

**Land Value Taxation and other Measures for Raising Public Investment Revenue: A
Comparative Study**

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Executive Summary

One of the central objectives of the long-term development policies in Ireland focuses on the need for continued upgrading and investment in public infrastructure. Due to the long-term nature of the fiscal crisis faced by this country, funding models for investment in streets, roads, public amenities, public facilities, communications, utilities, and public transport are now in the state of transition from the old paradigms.

Traditionally, taxes and user fees are the primary sources of infrastructure financing around the world and in Ireland. Supplemental methods include loans, bonds, public-private partnerships, and concessions. In the current environment of rapidly rising public debt and extremely deep structural and cyclical exchequer deficits, it is highly unlikely that loans-based or bonds-financed infrastructure investments can take place in the foreseeable future (before 2018-2020).

A new model of financing public investment will rely on more focused funding streams that address the main parameters required for such funding:

- Stability of revenue in relation to economic cycles (addressed in our earlier paper (Gurdgiev, 2009));
- Economically non-distortionary revenue sources (that minimise taxation drag on private investment and job creation, while supporting capital investment incentives – the subject of this paper); and
- Revenue sources that will be closely aligned with private benefits of public investment (the concept of value-capture that is comprehensively addressed in this paper).

Hence, both, from the point of view of the Exchequer and from the point of view of economic efficiency, we need new policy thinking on how Ireland can ensure adequate and sustainable public investment.

One of the most progressive and innovative approaches to public investment financing is known as *value capture*. As public infrastructure generates private returns (and in some cases negative externalities) it either enhances or devalues the value of adjacent and distant land. These changes in value can be dealt within the value-capture policies discussed in this paper. Two additional impacts that public investments on private value of properties and consumption are also incorporated into value-capture analysis. Firstly, public investment can yield property value

increases well outside the immediately adjoining areas and, second, public investments can actually reallocate value, subtracting value from adjoining properties, but enhancing value of properties elsewhere, for example.

Value-capture envisions creation of the policy tools to adequately capture the privately accruing changes in the value of sites and/or consumption that arise from public infrastructure investments.

In our earlier study (Gurdgiev, 2009) we have shown that Land Value Tax (LVT) represents an optimal tax instrument when compared to property tax and the existent structure of property taxation based on the stamps, VAT and development charges from the Exchequer perspective, when revenue stability, predictability and counter-cyclicity are of value.

In the present paper, in sections 3 and 4 below we briefly introduce and define all internationally available policies used for raising revenue to finance public investment. These are:

- land value taxes (LVT),
- property taxes (PT)
- tax increment financing (TIF),
- special assessments (SA),
- utility fees (UF),
- development impact fees (DIF), such as Development Levies (Section 48 and 49 of the 2000 Planning Act),
- joint development (JD), and air rights (AR).

In defining these policies we also briefly introduce their main features and draw on some international experience to highlight their main shortcomings and benefits.

Next, in Section 6 we provide a comprehensive discussion of the concept of value creation arising from public investment. In contrast to the existent literature, we consider a dynamic model of value creation. In other words, we allow for several stages through which a one-shot public investment project can add new value to existent property owners and consumers of public services. This is consistent with the economic framework of multiplier effects of public and private spending and investment.

Public investment has a profound impact on land and property values that can:

- Increase or decrease the value of specific sites in relation to the location of the public

- investment;
- Alter the value of the site in a greater proportion than the value of the actual property (site enhancement); and
- Reduce overall market incentives for more efficient use of properties.

Over time, these factors imply significant alteration in the use of land in the cities that develops along the lines of increasing the relationship between the sites utilization intensity, yields on land sites, closer alignment of land pricing and site qualities (hedonic and gravity impacts) and the development of major public infrastructure, e.g transportation networks, knowledge economy supportive capital development and enhancement of the quality of life consistent with the new Irish labour force with higher levels of human capital investment.

It is generally recognized in the economics literature that locations with greater accessibility to the desired destinations command higher price valuations on sites. In fact spatial geographic models of urban development, gravity models in econometrics and hedonic models of real estate finance and economics usually give accessibility a specific measure in estimating property prices or land values. Likewise, accessibility premia are conventionally factored into the yield models for commercial real estate.

The positive values of accessibility and clustering, both interacting with each other, are over time incorporated into the property markets valuations. This process first impacts the land or site values, followed by the translation of higher land values to property values. This time frame of value building implies that more efficient forms of value capture taxation or revenue raising policies must allow for early stage value capture out of the land or site values changes alone, prior to their translation into property prices. In other words, unlike most of the literature on taxation finance, we must distinguish two separate and unique stages of demand for funding:

- Early stage, capital allocation, demand linked to the full capital cost of the project; and
- Later stage O&M financing support.

This forms one of the criteria to our ranking system for proposed policies below and distinguishes our approach from other literature on the topic of public finance. We recognize the existence of loops of value transfers, where public investment in the vicinity of a given site leads to an increase in the value of this site, leading to more demand for development (private) around the site, implying further increases in the site value and associated rise in demand for future

expansion of public investment or, with careful planning and design integration – for sustainable demand supporting self-financing infrastructure. This triggers a renewed cycle of land values appreciations.

The entire objective of the value capturing taxation policies should be to create an instrument allowing for taxing exactly these benefits accruing to the site owners from the continued cycles of public investment. Such a tax, optimally, will act to capture not just the value arising from the first round of investment, but the value arising from subsequent rounds of financing as well. This condition is new to the literature on public finance, in so far as though some studies attempt to address value-capture in a static (one-off) setting of public investment, no mainstream economics literature recognizes the dynamic nature of value creation.

Following this outline of a dynamic value creation model of public investment, we rank the above policies with respect to their efficiency in addressing the dynamic nature of public investment. These are ranking criteria shown in summary Table A below where policies were assessed and ranked on the basis of the following criteria, all relating to the issue of financing public investment, creation of value from public investment and value-capture of the private gains accruing as a result of public investment.

We distinguished several stages of public investment –

- Pre-planning announcement;
- Planning;
- Financing;
- Implementation; and
- O&M.

For completeness purposes, we analysed the efficiencies (economic, social and political, whenever applicable) of each policy within each of the following criteria:

1. Value creation:
 - Timing of value accretion to the private beneficiaries of public investment and whether or not a specific policy can capture the private gains arising from early stages of public investment;

- First, second and higher order loops of value creation, and how efficiently each policy allows us to capture the values added to private assets / consumption / income arising in each subsequent loop;
2. Value capture:
 - Ability of the policy instrument to provide upfront investment financing for the projects, thereby reducing the risk on the Exchequer of financing large capital costs prior to recouping any of the gains privately arising as a result of such investment;
 - Ability of the policy instrument to provide ongoing funding for O&M operations post-investment;
 - Overall impact of each instrument on enforcement and supervision costs of revenue collection; timing of revenue collection, location on which the revenue collection measures fall, and the incidence of each instrument and cost;
 3. Risk transfers implied by application of each instrument;
 4. Economic efficiencies of each instrument;
 5. Social, economic and age-related equity considerations and the application of ability-to-pay equity principle to each instrument;
 6. Revenue sustainability of each instrument.

We do not explicitly deal with the issues of corruption and conflicting public objectives that may arise under various systems of financing of public investment. This problem arises predominantly under the measures that are not universally applicable (such as development levies, SAs, JD and AR etc). There is a lack of quantifiable evidence on such incentives and behavior. However, anecdotal evidence and some specific cases under investigation by the Tribunals of Inquiry in Ireland, show that current system of development levies, stamp duty taxation and non-transparent zoning processes may aid the cases of corruption, tax evasion and suboptimal localization of public investment.

In particular, current system of centralized public investment financing generates strong lobbying by local authorities to draw such investment to their locations, thus increasing property values there without any significant capture of these benefits by the exchequer. This can be associated with a politically motivated, inefficient system of allocating public health facilities, schools, and even higher education institutions that promote local interests over national efficiency objectives.

Light rail investments are commonly diverted to the green-field sites instead of built up areas not due to demand, but because new development yields development levies in contrast to the development taking place within developed properties.

In focusing on economic (rather than planning) aspects of the value-capture instruments, we omit the above considerations. However, it is clear that traditional instruments are inferior, from the point of view of planning and transparency efficiencies to more universal and more transparent tools, such as an LVT or a property tax.

As Table A (below) clearly indicates, in our view, Land Value (site value) Tax represents the optimal policy instrument for raising revenue for public investment when compared to all other alternatives. In a qualitative rankings above, the final distance between the optimal policy (LVT/SVT) and the runner-up policies (Property Tax and Joint Development/Air Rights) is significantly greater than the distance between the least favored two alternatives (Development Impact Fees and Special Assessments). This shows that the economy would gain much greater efficiency from moving from a Property Tax or a PPP-style system of financing (consistent with Air Rights and Joint Development) to a Land Value Tax system of revenue collection, than it would from any other reform within the confines of the above choices of policy instruments.

Table A: Summary of results for Criteria 1-3 rankings

	Criteria 1.1: Capture timing	Criteria 1.2: Loops capture	Criteria 2.1: Upfront investment	Criteria 2.2: Post-investment recovery	Criteria 2.3: Basic Features	Criteria 3.1: Risk transfers	Total Score for Criteria 2-3
Land Value Tax (SVT/LVT)	8	8	8	10	10	7	51
Property Tax	3	6	2	8	8	6	33
Tax Increment Financing (TIF)	6	3	2	8	7	3	29
Special Assessments (SA)	4	4	0	8	6	6	28
General Utility Fees (GUF)	2	2	0	8	9	6	27
Development Impact Fees (DIF)	2	2	6	4	6	7	27
Joint Developed and Air Rights (JD & AR)	8	2	6	4	10	5	35

Ranked 0-10, with 10 being most efficient alternative and 0 being least efficient

Table A (continued): Summary of results for Criteria 4 rankings and overall rankings

	Criteria 4.1: Economic Efficiency	Criteria 4.2: Equity	Criteria 4.3: Revenue Sustainability	Criteria 1-3 cumulative scores	Overall ranking scores	Overall Rank of policy (1 being the best suited for Public Investment Financing)
Land Value Tax (SVT/LVT)	10	10	10	51	81	1
Property Tax	6	5	7	33	51	2
Tax Increment Financing (TIF)	5	5	6	29	45	4
Special Assessments (SA)	3	5	4	28	40	6
General Utility Fees (GUF)	6	5	6	27	44	5
Development Impact Fees (DIF)	4	3	3	27	37	7
Joint Developed and Air Rights (JD & AR)	7	7	2	35	51	2

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1. Introduction

One of the central objectives of the long-term development policies in Ireland focuses on the need for continued upgrading and investment in public infrastructure. In addition to billions in planned future expenditure, Transport 21 and other infrastructure development initiatives for the next 5-10 years are envisioning a change in:

- Infrastructure priorities – a shift from roads construction to more localized investments in sustainable development and upgrading of the existent stock of public utilities, infrastructure and related services provision;
- Spatial distribution of infrastructure projects – with more concentration on demand-driven projects and away from national mega-projects;
- Infrastructure financing models – with the current domestic investment crisis (domestic investment has fallen by ca 34% in H1 2009 alone) putting under question the PPP-based model for infrastructure financing.

