies and Gentlemen. As Gresham regulars know, it wouldn't be a Commerce lecture without a commercial. Our next Long Finance and London Accord event will be held on the afternoon of 24 March close to here at Bank of America Merrill Lynch's King Edward Hall. The programme for the afternoon is "Peak Everything: Enough To Go Around?" and features Professor Paul Ekins, Ivo Mulder and Charles Secrett, amongst many others. Admission is free, but reservations are required via the Gresham College website.

Well, as we say in Commerce – "To Business".

[SLIDE: WEALTH TRANSFER]

We've seen unprecedented wealth transfers over the past few decades. For a start these include (1) wealth transferred from the young to the old via the housing market, (2) from the young to the old (healthy to the unhealthy) via the health service, (3) from the private sector to the public sector via public sector growth and taxation, (4) from private sector employees to public sector employees via state pensions, (5) from the rich and poor and middle-aged to the middle-class young via education, (6) from the 'real' economy to the financial services sector, and (7) from savers to borrowers and the credit-worthy to the feckless via defaults, public bailouts and inflation. Transfers also include redistribution from the wealthy to the poor via higher percentages of taxation or (sovereign) debt relief, accompanied by media incitement of the wealthy lording over the poor. It's a lot to come home at once. Tonight we'll briefly explore debt and money transactions across many generations.

Dominic Frisby charges that we have hit “peak debt”, while others predict the simultaneous combustion of dangerous exponential functions in the economy. [Morgan, 2010] Anatole Kaletsky wrote in Prospect last year that: “Because of the promises on health and pensions made by successive governments to the ageing baby-boom generation, a fiscal crisis would have occurred sooner or later even in the absence of the 2008 meltdown.” [Kaletsky, 2010, page 34] The meltdown has been accompanied by an amazing evaporation of trust. Recently commerce has become infamous for an IBG-YBG culture, “I'll be gone, you'll be gone”. Surely this isn't the way to achieve sustainable commerce over generations.

At several points we shall meet topics contained among some other 30 or more Gresham lectures I've had the privilege to deliver over the past few years. Previous lecture references are contained in the transcript, but to read the relevant ones out at various times would take too long, which reminds me of the great deregulator of the US airline industry, Alfred Kahn, who died this past December. Alfred Kahn transformed all of our lives, for the USA deregulation success spurred European airline deregulation. While Alfred Kahn was President Jimmy Carter's ‘inflation tsar’ he was notoriously outspoken and frank, calling economic figures a “catastrophe” or pointing out, tellingly for today, that “inflation occurs when everyone is trying to take a piece of the pie, but there isn't enough pie to go around.” He was frequently in political hot water for his candour. “Told off for using the word ‘depression’ in public, he replaced it with ‘banana’, and announced that the country was heading for its worst banana in 45 years. Told off by the head of United Fruit for using ‘banana’, he made it ‘kumquat’.” [The Economist, Obituary, 20 January 2011] Hopefully this lecture is less controversial, so tonight I'll use the word ‘details’ and wave my pen to indicate where you can go back to previous lectures for more background on a subject.

This lecture hopefully moves us on from a 2007 lecture, [Mainelli, Michael, “Stealing the Silver: How We Take From The Dispossessed, The Poor And Our Own Children”, Gresham College Lecture (12 November 2008) - http://www.gresham.ac.uk/lectures-and-events/stealing-the-silver-how-we-take-from-the-dispossessed-the-poor-and-our-own], while pulling together a few new thoughts.

[SLIDE: A LONG TIME AGO, IN A FATE FAR, FAR AWAY]

I would like you to imagine with me the All-time Universal Bazaar, or to paraphrase Douglas Adams, a Fete at the end of the universe. Think of a gargantuan field on the edge of a wide river ringed by trees; think of gala medieval fairs, marketplaces, feiseanna, bazaars; enormous rows of tents and stalls and entertainments with goods from all over the world. A bit like Jack and the Beanstalk, you're a simple fisherman and you've come to sell your wares, some sustainably caught fish. The All-time Universal Bazaar is an enormous marketplace in the countryside with a small difference. The small difference in this marketplace is, as if in a science fiction film, it exists outside time. People from every generation can come here for transactions across time. There in one corner are some Assyrians haggling with some moon colonists over artwork, over there are some Huns trading furs with a submarine commander.

To get whisked there, you invoke half of the physicist John Archibald Wheeler's magical incantation: "Space is what prevents everything from happening to me." Your first transaction is with someone from two centuries in the future. Population growth has still not abated and she'd like to buy your fish with some cash she has. After the sale, you muse that with fewer fish here and now, in theory there will be fewer children here and in the future. One of those awkward time travel puzzles, but you shake your head and move on. Your second encounter is with an African, traumatised from a fifteenth century plague, he's offering a bargain on yams. You take them, musing that at least these yams won't go to waste.

Finally, in your third transaction you show you're not such a simple bumpkin. A group of economic scientists from an exoplanet in mu-Arae approach you to be a broker for them with some Cornish tin miners. The economic scientists want you to get the Cornish tin miners to agree to use an interesting technique that recovers more metal with less environmental damage. But the tin miners don't want anything from the exoplanet in exchange, so in return for promising the miners a year's supply of your fish, the economic scientists promise you a lifetime's supply of Yttrium. The scientists are trying to make sure that earth's supplies permit shipping them that rare tin for their own mining processes six millennia later. You head home satisfied with a good day's trading, though your head spins with time travel paradoxes.

[SLIDE: TIME IS NATURE'S WAY OF KEEPING EVERYTHING FROM HAPPENING AT ONCE]

To get home, you invoke the other half of John Archibald Wheeler's magical incantation, "Time is nature's way of keeping everything from happening at once" - and the journey home begins. As the All-time Universal Bazaar fades, a fragment of dialogue vibrates in chord with a old film memory – "I've seen things you people wouldn't believe. Attack ships on fire off the shoulder of Orion. I've watched c-beams glitter in the dark near the Tannhäuser Gate. All those ... moments will be lost in time, like tears ... in rain."

[SLIDE: PILE IT ON]

But wait, something is wrong. You haven't left the All-time Universal Bazaar at all. Things just look uncomfortably different. Now there are enormous piles of paraphernalia everywhere. A skyscraper Manhattan of goods. To your right a slithering pen of struggling fish that would fill a supertanker's hold, with seagulls flying overhead and some fish starting to rot. You start to retch and hold your nose. A gargantuan pile of timber to your left towering 30 stories high. Guards everywhere. You have flashes of Soylent Green futures and a Koyannisqatsi world out of balance [Mainelli, Michael, "Commercial Philosophy: Science Or Religion?", Gresham College Lecture (21 May 2009) - http://www.gresham.ac.uk/lectures-and-events/commercial-philosophy-science-or-religion] Once again you invoke the incantation, "Time is nature's way of keeping everything from happening at once". This time it works and you can walk home.

