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Passive value capture through income taxation, and a beneficiaries-based funding model for infrastructure

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Abstract

Value capture is used to describe a range of mechanisms used to fund infrastructure projects. Active value capture mechanisms, specifically designed to raise revenue are well documented including land taxes, asset sales and other mechanisms with a direct nexus to the infrastructure that it funds. However passive value capture mechanisms exist, through extant government tax systems that capture value without being part of a specific program or policy to pay for infrastructure. These and their potential role in infrastructure investment are not well documented, with increased income tax collection representing a potentially significant stream of value capture funding for infrastructure investment. Through analysing current business cases with business beneficiaries, this paper documents income tax value capture and demonstrates how it may play a role in project funding of projects that are economically but not financially viable. A beneficiary funding framework is developed to show how government investment levels may be structured to allow economically but non-financially viable projects to proceed to create value within the bounds of treasury constraints.

1 Introduction

A large number of transport infrastructure projects are funded by government due to their inability to directly charge beneficiaries for the benefits provided. Such funding has historically been allocated from general taxation revenues but with pressures for governments to manage budget deficits and equity concerns, other funding mechanisms (over and above user charges) have been sought, and in particular mechanisms to better those to link beneficiaries to funding. Value capture is a broad term for these, with many different forms in existence, for example developer contributions and special levies by local governments, development of government owned land and more recently land taxes to capture windfall increases in land value generated by infrastructure investment.

These forms of value capture are collected though specific, active policy action to collect additional revenue – representing active value capture mechanisms. They are explicitly designed to raise revenue to fund infrastructure. However extant mechanisms capture value that is derived from infrastructure investment in a passive manner – representing passive value capture mechanisms. Increases in investment

activity (enabled by investment in infrastructure) can lead to increases in other taxes such as payroll tax and contract stamp duties (e.g. Ernst and Young, 2016), and on the capital value of assets when sold (including that on land and businesses). But future income taxation flows to government (particularly those from business) represent a stream of cash flow/value that is automatically captured, but one that not connected to the land which is used to generate that income. Whilst this is acknowledged by elements of the professional community and treasury/infrastructure funding bodies (e.g. Commonwealth of Australia, 2016), the consideration of income tax in this way has not yet been explicitly demonstrated in the literature, and nor is it evident in infrastructure funding decisions. This may have a use in such decisions, for which a funding framework does not appear to be present.

In this paper, select case studies of how income tax value capture may occur in infrastructure projects are presented through analysis of the applicable estimated benefits quantified in their related business cases. Section 2 discusses literature pertaining to value capture and explains business cases how they quantify benefits. Section 3 discusses the concept of income tax value capture through examination of the case study business cases and their projects, and the potential business tax value capture they may demonstrate. Section 4 outlines a potential beneficiary-based funding approach. In Section 5, limitations, results and conclusions are discussed, and an overview of future research directions to further analyse this topic are provided

2 Value capture and project decision making processes

Investment in transport infrastructure is a perpetual source of attention from a range of perspectives. Users want better and faster connections, communities see it as valuable to their local economies, and governments want it for economic (and political) benefits. A long-standing issue associated with infrastructure is that of how to pay for it, and likely in recognition of the broader economic benefits they are assumed to bring, government has been a significant funding source over time.

Users of transport infrastructure in most cases do make some form of payment for the use of infrastructure, be it a direct charge such as a road toll or rail track access fee however this has historically been insufficient to pay for the total lifetime cost of infrastructure provided. As governments have considered these infrastructure investments to be economically (though sometimes politically) beneficial, they have over time become the funders of transport infrastructure.

2.1 Value capture mechanisms

Governments perpetually look to reduce their exposure to infrastructure funding requirements, and instead recover some of this investment from beneficiaries of the built infrastructure. The concept of value capture is one that may be defined very widely[1] and covers a range of different programs that collect value from beneficiaries to fund infrastructure:

[1] Although see below where it has become more recently a narrower term for a specific form of value transfer of land tax amounts.