Figures 1.1 and 1.2 illustrate the overall significance of public capital investment programmes in Ireland for the period 2000-2011. While further projections into the future can only be speculative in the current environment of severe constraints on public funding, it is safe to assume that future development of Irish economy will require significant public investment in infrastructure and upgrading of the existent supply capacity for delivery of public goods and services.

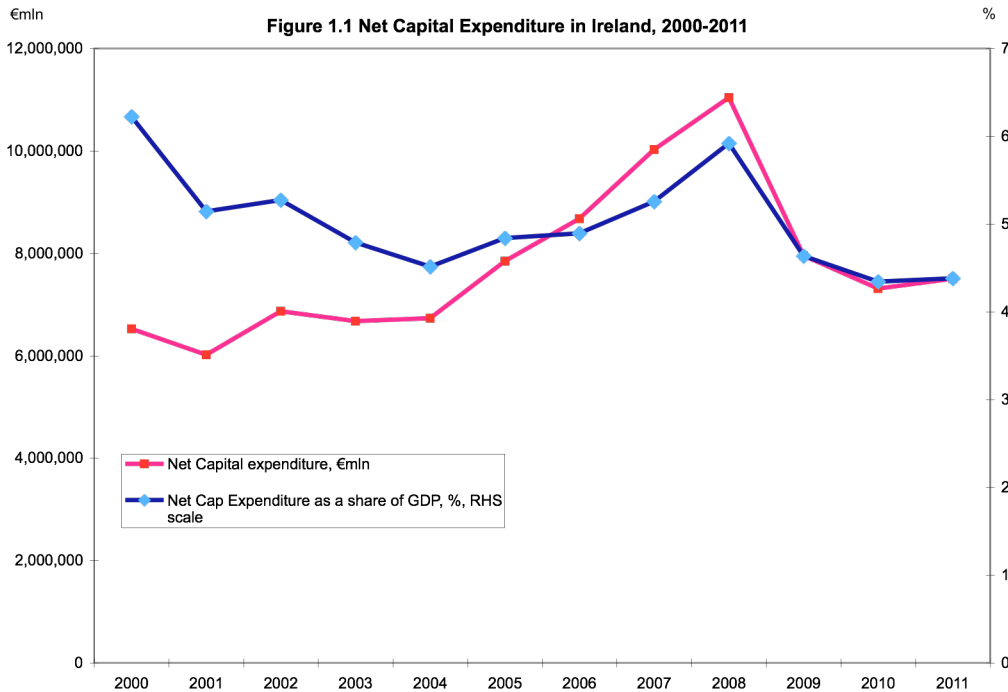
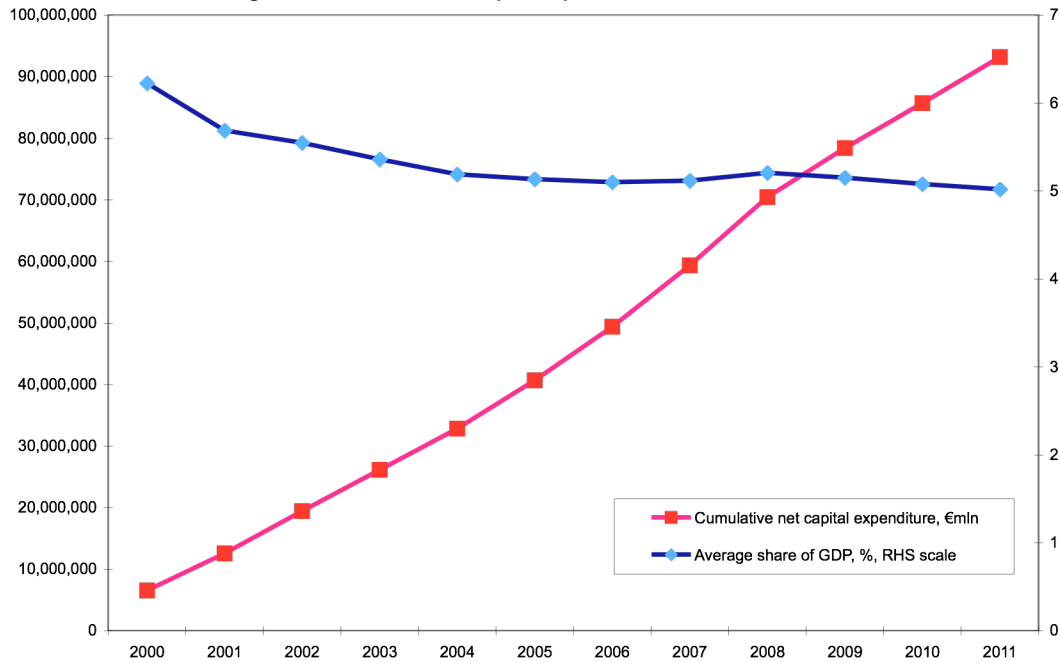


Figure 1.2. Cumulative Net Capital Expenditure in Ireland, 2000-2011



Thus, overall, it could be argued that funding models for investment in streets, roads, communications, utilities, and public transport are now in the state of transition from the old paradigms of being subject to direct Exchequer financing out of general funds or PPP-financed.

It is worth noting here that under the current financial markets and exchequer revenue conditions, PPP model of financing is facing a set of severe constraints. First of all, with tight global and domestic liquidity, it is hard to imagine how debt financing, on which PPPs come to rely, can be raised either by the exchequer or by private partners. Second, in the current fiscal conditions, adding the scale of the exchequer exposure to NAMA, it is difficult to see how PPPs can be progressed forward. Third, tight fiscal spending constraints imply the overall public capital investment funds are shrinking. Fourth, serious uncertainty about future returns, lack of the functional markets for large-scale capital investment projects and difficulties in pricing underlying assets (land, sites, permissions etc) imply that there is a reduced demand for PPP projects from the potential private sector partners. Looking further into the future, with Irish national debt expected to breach 100% of GDP levels by 2013, it is likely that the Irish exchequer will become significantly more risk-averse in relation to future public investment financing. In this context, PPP-associated structures of guaranteed minimum pricing and fees, the structure that level significant O&M financing risk onto the exchequer, are unlikely to remain acceptable for public investment financing.

A new model of financing public investment will rely on more focused designated funding streams that address the main parameters required for such funding:

- Stability of revenue in relation to economic cycles (As infrastructure investments are multi-annual allocations, it is desirable to insulate financing for such projects from short-term volatility in Exchequer revenue. These aspects of the existent revenue streams for Exchequer financing, available today in Ireland, as well as of the Land Value Taxation (LVT) mechanism proposed were addressed in our earlier paper (Gurdgiev, 2009).)
- Economically non-distortionary revenue sources (Revenue sources for public investment needs to minimise economic distortions and the taxation drag on private investment and jobs creation. It should support general capital investment incentives. We consider all possible alternative revenue-raising schemes in light of the economic incentives and distortions they create in this paper.)
- Revenue sources that will be closely aligned with the benefits accruing from new public investment (This is the concept of value-capture that we are considering in this paper).

Traditionally, taxation and user fees are the primary revenue sources for infrastructure financing around the world and, indeed, in Ireland. Supplemental methods include loans, bonds, public-private partnerships, and concessions, some of which are in use in Ireland as well, while others (e.g infrastructure bonds) are not. In the current environment of rapidly rising public debt and extremely deep Exchequer current deficits, it is highly unlikely that loans-based or bonds-financed infrastructure investments can take place in the foreseeable future (certainly not before 2018-2020 at the earliest).

Hence, both, from the point of view of the current decline in Exchequer revenue and from the point of view of economic efficiency of using a system of infrastructure financing that closely links benefits accruing to private individuals and firms from such investment, we need some new policy thinking on how Ireland can ensure adequate and sustainable public investment.

One of the most progressive and innovative approaches to public investment financing is known as *value capture*.

In general, public infrastructure either

- enhances the value of adjacent land (in the case of the infrastructure that yields direct benefits to residents, e.g schools and hospitals or major public transport access hubs), or
- subtracts value from their land (in case of infrastructure that delivers services outside the immediate neighbourhood and is associated with a loss of value for the surrounding areas, e.g public sewage works or waste treatment facilities, or public energy production investments, or simply investments that result in increased traffic and roads congestion in their vicinity).

In both cases, large public investments change the value of the land in the vicinity of these projects. These conventional changes in value can be dealt at least in part within the existent frameworks of value-capture policies discussed below.

However, there are two additional impacts that public investments have on private value of properties:

- firstly, public investment can yield property value increases well outside the immediately adjoining areas (e.g public utilities upgrades that can benefit a very large area not suited for coverage by existent value-capture tools. This particularly applies to the network connectivity effects which imply that efficiency of public investment rises with greater rates of utilization and demand for public services or goods supported by this investment; and
- secondly, public investments can actually reallocate value, subtracting value from adjoining properties, but enhancing value of properties elsewhere either via the remotely located properties having access to the new infrastructure, or via spatial shift in demand in favour of such remotely located properties (e.g the case of the Poolbeg incinerator shifting demand for development land out of Poolbeg area and incentivising relocation of existent residents away from the neighbourhoods in close proximity to increased traffic and to the facility itself).

Value-capture envisions creation of the policy (tax and charge) tools to adequately capture the privately accruing changes in the value of sites that arise from public infrastructure investments and compensate directly land owners suffering from the adverse externalities imposed onto their property by shared public investment projects. It is important to note that to date, value-capture policies have been predominantly focused on the positive value additions arising from public investment. We shall consider both aspects of such policies.

The policy tools allowing for value-capture are new and to-date include very few alternatives that we will discuss below. Pivotal questions that remains to be answered conclusively are:

- Whether value-capture policies are supportive of the sustainable economic development or do they reduce potential growth in the economy;
- Whether such policies reduce or increase volatility of Exchequer receipts, thus imposing a new layer of risks on public investment;
- Do these policies, when they are represented by specific tax instruments, have a definable optimal level of taxation that minimizes the distortionary aspects of tax mechanism while maximizing the returns to public infrastructure investment; and
- Whether these policies can be adequately ‘sold’ to the electorate.

This study builds on the previous submission to the Commission on Taxation that outlined the issues relating to land value taxation from the Exchequer revenue perspective.

Having shown earlier that LVTs are optimal from the Exchequer revenue stability point of view, we look at the relationship between public investment and land values, and the general means for capturing the private gains arising from public investment. We attempt to address the sources of value arising under various alternative and often coincident financing policies that can support public investment, including joint development, rezoning of land, reselling and speculative investment in land, use of development levies, special assessment levies, and positive and negative tax incentives. Throughout, we continue, as in the first volume of this research, to discuss the main aspects of the specific financing on local suitability, economic and financial efficiency, social equity and the resulting characteristics of the revenue source.