[SLIDE: REEL ‘EM IN]

So much for attempting a bizarre opening without an opening crawl, voiceover, swelling orchestras or special effects. We return to the here and now with a bump in production quality – though you may wish to keep an eye out for the film trailer of the All-time Universal Bazaar this summer. What would I like you to take from this thought experiment? I hope you got the idea that of the many externalities we have in commerce, time is the problematic one. The first vision postulates a commercial utopia. If we could store goods indefinitely at no cost, trade would be very different. If we could wait till undeveloped technologies are developed, we would be more efficient. If everyone lived in the same present, the same Long Now, with a 0% interest rate, we might trade close to meeting Daniel Bromley’s definition of economic sustainability – “a set of actions to be taken by present persons that will not diminish the prospects of future persons to enjoy levels of consumption, wealth, utility, or welfare comparable to those enjoyed by present persons.” [The New Palgrave Dictionary of Economics, Second Edition, 2008] [Mainelli, Michael, “Is The Party Over? Sustainable Hopes”, Gresham College Lecture (16 September 2008) - http://www.gresham.ac.uk/lectures-and-events/is-the-party-over-sustainable-hopes]

Or would we? The second vision of skyscrapers of goods postulates that everyone would take what they could in their own time. If everything was a great big universal commons, would we just perpetuate the tragedies of the commons on a larger scale, or would we evolve common resource pool systems as outlined by the Nobel prize-winner Elinor Ostrom? [Mainelli, Michael, “Goldilocks Government And The Market: Not Too Little, Not Too Much, But Just Right”, Gresham College Lecture (16 January 2006) - http://www.gresham.ac.uk/lectures-and-events/goldilocks-government-and-the-market-not-too-little-not-too-much-but-just-right] Repeated interactions at the All-time Universal Bazaar might mean that we would evolve hard rules about responsibilities and sanctions and avoid the transaction costs, such as collecting taxes, associated with government ownership of common resources. [Mainelli, Michael, “It’s A Mad, Bad, Wonderful World: A Celebration Of Commercial Diversity”, Gresham College Lecture (17 November 2008) - http://www.gresham.ac.uk/lectures-and-events/its-a-mad-bad-wonderful-world-a-celebration-of-commercial-diversity] On the other hand, perhaps the first generation would fell all the trees and trade them for fancy future goods at the All-time Universal Bazaar. Hang subsequent generations; they’ll only value trees more. Likewise, the second generation would take all the fish to the All-time Universal Bazaar, and so on. As Benjamin Disraeli once criticised a selfish man, “He thinks posterity is a pack-horse, always ready to be loaded.” [Speech, 3 June 1862] Do we need governments to restrain our greed?

The law of comparative advantage through time might either save or destroy everything of commercial value. If trade through time was possible, would values stop fluctuating and settle down? Could we eschew, somehow, competition in procreation and thus achieve some everlasting Arcadia, or are we compelled to yearn for a greater share, thus leading to competition simply to get our share. I’m reminded of a discussion with a Maltese official about the likely changes to family life as Malta responds to EU exhortations to increase the participation of women in the workforce (Malta has one of the lowest female participation rates - http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Gender_pay_gap_statistics). Oxford Professor Avner Offer notes, “By choosing individually to work, women found themselves collectively compelled to work.” [Offer, 2006, page 255] Is this mankind’s Fate, compelled to over-work and over-exploit because of competition in a too inclusive marketplace? The All-time Universal Bazaar raises excellent questions for economists and students who'd like to consider long-term values.

[SLIDE: DISCOUNT ME IN]

USA President John Quincy Adams exhorted, "Think of your forefathers! Think of your posterity!", but we transact with past generations and future generations mostly unwittingly. [Mainelli, Michael, "Save the World: A Commercial Break", Gresham College Lecture (28 April 2008) - http://www.gresham.ac.uk/lectures-and-events/save-the-world-a-commercial-break]. 'Previously on Gresham College', we concluded that 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." Once we concede death of individuals, institutions and governments, we must attribute a higher value to things nearer in time than those further away, and we concede positive discount rate. The discount rate is our way of calculating how much value we attribute to the present over the future. One of our biggest problems in finance is that short-term feedback tends to be positive, encouraging bubbles, while long-term feedback tends to be negative, meaning we learn slowly. As the discount rate goes to zero we learn very slowly, perhaps explaining many white elephant public works projects. As the discount rate goes high we learn very quickly, but typically not very sustainably. Stewart Brand remarks that, "Discounting the future led to modest short-term individual gain and horrendous long-term public loss. The accounting was too isolated." [Brand, 1999, page 120] What's the point of building for the long-term when income a few years hence is worthless. We are not in an All-time Universal Bazaar. Inter-generational discount rates vary both between and among generations (probably itself a fruitful area for research). While I want to move past technical discussion of discount rates, Jeffrey Sachs summarises well why discount rates contribute to a "tyranny of the present over the future".

"Two subtle issues are at work in this example [market price of fish]. The first is that the market price of a species will generally not reflect the species' societal value as part of Earth's biodiversity. Market prices do not reflect the value that society puts on avoiding the extinction of other species, only on the direct consumption value of those species (for food, aphrodisiacs, pets, hunting trophies, or ornaments). Second, the rate of interest diminishes the incentive for the resource owner to harvest the resource at a sustainable rate. If the value of the resource is likely to grow more slowly than the market rate of interest, the blaring market signal is to deplete the resource now and pocket the money! Since the market rate of interest depends ultimately on the saving decisions and preferences of the current generation alone, without any voice of the future generations, the market rate of interest can give the signal to deplete the resource at the expense of future generations. When the current generation is impatient, that is, it places a high value on current consumption relative to future consumption, the market interest rate will tend to be high and the market signal transmitted to each individual resource owner will be to deplete the resources under the owner's control. In essence, there is a tyranny of the present over the future.

"As expected from the theory, slower-growing animals and plants are especially endangered today. Consider as an example one major category: slow-growing megafish. Their slow growth makes them a "poor investment" even in managed fisheries, and their large size makes them an easy prey…" [Sachs, 2008, page 40]

[SLIDE: I WAS A TEENAGE MONGOL]

In the course of preparing this lecture I asked a few people what motivated them to think about the very long term future. The word 'posterity' popped up quite a bit. One of the founders of The Spectator, Joseph Addison, wrote about planting forests in 1714:

"I need only mention what is frequently observed by others, that the Increase of Forest-Trees does by no Means bear a Proportion to the Destruction of them, insomuch that in a few Ages the Nation may be at a Loss to supply it self with Timber sufficient for the Fleets of England. I know when a Man talks of Posterity in Matters of this Nature, he is looked upon with an Eye of Ridicule by the cunning and selfish part of Mankind. Most People are of the Humour of an old Fellow of a College, who, when he was pressed by the Society to come into something that might redound to the good of their Successors, grew very peevish, We are always doing, says he, something for Posterity, but I would fain see Posterity do something for us." [Spectator, volume VIII, number 583, 20 August 1714]

"What has posterity ever done for us?" is a question raised quite a bit since then, by people ranging from the poet Thomas Gray, to the Irish parliamentarian Sir Boyle Roche, to John Trumbull in the USA.