> *"Value capture is an umbrella term, covering a range of revenue mechanisms with a common goal . . . funding projects from beneficiaries rather than from taxpayers. Value capture . . . describes the spectrum of mechanisms. . . This includes user pay mechanisms, developer charges and contributions, targeted and broad betterment levies, property development rights, asset sales or leases, major beneficiary contributions, and other non-land taxes or levies". (Ernst and Young, (2016) in Abelson (2018))*

One recent mechanism is where specific levies are applied to incremental value increases caused by infrastructure investment (Batt (2001); Rybeck (2004)). Recognising that infrastructure investment leads to (windfall) gains in land values through providing faster travel times, improved transport productivity (like heavier loadings) or new path options, governments have proposed levies on this land value increase as a mechanism to recover some of the value from beneficiaries. There are a range of issues however around when, where and how to apply this form of value capture (Yen et al 2018; Mulley, Sampaio & Ma 2017; Le, Lim & Leong, 2018; Medda 2012; Hui et al, 2004). Once collected, transfer mechanisms (such as loans, grants or even tax increment financing (e.g. Zhao et. al. 2010) for example), are then used to transfer funds collected to infrastructure constructors.

These types of value capture might best be classified as active value capture mechanisms, mechanisms which have been explicitly designed to transfer value from land and other beneficiaries to the providers of infrastructure, where the infrastructure created leads to increases in land and capital values in proximity to that infrastructure

However, both the academic and professional literatures have not yet considered extant value capture mechanisms as found in current taxation processes - passive value capture mechanisms. These mechanisms are quite separate from land. These are usually non-transactional, recurrent in nature and will deliver returns over and beyond the term of the infrastructure project. They include payroll taxes, contract stamp duties, and importantly for this paper, income tax. When an infrastructure project proceeds, each of these mechanisms begins to collect revenues generated (indirectly) by this investment. But importantly, sans this investment, it would not be generated and collected. Whilst known to somewhat of a limited degree in professional practice (e.g. Ernst and Young, 2016; Capital Metro Agency, 2014), this form of value capture is not apparent in infrastructure funding decision making processes.

Later in this paper we will elaborate on this and demonstrate how value capture through these extant taxes may already be working to collect revenues. However before doing that we will discuss how project benefits are quantified and assessed, in order to better understand the nature of project benefits from which value can be captured and lay the groundwork to explain how these benefits could link to infrastructure funding decisions.

2.2 Infrastructure investment decision making

Infrastructure decisions in Australia has increasingly come under greater scrutiny when funding is provided by government. Investment some decades ago may have been approved based on departmental intuition, some opaque and non-transparent

internal assessments or political aims. But needs for more propriety in investment decision making have seen processes implemented to assess and document these decisions in business cases (for example, Infrastructure Australia, 2018).

A business case is a collection of sub-elements which can stand together to create a detailed document that how an investment decision is made. By describing the project, the project options, decision making frameworks, information inputs, project risks and how they are managed, and (importantly for this paper) the net financial and economic benefits associated with the project, governments are increasingly showing why certain projects are selected and why others are not. If a project has positive net economic benefits, it generally proceeds.

Given its importance, the economic appraisal is one element of the business case that is defined, especially considering it is a stand-alone tool and has been used for some time before and separate to the business case. Cost Benefit Analysis (CBA) is the key method used to complete this analysis, comparing discounted costs and benefits to determine the net economic position. Project benefits can be wide and varied, however typical transport benefits include travel time savings and vehicle operating cost savings (De Jong, 2000). In projects where mode shifts are envisaged, benefits may include environmental and safety (Forkenbrock, 1999; Janic, 2007), road consumption/damage, health (Cavill et al, 2008) and congestion (Dachis, 2013). Each project is different but typically for transport projects, user savings are a large proportion of the project benefit, with environmental, safety, congestion and infrastructure benefits providing lesser benefits. Accurate benefits identification is a developing and evolving process, such as recent conceptualisation of wider economic benefits (Lakshmanan, 2011) into the decision process.

