

Towards affordable regional infrastructure

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Modern societies have failed to find affordable ways to fund needed infrastructure. Problems have multiplied from ignoring the particular characteristics of infrastructure and assuming the adequacy of the conventional finance of recent times, be this publicly or privately sourced. These failures, compounded by insensitive monetary stances, have led to a lingering economic and financial malaise, one particularly evident in some regions. They have also contributed to the development of the current global crisis.

Issues of infrastructure affordability are central in this paper. A line of argument which explicitly acknowledges that infrastructure and like investments alter structures and capabilities regionally and otherwise is initially proposed. Issues of affordability, investment and credit are then canvassed with simple numerical illustrations used to highlight important aspects of debt financing. Interest rate and other movements over decades can generate significant debt servicing issues, and crises.

A new economic and financial era may well be emerging from current crises. Its foundations and eventual success will be well established and supported if the peculiarities of various forms of investment, including infrastructure, are adequately recognised and planned for. Better efforts to understand and accommodate the infrastructure affordability problem are called for, along with changes to monetary and other policies.

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Infrastructure investment is distinctly different from many other forms of investment. It is located, regionally specific and highly embedded in place and time. While durable, it requires maintenance and incremental improvement as changing demands and technologies are likely over its life. Whether soft or hard, infrastructure persists as do the consequences of investment.

Funding is always an issue. Typically, large initial expenditures are made on non-relocatable assets with efficient capacity utilisation taking years or decades. Patient capital and long term finance across several business cycles are needed – yet these have been discouraged by current arrangements. Indeed, many of the properties of infrastructure are contrary to those often assumed in economics and finance.

Infrastructure provision, management and availability may be public, private or some mix. Public arrangements are to be open to all and there are typically theoretical and practical difficulties in identifying and charging users. Private arrangements risk discriminatory and pricing practices typical of monopoly. Mixed arrangements require suitable reconciliations of stakeholders and interests. They may involve particularly high transactions costs, notably for public private partnerships or PPPs.

All infrastructure investments face long lead and repayment times for something that is foundational for industry, regional and community development. A root of the sub-prime crisis was a failure to recognise this. Inadequate funding models so based eventually imploded financial systems around the world. Australia, despite current appearances, is not immune from ongoing threats. Indeed the nation, its businesses and governments appear uniquely vulnerable.

It is time for the full nature of infrastructure investment to be recognised and accommodated.

- Affordability needs to be estimated under a range of scenarios and established across specific situations.
- Infrastructure is regionally embedded, not nationally present, so suitable regional and industry analyses are part of any adequate evaluation.
- Infrastructure provision and maintenance need to be more soundly based with clear, robust analyses of contributions, particularly if debt financing is envisaged.
- Financial regimes and monetary arrangements need review and renewal, especially where they needlessly raise risks and costs while reducing competitiveness and viability.
- Current tendencies to take needless investment risks with implications well beyond current times of heightened uncertainty need to be curtailed.

Viable infrastructure projects will be one element in moving beyond our subprime past but viability needs to be established not assumed if true progress and sustainable economic reinvigoration are to

be achieved. Sound future-facing infrastructures can help create better regional and national futures.

1. ISSUES OF POSITIONING

Positioning a line of argument

We begin with a question: *Why across the OECD did infrastructure spending decline in the 1970s and subsequently while governments ran deficits?*

An immediate answer is obvious: that discretionary capital works are relatively easy to reduce in times of tight finances. An alternative answer might be that infrastructure needs were (seen as) largely met with other priorities accorded importance.

Reflect, however, that across the OECD:

- Government deficits have generally continued, even when assets have been sold;
- Infrastructure needs are generally recognised as unmet, despite all manner of innovative arrangements in their provision; and
- Economic growth and productivity increases have often been disappointing.

It seems sensible to consider other alternatives and the possibility of contrary and inhibiting influences in the policy environment and broad socio-economic settings.

The line of argument in this paper is that infrastructure became unaffordable under the arrangements that emerged in the 1970s and 1980s, particularly in the macroeconomic area. A resolution of underlying infrastructure shortfalls and other problems will require new arrangements, including in macroeconomic positioning. Monetary policy in particular needs recasting.

Infrastructure is literally some thing below, beneath or within a structure. Items of infrastructure each contribute towards some “greater” structure and the activities it supports. Used collectively, infrastructure is a collection of parts that comprise some structured, long-lasting whole. Infrastructure persists, as do the impacts of its provision.

Infra-structures add creative possibility. Some new or better “ways of doing” come into being as a result of the improved structures put in place and into places. While many consider efficiency improvements as a hallmark, the impacts of infrastructure provision are much wider. Provision changes what is achievable in some region or part of the world. Explicit regional and other development considerations are needed in any adequate consideration of infrastructure and its impacts.

If this argument is accepted, then inadequacies in infrastructure provision have not only inhibited the amount of achievement (measured perhaps in terms of economic growth) but also the mode and quality of achievements. Whether a policy is a cohering or a fragmenting one as far as some chosen (and/or wider) population is an important related issue.

Materials developed in this paper can only add a small amount to what is an important dialogue, particularly in these subprime times. It is hoped that the arguments and examples presented can help refocus attention on central but neglected issues that underpin the affordable provision of infrastructure. Since the 1970s, it seems, our preferred choice sets have made much-needed

infrastructure unaffordable. It is time to change our preferences and begin to not only rectify infrastructure problems but also foster the development of new possibilities.