Our subsequent (third stage) of research will focus on the administrative and political feasibility of a LVT reform in Ireland, building on the conclusions of our extensive survey of stakeholders in the taxation policy reforms.

2. Basic findings of the previous research

First, let us summarize the findings of the first stage of our research into feasibility of LVT reform in Ireland.

Land Value Tax is defined as an annual tax or charge on the rental value of the land occupied by the site or a property. LVT can apply either in a flat rate fashion or on the basis of the zoning of land. As such, LVT is not a transaction-based tax, but a tax levied on the economic value of the land.

The first stage study (Gurdgiev, 2009) shows that any other form of property taxation delivers three major disadvantages relative to LVT:

- Property taxes, unlike LVT, penalize more sustainable use of land suitable for development, thereby encouraging land speculation and discouraging efficiently planned development;
- Property taxes, unlike LVT, induce significant efficiency losses in tax collection; and
- Property taxes do not deliver a direct public return to publicly-financed infrastructure and public/social amenities investments. LVT does provide exactly such a mechanism for capturing a share of private windfalls accruing to land owners arising from public investments.

In light of the collapse of the property boom, it is now apparent that the existent structure of property taxation in Ireland no longer represents a viable environment. In particular, the existent system based on transaction taxes presents a set of major shortcomings from economic and fiscal points of view. These are:

- disincentivising sustainable use of land in development and encouraging speculative holding and rezoning of land, while creating artificial constraints on supply of land suitable for development;
- increasing potential for tax avoidance, grey markets transactions and corruption;
- reducing market turnover in resale properties and the liquidity of household wealth;
- contributing to asset price bubble emergence, inflation and collapse in the real estate markets;
- reducing life-cycle investments in human capital, social capital and other economically important activities, reducing pensions and savings provisions;

- levies unnecessarily high burden of taxation on personal income.

The problematic aspects of the existent system of taxation are contrasted by the positive effects of LVT reform on the aforementioned incentives and economic mechanisms.

From the fiscal policy point of view, the existent transactions-based system of property taxation was shown in Gurdgiev (2009) to reduce fiscal policy capabilities to act as countercyclical economic stabilizer. Stamp duty types of taxation on property induce greater volatility to fiscal policy and stronger pro-cyclicality of tax revenue, reduce planning and forecasting accuracy for fiscal and economic policies and increase the volatility of Exchequer revenues, while reducing the level of tax receipts.

Gurdgiev (2009) shows that LVT reform satisfies the set of main criteria for reforming existent system of property taxation must include the following considerations. The reformed system will:

1. Improve macroeconomic stability and support economic growth with specific focus on higher value-added development activities and provision of quality housing, commercial property and infrastructure consistent with creation of sustainable high quality employment, skills acquisition and investment in human and productive physical capital;
2. Increase efficiency of resource allocation, as pertaining to development and property;
3. Reduce adverse impacts of property taxation on economic and social inequality, inclusive of addressing the issues of social exclusion;
4. Support environmental sustainability of development and enhance social capital;
5. Simplify the tax system and make it more transparent and reduce incentives for corruption, operations of grey markets and tax evasion;
6. Introduce change gradually so as to avoid disruption of existent contractual arrangements and not cause dramatic shifts in economic expectations;
7. Allow and encourage coordination of tax policies with other reforms;
8. Achieve political feasibility without creating a single narrow interest constituency.

Thus stage 1 of our research (Gurdgiev, 2009) provided initial quantitative and qualitative analysis of these objectives.

3. The main preliminaries of the present analysis

While pivotal to the present analysis, the argument that public infrastructure investment alters the overall value of adjacent properties is taken to be the underlying assumption of this research without providing direct and detailed evidence. In addition, we must recognize that the accretive value arises not in the context of the overall hedonic or fundamentally justified value of buildings and other constructed amenities on the property itself, but via the changes in the value of the site underlying the property. This is extremely important for it allows for making a straightforward argument that a tax on the value of the property will not capture the benefits of the public investment in the adjoining infrastructure. Instead, a tax on underlying value of the site will do exactly this.

However, these assumptions are non-controversial and have been proven to be empirically valid. For example, in the case of public investment in transport, accessibility to desired destinations by individuals and businesses usually plays a significant role in choosing a specific location for a residence or business. Thus, proximity of convenient public transport networks usually commands a price premium on the properties and land values. This has been established in the case of Dart and Luas lines in Dublin (Sunday Business Post, 2007/07/09). For example, if in 2006, development land in the greater Dublin area was priced at around €500,000 per acre, prices in Tallaght – at the end of Red Line and Swords – at the end of the Transport 21 proposed extension, have risen by 30-50% within one year. Even increases in the capacity of existent lines are associated with driving up prices for land that lies within the proximate areas.

Considering two properties adjacent the same transportation network, any public investment in network will generate identical upside to each site. However, the property value of each building will be determined also by the quality of the building and by its hedonic properties. Both of the latter determinants of property value arise solely out of individual owners decisions to invest or not in property maintenance and upgrades. If the two identical, otherwise, properties are differentiated by, for example a more modernized system of heating and insulation installed in one of the properties, the price differential between the two properties can be between 10 and 15%. This price differential, under the property tax of, say 5%, will incur an additional charge on the modernized property of 0.5-0.75% of the property value regardless of the fact that a public investment in the transport network of which the property is a beneficiary has absolutely nothing to do with the property value arising from modernization of its heating and insulation systems.

However, an equivalent (assuming 40% site value cost of the average dwelling) 8% site value tax on land occupied by each dwelling will yield the same revenue, yet will not penalize modernization investment by the owners of the more sustainably developed and economically efficiently used modernized property. Equally important is the fact that the property tax in the example above can end up penalizing a (relatively) lower income household (if such household was the one investing in their property modernization) and subsidise a (relatively) higher income households (if that household did not invest in the upkeep or modernization of their property). In contrast, and LVT will entail no penalty or subsidy of any sort, inducing greater social equity than a property tax.

As argued above, a property tax levied against the actual property value does not allow for value-capture of the private benefits arising from the public investments into infrastructure. Furthermore, a property tax imposes an added penalty on those property owners who choose to undertake private investment in their buildings and facilities independent of any public investment in the surrounding locations.

A general economic principle, known as the *benefit principle*, states that a system of expenditure or investment efficiency is determined by how closely the costs and benefits of such an expenditure or investment are aligned with each other. Three examples of alternative revenue raising systems for public investment can be considered in this context of benefit principle.

First, consider a property tax as a revenue raising exercise. Assuming construction of a nearby transportation link increases the value of the individual dwelling (perhaps via improving access to desired locations), a property tax does allow for additional revenue to be raised as the direct consequence of the new investment. However, as outlined before, such a tax will fall disproportionately on those homeowners who utilize their property more efficiently, thus favouring those who do not. This is both, potentially socially unjust, and economically perverse.

Second, a common mechanism for investment financing is to levy user charges or a tax on fuel. Once again, both offer additional revenue enhancement, but both ignore the fact that a site owner for the adjacent property with improved access might not be a user of the transport facility or a payee of additional fuel tax, despite being a beneficiary of the new investment. Furthermore, in the case of general Exchequer financing through fuel charges, there is no direct link between

higher taxes faced by a person who has no access to the new facility and the subsidy that this entails to a person who pays lower user fees on this facility. Once again, the benefit principle of efficiency fails in this case, as is any consideration of equity or economic sustainability of such financing mechanism.

Third, a land (or site) value tax levied directly onto the value of the land itself will allow for full capture of the benefits accruing to the land user (see Gihring, 2009 for example). This tax will, of course, ignore user charges, but the efficiency argument under the benefit principle implies that there are, indeed two distinct benefits accruing through the investment in new facility:

1. The first benefit is directly to the users of the transport link, who may or may not be the local land owners – these are most efficiently captured via user fees which are not contradictory to the application of the land value tax;
2. The second benefit accrues to the owners of the adjacent lands, whose value of land, and thus property, increases regardless of whether they themselves are users of the new public transport service or not. This benefit can be captured directly only via a land value tax.

It is clear from the three examples above that we are omitting the third beneficiary of the public infrastructure investment – the general public, who receive the gains in economic activity and general quality of life. However, these gains accrue independently of the land ownership and new link usage. Yet, it is these broadly defined social and economic returns to infrastructure that actually motivate the investment and serve as the justification for the use of general fund financing of many infrastructure projects. Once again, the only tool for capturing such gains is a LVT, for enhanced quality of life and economic activity in the country accrue not to the existent properties (otherwise they would not occur to the new properties, implying that new developments are not additive to the economy or the quality of life in the country), but to all properties – built or planned or even those yet to be planned. In other words, the value accrues to the sites, or land.

In general, as the growth in the economy's overall tax base takes place over time and through the entire life cycle of a infrastructure investment, the general Exchequer revenues can be seen suitable for both allocating the initial capital costs and financing the ongoing operations and maintenance (O&M) costs. In contrast, user fees and charges, as arising from the specific utilization of the new infrastructure project itself, are best suited for recovering the O&M costs alone. At the same time, as land owners benefit both from the actual capital investment (with site

values rising in advance of actual investment being undertaken) and from the O&M operations during the life cycle of the infrastructure project, land value (or site value) taxation offers the best means for capturing the benefits of public investment to private land owners at both the capital investment part of the life cycle (recovering the immediate benefits from announced or planned investment before any investment actually takes place) and O&M operations.

The problem with the above analysis is that it does not incorporate considerations of social equity and economic efficiency. This is something that we are addressing in the present paper - a joined-up evaluation of economic, fiscal, equity and value-capture properties of the revenue raising schemes for public investment financing.

In what follows, we will assess the efficiencies associated with the use of value capture policies such as

- land value taxes (LVT),
- property taxes (PT)
- tax increment financing (TIF),
- special assessments (SA),
- utility fees (UF),
- development impact fees (DIF),
- joint development (JD), and air rights (AR).

In general, since most of these measures relate to the public investment beneficiaries who realize most of their value gains upon the completion of the project, these strategies may be used more often for capital costs recovery and less for O&M operations financing.

4. Some definitions and specifications

Land Value Taxes (LVT, or alternatively site value taxes) usually allow for a full capture of the private values accruing from the provision of public goods. These include infrastructure investments, but also creation of public amenities, such as parks, common areas, public access and other. Instead of applying the tax to specific projects, with a resultant risk of assigning the project benefits to a specific and narrowly defined subset of potential beneficiaries, LVTs capture the value added by the provision of public goods more generally.

Around the world, traditional means for raising public investment revenue relies on property taxes (PTs) – levied against the value of the property and thus linked to both public investment and individual private investment.