Interestingly, some business cases are beginning to consider passive value collection mechanisms as increased payroll taxes and stamp duties (see for example Sydney Metro (2016), p.88) but this paper posits that all passive value capture sources, including income tax play a role in project funding decisions. We now turn to a practical analysis of two projects to demonstrate how this may be the case and discuss how this may impact infrastructure funding decisions by government.

3 Value capture through income taxation

As discussed, value capture is more than just about land and capital amounts. There are extant value capture mechanisms operating on non-transactional, non-capital flows of a business. We now seek to demonstrate how this concept may assist funding decisions through a case study examination (Eisenhardt, 1989) of recent transport infrastructure project business cases. By analysing benefits generated by the cases, we show additional income tax is generated through project investment that would not have otherwise been.

The Infrastructure Priority List as prepared by Infrastructure Australia (2019) was obtained. This list was reviewed to identify those projects that had been assessed by Infrastructure Australia and that focussed primarily on business user benefits. Substantially all road projects were eliminated given they contained significant passenger benefits which, as will be discussed later, may lead to different taxation outcomes than freight benefits. From this list, two freight rail infrastructure projects

were identified being the Murray Basin Rail Project (MB), in the north west of Victoria, and the Inland Rail Project (IR) from Melbourne to Brisbane. These are representative of business focussed projects under construction in Australia and business cases are prepared on a pre-tax basis (see Australian Rail Track Corporation, 2015). Their business cases report a BCR of more than 1[2], with the Murray Basin returning a BCR 1.74 and the Inland Rail returning a BCR of 1.02 (both at 7% discount rate).

The benefits identified in these projects are shown in
Table 1. These are categorised into categories depending on the beneficiaries of those benefits. Figure 1 shows these benefits by beneficiaries as a proportion of total benefits.