Positioning the entity

An economy can be considered as *entities interacting via and for economic means*. Be it a household, business, government or other organisation, the entity faces choices, acts and is affected by its actions and those of others. Engagements are not only within some structures, including those things we term infrastructures. Entities selectively make use of structures to aid planning, activities and achievements.

Already incurred obligations bind any existent entity, but not the ephemeral entity commonly assumed in much of economics. The existent will be not only physically actualised but also actualising of some developmental outcome. The existent deals with the details, structures and opportunities involved in living life while the ephemeral transcends them.

This distinction is a key point of demarcation between not just the works of Smith, Marshall, Keynes and others whose works consider an *embedded* entity and those works centred on the *ephemeral* entity and cojoined under the popular heading of neoclassicism. It is also a point of significant practical demarcation between, for example, Australian farmers and “their” National Farmers Federation, the concerns of State and Federal governments and many a transport planner and the commuter. Such dual interpretations of the entity go largely unrecognised to bedevil many dialogues. Alternative and even perverse pronouncements by parties purporting “a common interest” cease to be a surprise when the distinctive basing points are considered.

Infrastructure is anything but ephemeral. It is also typically embedded in or across some parts of a region, not confined to a single entity (or encapsulable within some private organisation). For an embedded entity, bounds and boundedness exist and matter. For an ephemeral one they are largely absent. The latter can prospectively do almost anything and has a few (in the short run) or no (long run) binding attachments. The former has a future formed in a present conditioned by a past, with any present or past variously differentiated and idiosyncratic. The embedded are not only bound in some ways but also specifically situated as regards both perceptions and possibilities.

The future and the world are considered in distinctly different ways.

“Keynes identified uncertainty as the pivot of the actual economic system. Expectations of the future determine investment, which in turn determines aggregate demand and employment through a spending multiplier. The economy is volatile because expectations and investment are volatile. However, uncertainty was not a vague background context, but was at the heart of a moral as well as a probabilistic philosophy which implied a different way of understanding the economy. The major fault of the classical theory of economics was that it had failed to understand the implications of uncertainty. The reason why investment is unstable is that the reaction of the average investor to uncertainty is radically irrational, in a way that economics had not recognised as meaningful.” (Fitzgibbon 1988)

Uncertainties attend infrastructure investment, provision and use. Uncertainties are not part of “some vague background context” but something specifically incident. Uncertainties will need to be explicitly addressed and dealt with, perhaps for decades. Assuming ephemeral entities simply

assumes away such issues and renders uncertainty as a curiosity in some well-ordered ephemerality. It is time to move beyond such manifestly inadequate lines of thinking.

Further positioning infrastructure investment, and underinvestment

Infrastructure investments involve a mix of entities engaging to deliver some extensive regional capacity. Extensiveness may be across:

- Time
- Space
- Resources
- People
- Interests

All aspects are typically intermixed in various ways in any infrastructure proposal.

The infrastructure itself will be physically embedded in a place or places (hard) or persons (soft). Infrastructure involves physically allocated capitals. Infrastructure investments are typically made with limited (if any) reversibility physically and often financially.

Cumulatively, such investments make a web of extensions between times, places and people through the use of which considerable gains may be had. This, of course, is the basis of both “the network” and “the system”. While use of the former emphasises connectedness and the latter some overall coherence, both enable surpluses or “positive sum games” and the achievement of enhanced outcomes. “The whole” somehow exceeds the sum of the parts not only quantitatively but also in terms of possibilities and achieved outcome mixes. Complex interplays occur.

Positioning *embedded enterprising entities* in a region.

The region is “*where it all comes together*”, or “*is to come together*” when an investment is being planned. Interplays and interdependencies between various investments structure regional capabilities. Enterprises are built upon various regional bases and interregional mixes.

In the regions are various *embedded enterprising entities*.

- Though interdependent, the entities are discrete parties in their own right.
- Entities engage in some forms of enterprise and variously “take things in hand”. Whether public, private or otherwise, they are typically working for some “economic” purpose.
- Entities are durably connected in some ways to selected structures and other durable features of their place and region. They are grounded and obtain advantage from their grounding, and may offer advantages to others.
- Interactions can involve a mix of competitive, cooperative and independent actions.

Such regional complexity with its high levels of interdependencies requires understanding that is more adequate. Greater care and insight are needed if analysis and attendant policies are to assist development and to advance sustainable sustainability, or other goals. Important complications arise with multiple users as the interests of, returns and risks to, and contributions from any party

are not fully separable or identifiable. Such considerations provide one basis for public involvement or interventions.

A road, rail, air or other transport network provides a capacity to move goods and people between places (or across a region) so connected “better” than would otherwise be the case. The benefits of a network are not in the use *per se* but in enhanced efficiency, reliability and surpluses that accrue to the directly involved entities as well as to others affected, including the wider society. Suitably enabled by and mediated across provided infrastructures, network outputs assist entity outcomes both directly and indirectly.

Critically, the outputs of functioning networks (with their subsumed infrastructures) enable wider functioning to be achieved. An enhanced ability to move products or people allows exploitation of “distantly sited” resources, for example. Transport network investments can catalyse developmental investments, for better or worse. Such associated investments are made with some expectations of link performance in mind, and the ongoing viability of such investments may be dependent to a greater or lesser extent on the ongoing functioning of the transport network. Transport infrastructure can be seen as a necessary precondition for development beyond the rudimentary stages of an economy.