The eighteenth century Italian playwright Carlo Goldoni believed we live on through our children: "He only half dies who leaves an image of himself in his sons." ["Muore per meta chi lascia un' immagine di se stesso nei figi."] Pamela (II, 2) Richard Dawkins' introduced the idea of the selfish gene and the replicator. "The fundamental mover, the prime mover of all life, is the replicator." [Dawkins, 1976, page 264] A replicator that cares for its copies, albeit slightly imperfect copies, ought to do better. Thus it's your selfish genes of today wanting to care for their replications that matter. We can estimate that through the mixing of genes, looking back a mere 33 generations could, in theory, encompass some 8,589,934,592 ancestors, more people than there are on the planet today. Taking a generation as about 25 years, and with some brave simplifying assumptions on genetic mixing, e.g. always marrying outside, we see that we could be related to every parent with a successful lineage from eight centuries ago. In 2003, National Geographic highlighted some research on Genghis Khan's (1162–1227, probably) Y chromosome [http://news.nationalgeographic.com/news/2003/02/0214_030214_genghis.html], 14 February 2003]. Genetic research indicated that just his Y chromosome is in some 16 million descendants alive today, 0.5% of today's male population. With some overly free calculations and assumptions on perfect genetic mixing, according to the bar-room theory of the selfish gene, Genghis Khan's genes eight centuries on could be in almost everyone. If you have, or intend to have offspring, given the mixing of genes in future, you might care about your own descendants more in the near term, but as you look further and further ahead you should approximate caring for everyone. In the long-term there is no difference between altruism and nepotism. According to bar-room theory, Genghis Khan should probably have cared more for our generation which might be close to 100% related offspring, than any strangers he met along his travels. Perhaps that's why he ravaged Asia and not our time (joke!). Before you dismiss the impact of a future generation's lot on today's feelings as too abstract, remember how emotional discussions of inheritance tax can become.

[SLIDE: WHAT HAVE THE ROMANS EVER DONE FOR US?]

Leslie Poles Hartley opened his novel The Go-Between (1953) with the line, "The past is a foreign country: they do things differently there." Surely the future is a more foreign country: we have no idea what things they will do there. Ethics deals often with the rights and wrongs in our dealings with strangers. [Harris, Ian, "Commercial Ethics: Process or Outcome?", Gresham College Lecture (6 November 2008) - http://www.gresham.ac.uk/lectures-and-events/commercial-ethics-process-or-outcome) The ethical issues involved in dealing with strangers and dealing with posterity are strongly linked. Madame de Stael commented that, "Strangers are contemporary posterity." [« Les etrangers sont la posterite contemporaine. »] (Baronne Anne Louise Germaine de Stael-Holstein). One of the stranger things I've found recently has been futurists pointing out that we may soon be unable to comprehend our offspring. With genetic modifications and implants, in a few decades our descendants may soon resemble augmented cyborgs that can out-think and out-perform us in ways we cannot conceive.

Sticking with the idea of posterity, there are other reasons for caring about future generations than just genetics, perhaps our own mortality features. Equal or possibly superior to our feeling for our offspring is our own survival. Does being seen to care about future generations bestow a feeling of immortality? Seneca believed in this form of remembrance: "Why do you ask, how long has he lived? He has lived to posterity." ["Quid quaeris, quamdiu vixit? Vixit ad posteros."] (Lucius Annaeus Seneca), Epistles (XCIII)

Or does caring about future generations bestow a feeling of honour. Tacitus observed that "Posterity gives to every man his true honour." ["Suum cuique decus posteritas rependet."] Tacitus (Caius Cornelius Tacitus), Annales (IV, 35) We find satisfaction in honour, and may feel that true honour comes from seeing further ahead than others. "Danny Hillis calls the Golden Rule of Time: 'Do for the future what you're grateful the past did for you.' (Or what you wish the past had done for you.)" [Brand, 2009, page 300]

Or does caring for posterity help the godless achieve a feeling of transcendence, of the mystic? In last year's Long Finance publication, The Eternal Coin, Dr Malcolm Cooper pondered whether increasing secularisation was linked to short-term thinking, while religious thinking and the afterlife fostered long-term thinking. Perhaps this feeling of transcendence is achieved through intellectual satisfaction in just or righteous action. "Posterity is for the Philosopher what the other world is for the religious." [Denis Diderot] Given the satisfaction of a large endowment at many institutes that house philosophers, perhaps money itself is transcendental.

This echoes the great Z/Yen sage, Chow Kli Ning, who set out his philosophy of a quality life, one with opportunities to make a quick buck, “Endeavour to infinitely improve ourselves and honour our ancestors and thus, in so doing, produce the ultimate service for our community and in our small, modest way make the world in which we live a perfect place not just for ourselves or our immediate descendants but for infinite generations yet unborn.” [Mainelli and Harris, 2000, page 55] More seriously, but in the same vein, many people invoke “seventh generation sustainability”, a concept attributed to the Iroquois, that all major decisions should take the next seven generations into account. From their Great Binding Law, written in the 15th century, “Look and listen for the welfare of the whole people and have always in view not only the present but also the coming generations, even those whose faces are yet beneath the surface of the ground - the unborn of the future Nation.” [http://etext.virginia.edu/toc/modeng/public/IroCons.html]

[SLIDE: PINCH ME IF IT’S REAL]

In our materialistic world, we prefer social and economic grounds as justification for posterity care. Last year David Willetts, the MP, published an excellent book, The Pinch: How The Baby Boomers Took Their Children’s Future – And Why They Should Give It Back, which attempted to explain why we in the UK should strive for inter-generational equity. Willetts main argument is that we’ve moved from a millennial old model where those of middle age transfer wealth to the young and old, to one where everyone transfers wealth to the old. Willetts makes arguments about how inter-generational inequity leads to inequality, poverty, violence and social strife. He points out that geo-politics is dominated by demography such that a massive surge of teenage males within a population is a serious warning sign of social unrest, from the French Revolution to the Cultural Revolution to the fall of the Shah to Egypt and Tunisia today. For Willets the “two big events of the last fifteen years – lower inflation and greater longevity – have between them delivered a massive shift in the relative wealth of different generations which we have barely begun to understand let alone address. It is their interaction which makes them particularly potent, especially in their impact on our pension wealth – if you live longer but inflation is high your pension may lose much of its value. But if you live longer in an age of low inflation your income may keep its value.” [Willetts, 2010, page 75] Willets points out that we do want to have social contracts that span generations. “One reason why families matter so much is that many family exchanges are across different generations.” [Willetts, 2010, page103]

Dr Malcolm Cooper noted that communities with strong ties to land, in particular families, religion and seats of higher learning, seem to be the most enduring. As the three century old concept of the nation-state and land control ages, we increasingly find nations joining the short list of institutions devoted to inter-generational transfer. We are left to wonder whether we value these institutions because of their continuity or because of their ability to help generations exchange. Willett’s notes four implicit contracts between familial members of successive generations:

¨ direct exchange – if we care for our children, they will care for us;

¨ obligation – our parents cared for us, so we need to care for them;

¨ replicating behaviour – if we are seen to care for our parents, our children will copy and care for us;

¨ future generations – if our care for our parents and our children is copied, our descendants will benefit.