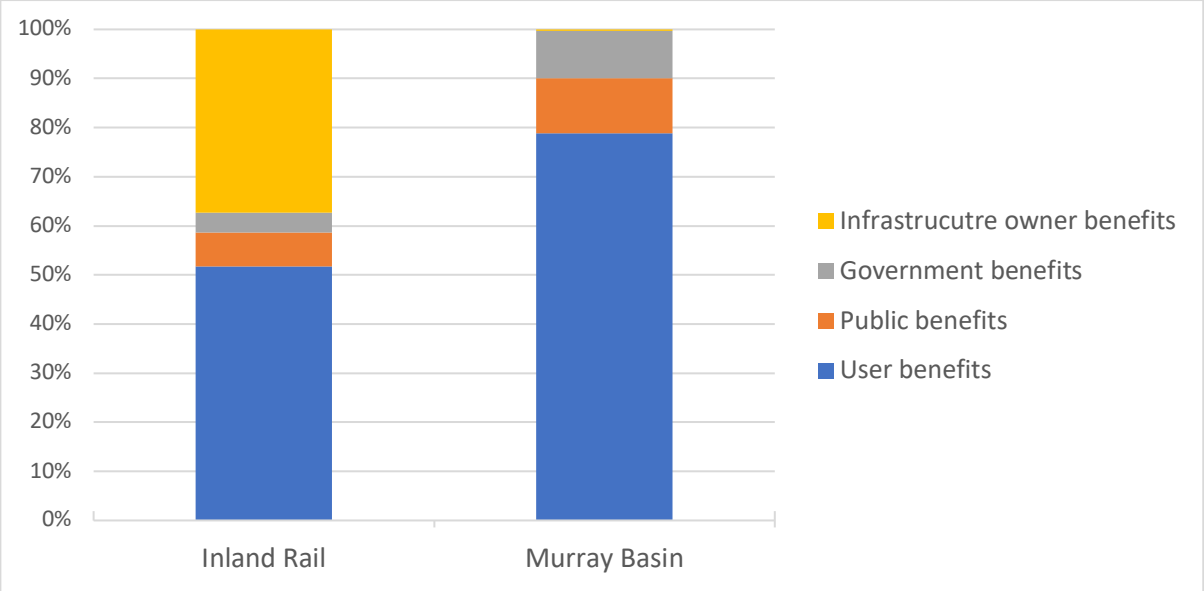
Table 1: Total project benefits by type

Project	**Inland Rail[(a)]**		**Murray Basin[(b)]**	
Benefit	A$(m)	%	A$(m)	%
Freight user benefits - Value of freight time - Reduced transport costs	11,616	52	598	79
Passenger user benefits	32	0	-	-
Public benefits - Greenhouse gas reductions - Congestion reduction - Amenity improvement	1,560	7	86	11
Government agency benefits - Avoided crash costs - Avoided road damage	890	4	73	10
Infrastructure owner benefits - Residual value - Reduced lifecycle costs	8,405	37	2	0
Total	22,502	100	760	100

Australian Rail Track Corporation (2015), Department of Economic Development, Jobs Transport and Resources (2015).
Amounts rounded to nearest whole number, figures may not sum due to rounding.
(a) - At 4% discount rate, including Western Line Upgrade, P50 cost estimates.
(b) - At 7% discount rate.

[2] For the purposes of this paper CBA quality is not questioned, however for balance media discussion on this is noted.

Figure 1 – Proportion of benefit by beneficiary



The above analysis shows freight user benefits form the majority of the benefits in both projects. These business benefits are in the form of reduced transport costs and therefore are implicitly assumed to increase business profitability, in a monetary sense. Most of these benefits are monetary savings through lower operating costs, (91% of freight user benefits for MB and 55% for IR), or improvements to reliability and availability (16% for IR). The remainder of these benefits relate to the value of freight time savings, which may or may not accrue to users (Sambacos and Remfo, 2016). But for the purpose of this analysis it is assumed that all benefits will translate, on the user population/supply chain as a whole, to taxable income increases.

As noted, this is different to passengers who may be less likely to use their time to generate more income (and instead use it for perhaps leisure). Because of lower freight costs, it is assumed that taxable income will increase for these businesses by the amount of cost lowered. In the accounting literature, the concept of tax effect accounting (Graham et. al., 2012) acts to recognise tax impacts on business transactions in balance sheets of businesses, recognising future tax receivables and payables. Modifying this concept to infrastructure project funding suggests that the benefits of the project that accrue to users, assuming these benefits translate into taxable income, will lead to higher taxation revenues for government in future tax years. This represents the value capture through income taxation, and the hypothecated and simplified net present value of funding captured in these projects is indicated in Table 2.

Table 2: Income tax value capture

Project	**Inland Rail**	**Murray Basin**
Freight user benefits	11,616	598
Income taxation value capture (at 30%)	3,485	180

This means potentially 30% of the freight user benefits may be considered to return to government through taxation, which may have relevance for funding decisions. This

analysis is based on some key assumptions (which will be considered in more detail in the discussion). The first key assumption is that the benefits estimated in simulation are realised in practice. It is unclear for how much of the identified benefit will be realised especially given uncertainty. Secondly (as above), all benefits are assumed to translate into increased taxable income for freight users. Thirdly, there may be some form of multiplier effect that dynamically changes the net present value of the underlying benefits through for example other investments being made by freight users that lead to taxable income being generated by other downstream beneficiaries. For now, assume freight user benefits act as a proxy for all up and downstream users and assume that the multiplier effect is zero. Fourthly, the corporate tax rate is assumed to be 30%. In reality, different businesses all have individual tax rates based on timing differences in their income tax returns, and they may have rates higher or lower than 30%. Governments may change this rate, and different countries have different rates which may change this analysis in other jurisdictions.