Such investments and wider functioning allow enhanced outcomes for parties involved, be these cast as profits, utility, tax revenues, health or whatever. Underdevelopment in infrastructure (absolutely or relative to some other regions) can diminish outcomes. Underinvestment continuing over time can engender an ablative process that leads to the wearing away of prior existents, or of what stood before, be these built structures (hard or soft, including systems and networks), resource endowments, capacity and current functioning or the perceived capabilities of a region and its people.

2. ON AFFORDABILITY, INVESTMENT AND CREDIT

Some key considerations surrounding investment and affordability are now discussed in terms of a simple series of propositions. While much discussion has been of alternative investment choices (as in portfolio and opportunity cost analyses), the central issue for any particular investment is whether parties involved will “satisfactorily recoup” the contributed resources.

Investment involves preferentially allocating resources to some “durable bundle” which can “generate returns” over time. There is a deferring of the use of some resource (by one party in favour of some other) in anticipation of “greater returns over time” (from the using party back to the deferring party).

Essentially, the process is one of “delayed gratification”, the psychological term for “waiting for what one wants”.

“To function effectively, individuals must voluntarily postpone immediate gratification and persist in goal-directed behaviour for the sake of later outcomes.”(Mischel, Shoda et al. 1989)

Such a position motivates savings and underwrites investments. Peoples’ beliefs matter, along with their “animal spirits” or “spontaneous optimism rather than mathematical expectations” (Keynes

1936). Note also that the explicit inclusion of time renders static and comparative static analysis problematic.

Time and commitment are central to an investment. There is some period during which the invested resource is not returnable either as was or *via* a stream of acceptable returns. There are also expectations, however founded, that there will be “in the fullness of time” a sufficient return, however expressed, to make the investment worthwhile.

A realisable surplus is the basis of any successful investment. Returns must actually occur and be sufficiently in accord with expectations. An adequate surplus, however calculated, provides both a benchmark and an allocable pool of returns. Allocations can be determined *ex ante*, *in situ* or *ex post* with markedly different risk profiles attending alternative allocation modes.

An investment is affordable if a surplus can and does eventuate. Both a possible and a practical realisation are needed, the former to allow sensible entry into some arrangement (such as a contract) and the latter for its (“happy”) dissolution.

Clearly, the situation is one of multiple parties. At least two parties are involved, the provider of the invested resource and the user. The situation is a joint one as the interests of both are merged to some extent.

Whatever the mix of formal and informal costs, risks and returns, there need to be acceptable allocations and balances across the life of the arrangement. Balances may be, and will be, struck in various ways.

Any persistent imbalance in some area is the basis of crisis. Mutually and/or individually expected outcomes are threatened. “Now-feasible” allocations will differ from those expected. Some renegotiation may be appropriate, or it may not. Default may be considered by one or other parties.

Technically, strains due to an inadequate surplus transmit effects externally while also somehow transforming the stressed bodies. A stress-strain-elasticity model of an extended entity (set) can provide a basis of comprehensive analysis, but this is not further developed here.

There are then three relevant perspectives based on the considered event as it unfolds:

- *Ex ante*. That up front, when the undertaking is initially made and arrangements are agreed and set in place
- *In situ*. That during the life of the arrangements when various agreed obligations are to be met. Adjustments may be needed if eventualities differ markedly from expectations.
- *Ex post*. That at the end when the arrangements are dissolved and parties can evaluate their final positions.

These three perspectives focus on the stages of an event. Taken together, they can encompass an infrastructure investment (or other) event.

There are also at least two consideration levels for the event “itself” in terms of its impacts:

- *As realised.* That which relates to the undertaking of the event itself. How it is initiated, proceeds and eventuates as a series of direct interrelations falls within some overall coherence that is definitional of the event “itself” as a whole, and its various properties.
- *As enabling.* That which relates to the impacts of the event. Events may be undertaken for some wider purpose, or they may be part of a wider web of interactions. Various couplings of influences may link an event across wider realms of interactions with both “positive” and “negative” influences. Enabling is used as a general term that may include the furtherment of negative influences or disabling processes.

These two levels position the event externally in terms of direct and further coupled effects.

Infrastructure and like investments present in some ways an extreme form of investment as they involve:

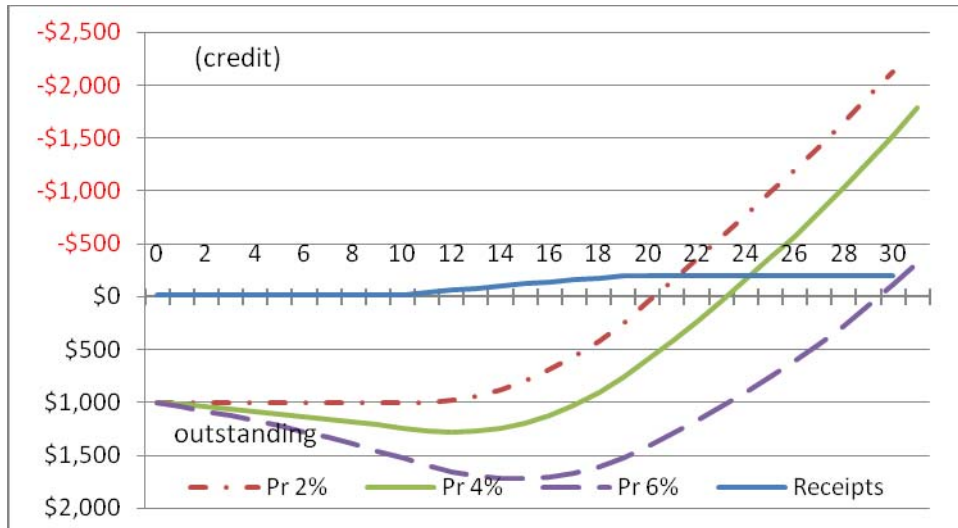
- Assets with an expected very long life cycle;
- A mix of parties committing for often very lengthy periods of time (during which much might happen);
- An immobility in the constructed physical asset (particularly for hard infrastructure) and attendant maintenance liabilities;
- High initial expenses and, typically, much delayed returns;
- A varied ability to identify and charge users of the asset; and
- A varied ability to identify and charge beneficiaries (and compensate contributors).