At first these four contracts seem to make sense of cultures based around revering ancestors, but Willets points to a paradox implicit in these four contracts that also turns up in social research, “older people are the most future-oriented.” [Willetts, 2010, page 118] “They are beginning to live through the younger generations coming after them.” [Willetts, 2010, page 118] There is a multi-attributed quotation that highlights this change of direction – “The world was not given to us by our parents, but loaned to us by our children.”

We contract with future generations in lots of unnoticed ways, think landfill arrangements, think pensions. One clear inter-generational transfer is a legacy. We may be left a legacy, or think about the legacy we leave. I have the privilege of being a Trustee at two educational institutions, Gresham College and Christs Hospital School, where we effectively interpret in one case a 1579 legacy and in the other a 1552 legacy, which shows that these legacies and their associated trusts can stipulate and effect rules for centuries of transfer.

[SLIDE: STAINLESS STEAL REVISITED]

In our personal lives we have some fairly obvious long-term asset and liability management tools, in particular mortgages, pensions and life assurance. Mortgages, pensions and life assurance are among the oldest financial products. These products interact with our family arrangements in various ways. In a world where currency didn’t lose value, we probably wouldn’t have pensions; saving would suffice. In a world where the taxpayer would bear the cost of supporting the elderly, we also wouldn’t have pensions – if everyone worked for the public sector for example. Yet we count on contracting with future generations to bear the longevity and investment return risk of caring for us, and on democracy to enforce the contract, of which more later.

Where I would like to go, as we move outside our family arrangements, is to look at how we increasingly count on the state to contract for us with future generations, and the state’s view of the long-term is national infrastructure and debt. Frédéric Bastiat noted, “The state is the great fiction by which everybody seeks to live at the expense of everyone else.” « L’État, c’est la grande fiction à travers laquelle tout le monde s'efforce de vivre aux dépens de tout le monde. » [Bastiat, Volume 4, page 332] Taking pensions, perhaps the rational view is to look at your age's cohort, in aggregate certainly saving enough, and realise that you're better off spending now, then later using your voting power in future to grab back a share of income from others despite current promises that if you fail to save you'll live in penury. The alternative might be means-tested aged poverty benefits till you're savings disappear, whereupon you are reliant on the state anyway.

One of the most interesting suggestions I've heard on pensions and longevity is to have an individual floating retirement age. You can retire when you're actuarially likely to have X number of years remaining. Say that the pension guarantees 15 years of income, then people retire at 70 when the actuary says they'll live to 85, or retire at 72 when the actuary says they'll live to 87, and so on. Basically a guaranteed, fixed-term, annuity for future delivery. Con Keating, in conjunction with Long Finance, published a book last December on the many inter-generational issues of pensions [Keating, 2010], and David Steven likewise a book last February on longer term thinking around mortgages [Steven, 2010] so I won't go into pensions or mortgages more this evening.

The 2007 lecture ended with this slide of Seven Subtle or Stainless Steals, with climate change as the example. The Seven Subtle Steals are how we dispossess people in the near term through regressive taxation, waste, biased social services, subsidies, lack of competition, under-provisioning and externalities. The state can contribute to the Steals, or intervene to combat them via suasion, better information, direct delivery of goods and services, regulation, creating markets, taxation or setting things aside such as natural reserves in land banks. The closing statement was, "If we truly care about the dispossessed, the poor and our own children, we need to make sure that (1) the facts are clear, (2) we suppress the seven subtle steals, and (3) when we agree on the order of things, we use discount rates appropriately, with very low rates for the longer term." But even if we can agree on the facts and use appropriate discount rates, the temptation to cheat is very high. [Detail] [Mainelli, Michael, "Does Society Risk My Life Through Safety? The Perils Of Too Much Risk-Aversion", Gresham College Lecture (19 March 2007) - http://www.gresham.ac.uk/lectures-and-events/does-society-risk-my-life-through-safety-the-perils-of-too-much-risk-aversion] How can we tie our own hands to do the right thing by posterity over the longer term?

[SLIDE: FOREIGN VIEWS]

When governments issue debt today, they do so as bonds, a promise to repay over time. A bond creates future obligations for taxation, and thus money. We are going to move in a moment to looking in a little detail at what government debt means for money, but first let's look at the idea of 'legal tender'. Legal tender is an offered payment that, by law, cannot be refused in settlement of a debt. Government-issued fiat currency is the most common form of legal tender. Legal tender extinguishes debt. Private contracts can be written to avoid legal tender, but government itself writes contracts using money in the form of its own debt. Yet we can have some fun with a very strict definition of legal tender - currency is valuable because it can be used to extinguish future obligations to government, principally tax obligations. People are going to want more of their currency, i.e. money becomes more valuable, if people believe it will be increasingly hard to find money to pay future tax bills.

It's fun to follow this thinking because you can look at foreign exchange rates as relative indicators of future expected taxation. A currency, other things being equal, grows in value if you think that future taxation levels in that country will increase relative to everything else. The same amount of currency will extinguish less future debt. But if you think that today's currency will extinguish more future debts, i.e. taxation levels will decrease, then tomorrow money's value is closer to today's and interest rates should fall. There are numerous other considerations that affect the value of money, such as the quantity and velocity of money, or tax enforcement, which I'm ignoring to make this simplistic, but fun, point, derived from an overly zealous application of the definition of money as extinguishing tax debts. Although disputed, I happen to sympathise with Yellen's summary that – "in a closed economy scenario, deficits retard capital formation and shift the economy to a growth path with lower per capita output and capital per worker. In an open economy scenario, current account deficits induce growing foreign indebtedness and result in a burden of future interest payments which will lower the disposable income of domestic residents." (Yellen, 1989, page 18).