As such, PTs can be seen as a combination of a value capture tax (on that share of property value that arises from property location relative to public infrastructure project) and an investment tax (on the share of property value that accrues as the result of individual investment by the property owner). The latter aspect makes property tax an economically distortionary tax in so far as it reduces the rate of return to private investment and acts to lower incentives for the private owners to improve the efficiency of their property holdings. LVT has not such effect. Thus, in principle, a tax on land or site value, rather than buildings and home improvements, would be desirable, as it would be less distortionary, as the supply of land is fixed and the only value that can be added to land directly arises from rezoning – a form of public act or investment that has little to do with the private investment activity by an individual or a firm.

Variations of the LVT have been put in place in a number of countries. The most common is a split-rate property tax, in which the land and improvements that constitute a property are valued separately and taxed at different rates, most often with a heavier emphasis on land. A drawback here is the lack of precise mechanism for separating out the two parts of property valuation. Canada, Australia, New Zealand, Denmark, South Africa, Hong Kong, parts of the US (towns of Fairhope, Alabama, and Arden, Delaware and in parts of Pennsylvania, but also in some locations in Ohio, California and, currently under consideration in the states of Washington and Minnesota) all have used LVT in the past with a significant degree of success.

Per economic literature in general a tax on the value of land is preferred to a tax on buildings. This is so, because, as illustrated in example above, LVT will result in less economic distortion due to:

1. fixed supply of land, implying inability of the tax base to migrate out of the tax capture jurisdiction;
2. direct connection between the benefits recipient and the tax payee;
3. no associated disincentives for improving the efficiency of land use;
4. no distortions of the existent land use.

Our previous study on LVT has highlighted several traditionally raised objections to the

application of the LVT. From the point of view of the current study, the more important ones are:

- Although LVTs are desirable from the standpoint of economic efficiency and sustainability, they can be mildly regressive in terms of ability-to-pay.
- LVTs may prove politically challenging due to high visibility and potential unpopularity. However, this is mitigated by the current plans for introducing an even less popular and more distortionary direct property taxes.

Tax Increment Financing (TIF) is a public finance method that levies a tax on the incremental increase in property value within a specific development project. Usually, TIFs are used to cover development-related costs, such as access roads, communications etc. In general, TIF can cover not just the specific site of the project itself but a broader area, just as with the case of special assessment districts defined below. This, traditionally, local government levy requires a well contained development boundaries and is therefore largely unsuitable for development of larger public infrastructure projects or for investment in infrastructure that can be shared by the residents of other locations (e.g general schools and sporting facilities).

TIFs are similar to Section 49 of 2000 Planning Act which envisions development levies on a particular bounded development where specific facilities will be provide by the local authority (access roads or a crèche) which will be used primarily by residents in that development. It is, however, observed that section 49 provision is rarely used for public investment financing.

One example of limitations in TIF application can be found in Chicago, where TIF was used to finance construction of specific public transport (mass transit) stations, but not for construction of the actual transit lines. The largest example of this application was in construction of Randolph/Washington station that raised \$13.5mln in investment funds – a sum that is hardly large enough for significant infrastructure investments. The second largest application in the US – in Portland, Oregon – raised just \$7.5mln to finance Central City Streetcar transit. This amount paled in comparison with a \$30mln general note issued by the municipality to co-finance development.

Special Assessments (SA) impose a levy on property owners near a new or improved public infrastructure, usually transport-related. The levy is ringfenced for properties based on geographic proximity or another measure of the specific benefit accruing to the property. This requires assessment of individual properties and a measurement or estimation of the specific benefit

extent. Some models can be based on physical proximity to the infrastructure project, or the features of the property itself, such as the site size or the frontage to the infrastructure development.

This represents several major problems in application of the SA. First, the assessment model itself can be perceived as an arbitrary one, especially if it is based on the proximity principle or other relatively artificial and contestable attributes of property. Second, SA presents only a limited mechanism for raising public investment-linked revenue, as it usually involves a very restricted local area or development. Third, politically, SA can be seen as either a ‘beneficiary pays’ principle application or a ‘dumping’ principle. The latter is egregious as property owners in a restricted area can see SA as a subsidy from them to others who might be also using the new facilities or amenities, but reside outside the SA zone. Fourth, SA is inferior to other forms of investment-linked taxation, such as LVT, which have much less arbitrary means for imposing public investment-linked charges. For this reason, SAs have had only very limited application, usually linked to local authorities own small-scale infrastructure improvements with a well-defined zone of benefits distribution and no diffusion of benefits to areas outside those defined by the SA levy.

Utility fees (UF) price public infrastructure facilities (again, usually transport networks) as standard utility services to be financed from user charges. These have had low applicability in Ireland where even basic utilities, such as water, have no specific charges applying to them. UF’s benefit is that it attempts to closely link infrastructure costs to actual demand. In addition, UFs allow for tax base widening by covering not only residential users, but also commercial and business use as well. In Ireland, this system has been skewed, in some cases, in favour of households at the expense of businesses (local charges) or vice versa (Dublin Port tunnel charges).

A major problem with UFs is that these fees do not allow for significant subsidization of the under-used public transport networks and do not promote greater use of existent networks. In other words UFs, if set sufficiently high to supply significant capital financing for public infrastructure investments will act to reduce attractiveness of such investments. Another problem is that enforcing UF is commonly perceived to be very difficult as free riding hardly stands up in court as a grave enough offence to restrict property rights of the owners. Finally, UF does not allow capture the part of private benefit that accrues through increases in the site values.

Development Impact Fees (DIF) are one-off charges collected by local governments from developers to supply new infrastructure and services associated with new development. These are not compatible with financing infrastructure maintenance or ongoing improvements to existent infrastructure post-development or O&M charges. In addition, if set high enough to actually pay for infrastructure cost, DIFs risk saddling the purchasers of new property with a life-time cost of infrastructure, in effect providing a potential subsidy to subsequent owners not necessarily recoverable via subsequent resale. This is especially egregious in the markets where the developers can pass full cost of housing completion onto homeowners – the markets marked with information asymmetries and resale inefficiencies.

Overall, DIFs are relatively efficient in so far as they do pass onto the owners of the property the marginal cost of land development and promote benefit equity. However, from the perspective of the property development sector, in the markets where the developers cannot fully pass the cost of DIFs onto the buyer, these fees may also have adverse long-term equity effects, as developers will find it financially infeasible to develop low-cost and moderate-cost housing due to lower margins. DIFs are similar to negotiated exactions in that they are charged to new development to help recover the cost of public service provision. However, DIFs can also be used to cover the cost of off-site services: local roads, schools, parks, playgrounds, sporting facilities etc. DIFs are administratively simple and politically feasible because they create an illusion of ‘developer-pays’ principle. Yet, in most cases, it is indeed the homebuyer who ends up paying most or all of the DIF cost.

Joint Development (JD) and Air Rights (AR) refers to the coincidental development of a public facility (e.g. a public transit station) and adjacent private real estate development. In this case, a private sector partner may provide the actual facility itself or make a financial contribution to investment. The investment project can be either jointly developed and/or jointly owned. A major shortcoming of the JDs is that their implied tax base is extremely narrow, limited to the number of private sector participants in the project itself. One advantage of the JDs is that they ensure that projects undertaken are economically efficient, since the private party to the arrangement seeks to maximize their return on investment. In contrast to JDs, air rights (AR) assign property rights to the developments located literally on the site of the public investment

project, e.g privately owned concessions in public parks or buildings erected above the transport hubs. These suffer from exactly the same shortcoming as the JDs, but are in addition not sufficient to finance capital costs of investment, thus providing usually a revenue stream for O&M operations.

5. Organization of this report

The main objective of this report is to provide analysis of the LVT/SVT option for financing public investment as compared against other available revenue raising alternatives. The report aims to establish economic, financial, social and spatial advantages and disadvantages of the LVT/SVT taxation mechanism relative to these other alternatives.

With this in mind, building on the definitions supplied above, section 6 below links up the public finance concept of value capture to the raising of revenue for public investment. We devote specific attention to the linkages between the value of land, value of property and public investment. From there on, we build policy links between the values accruing to private owners and public spending on infrastructure and other public goods. We specifically focus on the issues of benefit incidence, measurement and cost under different revenue raising mechanisms. This allows us to establish an early ranking system for the specific policies that can be used to achieve value capture. In section 7 we evaluate the main set of revenue raising alternatives on the basis of economic efficiency, social equity, revenues sustainability, and political and administrative feasibility. This augments our early rankings system. Section 8 addresses the issues of risk transfers between the public and private sectors inherent in each alternative policy instrument. Section 9 concludes by identifying potential political and administrative barriers to implementation of LVT/SVT and other main value capture revenue policies. We finalise our political and socio-economic ranking system of the revenue raising alternatives.

6. Value Creation Loop and Public Investment Financing

Public investment has a profound impact on land and property values that can:

- Increase or decrease the value of specific sites in relation to the location of the public investment projects (positive or negative externality);
- Alter the value of the site in a greater proportion than the value of the actual property (site enhancement) or reduce the value of the land/site in relation to the overall value of property (negative site impact); and
- Reduce overall market incentives for more efficient use of properties.

Over time, these factors imply significant alteration in the use of land in the cities that develops along the lines of increasing the relationship between the sites utilization intensity, yields on land sites, closer alignment of land pricing and site qualities (hedonic and gravity impacts) and the development of major public infrastructure, e.g transportation networks, knowledge economy supportive capital development and enhancement of the quality of life consistent with the new Irish labour force with higher levels of human capital investment.

Spatial models of the cities have for a long time identified the physical transport connectivity – or the ease of access to the main transport networks – as the driving factor of land valuations, but not necessarily property valuations. In other words, the main factor in the market for urban land, aside from local zoning and density restrictions, is the accessibility, or the ability of individuals and businesses to reach a desired destination from a given location. Desirability of each destination, in turn, is defined by the frequency and intensity of its use by households and businesses.

Thus, proximity to or accessibility of the employment sites is often a desired feature of the residential sites that commands a market premium. It is followed by shopping, medical, entertainment and educational facilities. Within the latter three, additional variation in value is driven by the quality and type of each of these activities. Thus, for example, families with children prefer locations with easy access to such facilities as discount shopping and multiples retailers, zoos, parks, and proximity of lower level schools. The same logic extends to the location decisions by companies.

Another indirect function of accessibility is the clustering or density effects. In some cases,

increasingly so in the traded services and R&D intensive sectors, clustering is a beneficial property of the specialized labour and knowledge markets, implying higher value accruing to the sites that are directly and easily accessible by the specific type of employees and firms. To a lesser extent clustering, as represented by the convergence of dense locations by the types and socio-economic status of their inhabitants, has a positive value in housing markets or residential site valuations as well. Clustering is certainly of high value for retailers and commercial real estate values are directly driven by this consideration.

It is generally recognized in the economics literature that locations with greater accessibility to the desired destinations command higher price valuations on sites. In fact spatial geographic models or urban development, gravity models in econometrics and hedonic models of real estate finance and economics usually give accessibility a specific measure in estimating property prices or land values. Likewise, accessibility premia are conventionally factored into the yield models for commercial real estate.