Such things make debt funding of infrastructure particularly problematic. It is on this financing strategy that we next focus.

3. EMPIRICAL ILLUSTRATION OF THE REPAYMENT PROBLEM

A simple example can illustrate some issues related to debt financing of infrastructure initially valued at \$1000. Revenues begin low, rise over the mid period and then level off at a generous 20% yield on the initial investment. Funding costs for three different interest rates are shown: 2%, 4% and 6% pa compounding. The investment would then be repaid in years 20, 23 and 29 respectively. Maximum debt exposures are 1, 1.28 and 1.72 times the initial investment.

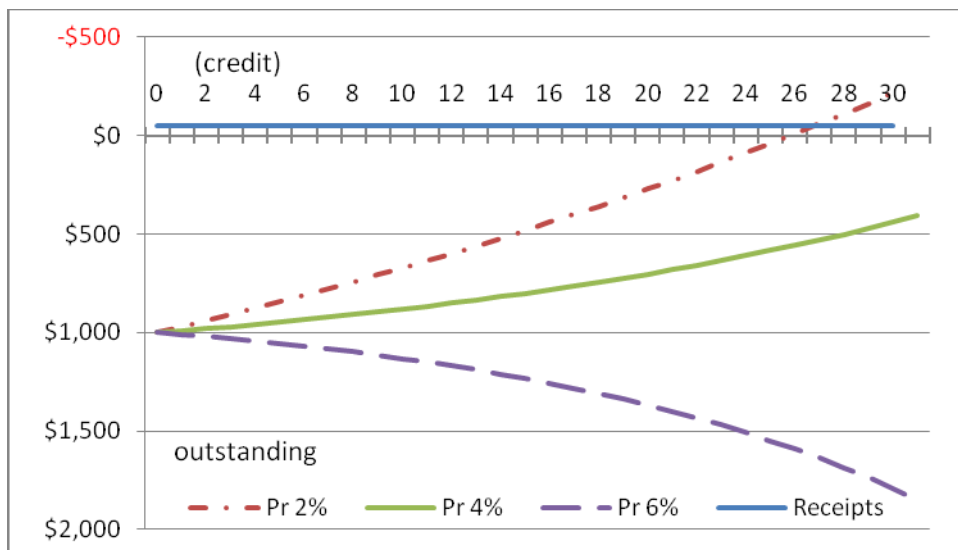
Figure 1. Illustrative cash borrowing position, with delayed receipts from investment funded at different (real) rates



Note: The situation is a relatively optimistic one in terms of revenues in that receipts after the initial period of \$20 pa for years 0 to 10 build quickly by \$20 pa until they level off at \$200 from years 19 to 30.

As a comparison, consider a constant 5% (or \$50) annual receipt over the life of the project. The results are shown in Figure 2. While this is sufficient to repay the borrowing at 2% pa in year 25, at year 30 an amount of \$440 remains outstanding for a 4% rate and \$1791 for a 6% rate.

Figure 2. Illustrative cash borrowing position, with constant receipts from investment funded at different (real) rates



Two simple lessons can be drawn from this analysis.

- “Delayed revenue schemes” are particularly vulnerable to higher interest rates. Such a situation may apply where installed infrastructure capacity initially exceeds demands with full capacity utilisation not reached for some years.

- “Slow and steady” approaches lose out markedly once interest rates exceed the revenue rate (here 5%).

Obviously further examples can be given and “more sophisticated” analysis can be employed. However, these simple examples do highlight key basic considerations in debt servicing. Arguably, such patterns are generally well understood but little applied. All manner of arguments and assumptions can be advanced to blur the mathematical drivers. Two popular ones have been:

- Asset values are rising so I can always profitably liquidate my position.
- Inflation means that my ability to service the loan improves as my revenue stream will rise with inflation but repayments will not.

At times such arguments may, and will, hold true. At other times they will not. Reliance upon contingencies always involves some risks. Situations can be compromised when the contingent argument is assumed universal. Whatever the arguments, ongoing obligations exist and mathematics quantifies the loads. A borrowing investor is additionally embedded financially and also encumbered, as is the originator to some extent but not necessarily the broker of the loan.

4. CHANGING INTEREST RATE CONTEXTS and DEBT-FINANCING SCENARIOS

Investment relies upon foregoing of some current use of resources in anticipation of “some greater” returns in the future. Conventionally analysis is in terms of monies with conventions such as discounting used to come up with some “present value” of the proposed investment. This estimated value is then compared to alternatives allowing a formal (perhaps “rational” as in estimating the ratios of returns) value as a basis of decision making. Such a process, though conventional, can lead to deeply flawed decisions in “inopportune circumstances”. The general argument must be left to another place. Here only the special case of debt financing will be considered.