We start to touch on Hyman Minsky or Carl Menger and the Austrian School of Economics where low interest rates and an increase in the money supply are presumed to lead to reckless, speculative borrowing, resulting in misinvestment and bubbles, followed by a recession and a contraction of the money supply. [Mainelli, Michael, "Liquidity: Finance In Motion Or Evaporation?", Gresham College Lecture (5 September 2007) - http://www.gresham.ac.uk/lectures-and-events/liquidity-finance-in-motion-or-evaporation]

[SLIDE: NATIONAL DEBT: NOT GOD'S WORK]

We know that Sir Thomas Gresham copied the Antwerp Bourse, but the English copied many other Flemish financial inventions, including the modern idea of bonds. There's an old quip on the other side of the North Sea – "God made the world, but the Dutch made the Netherlands". And not a word about how God financed it, but we know a bit more about Dutch financing. In finance, the Dutch tried to achieve perpetuity; here's an interesting example. In 1624 a woman by the name of Elsken Jorisdochter invested 1,200 florins in a bond used to finance repairing a dyke paying 6¼%. The Lekdyk Bovendams Company was a semi-public body with taxing power chartered in 1323. Sometime in the eighteenth century the rate was renegotiated at 2½%. The bond needed to be presented every five years in Utrecht. In 1938 the New York Stock Exchange bought the bond and as late as 1957 it was still being presented for payment of interest. [Homer and Sylla, 1963, pages 126-127 - http://books.google.co.uk/books?id=PVqqAAAAIAAJ&dq=Elsken%20Jorisdochter&source=gbs_similarbooks]

Dutch financial inventions proliferated in England during the seventeenth century with the arrival of King William III and his Whig supporters, leading to the Bank of England, recoinage and the national debt. "… it is the ‘Tontine Act’, which passed through Parliament during December 1692 and January 1693, which strictly speaking should be taken to mark the origin of the national debt.” [Davies, 2002, page 264] The UK issued the first sovereign bond in 1693 in the form of a tontine to fund part of the Nine Years War against France. In a tontine each investor pays a sum and receives annual dividends. As each investor dies, his or her share is reallocated among the surviving investors, continuing until only one investor survives. The principal is never paid back. By the mid-18th century, investors knew how to play the system by buying tontines for young children. Because governments underestimated the longevity of the purchasers, tontines were ruinous and abandoned. This actuarial mistake echoes current mistakes over pensions.

[SLIDE: RECYCYLING DEBT]

The establishment of the Bank of England in 1694 was controversial in many regards, from its monopoly on discounting bills, to its private character and its joint stock structure. Davies points out the importance of the change to the money supply.

“The fact that more than half of the total money supply was now being created, not by the mint under the dictate of the monarch, but rather by the London money market and the provincial bankers gave rise to the most profound constitutional consequences. First, in order to carry out his much more burdensome civil and military duties, the monarch, after a painful but vain struggle, had been forced to call parliaments annually. Secondly because of the state’s need to supplement taxes regularly and substantially with various forms of short-, medium- and long-term borrowing, the state had been forced to take into account the views and interests of the moneyed classes and the nature of the institutions which its borrowing had very largely brought into being.”

[Davies, 1994, page 281]

People did, and do, struggle with the idea of handing on debt to the next generation. Thomas Jefferson questioned the justice behind it. “The question, whether one generation of men has a right to bind another, seems never to have been started either on this or our side of the water. Yet it is a question of such consequences as not only to merit decision, but place also among the fundamental principles of every government.” [Thomas Jefferson, letter to James Madison, 6 September 1789 - http://classicliberal.tripod.com/jefferson/mad02.html] There has equally been a lot of debate, much inconclusive, looking at whether government debt makes us wealthier. The Barro-Ricardo equivalence proposition controversially suggests that consumers understand government obligations and thus it does not matter whether a government finances its spending with debt or a tax increase, the effect on total level of demand in an economy being the same. [Barro, 1974]

In a like vein with state pensions, Con Keating argues: “The idea is prevalent that these unfunded schemes are devices for intergenerational theft. This is a simple miscomprehension of the economics. A pension is a claim on future production. However it is always current production which is divided among economically active and inactive individuals, since consumption goods cannot be stored. The award of an unfunded pension to a nurse lowers the need for higher taxation today. This raises the disposable income of all individuals, who are free to consume or invest this today.” Further, The Economist points out, “The rationale behind private-sector pensions is to reduce the burden on governments of an ageing population. Yet if private funds are invested mainly in government bonds, then pension promises end up being a claim on future taxpayers all the same. This may merely reflect reality. Pension benefits, whether funded or unfunded, are a postdated cheque on the income of future workers.” [The Economist, “Buttonwood: In Debt To Grandpa”, 29 January 2011, page 69] One mechanism for transactions across time that could be used more often is for private pension payers to ask if the people handling their investments are investing in a retirement world they’d like to live in.

[SLIDE: INVENTED IN 1699]

In the early 1700’s one of the founders of the Bank of England and instigator of the Scottish Darién debacle, the “bold even to rashness” [Andreades, 1909], William Paterson, came up with a scheme to eliminate national debt through investment. Stanhope, the Chancellor of the Exchequer in 1716, with the support of Robert Walpole adopted Paterson’s idea of a ‘Sinking Fund’. Surpluses from taxation were supposed to be invested to reduce the debt. In many ways this was an early form of the modern Sovereign Wealth Fund or stabilisation fund that an economist might recommend to a resource cursed country. The ‘Sinking Fund’ investments worked well, but exigencies of war seemed to always result in a reason to raid the coffers and reflate national debt.

But we happily hand on infrastructure to future generations. There is an argument that the benefits of a fixed capital asset can be charged to future generations if they derive benefit from it. Adam Smith classified the “stock of society” in three parts - immediate consumption, fixed capital and circulating capital. Interestingly, given our recent property bubbles, Smith used an example of a house for current consumption - “Though a house, therefore, may yield a revenue to its proprietor, and thereby serve in the function of a capital to him, it cannot yield any to the public, nor serve in the function of a capital to it, and the revenue of the whole body of the people can never be in the smallest degree increased by it.” [Smith, 1776, Book II, Chapter 1, paragraph 12, page 356 - http://www.bartleby.com/10/201.html] For Smith, capital growth was value in excess of steady state. When the Victorians overbuilt, in the sense of building sewers, railways or bridges for a much longer term than their lifetimes, they could have argued that increasing the national debt was rational as we would have the benefit and should pay. They had foregone some immediate consumption to increase the fixed capital. There are numerous other ways in which we can hand on increased wealth-generating capacity to future generations than just physical infrastructure, for example we can hand on well-educated children, healthy children, data, information and knowledge, cultural cohesion, cultural artifacts, or natural parks. But how do we arrive at a fair deal between generations? For example, suppose we raise money to keep a painting in the country, but the next generation sells it to the Far East, or we acquire large gold reserves, but these are sold off, or we forego development in a national park, but the next generation builds on it (part of the emotional reaction behind the recent national forestry sales discussions in the current press).