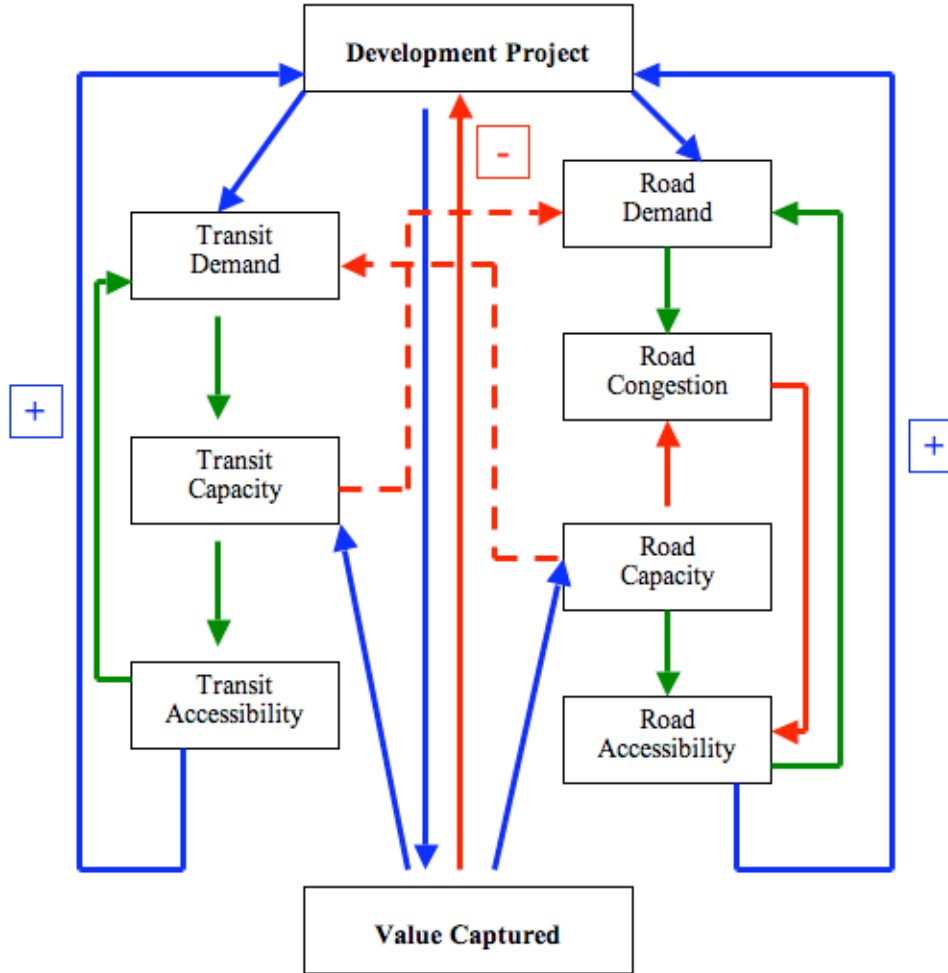
The positive values of accessibility and clustering, both interacting with each other, are over time incorporated into the property markets valuations. This process first impacts the land or site values, followed by the translation of higher land values to property values. This time frame of value building implies that more efficient forms of value capture taxation or revenue raising policies must allow for early stage value capture out of the land or site values changes alone, prior to their translation into property prices. In other words, unlike most of the literature on taxation finance, we must distinguish two separate and unique stages of demand for funding:

- Early stage, capital allocation, demand linked to the full capital cost of the project; and
- Later stage O&M financing support.

This forms one of the criteria to our ranking system for proposed policies below and distinguishes our approach from other literature on the topic of public finance.

The dynamic nature of both accessibility and clustering factors (their propensity to change over time and to be linked with evolution of property values) imply that land use and public investment (transportation systems or investment in local schools, for example) and their associated patterns of accessibility generate feedback loops, affecting all the actors in these systems. Levinson (1997) provides a systemic representation of such feedback loops which we adopt in Figure 6.1 below. We denote by signs + or – those feedbacks that are either value enhancing or value subtracting in relation to property and land prices.

Figure 6.1: Feedbacks in public investment in transport and land use



Source: Levinson (1997)

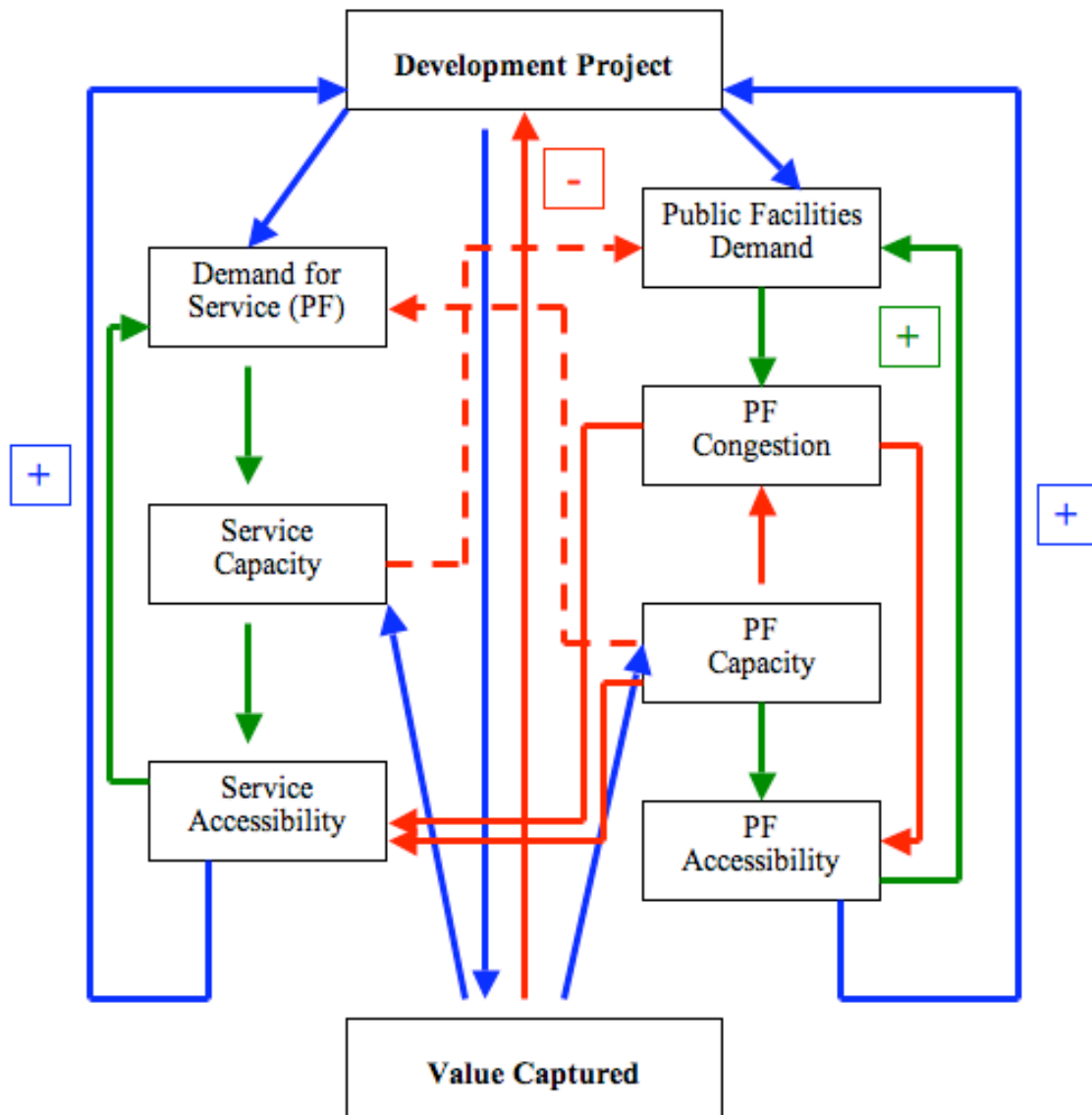
The important points to note in Figure 6.1 are

- increases in the capacity of each mode in response to rising demand lead to increases in land values;
- allowing congestion decreases site values.

Exactly the same logic applies to other public infrastructure investments, as shown in Figure 6.2, with some significant modifications. Just as travel time acts as a disincentive to consumers to choose destinations that are farther away, in the case of public transport or roads investment, so are other public infrastructure facilities congestion or remoteness increase the cost of access.

Unlike roads and transport access, some of the other public infrastructure is explicitly rationed to those who reside within a specified catchment area – e.g schools that service local community on

Figure 6.2: Feedbacks in public facilities investment and land use



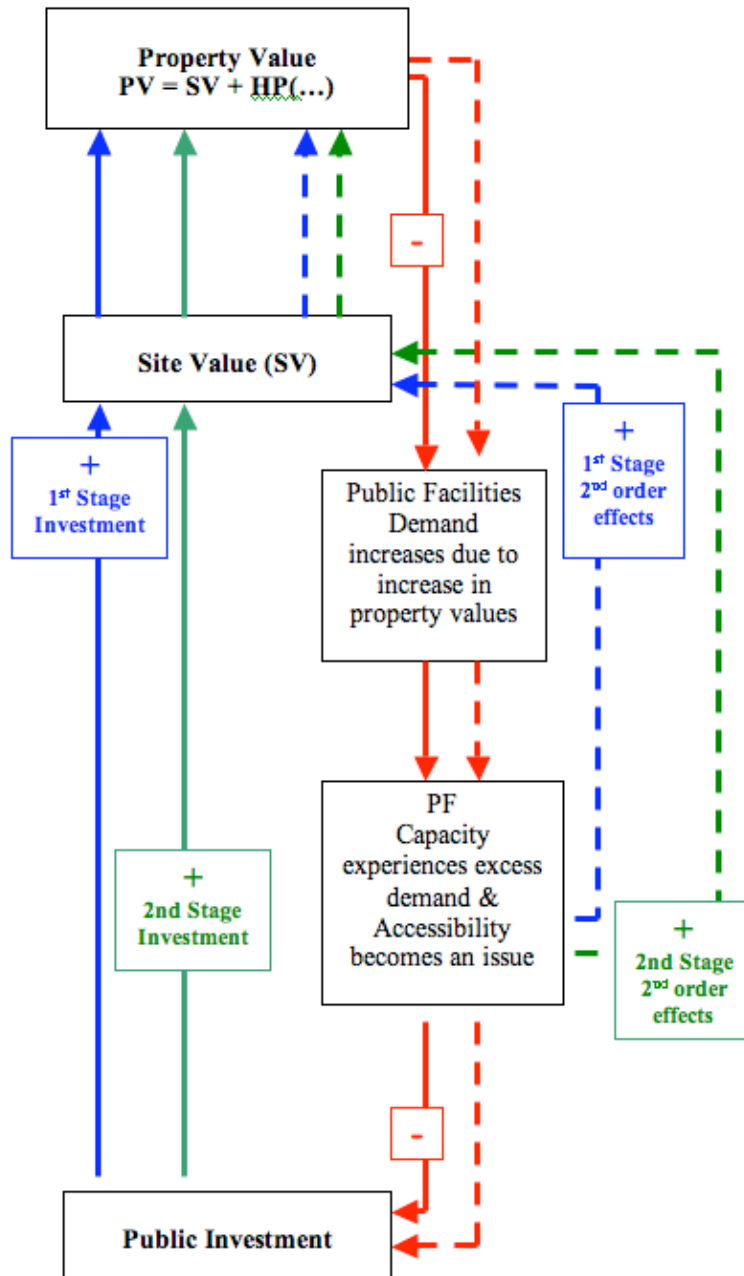
Source: Author own adaptation of Levinson (1997)

the basis of assigned priority of placements, etc. These are captured in two additions adverse pathways (red arrows from Public Facility congestion to Service accessibility and from Public Facility capacity to Service accessibility) that exist in the case of general infrastructure provisions but do not exist in public transport investment. These costs relate not just to the monetary costs of actual access, but also to time and effort expended.