Successful debt financing requires that expectations be sufficiently met so that returns exceed costs across the life of the arrangement. Given the formal, legal nature of undertakings made as contracted debts in the Western tradition, the debtor can be held “fully responsible” for any failure to meet liabilities. Potentially, this may be not just for any failure of expectations on his or her part but also possibly those of the lender. Risks are then considerable, so a considerable part of the development of Western business has been centred on the limiting or quarantining of debt-associated liabilities.

Developments in monetary policy and its governing institutions since the breakdown of the Bretton Woods system in the early 1970s have complicated matters in ways that are only now being appreciated. Again full discussion must be left to another place but important issues that need to be addressed include:

- failures to expunge unrepayable debts;
- a lack of effective or appropriate discrimination between borrowers with different risk and return profiles;
- the trend towards short term financing and increasing reliance on refinancing;
- under what conditions interest rates across an economy can be sustainably or sensibly above GDP growth rates;

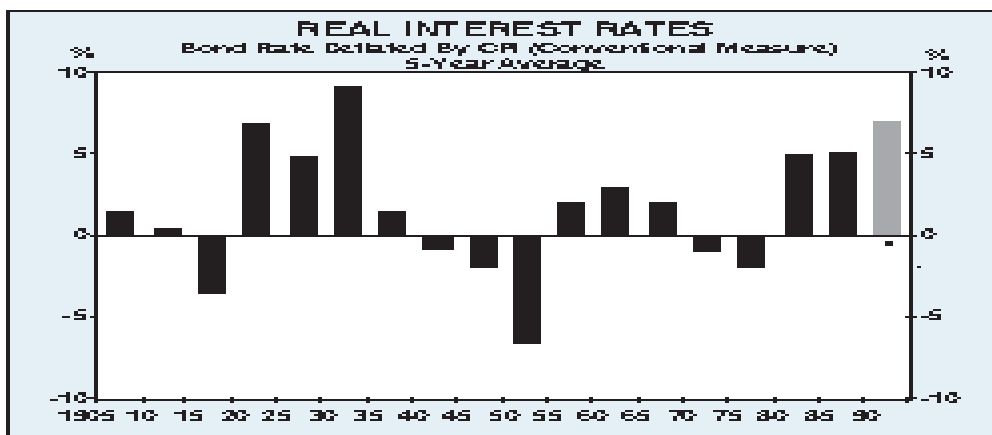
- ways by which current global imbalances developed and future ones might be avoided;
- institutional performance, with several central banks and many private banks showing “unduly poor” records;
- whether central banks which have made, and can continue to make, serious errors at the expense of others constitute a peculiar source of moral hazard;
- whether market concentration and sectoral coordination have moved beyond optimal levels; and
- the implications of currently emerging regulatory and policy stances, nationally and internationally.

A borrower today faces not just the usual uncertainties of business and life but also the unknowns of a faltering financial system, demonstrated inadequacies in regulation and policy and unfolding crises. While opportunities will be present for some, others are being impoverished and debilitated.

A range of scenarios arises in such circumstances. When future conditions are peculiarly uncertain or *a priori* analysis and logic are unusually inadequate, it seems prudent to consider various possibilities. Questions of whether the current global crisis is over or yet to really begin need not distract us since enough has already changed for “the past” to be a poor guide to “the future”.

Investigating questions of “to where might ‘we’ go?” deserves greater priority. Specifically, we consider “to where might borrowers go?” using the earlier illustrative examples and allowing for situation of variable interest rates. Rates can be volatile as demonstrated for the last century in Figure 3 in which Australian five-year average real interest rates are shown. Clearly, borrowing occurred with some very different interest costs across the century. For borrowing over 30 years or so, six average rate settings (or graphical bars) could impact.

Figure 3. Real Interest Rates - The Australian Historical Experiences



*Average June 1990 and June 1991.

Source: (Fraser 1991)

The borrower in 1905 initially had a good run (presuming no asset destruction or earnings diminution during World War 1) but was then caught by the highest real interest rates in the latter half of his loan. The 1935 borrower had the best real interest rate run. Those excited by the mining

boom in the late 1970s and early 1980s faced stiff interest rates up front (and failing commodity prices in the 1990s) as this boom turned to bust and stocks to dust while plans shredded.

While a more adequate set of real interest rates is needed, the present set illustrates clearly the volatility of rates across the years. In addition, this dated set has been chosen to highlight the limited nature of both such information and of embedded decision making. A 1980 investment might only now be maturing - and if you had been an analyst using Figure 3 in 1992 what might your interest rate expectations and project assessment then have been? Today, how many evaluations of long-lived investments, new or installed, adequately consider what interest rates or other economic and financial conditions actually have been and might be when exploring affordability and risks?