The democratic question of binding future generations to today's decisions is an old one. Speaking in the House of Commons on the subject of a railway bill in 1886, Charles Conybeare asked, "Are we prepared to sacrifice the rights of posterity to suit the exigencies of the present moment?" (11 May 1886) The rights of posterity seem to entwine two things – decisions that cannot be reversed and the obligation to pay for them. Some decisions can't be reversed, for example turning a nature reserve into an industrial area. Some decisions can be easily reversed, yet leave the obligation to pay, for example abandoning a new hospital. One significant example of shorter-term decisions leading to longer-term payment obligations has been UK governments' infatuation with off-balance-sheet finance, known as the Private Finance Initiative under the Conservatives, and Public Private Partnership under Labour.

[SLIDE: COMMERCE & POLITICS]

[following two paragraphs of argument developed with Jan-Peter Onstwedder]

Politics, and therefore government, is short term oriented because of the electoral cycle. Commerce should be "appropriate" term for risk and reward. Where government and commerce interact the short term targets of governments induce shorter term returns for commerce. As we discussed last year at a Long Finance conference, both commerce and government are worthy contenders for the shorter-thinker award. Increasing transparency and accountability lead, in average and over time, to better decisions, but they also create a greater flow of information about the processes and discussions and arguments that lead to those decisions. Markets absorb that information and act on it, creating volatility. We can think of that volatility as the price we pay for the prize of better decisions, much like financial assets with higher expected returns generally exhibit greater risk. One specific risk is greatly increased by this dynamic, government policy risk. The almost continuous process of policy development played out in public, the almost continuous cycle of white papers, green papers, regulatory reviews, investigative committees, etc., create uncertainty about the future path and destination of government policy.

The so-called 'third way' in politics can be seen as a response to this dynamic. Traditionally, the left and right both promoted a high degree of separation between government and commerce. The left desired to have government take care of most socially important products and services, either directly or by directing business; the right desired to have government be limited to setting the rules for business once it became clear business without rules wouldn't meet government's targets. The third way saw this as unnecessarily confrontational, and created much closer integration, primarily through finance: public-private partnerships, private finance initiatives, subsidies, tariffs, quangos, ... Combined with both government's and business's tendency to grow in order to amass more power and/or money, this style of public-private interaction had unintended consequences. Scale begat inertia, and without a contrary force, that inertia crowded out innovation, leading to policies that discouraged competition, and fostered too-big-to-fail businesses that needed to be bailed out.

If we take the long term view of democracy, perhaps an All-time Universal Forum, where generations can debate with each other, we realise that no significant decision fails to create long-term obligations. Today's media seem to believe that democracy is about expressing the popular will at a particular moment – X% of people want more spent on schools, so more money should be spent on schools, now. Under this definition of democracy, consistent long-term policies could be overthrown at any moment they fail to capture the support of the current majority. With the increasing scale of state intervention in markets, the ability to change direction rapidly unnerves investors leading to under-investment in supposedly agreed programmes such as education, health or climate change. Some people seek changes to democracy, such as "deliberative democracy" or deliberative polling, which allow more informed decision-making on complex issues. Equally, we seek commercial mechanisms that force governments to honour their long term promises.

[SLIDE: CHASTITY AND POSTERITY]

What force might be strong enough to force governments to heed their promises? James Carville, an advisor to President Clinton, quipped – the bond markets - "I used to think if there was reincarnation, I wanted to come back as the president or the pope or a 0.400 baseball hitter. But now I want to come back as the bond market. You can intimidate everybody." [Wall Street Journal, 25 February 1993]

To be in debt or not to be in debt nationally is a puzzle. William Cobbett questioned the sanity behind national debt. "There is something so consummately ridiculous in the idea of a nation's getting money by paying interest to itself upon its own stock, that the mind of every rational man naturally rejects it. It is, really, something little short of madness to suppose, that a nation can increase its wealth; increase its means of paying others; that it can do this by paying interest to itself. When time is taken to reflect, no rational man will attempt to maintain a proposition so shockingly absurd." (Cobbett, 1828, page 54). Cobbett misses the idea that national debt may be tantamount to national self-discipline.

One interesting, slightly subversive suggestion is the idea of policy performance bonds. Such bonds would pay more interest the further governments were from their stated targets. Inflation-linked bonds emerged during similar periods when governments were in tough spots issuing debt, the UK in 1981, followed by Australia in 1985, then Canada in 1992, Sweden in 1994. What might other policy performance bonds look like? One specific idea, index-linked carbon bonds, was highlighted in a London Accord team paper and presented to the World Bank Government Borrowers' Forum at Ljubljana in May 2009. At their simplest, index-linked carbon bonds would set interest rates on government debt by linking to governments' carbon emission targets, tariff feed-in prices, in-country fossil fuel prices or carbon prices. Governments would pay more interest when they missed targets or when relevant green prices were lower than governments had promised. This kind of index-linked bond could easily be issued by any government (national, state, province) or multi-lateral agency without any need for a global initiative. Governments claim they are serious about meeting carbon emission targets and moving to a low carbon economy. Given that failure to perform would cost, governments would have real incentives to meet their own emission targets. Further, the debt price would provide a constant speedometer about confidence in governments meeting green targets. Bond-cuffs.

Index-linked carbon bonds are but one possible policy performance bond. Imagine governments issuing debt linked to other areas they control, branching out from inflation and carbon targets to education, healthcare or crime. We, the government, will borrow money, but guarantee we meet our targets. You, industry, will locate your corporate facilities in deprived areas (poor education rates, high murder or crime rates) and hedge the risks with government debt (education quality bonds, crime-linked bonds). As you can easily make a market in the next bubble, naturally, the ultimate innovation would be the government bond whose interest rate goes down as government debt goes down (fat chance).

[SLIDE: INTER-GENERATIONAL CALCULATIONS]

We could discuss some other intergenerational mechanisms such as insurances that span generations, or Keating's pension indemnity assurances. One good example of consilience is the use of transferable fish quotas. A regulator sets a species-specific total allowable catch, typically by weight for a given time period. Quota shares are allocated and can be bought, sold and leased. Transferable quotas can be allocated to individuals or communities. Transferable quotas are a good example of consilience about choice, deciding how to help people choose sustainable fishing; economics, using markets to allocate scarce resources; systems, thinking holistically about the environment and society; and evolution, from the science of complex biosystems to the evolving technologies of fishing which make it increasingly efficient. The first country to adopt transferable quotas as a national policy was New Zealand in 1986. Based on success, transferable quotas have spread globally and it is estimated that about 10% of the annual marine harvest is now managed by transferable quotas. Further, in some work my firm Z/Yen did for the UK government, we proposed an extension whereby the quota, the right to fish, was distinguished from the activation, actually using the quota. To use a fishing quota triggered the need for an activation certificate, and an activation certificate was only valid with an insurance guarantee that the user would not harm the underlying fishing resource, else the insurer would have to pay to return the resource to its former condition. People could own a transferable fish quota without fishing, e.g. an NGO trying to buy breathing space for fish. People who overfished would be subject to commercial costs for their recklessness. The longer term fishing community is brought to the fore.