The now identified source of value capture through income tax may assist in decision making processes for funding. They may reflect amounts that government could contribute and maintain a positive investment position in the project. But at the present stage, there are no set mechanisms that link benefits discussed above to funding arrangements. Applying a beneficiary-based perspective, a framework may be designed where beneficiaries, including users and government, may pay for this.

4 A benefits-based funding framework

Despite the push towards a user pays framework across a range of policy and program areas throughout all levels of Australian government, there is no set framework for when it comes to funding infrastructure, with large proportions of it still coming from public funds (or through private sector funding with guarantees provided by government), albeit sometimes under grants with program rules.

Before doing so, the benefits and to whom they accrue needs explanation, to inform who, under a user pays system, the ultimate funders may be. These benefits are grouped as described in
Table 1 and Figure 1 as User, Government, Public and Infrastructure Owner. User benefits accrue to the users of services that are expected to use the service, being through lower freight charges which in this case are mainly financial in nature. As assumed above, it is assumed that these benefits accrue to the freight users. Public benefits accrue to the general community as they are difficult to assign to individuals. Government benefits are assumed to accrue to government departments/agencies which will no longer have to incur costs. For example, road damage benefits would accrue to federal, state and local government road owners who would not have to maintain or roads. Avoided crash cost includes emergency services and road management agency time and materials that are incurred in the response, management and rehabilitation activities required to deal with crashes. Infrastructure benefits accrue to infrastructure owners as a result of project investment and the future cash flow benefits that are obtained past the end of the assessment period (which is

usually 30 years but can be longer)[3]. These infrastructure owners are in this case, and many cases, government owned as well.

Based on these classifications, a beneficiary funding framework can be developed. In the case of Public benefits (in the absence of any other specific beneficiaries being identified), it may be argued that governments should fund these given their broad base of recipients of these benefits. Whilst there is no legal/regulatory mechanism that requires this, government funding would be logical where the project would lead to savings in other government agencies, or where it would help achieve other policy aims, including say international environmental treaties and urban liveability. In the case of Infrastructure Owner benefits, particularly when this owner is a government agency, that Infrastructure Owner would be the likely funder of these benefits. Finally, Government departments/agencies, may be willing to contribute to projects where that contribution would reduce the cost of running those agencies. We would assume that for each of these beneficiary classes that an amount that would be funded would be equal to the amount of benefit that they receive.

Turning to User benefits, a strict application of user pays principles would dictate that users should pay for these. However, in certain cases, the amount of user charge required to be levied to raise these funds may lead to freight rates that are not be competitive with other options (particularly due to the present market failure in road user charging). This would mean the project would not proceed, despite the net positive economic benefits. But an argument may be made that taking into account the value capture amount above, Government funding of the amount that their captured value represents of those User benefits may be made, without leaving Government worse off, but still allowing the project benefits to be obtained.

We now use the MB and IR projects to examine how this funding framework may apply in practice. Table 3 shows the beneficiaries and their classifications for the Murray Basin Project.

Table 3: Beneficiary analysis - Murray Basin Rail Project

Project	**Murray Basin Rail**				
		Government		Public	Users
Benefit	A$(m)	Agency and Infrastructure Owner	Income taxation value capture		
Freight user benefits	598	-	180	-	418
Public benefits	86	-	-	86	-
Government agency benefits	73	73	-	-	-
Infrastructure owner benefits	2	2	-	-	-
Total	760	75	180	86	418

[3] Note also that in business cases the infrastructure owner benefits are sometimes a function of the discounted cashflow methodology which assumes all remaining benefits at the end of the assessment period accrue to the infrastructure owner. In reality this benefit is a proxy for future benefits of a similar nature to the other benefits, e.g. the future benefits to users, public and government agencies.