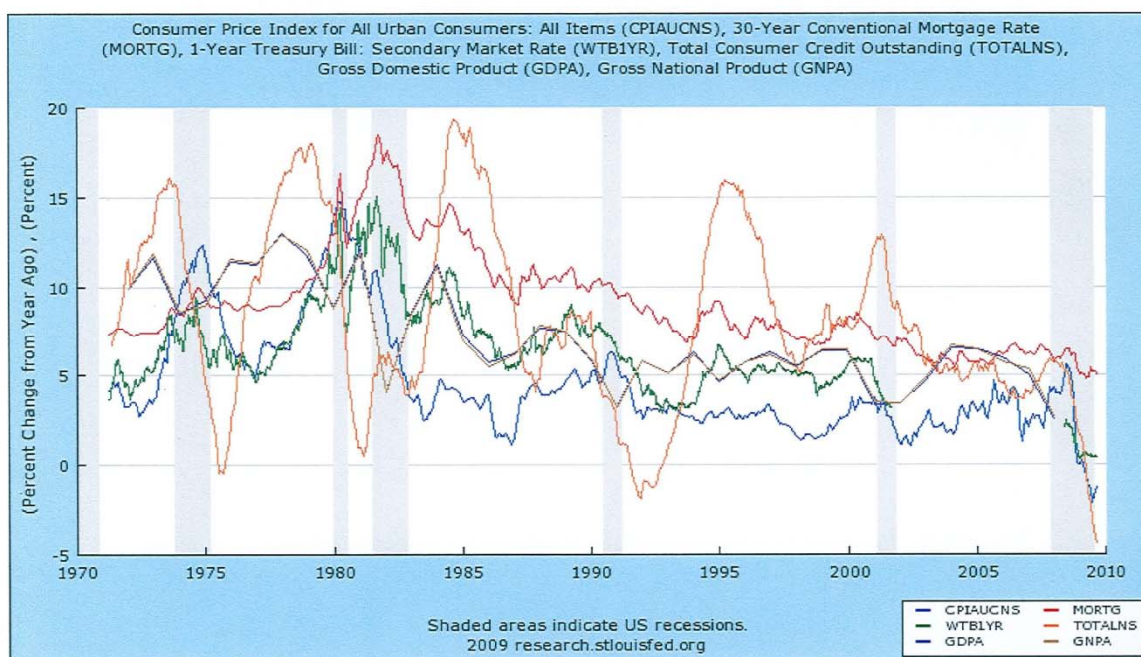
Such a period bridges from the breakdown of the Bretton Woods system to the current breakdown of what might be termed the “roll on roll up” system. This era of globalisation just passed was many things - including a period that saw unresolved problem debts repeatedly rolled in with those that were performing and packaged up as a new bigger bank or more sophisticated financial product available globally. As banks and other financial organisations became global through extended geographic representation (growing branches, franchises or agencies), joint venture participation, merger or acquisition and/or trading in consolidating markets, products became not only less known and more spread but also more lightly regulated. Monies from around the world were “best” when “rolled”, on and up to the global arbiters in search of ever higher returns.

Few pondered how it all came together and “contrary” works were ignored, until 2007 when an era ended. Full analysis is beyond this work but movements in some economic measures for the USA over almost four decades give a flavour of what was happening. Shown in Figure 4 are *unadjusted* measures of US:

- growth (GDP *black*, and GNP *brown*)
- inflation (CPI *blue*)
- short term interest rate (US 1 year Treasury bill *green*)
- long term fixed interest rate (30 year mortgage rate *red*)
- credit growth (change in total consumer credit outstanding *orange*)

Real growth occurs when measured or nominal growth exceeds inflation (black above blue). While short term government interest rates move reasonably with growth (green and black together) there are interesting exceptions. Long term mortgage rates clearly have a “higher” life of their own (red generally down since 1982, but above green). Real interest rates are positive when the rate exceeds inflation (green or red above blue). Credit cycles are evident (orange swings) with four major peaks (above 15% annualised growth) and two lesser ones. A shifting phase relation between interest rate and credit growth movements is suggestive. Consumer credit contracted only around 1992 and in the last year when the roll up stalled and the roll on froze. While even the most reluctant called “crisis”, the inability to deal with underlying imbalances and unrepayable debts was stunning. On we roll, and “the recovery” that carried 2009 may well be introducing Act 2 of our global drama.

Figure 4. Some US growth, inflation, interest rate and credit growth measures, 1972 to 2009



Source: (Federal Reserve Bank of St. Louis 2009)

5. TOWARDS A NEW ERA?

Investment is inherently uncertain. Interest rates add one man-made element to uncertainty. Allowing rates to be set by oligopolies with little effective societal direction has been an interesting experiment with an ongoing legacy, particularly for highly indebted Australian households. Further, modern monetarist claims for referencing a particular rate is not only an intriguing position (why should there be a single reference given the many types of uses and users of money?) but one that has limited empirical support.

Investment-attendant risks are compounded by our own ignorance of what has passed, and not just in the area of interest rate movements. It is stunning how little of the research into international economic crises, for example, appears in public discussions in Australia today. Stunning also is how little of the arguments of Keynes, Minsky, Friedman and others are preserved in their “translations” today. Briefly, empirical experiences, relevant research and key ideas deserve closer attention.

Such matters take on particular importance when Australia is seeking “to boldly go where no man has (successfully) gone before”, to paraphrase a theme from Star Trek. Not only do Australian governments now plan to add around \$500b between them to the existing private debt of \$700b, a principal source of funds will be offshore. In transiting perilous economic conditions, the star-ship “Australian Enterprise” would be fuelled by debts at 120% of GDP, if optimistic income expectations were allowed. “Happily” (?) debt funds would be significantly sourced offshore.

This is where (in the movies at least) red lights flash and “Warning” sounds as from the deeper realms of economic space the long run budget constraint or LRBC (Feenstra and Taylor 2008) and

other “threats” to the mission arise. However, in a nice “happy” (!) twist as the LRBC “menace” lurks and overseas borrowing conditions tighten (with money multipliers dancing around zero as banks globally build reserves and avoid risks), starry-eyed proposals are surfacing in the land of Oz, such as making a variety of government debts part of bank base capital in Australia. “Roll on, roll on” as we roll up ever more the problems we face.