[SLIDE: FREI AS A GESELL]

Finally we turn to the toughest area of all, the money measure. One of the more interesting excursions into reform over generations is the Freiwirtschaft movement. Silvio Gesell (1862-1930) was a German economist who found fertile ground for his ideas in Switzerland. As an emigrant to Argentina in his 20's he had experience of unstable currencies. He returned to Germany and began thinking about the role of the velocity of money in determining price levels. After the first World War he began writing about monetary reform, with a one week term of office as Finance Minister of the Bavarian Soviet Republic (Bayerische Räterepublik) in 1919 during its very brief lifespan of a few weeks. Gesell's core ideas for Freiwirtschaft were three. Free trade, free land and free money. Free trade we understand today, but free land and free money require some explanation. By free land Gesell, like Henry George in the USA before him and with some echoes of the Social Credit movement, meant only public institutions could own land; land was held by communities. Land could only be rented, not purchased, though perhaps on a very long lease. The implications of free land were that longer-term stewardship was encouraged, land prices wouldn't inflate, and society controlled the basic productive resource, land. By free money Gesell meant for money to be issued for a limited period at constant value (neither inflation, nor deflation). The implication was that the velocity of money had to be kept up otherwise the issued money expired, and that long-term saving required genuine investment; one couldn't sit on cash to exploit rents. If you can't store money then you need to avoid the temporal mismatch and debasement. You need to have a claim on productive assets, not just currency. One of Gesell's legacies is the Wir, a currency still used in Switzerland with its own cooperative bank, over 60,000 members and trading nearly CHF 2 billion per annum even today.

Gesell's 1918 warnings included a letter published in Berlin's Zeitung am Mittag – "If the present monetary system, based on compound interest, remains in operation, I dare to predict today that it will take less than 25 years before a new and even worse war." A prophetic warning even today. But what was so important about Gesell? In many ways I think Gesell put his finger on the nub of the problem that takes us back to the All-time Universal Bazaar. According to Freiwirtschaft, well at least in my interpretation, a price system with large volatilities is dysfunctional. With more stable prices, "wobbling" is is a positive, self-stabilizing, mechanism. But with large swings, asset bubbles and such, the monetary system is about speculation, not price discovery. [Mainelli, Michael, "Perceptions Rather Than Rules: The (Mis)Behaviour Of Markets" (14 November 2005) - http://www.gresham.ac.uk/lectures-and-events/perceptions-rather-than-rules-the-misbehaviour-of-markets]

[SLIDE: MONETARY REFORM]

Activities which diminish the effectiveness of saving increase the discount rate, thus making us more short-term. Financial innovations that release huge amounts of unnecessary credit for current consumption, or that allows people to sell future earnings, run the danger of destabilising our long-term decisions. A self-stabilizing price mechanism can't permit price formation to be swamped by fractional reserve banking and shadow banking credit creation. This leads us to want an eternal coin. An old joke runs, "Jesus saves but Moses invests". The pun obviously contrasts salvation with putting money away, while investment is to put money into productive assets in the hope they will provide future value. Freiwirtschaft is on the side of Moses.

What we measure over long periods of commerce is money, and, with apologies to Protagoras, as the measure of many things human, money needs a rethink. The subject of money and communities is long and deep. [Harris, Ian, "Changing Money: Communities, Longer Term Finance and You", Gresham College

Lecture (16 November 2010) - http://www.gresham.ac.uk/lectures-and-events/changing-money-communities-longer-term-finance-and-you] UK and USA audiences tend to be sceptical about monetary reform being either desirable or achievable. The English penny is a thousand years old. The US$ is two centuries old. Remember though that the likes of Isaac Newton and John Maynard Keynes devoted large portions of their life to monetary reform. Keynes' Bancor ideas resurface today. But on the continent, the new currency is just 10 years old. And looked at from the perspective of Long Finance's Eternal Coin, many currencies are in their infancy or their teens. The UK Department for Business, Innovation & Skills (BIS) has called for evidence in a review entitled "A Long-Term Focus for Corporate Britain". I would like to see further reviews of Government Britain and the Monetary System.

Monetary reform is a tall order and I'm not making specific proposals, but I think we can outline a few items worthy of further discussion in line with free trade, free land and free money. First, money gains in value as its value stabilises. Money is self-referential and recursive. Recursive economics needs more examination, particularly co-recursive functions with money. Second, how currencies are backed matters. With apologies to hardened gold standard bugs and softy fiat currency apologists, the ultimate backing of currency is its ability to extinguish debts in future. The depth and distribution of debt obligations are what give a currency value. If one person in the world has all the money, then the money is worthless. If every person in the world both holds and owes a currency in some depth, then that money is valuable even if it is 'unbacked'. I sometimes wonder if we overvalue liquidity. The liquidity that comes with inflation friendly currencies comes at a price. Does the cost of liquidity in money obscure the true price of assets? There is no God-given right for money to earn returns; in fact the religions of the book prohibit usury. Like Moses, people have to invest in productive assets that will fulfil long-term values. Third, new technology permits us for the first time to create a new, virtual element, call it Pecunium. We can develop new currencies with Pecunium using technologies that can automatically sense its velocity and distribution, and then automatically adjust its 'atomic' quantity. For example, the Ripple network intends to be a peer-to-peer distributed social monetary system based on trust among people in real-world social networks; financial capital backed by social capital. But Pecunium and technology are not enough. People need new relations with each other and the state. We have a lot of discussion ahead if we are to design a monetary system that can handle long commerce transactions across time.

[SLIDE: THE GENERATION GAME]

We can paraphrase Wheeler's invocation about time and space; money is man's way of envisioning all of time and space in one place. While the discount rate is our way of ensuring it doesn't happen all at the same time and place. The nearer in time and space are more valuable. However, this is not a Fukuyama Moment. The end of monetary history has certainly not arrived. We need evolution, not revolution. But if we wish to be equitable with future generations, we should probably get started rethinking money.

We started with the Fate of the All-time Universal Bazaar and conclude with the idea of an eternal coinage. I ask you to ponder this poem about children on the seashore of endless worlds. If we want to look to the long commerce, we need to build systems that, as Robert Burns said over two centuries ago, will last "Till a' the seas gang dry, my dear", and that probably means finding a way to build a coinage that will survive serious droughts. [Burns, 1794] And tonight it's nice to be able to close with a remark from that former Prime Minister who was a famous proponent of inter-generational and societal fairness, Margaret Thatcher: "No generation has a freehold on this earth. All we have is a life tenancy - with a full repairing lease." [Speech to Conservative Party Conference, 14 October 1988 - http://www.margaretthatcher.org/document/107352]

Thank you.