These feedbacks create a loop of value transfers, where public investment in the vicinity of a given site leads to an increase in the value of this site, leading to more demand for development

(private) around the site, implying further increases in the site value and associated rise in demand for future expansion of public investment or, with careful planning and design integration – for sustainable demand supporting self-financing infrastructure. This second round of new public investment then triggers a renewed cycle of land values appreciations.

Figure 6.3. Property and Site Value Loops



Source: Author own

This describes the *value creation loop* associated with public investment in shared infrastructure that is illustrated in Figure 6.3. This loop clearly relates the added private gains to public investment and the circular pattern of added value accruing to the site owners, irrespective of the nature of property holdings or any other capital invested privately in the site itself.

The entire objective of the value capturing taxation policies should be to create an instrument allowing for taxing exactly these benefits accruing to the site owners from the continued cycles of public investment. Such a tax, optimally, will act to capture not just the value arising from the first round of investment, but the value arising from subsequent rounds of financing as well. This condition is new to the literature on public finance, in so far as no literature – theoretical or empirical – recognizes the dynamic nature of value creation. We reflect this innovation in our first ranking exercise below.

It is worth noting that the looped model of value creation is very similar to the money or consumption multipliers in traditional economic setting.

Ranking exercise 1.

We now want to rank, using our discussion of value addition of public investment, various taxation alternatives as to their effectiveness in capturing the two aspects of value creation discussed earlier.

Ranking criteria 1.1:

The positive values of accessibility and clustering, both interacting with each other, are over time incorporated into the property markets valuations. This process first impacts the land or site values, followed by the translation of higher land values to property values. This time frame of value building implies that the more efficient forms of value capture taxation or revenue raising policies must allow for early stage value capture out of the land or site values changes alone, prior to their translation into property prices. We rank the considered alternatives on the basis of 1-10, with 1 being the poorest performing alternative in terms of on-time (or in advance) capturing future gains from public investment;

Ranking criteria 1.2:

We have shown in Figure 6.3 that there is continuous loop of value creation from public

Table 6.1. Ranking exercise 1: results

	Ranking Criteria 1.1: Capture timing	Ranking criteria 1.2: Loops capture
Land Value Tax (SVT/LVT)	8	8
Property Tax	3	6
Tax Increment Financing (TIF)	6	3
Special Assessments (SA)	4	4
Transportation / Utility fees (UF)	2	2
Development Impact Fees (DIF)	2	2
Joint Developed and Air Rights (JD & AR)	8	2

Ranked 0-10, with 10 being most efficient alternative and 0 being least efficient

infrastructure investments that accrues primarily to the site value of land adjoining (or of proximate location to) the public investment project. We rank the listed policies in terms of their efficiency of raising tax revenue at each cycle, with 1 being less to 5 being most efficient. We assume two loops of value addition, so overall scores are in the 1-10 range.

The results of the first ranking exercise are self-explanatory. Due to its ability to capture all of the value created in all of the rounds of value-creation loop into the tax base, LVT/SVT is by far the most superior tool for value-capture in terms of timing and loops capture.

7. Value Capture Policies

In economics, the *benefit principle* states that efficiency of the system is higher, the closer is the link between the system costs and payoffs. Under the benefit principle concept, optimally, the benefactors of public investment should be the payees for such investment. However, this is true only in highly rarified environment of theoretical economics. In real world, there are both positive and negative externalities of public investment that accrue to various economic agents, in addition to information asymmetries and other markets distorting factors. Thus, optimally, a combination of tax and charge measures should be used to fully capture private gains from public investment.

Whatever the approach used, LVT or SVT represent one of the most efficient ways of accessing value created by public infrastructure and privatized via property holdings. For example,

currently a combination of development charges, special assessments, utility fees and tolls are used to supplement general Exchequer spending on roads infrastructure. The latter primarily can be linked to the revenue base arising from VRT and fuel taxes, as well as a host of other transport-related levies. However, the entire approach can be deemed efficient or consistent with the benefit principle if and only if the users of the roads are the sole (or at the very least predominant) beneficiaries of such public investment. In reality they are not, as land owners also benefit – often very significantly – from public infrastructure development. These benefits are not captured through existent taxation policies.

In general, public finance framework allows us to model value capture process. The main premise here is that the cost of the public good must be proportional to the benefits received by the consumer of such good.

There are four broadly defined types of beneficiaries of public goods:

- Consumers who gain unrestricted access to the public good – e.g those of us enjoying a common park that is not restricted in access to the residents of the specific area;
- Capital owners who benefit from enhancement of their capital values independent of their actually using the public good – e.g those of us who own property in the immediate vicinity of desired public amenities, such as a park or a university;
- Consumers who gain access on the basis of payment or some other restriction (be it means testing or membership in some other group, etc);
- Capital owners who benefit from a given public investment, while remaining outside the immediate area of investment itself (remote located sites appreciation).

The first and the second category of beneficiaries are better distinguished within the context of public transportation investments. Such investments create public benefits that accrue to many more residents of a given city than the number of direct (paying) users of the system. For example, shop owners at transport locations gain from increased footfall associated with people using (and paying for) transport services. These belong to the first category of beneficiaries. Land and property owners gain due to increases in their property values (the second type of the beneficiary). Finally, users of transport network itself benefit from direct consumption of public service.

The first type of the benefit can be related directly to general source of tax financing of public

infrastructure investments. Building a new university in the city can be seen as a benefit to the nation at large. This benefit requires value capture through a broadly-based nationwide taxation. At the same time, the new university is also likely to increase property values in its vicinity (as, for example, higher footfall associated with student population will lead to higher yields on commercial real estate, or as greater demand for high spec office space underpinned by clustering of high human capital-intensity businesses around the campus pushes up yields on office space, etc). This type of the benefit can be captured through LVT. Lastly, the university students themselves will gain from this public investment, implying the need to impose a user fee or some similar structure of public finance.

Of course, in contrast with localized value enhancement, a university will benefit also other areas outside the immediate capture areas. One example of this is Chicago, where University of Chicago (in South Chicago) and Northwestern University (in the North of the city) are both located miles away from the main commercial hub of the city centre. Of course, the city centre hub benefits directly from both campuses locations, yet virtually no office development is taking place at and around the campuses themselves. Therefore, while the residents of Hyde Park (University of Chicago location) and Evanston (location of Northwestern University) are types 1, 2 and 3 beneficiaries in our taxonomy above, the residents of the city centre Loop are types 1 and 4 beneficiaries of public investments made to accommodate two (private) universities.

While public finance has evolved a large body of tools for modelling and research on the value capture of the first and third categories of public goods consumers, we are primarily concerned here with the lack of traditional instruments allowing for value capture in the case of the second and fourth types – the indirect beneficiaries of public investment whose benefits from this investment are fully private. As stipulated earlier, only a limited number of existent policies would impact property owners gaining from public investment at the closely located sites. Table 7.1 presents a general summary of each type of tax instrument within the taxonomy of revenue raising mechanism. We also provide a second set of rankings reflective of the new criteria:

- An ability of the policy instrument to finance upfront capital investment in public project; and
- An ability of the policy tool to support O&M expenditure in post-investment stage.

Table 7.1: Value capture in the general framework of public finance

Revenue Mechanism for public investment and Consumers/beneficiaries of the public good	Economic activity underpinning the value capture mechanism	Financial instrument	Cost and timing rankings (1- least effective)	
			Criteria 2.1 Upfront investment	Criteria 2:2 O&M recovery
General source of revenue – General taxation				
Public overall	Revenue increases possible either via higher rates (Laffer Curve), broadening of the tax base, or growth in taxed economic activity	- Allocations from the Exchequer general funding,	10	4
		- Future property taxes, and/or	6	4
		- Direct sales of access to infrastructure (user fees etc)	0	8
Value capture measures				
Non-user beneficiaries with restricted access to the public good				
Owners of land / sites	- Increase in site value; - Increase in property value independent of the site value change - Additional benefits (footfall etc); - Infrastructure-linked benefits (access to specific public good)	LVT/SVT	8	10
		Property tax	2	8
		As above	As above	As above
		As above	As above	As above
	2) Developers	As above for land owners, with added effect of possible gains in re-zoning or new development allowances		

Due to the nature of Irish public investment financing we omit direct issuance of debt for infrastructure development which can present an alternative bridging finance source for raising sunk capital costs prior to generating a cash flow sufficient for raising O&M finance. However, the nature of debt issuance in other countries is consistent with the drawbacks of direct Exchequer financing methods mentioned above.

In section 6 above we have listed six basic tax and charge policies (grouped into 6 major categories) that are used to raise public financing for infrastructure development. Having ranked them in terms of their ability to capture value and the timing of such capture (criteria 1 and 2), we now would like to identify their respective features across various other criteria. Table 7.2 provides the results.

Table 7.2: Basic features of tax and charge policies

	Payee	Enforcement & supervision	Timing	Location	Incidence of instrument	Cost	Overall Rank for Criteria 2.3: Basic Features
LVT/SVT	L / U	TA	K / OM	Z	ND / ED	K / OM	10
PT	L / U	TA	OM	Z	ND / ED	OM	8
TIF	L	TA	K/OM	RA	ND / ED	K	7
SA	L	TA	K/OM	RA	ED	K	6
UF	L / U	TA / P	OM	RA	ND / ED	OM	9
DIF	D	P	OM	RA	ND	OM	6
JD & AR	D	C / P	K / OM	OS	ND / ED	K / OM	10
Guide	L = land owner D = developer U = user	TA = tax authorities C = contractual P = partnership	K = capital investment stage OM = operations & maintenance stage	OS = on site RA = restricted access Z = full catchment zone	ND = new development ED = existent development	K = capital operations and maintenance	Pu = public Pr = private PPP

Payee refers to the source of payment for investment or public good. In the case of public infrastructure investments, there are generally three types of payees – land owners, developers and end users.