Table 4 follows on and shows the beneficiary funding framework and the net investment position of the Victorian and Federal Governments for MB. Due to the split of funding between the Federal and State Governments, it is assumed that the Agency and Infrastructure Owner benefits accrue to the Victorian governments (as the key agencies involved are mainly state based) and the Public benefits are covered half each by both governments.

Table 4: Funding analysis - Murray Basin Rail Project

Project	**Murray Basin Rail**		
A$m	Victorian Government	Federal Government	Users
Government – Agency and Infrastructure Owner	75	-	-
Government – Income tax value capture	-	180	-
General public	43	43	-
Users	-	-	418
Total	118	223	418
Funding provided	**220**	**220**	
Surplus/(deficit)	**(102)**	**3**	

As shown, the Victorian government may be incurring a substantial deficit in delivering the project, with the Federal Government making a small, likely immaterial gain on the project. Users make a substantial gain (their contribution in the form of user fees is not available for the analysis). Whether by design or not, the Federal Government is behaviour is consistent with this framework, however the Victorian Government's is not (it is likely that the 50% each split of the total funding amount is a more pertinent driver).[4] The Victorian Government, as the owner of the rail infrastructure, might charge more for this, but for distortions in the land transport market through the lack of user and congestion fees for road transport. (However, questions might be asked about whether the MB business case contains all benefits, noting that this project would likely preserve container traffic from Mildura to the Port of Melbourne. This traffic, without the cost-effective rail access envisaged in the project may be redirected to the Port of Adelaide given the almost 200-kilometre difference in road transport distance and cost. Given this business case was written before the finalisation of the Port of Melbourne sale, preserving this traffic might have had financial benefit to the Victorian Government that was not included in the benefits of the MB project).

Analysis of the IR project spans 3 states but is Federally funded government, general public and users. The Inland Rail benefits are therefore analysed in Table 5.

Table 5: Beneficiary analysis - Inland Rail Project

Project	**Inland Rail**

[4] In somewhat of a post script, due to poor management of project costs, the Murray Basin Project has been augmented by another project, the Freight Passenger Rail Separation project with a cost of approximately $130 million, bringing total Victorian government investment to approximately $350m, increasing their deficit.

		Government		General public	Users
Benefit	A$(m)	Agency and Infrastructure Owner	Income taxation value capture		
Freight user benefits	11,616	-	3,485	-	8,130
Passenger user benefits	32	-	-	-	32
Public benefits	1,560	-	-	1,560	-
Government agency benefits	890	890	-	-	-
Infrastructure owner benefits	8,405	8,405	-	-	-
Total	22,502	9,295	3,485	1,560	8,162

Using these benefits and beneficiaries, Table 6 shows a possible funding framework and the net investment position of the Federal Government for the IR project.

Table 6: Funding analysis - Inland Rail Project at proponent discount rate (4%)

Project	**Inland Rail**	
A$m	Federal Government	Users
Government – Agency and Infrastructure Owner	9,295	-
Government – Income tax value capture	3,485	-
General public	1,560	-
Users	-	8,162
Total	14,340	8,162
Funding provided*	**8,575**	
Surplus/(deficit)	**5,765**	

*Adjusted P50 investment value per business case. Using the unadjusted P90 value would result in a surplus of $3,640 million.

Under a beneficiary funding framework, the Federal Government's investment is already justified on the benefits that its project will generate for its own agencies (including the Infrastructure Owner). However, its position is improved when general public benefits and income tax value capture are added – where from a government perspective, the IR investment has a significant project return.

5 Limitations, discussion, conclusions and future research directions

The analysis above shows how there is a presently undefined form of passive value capture that exists through the collection of incremental income taxes that arise as a result of infrastructure investment by government (a funding collection mechanism). This income tax receipt, when considered in conjunction with other benefits, may support government investment in projects where there are net economic benefits, but not net financial ones, so long as the amounts spent by government are less than the

amounts that they recover from the project (a funds distribution mechanism). However, there are a number of issues surrounding this premise that require discussion.