[SLIDE: DISCUSSION]

Further Reading

ANDREADES, A M, History of the Bank of England, P S King and Son (1909) - http://www04.us.archive.org/stream/historyofbankofe00andruoft/historyofbankofe00andruoft_djvu.txt BARRO, R J, “Are Government Bonds Net Wealth?”, Journal of Political Economy, Volume 82 (1974), pages 1095-1118 - http://hussonet.free.fr/barro74.pdf BASTIAT, Frédéric, OEuvres Complètes de Frédéric Bastiat, mises en ordre revues et annotées d’après les manuscrits de l’auteur en 7 volumes, Volume 4, Paris Guillaumin et Cie (1862-1864) - http://www.unmondelibre.org/pdf/Bastiat_L_Etat.pdf BRAND, Stewart, Whole Earth Discipline, Viking Press (2009). BRAND, Stewart, The Clock of the Long Now: Time and Responsibility, Basic Books (1999). COBBETT, William, Paper against gold: or, The history and mystery of the Bank of England, of the debt, of the stocks, of the sinking fund, and of all the other tricks and contrivances, carried on by the means of paper money ..., William Cobbett (1828) - http://books.google.co.uk/books?id=RvoJAAAAIAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false COOPER, Malcolm, In Search Of The Eternal Coin: A Long Finance View Of History, Z/Yen Group Limited (2010) - http://www.zyen.com/LongFinance/MALCOLM_COOPER.pdf DAVIES, Glyn, A History Of Money: From Ancient Times To Present Day, 3rd edition, University of Wales Press (2002, originally 1994). DAWKINS, Richard, The Selfish Gene, Oxford University Press (1989, originally 1976).

10. GESELL, Silvio, The Natural Economic Order, Revised edition, London: Peter Owen (1958) - http://www.utopie.it/pubblicazioni/gesell.htm

11. GRECO, Thomas H Jr, The End Of Money And The Future Of Civiliszation, Chelsea Green Publishing (2009).

12. HOMER, Sidney, and SYLLA, Richard Eugene, A History of Interest Rates, Fourth Edition, John Wiley & Sons (2005, originally Rutgers University Press 1963).

13. KALETSKY, Anatole, “Capitalism, But Not As We Know It”, Prospect, Prospect Publishing Limited (August 2010), pages 33-36 - http://www.exacteditions.com/exact/browsePages.do?issue=6566&size=2&pageLabel=33

14. KEATING, Con, Don’t Stop Thinking About Tomorrow: The Future Of Pensions, Z/Yen Group Limited (2010) - http://www.zyen.com/LongFinance/Long%20Finance_FutureofPensions.pdf

15. LIETAER, Bernard, The Future Of Money, Random House (2001).

16. MAINELLI, Michael and HARRIS, Ian, Clean Business Cuisine: Now and Z/Yen, Milet Publishing (2000).

17. MENGER, Carl, On The Origins Of Money, translated by C A Foley, Economic Journal, Volume 2 (1892), pages 239-255 - http://socserv.mcmaster.ca/~econ/ugcm/3ll3/menger/money.txt

18. MORGAN, Tim, Dangerous Exponentials, Strategy Insights, Issue Five, Tullett Prebon (June 2010) - http://www.tullettprebon.com/Documents/strategyinsights/tp0510_TPSI_report_005_LR.pdf

19. OFFER, Avner, The Challenge of Affluence: Self-Control and Well-Being in the United States and

Britain Since 1950, Oxford University Press (2006).

20. ROWE, David, "The Power of Defunct Economists", Risk Magazine, 9 January 2011 - http://www.dmrra.com/publications/Risk%20Magazine/The%20Power%20of%20Defunct%20Economists.pdf

21. SACHS, Geoffrey, Common Wealth: Economics For A Crowded Planet, Penguin (Allen Lane) (2008).

22. SALTIEL, Miles, "On Borrowed Time", The Adam Smith Institute (2010) - http://www.adamsmith.org/files/ASI_On_borrowed_time_8_12_10_web(1).pdf

23. SMITH, Adam, The Wealth of Nations, Bantam Books (2003, originally 1776).

24. STEVEN, David, Time To Stop Betting The House: Mortgages, Resilience And The Long Finance, Z/Yen Group Limited (2010) - http://www.zyen.com/LongFinance/DAVID_STEVEN_paper.pdf

25. USSHER, Leanne J, "Do Budget Deficits Raise Interest Rates? A Survey of the Empirical Literature", Transformational Growth and Full Employment Project, Working Paper, Number 3, New School For Social Research (April 1998) - http://www.qc-econ-bba.org/RePEc/pdf/0005.pdf

26. WILLETS, David, The Pinch: How The Baby Boomers Took Their Children's Future – And Why They Should Give It Back, Atlantic Books (2010).

27. YELLEN, Janet L, "Symposium on the Budget Deficit", Journal of Economic Perspectives, Volume 3, Number 2 (Spring 1989), pages 17-21.

Further Surfing

Long Finance – www.longfinance.net Exoplanets – www.exoplanet.org Freiwirtschaft movement - http://en.wikipedia.org/wiki/Freiwirtschaft & http://www.finanzcrash.com/english/aberrations.html Sustainability - http://en.wikipedia.org/wiki/Sustainability & http://www.dictionaryofeconomics.com/article?id=pde2008_S000482&edition=current&q=sustainability&topicid=&result_number=1 Alfred E Kahn - http://en.wikipedia.org/wiki/Alfred_E._Kahn "Money Facts: 169 questions and answers on money – a supplement to A Primer on Money", Subcommittee on Domestic Finance, Committee on Banking and Currency, House of Representatives, 88th Congress, 2d session, US Government Printing Office (21 September 1964) - http://dewoody.net/money/ Money and central banks - http://www.rayservers.com/images/ModernMoneyMechanics.pdf Ripple new monetary system project - http://ripple-project.org/ Oliver Sparrow's contrarian view on wealth transfer - http://www.chforum.org/library/renewal.shtml#

Thanks

Diverse people have contributed, sometimes unwittingly, to ideas presented in this lecture, but I'd particularly like to thank Professor Dr Mr Will Ayliffe, Les Blignaut, Stewart Brand, Rob Challis, Alice Chapple, Professor Victoria Chick, Dr Malcolm Cooper, Stephen Davis, Mark Field MP, Bob Giffords, Jeremy Goford, Duncan Goldie-Scot, Ian Harris, Bill Joseph, Bernard Lietaer, Maxine Mainelli, Xenia Mainelli, Bob McDowall, Tony Manwaring, Stephen Martin, Paul Moxey, Richard D North, Jan-Peter Onstwedder, Dr Steve Priddy, Dr Gill Ringland, David Rowe, Miles Saltiel, Penny Shepherd, Arjuna Sittampalam, Oliver Sparrow and all my colleagues at Z/Yen Group Limited.