Enforcement and supervision of implementation refers to the overseeing or collecting authority that is responsible for capturing the value added accruing as the result of public investment. While there are many independent authorities in various jurisdiction that collect various taxes, fees and other revenue relating to public investment, in general in Ireland these can be aggregated into three types: tax authorities, contracted bodies (e.g specific contract arrangements stipulate specific payments procedures and enforcement covenants) and partnership-based system of enforcement and supervision over the project. For example, air rights

usually imply some in-kind or monetary charges in exchange for infrastructure provision. Since air rights are assigned on the specific project basis, these involve either an partnership or a contractual arrangement. In contrast, a tax, such as LVT, will be collected by a respective tax authority.

Timing refers to the stage at which the specific policy applies or is implemented. TIF and SA require advanced planning, that is associated with early identification of a specific tax zone prior to initiation of construction. AR and JD can be instituted prior to the actual investment or ex post investment. In contrast, UF apply post development, while LVT starts applying whenever expected public investment benefits (planned and announced) start feeding into the value creation loop.

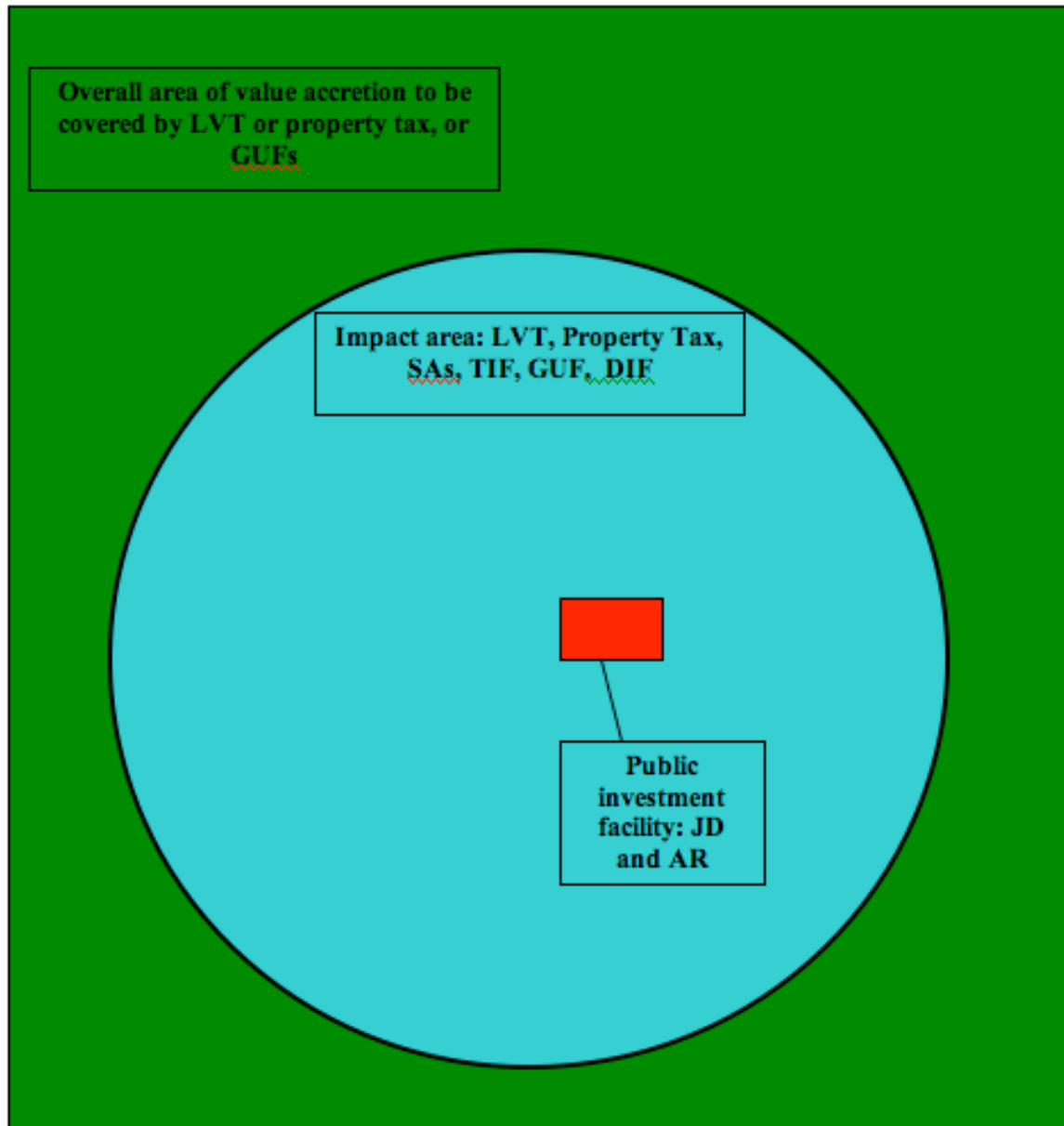
Location refers to the cover provided by the public investment services – in other words, the cover of the value creation area that arises due to public investment. LVT and user fees provide the broadest cover for the area, with no added value remaining un-captured due to any restrictions on boundaries under these instruments. In addition, LVT will scale the payments for the value added directly on the basis of proximity principle.

Thus, for example, two residents of the area that adjoins a new transport development will pay exactly the same user fee for utilization of transport services. This will happen regardless of whether a person walked to the transport hub for 3 minutes or 20 minutes. However, a resident with a site in closer proximity to the infrastructure hub will see her site value increase by more than a resident in more remotely located site. Thus this person will face higher LVT. This is the proportionality principle that applies to LVT, but does not hold for other revenue raising policies.

TIF and SA areas are commonly restricted to specific well-defined and bounded areas in the immediate vicinity of the public investment project. This is often done on the basis of a prior expectation for where a value creation can take place. However, whenever public investment takes place in geographically highly inter-connected area, such an ad hoc boundary cannot be easily established. Political and administrative boundaries also restrict several other modes of revenue raising. Contractual and partnership restrictions apply to JD and AR arrangements.

Overall, figure 7.1 below illustrates the spatial nature of our location criteria tying it geographically to a model of public investment.

Figure 7.1: Value capture policies classified by spatial effects in a static value creation model



However, Figure 7.1 represents a case of theoretically perfect cover for a public investment project that is inconsistent with

- Restrictive value gradations in terms of value accruing to private owners of properties;
- Perfectly bounded sets of beneficiaries; and
- Fully contained overall area location (the 'green' zone).

In a more realistic setting, however,

- Zoned user fees fail to capture the true variation in the marginal utility derived from public investment, with consumers at the periphery of each ticketing/user fee zone subsidizing those closer to the centre;
- Lack of definitive boundary to the benefits zone implies that there are net transfers and subsidies within each zone and across the zones not captured in the model above;
- The entire area of positive benefits can extend across the country (as in the case of Ireland), thereby making the whole exercise of zoned charging a moot point.

To correct for this, we must recognize that under even a simple gravity model, sites located closer to the public investment project accrue higher value due to public investment than those located further away. This, in turn implies that some of the measures discussed do not provide a sufficient capture mechanism. We illustrate this in Figure 7.2 below. Note how dramatically is the increase in complexity of the benefits allocation under a simple relaxation of the above assumptions.

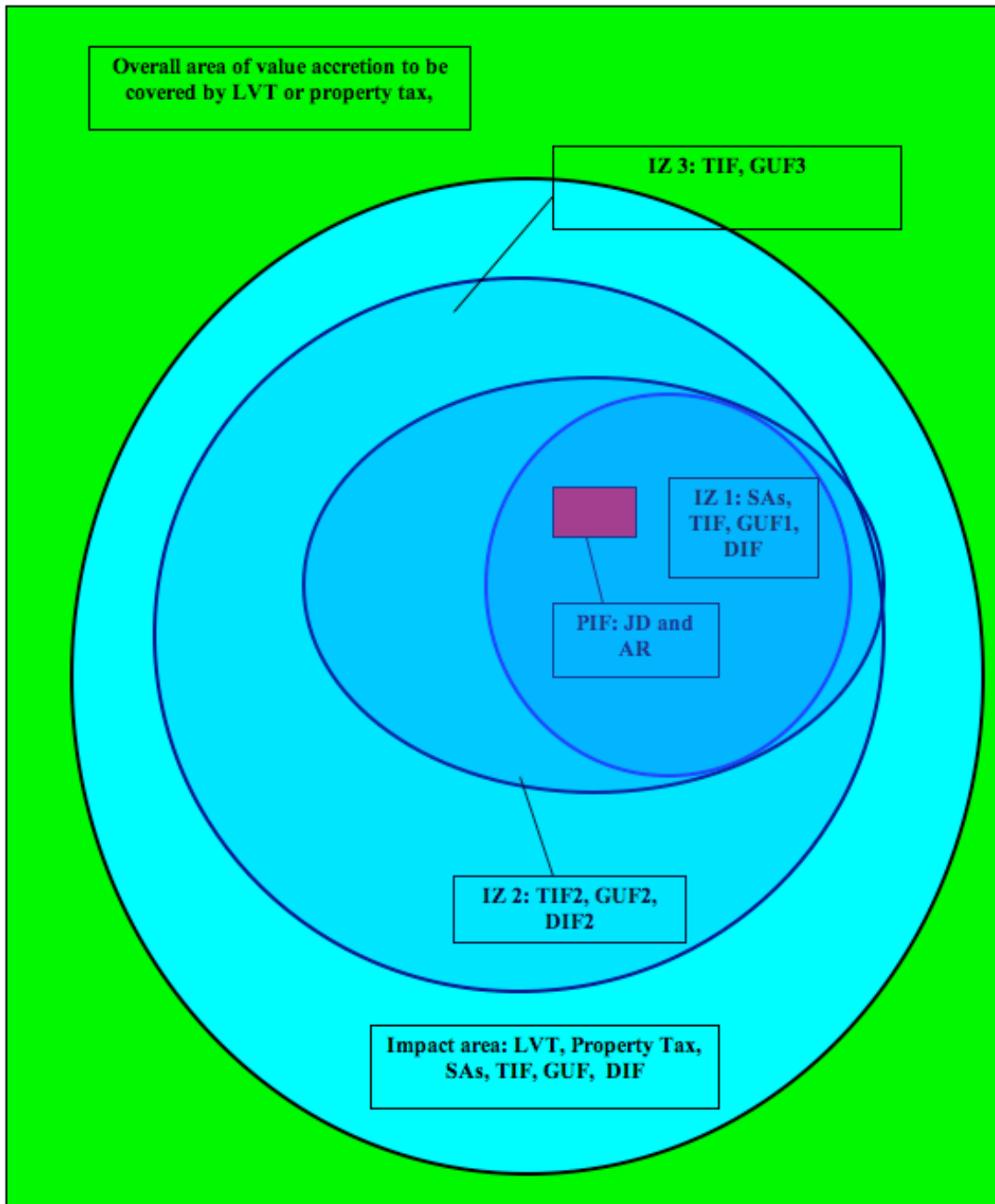
This complexity of the system requires us to consider the payment / investment financing tools in the light of their ability to flexibly reflect true extent of benefits distribution across geographic distances, population types, capital types and businesses types. It is clear that only a universal charge levied against the least mobile form of capital can cover these variations. Such a charge is consistent with either a general property tax (with an added disadvantage of PTs being economically and socially suboptimal, as we establish below) or with a LVT/SVT.