Firstly, this is a hypothetical case and political realities mean that such a framework may be difficult to implement. In our complicated system of government, with federal, state, local, political, departmental and industrial actors, applying more rules to investment decision making that may limit potential project investment may be difficult to achieve. In addition, there are a myriad of current schemes, programs and grant systems in place that would need to be re-examined and/or replaced.

Perhaps most significantly, the application of this concept may need consideration from the perspective of various taxation principles, as the use of income tax funding in this way may considered as to be a hypothecation of those revenues. Use of income tax in this way does have some similarities to tax increment financing (Zhao et. al. 2010), where all property taxes for a defined development area are quarantined and redirected to the developer (usually via a government agency). And so it may also be accompanied by some of the same problems, including the creation of equity issues where funding that would otherwise be available to governments to use on other projects is granted to specific groups of tax payers, through the provision of infrastructure. It may also be characterised as a tax rebate or subsidy for these taxpayers.

It is noted above that government participation in projects in this way, which due to the various interactions of funding across government may result in a net zero or positive cashflow for government, may lead to economic projects being advanced where they would otherwise not proceed based on financial assessment alone. This would unlock economic benefits in a range of areas that otherwise would not be. However, the alternative uses for this funding, at varying levels of risk and return in different projects across different parts of government, should be considered alongside the use of income tax revenues in this manner. Additionally, this concept may lead to suggestions that income tax revenues be hypothecated to subsidise a range of financially viable infrastructure projects, despite the benefits users would obtain through investment. Should policy decisions be made as a result of this analysis, further consideration from the perspective of a number of taxation principles would be required.

A second major area of concern is the dependence on the above analysis on business case results. Business cases are models of reality, and the actual results achieved will differ from the modelled results. As noted, the Murray Basin project has seen a cost overrun and given current drought conditions, the benefits associated with the project may not be certain either. Business cases can be very dependent on the inputs into them, including how users would use infrastructure and so the benefits they would derive, the discount rates (e.g. see Terrill and Batrouney, 2018) and other factors. Whilst business cases are subject to guidelines for preparation, a number of issues remain outstanding with regards to these inputs which may impact on the overall position of the benefits that are quantified in them and the cost benefit analyses that are performed with these benefits. For example, the IR project, carried out at a 7%

discount rate, reveals a different result as shown in Table 7, with At 7%, the government instead incurring a deficit of almost $5 billion dollars[5].

Table 7: Funding analysis - Inland Rail Project at Infrastructure Australia discount rate (7%)

Project	**Inland Rail**	
A$m	Federal Government	Users
Government – Agency and Infrastructure Owner	1,495	-
Government – Income tax value capture	1,494	-
General public	664	-
Users	-	3,499
Total	3,653	3,499
Funding provided	**8,575**	
Surplus/(deficit)	**(4,922)**	

Further research is required to analyse the benefits modelled in business cases and determine how accurate this modelling is. From assessing the effectiveness of data collection methods and analysis, to determining values for freight travel time and cost savings from different modes, a more accurate and reliable accounting method for these amounts will improve business case credibility. Importantly, quantification of how much of these benefits do actually turn into additional financial income and therefore taxation revenues (which are of significance to urban infrastructure decision making) is an essential step in determining how much value has been captured through this mechanism. In addition, as alluded to in the assumptions to this analysis, there may be multiplier effects of this infrastructure investment that need to be quantified and understood which may change the amounts of benefits quantified through the business case process. Business cases themselves may also warrant further augmentation with the funding decisions to support investment, which would help explain funding decisions by governments.

Further research into this issue will aid treasury, infrastructure and transport policy makers in better understanding their longer-term financial positions and the impacts of future income tax revenue on investment decisions in infrastructure, particularly infrastructure which is economic but not financial.

[5] The issue of appropriate discount rate requires further research, given long life assets such as rail infrastructure and benefits well past the 30-year assessment period.

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