Such proposals may alleviate access to funds problems but they do nothing to build an ability to repay. Prudent investments *need clear earnings potential, sound delivery prospects and an ability to deal with eventualities*. In science fiction, a bold mission is undertaken for entertainment but sadly “in our real world” ship and crew are better as scrap unless there is some adequately enriching experience from traversing the wonders of space. *Where is the realisable profit or other demonstrable gain?* In current economic fiction, enrichment is to be ours if we seize the opportunity and boldly traverse the wonders of supercycling economic space. Pepped up by conventional and governmental wisdoms and some rejigging, we are to boldly ride a debt-fuelled dream.

Along the way, we will add fifteen million people while solving global warming, urban congestion, food security and other pressing challenges. Policies, public and private, are nothing if not ambitious! However, as the Merchant of Venice discovered centuries ago and many have since, risks attend ambitious ventures and the costs can be deadly. At the very least, coherent dialogues should be built with uncertainties well-identified and supposed “menaces” understood. The LRBC of intertemporal macroeconomics is, in the international setting, essentially about a country living within its means. Borrowing and lending may buffer immediate shocks but there are limits to their efficacy and supportability. Consequences attend their use. Crises occur when limits are reached.

Infrastructure may well be “needed” but it will come at a cost. The key question remains “*Under what conditions or scenarios is an investment (or other mission) affordable?*” Infrastructure investment needs justification and a reasonable chance of success, not ungrounded adventurism or escapism.

A critical and unquestioned link is that government expenditures are “properly” debt funded, including for infrastructure. The convention of issuance of monies only via an oligopoly of private firms or some encompassing (and laterly global) market is assumed and to be maintained, it seems. Direct actions by governments and regional communities have been successfully undertaken in the past, and could be today.

The conventions which lead to our sub-prime world have manifestly failed. Crises are not resolved by maintaining causes of problems. Persevering with failed conventions helps regenerate problems not solve them. Building robust, responsible, incisive and well-reasoned cases should take priority over maintenance of conventions, convenience and furtherance of fictions.

What is widely recognised as the greatest economic crisis since the 1930s will not pass easily. While governments have generally responded well in bridging the Keynesian liquidity trap and stopping critically stressed economic systems from stalling and freezing up, their approaches to the recovery phase threaten to turn what began as a banking crisis into triple crises with major banking, default and currency events. Even as the lists of ratings downgrades and defaults increase, needlessly risky and potentially crisis-enabling approaches are being promoted for infrastructure funding. Everyone agreed the *Titanic* was unsinkable, but no one told the iceberg – or the arbiters of debt today.

The central position adopted in this paper is that much more adequate analysis of infrastructure affordability is needed in Australia. Debt financing is particularly problematic, especially if there are untoward exposures and little-limited risks. Current conventions surrounding the issuance of monies appear deficient with an evident need for some disintermediation in infrastructure and other funding. A recent issuance by the European Central Bank of € 80b to the banking sector with € 30b immediately borrowed back by governments seeking deficit financing provides a fascinating example of debilitating conventions, and of dreams about to become debt-laden nightmares. Questions of achievable (let alone sustainable) balances and of alternate feasible means have been dropped from their scripts, and ours, it seems.

Infrastructure has particular characteristics which appear poorly serviced by financial and monetary arrangements that have evolved over the last three decades. The run-down in OECD infrastructure is not then surprising, nor is the run-up in some non-OECD infrastructure and economic capacity. Now, even China and others who have previously drawn directly from surpluses at hand in funding infrastructure and relied upon returns from the wider economic impacts to replenish the surplus, have ramped up credit while maintaining overcapacity. This effectively raises costs while hindering income-generation capacities so establishing a pernicious imbalance and pathways to decline.

Deficit conditions can be expected when the specifics of an investment differ significantly from those presumed in financing. Deficits are evident today not just in the household, governmental, banking and finance sectors but also in industries with installed overcapacity. Issues of mismatched terms (invest long but borrow short) are particularly pronounced with infrastructure, as is reliance on overly optimistic growth forecasts or monopoly opportunities.

These are not good times to be seeking supercycle adventures internationally and risky if bold infrastructure missions regionally. Even well planned investments and expeditions face heightened uncertainties and unanticipated risks. Things may “stack up” after properly considered evaluation but “sound evaluation” is an end point not a starting assumption. An end point is not really reached until the investment project has run its course with the infrastructure not only present and embedded but paid for. Much better can and, I suggest, should be done in improving our chances of responsibly and efficiently reaching chosen endpoints.

In times such as these narrow technical studies may focus attention in areas that are of lesser importance as the world transits from an old to a new set of arrangements and conditions. Though tempting, posited “political solutions” to what are essentially economic and financial problems run the risk of irrelevance, or worse, unless they are carefully grounded in adequate economic understanding and robust financial analysis.

The argument in this paper has been illustrated in terms of simple scenarios about the repayment of debt under variable interest rates. As was seen, investment decisions made assuming a four percent real interest rate would have worked out “much better” if made in 1935 or 1950 than in 1920 or 1980, and perhaps today? Considering infrastructure directly, it may be that affordability may only sensibly occur at no or two percent interest, which begs the question of why suitably enabling infrastructure should not be funded at no or low interest.

Repayment is a central issue in the debt-financing of infrastructure. Irrespective of how the debt is held, obligations need to be met. It may be that adverse conditions arise despite the best efforts of

borrowers. Oligopolies in finance may well generate such conditions, even unintentionally, as they seek *and are able to advance* their interests in preference to the interests of other parties. Remedies may be found in reviewing oligopoly theory, regulatory experiences and chosen scenarios.

Unfortunately, banking is “not what it used to be”. Not only do we have the failures across the globe but also government interventions are meeting with only limited success. Even the super set of banks in Australia reportedly earned two-thirds of recent combined profits from fees and charges rather than their core banking activities. This is not a model for the world, especially as it is coupled with historically high household indebtedness. Banks face a difficult, and perhaps bleak, future unless their profits can be more sustainably balanced.

Financial globalisation, even in its current distressed state, allows for all manner of further arrangements and games as interplays develop between not only national and global oligopolists but also between different preferred business models in the financial sector. International business and global industry analyses built using ideas of oligopoly and structured markets offer greater adequacy than the naive models of competitive markets which ignore not just place, time and circumstances but also the possibilities of interdependence and impacts.

Those starting with assumptions of competitive, efficient or contestable markets, limited or no moral hazard, routinely manageable impacts and/or technically calculable futures are looking not only in a different direction but also with a distinctive perspective and their own preferred guidebook. So while detailed technical analysis may be offered, important biases introduced in the choices of perspective and applicable theories need to be recognised along with the special and limited nature of such analysis.

6. CONCLUSION

The central interest in this paper is understanding the conditions under which infrastructure is affordable, or not. One line of analysis has been explored with illustrative discussions offered. It is hoped that those interested in the sustainable provision of infrastructure, particularly in the regions, will find issues of interest and elements of a new agenda for infrastructure assessment. It is time to move past an uncritical “we need more infrastructure” mantra to *“well-reasoned evaluations of affordable enabling infrastructure”*.

Those in the various regions of Australia have a particularly important task if such evaluation is to be not only informed but also adequate and relevant. Successfully embedding an infrastructure investment into an existing economy requires good fit and enabling engagements with what is already present. The potentials attending infrastructure investment will only be realised if those in affected areas can and do make use of this enhancing capability.

Building a road or dam, for example, may “open up an area” for industrial development, say, but this development will only occur if those in industry see likely returns from their investment in this “affected” regional place and if residents cannot access the developed sites and available jobs. Follow-on effects including consequent developments can be many as other parties seek to take advantage of newly changed regional circumstances. That is, one change can engender others, ideally in a positive-sum and cumulatively progressive manner.

Paying for such a road or dam *without which consequent development would not be able to occur and from which widely-dispersed impacts (and incomes) arise* needs much more careful consideration and sensible rebalancing of interests. Infrastructure has been provided for centuries with varying levels of success. As we globally “roll down” and move beyond the “roll on roll up” era it seems sensible to seek to improve our chances of success, both in transition and in the emerging era. Should our goal be more “*to roll forward sustainably*” in the full senses of all words?

Economic eras come and go. In its later days, our “roll on and up” era had the semblance of a perpetual wealth machine with ever greater prosperity not just assumed but actively promised. In the mania that built, all were to be rich *via* entrepreneurial drive and sophisticated finance. Now, still stunned by the panics of 2008 we try to rebuild what was. However, our world has changed – fundamentally, I would argue. A new era has begun. Even if this is disputed and recent events are regarded as mere “corrections”, enough economic, financial and societal damage is evident for even the most adventurous to question whether they are well prepared for what may lie ahead.

Crises occur when imbalances become unsustainable. Crises over the centuries have been of all manner, style, duration and intensity. While there is a common theme, typically one of unrepayable debts or like unmeetable obligations, many a story line has occurred. Country experiences are many and varied. Many in Japan in 1989 assumed “a correction” was underway while Asian Tigers roared ahead and post-Soviet transition economies began their journeys. Two decades later Japan is still correcting, despite all manner of stimulus including from large infrastructure projects. The Tigers have rebuilt after their unexpected 1997 crises but an emphasis on large reserves as a precaution against crisis repetition is part of the current global imbalance. The post-Soviets demonstrate all manner of development with, for example, Europe’s declared “best” infrastructure project of 2005 now a star failure.

Infrastructure investment encapsulates several critical problems:

- infrastructure typically requires substantial funds well in advance of any returns so uncertainties are significant and should be so treated;
- infrastructure recasts the region and wider nation while supporting a range of potentials and attendant other investments;
- infrastructure is located and physically embedded with impacts spread across parties, space and time making for many “users” and “beneficiaries”;
- infrastructure investments are typically cumulative in effect and multiply engaging in process (including of levels of government, a story for another place); and
- infrastructure failures (both in provision and in use arrangements) can be widely disabling, necessitating sufficiently robust arrangements and good societal oversight.

The outputs of infrastructure underpin the outputs and outcomes for many, yet the inputs to infrastructure provision have been inadequate for a decade.

- long-lived assets require more than short-term loans and irregular maintenance;
- infrastructure often has a revenue profile that is ill-suited to traditional debt financing;
- debts need to be repaid from some revenue from some where or one, yet analysis of revenues is often deficient and sometimes deceitful;
- no other current alternatives to debt are without serious problems;

- monetary policy which has compounded problems with long term investments needs to be recast to assist and enable appropriate infrastructure.

Infrastructure affordability has been a neglected issue. This will need to change if problems of the passing era are to be resolved and a more robust basis built for the emerging era and the unexpected things that will lie ahead.

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