Denote with IZ impact zones 1-3 in the Figure 7.2 below, with land values increasing in size due to public investment facility (PIF) as we move from IZ3 to IZ1. Now, since we have 3 zones of value creation, it is clear that some of the policy tools now become zone-specific. Only two policy tools – LVTs and property taxes remain universal (in other words can apply to all zones), while allowing for value capture across the entire country or area of value accretion.

Incidence of an instrument refers to whether a specific revenue raising tool or instrument applies only to a new development or whether it can be applied to the existent development.

Cost allows us to classify policies on the basis of whether it allows to raise financing for capital investment stage of the project, O&M or both.

Figure 7.: Value capture policies classified by spatial effects in a dynamic value creation model.



8. Risk transfers (negative externalities)

In addition to the above criteria, alternative financing models imply various sources and distributional implications of risk transfers. Investment in general is a risky undertaking, but a long term public investment carries several significant idiosyncratic sources of risk. These are:

- Source of return risk: as investment in infrastructure relies on (either in terms of raising capital or O&M financing or both) on some capturable private returns, there is a risk of over-estimation of such returns. This is in particular pronounced for ex ante value capture models of investment, but this risk source is also present in some ex post cases as well;
- Instrument-specific risks: risks that arise under specific choice of financing instrument that are unrelated to the value capture itself;
- Financial risks: risks that are attributable to standard investment under uncertainty models independent of financing arrangements chosen – from our point of view, these are important only in the context as to how specific financing instruments transfer these risks between the project participants, payees and beneficiaries. What is important in the context of optimal tax policies is the need to account for non-linear interactions between various risks as they are transferred from one participant in the economy to another. This point is relatively novel to the literature of public finance in general and to the value-capture literature in particular. Gurdgiev (2003 and 2004) shows the importance of such interactions between various risks, inducing first and second order uncertainty on overall investment.

From the point of view of selecting an appropriate financing instrument, it is important to be fully informed as to who bears the bulk of the risk arising in association with each type of policy.

Policies that rely on up-front payments from developers prior to the actual delivery of public infrastructure services will generally transfer risk to developers. The latter pay the charges for development and then investment takes place, so that the developers will hold the entire risk of the state default in provision of infrastructure. The developer cannot perfectly transfer such costs onto the shoulders of property owners, as no perfect pre-payment mechanism can exist in the competitive property markets. It is only ex post development that the developer can hope to recover some of the costs associated with financing public investment, and, crucially, to obtain compensatory risk premia.

Some anecdotal evidence from the market is showing the extent of such risk in the current crisis. In some cases, local authorities who used development fees to provide investment in public infrastructure (access to sewage and water, for example) have defaulted on their commitments, leaving some developments without proper services connections. However, it is hard, in the current market climate to either cost such defaults (with no market in existence for some developments affected by infrastructure access delays) and/or the actual nature of default (with no details provided by the local authorities on any or all commitments undertaken and the underlying financing policies chosen).

Table 8.1. Risk transfers under various value-capture policies

	Main risk bearer	Secondary risk bearers	Risk severity	Risk timing	Risk hedges	Criteria 3.1 ranks
SVT / LVT	Exchequer	Site owners & Gen public	Medium	Early warning system	Advanced testing & rates increases, allows for other ex-post charges	7
PT	Exchequer	Property owners & Gen public	Medium	No warning system	No advanced testing, but otherwise same as above	6
TIF	Exchequer	General public	High	No warning system	As property tax	3
SA	Developers	Exchequer	Low	No warning system	None	6
UF	General public & Exchequer	Property owners	Medium	No warning system	As property tax	6
DIF	Property owners	Exchequer	Low	No warning system	As property tax	7
JD / AR	Exchequer & Partners	Gen public	High	Early warning system of limited scope	None	5

Policies that rely on future appreciation in property or site values, the user fees and air rights transfer the risk of post-development returns to the Exchequer. However, this risk transfer is non-linear in nature (Gurdgiev, 2004).

Unlike other tax systems, LVT/SVT allows for a partial offset of this risk as value of the sites tends to increase well before the actual investment in public infrastructure takes place. This furthermore allows us to address non-linearities arising from risks interactions and transfers – a unique feature of market based price mechanics of LVT. Recalling our value creation loops, the first loop of adding value to the site takes place on the announcement of the future investment and this pre-dates any increases in the property values themselves. In fact, in the case of Irish land procurement practices, even the planning stage of future investment, well in advance of the actual investment announcement, results in an upward movement in land values in the vicinity of potential routes.

Table 8.1. above lists various risk transfer dimensions of different revenue raising policies.

9. Evaluation of alternative financing arrangements: comparatives to LVT

In this section we want to formally evaluate all considered alternative means for raising public investment funding from the point of view of the following main criteria:

1. Is the cost paid by the contributors linked to the benefits they receive?
2. Is the cost paid by the beneficiaries proportional to the actual value they gain?
3. What incentives to optimize her economic choices do the costs of the particular instrument provide for the payee?
4. What overall impact on economic development can the system be expected to have?

5. Is the system fair from the point of view of contributors in relationship to the benefits they receive?
6. Are there issues of social or inter-generational equity from the point of view of benefits received?
7. Is the system capable of addressing any ability-to-pay constraints and is it regressive or progressive as a form of taxation?
8. Is the system revenue base broad or narrow? Is the system capable of supplying adequate revenue streams without imposing a punitive level of taxation?
9. Does revenue stream follow closely income growth stream (cyclicality and general

- economic value capture properties)? Is revenue volatility higher or lower than income volatility?
10. Can revenue be scaled to reflect increases in demand (one-off, cyclical or structural)?
 11. Is the tax transparent from the point of view of the public?
 12. Can this tax be evaded/avoided through legal means internally or by exporting underlying tax base to lower tax jurisdiction? What is the cost of collecting this tax and the cost of compliance with the tax?

Questions 1-4 are designed to reflect on economic efficiency of a particular instrument for value-capture. Questions 5-7 deal with equity of the system, while questions 8-12 address sustainability of revenues from Exchequer perspective.

As noted earlier, LVT represents the most broadly based means for directly capturing the value of public investment accruing to private property holders.

Below we address the above questions, leaving some of the other questions (under the heading of Political/Administrative feasibility) for the third stage of our research project that will be based on our analysis of the Delphi survey of the main stakeholders in the process of property and LVT taxation reforms.

9.1 Economic efficiency.

LVT comes the closest to ensuring an efficient allocation of society's resources of all other infrastructure value capturing tax policies.

(1) Is the cost paid by the contributors linked to the benefits they receive? The answer to this question is a clear cut yes. As a rate charged on the value of the site or land, LVT allows for direct proportional capture of the benefits (in terms of value added to the site) from any public infrastructure investment taking place anywhere in the country, irrespective of the proximity of the location of such investment. In other words, LVT will fully reflect the increases in the value to the site/land and thus to property both for positive spillover of value and for the negative externalities alike. This allows to set aside the issue of distributive compensation to be paid to land that loses value due to near by investment in public infrastructure that might be of negative value to its neighbors (e.g location of public sewage treatment center, etc).

This is not the case with any of the other tax measures, with exception of user fees. However, user fees do not allow to distinguish between those users who face added costs of accessing a given public good and those who do not. For example, a transport hub access differs in cost to a person living in the property adjoining the hub from the cost to the person living within 10 minutes walking distance of the hub. Yet, the user fee for utilizing the hub is identical to both individuals. This can be corrected in a limited number of cases through provision of additional bundled services, such as subsidised car park-and-ride facilities. Yet, such corrections are rare, costly and exert a funds transfer from one user to another.

In fact, Gafney (2006) looks at a set of various tax policies that can be applied to specific-use land (in his case – forestry) and finds that compared to property tax, product tax or value added tax on output, income tax and rent tax, an LVT would offer an economically optimal alternative. He shows that “compared to yield taxes, property taxes, income taxes, and site value taxes... a change from the first three to the site value tax would induce quantum leaps from lower to higher uses of land”.

Property taxation does not allow to fully link benefits with costs paid by contributors, as a property tax applies to the hedonically-determinable value of the individual property that can, through use or disuse, investment or underinvestment, over time, enhance or offset the value of the land or site on which this property is located. One can argue that in fully efficient property markets, over time, changes in land value will be fully priced into the changes in property values, but such a statement will be a significant departure from the realities of severely constrained, information-inefficient markets for sticky assets, like property.

(2) Is the cost paid by the beneficiaries proportional to the actual value they gain? Yes, fully proportional under a single rate application for LVT and for user fees. Other instruments achieve at best only partial proportionality. For example in the direct case of air rights, rents charged on access to the site of public investment will be reflective not just of the value of the business located there, but of the value of comparable businesses elsewhere. This benchmarking will mean a dispersion of the rates and rents away from the actual gains accruing to specific businesses. In addition, there is dynamic inefficiency built into the air rights structure, as rates revisions are either infrequently applied or are independent of actual value changes, thus as value accruing to the site changes over time, air rights system of charges only imperfectly aligns the rates returned

to the Exchequer with the value added to the sites.

In addition, the LVT is non-distortionary, as far as the actual incentives to use land – other than dynamic factors affecting timing (Smith, 1978 and Douglas, 1980) go. This has been long established in the literature, dating back to Ricardo and confirmed by Nertzer (1969) and Holland (1966).

(3) What incentives to optimize her economic choices do the costs of the particular instrument provide for the payee? A payee of LVT/SVT experiences no distortion in terms of incentives to invest in increasing the value of her property. In addition, by representing a cost to speculative holding of land banks, LVT encourages timely and appropriate (consistent with demand) development and discourages speculation in land. In contrast, a property tax will severely distort efficiency of investment in property. Similarly, other alternatives impose distortions and indirect subsidies. One example has been discussed in the case of park-and-ride facilities compensation for a flat rate application of user charges. Another example arises when we consider use of special assessments, whereby a relatively arbitrarily defined zone of tax catchment might exclude properties that still benefit from public investment. In many cases, tax free zones (a form of public investment in themselves) or IDA-supported sites might exclude charges on businesses that subcontract to these locations and whose property valuations might be reflective of a close proximity to such sites. Once again, LVT will allow for full capture of such benefits.

To see how LVT acts to reduce speculative holdings of land we must consider a time structure of investment in development. Suppose a piece of land can be developed today to yield €10,000 in rent per annum. If the tax rate is set at zero, then, the development value today is €100,000. Postponing the development for 1 year will only make sense if the yield increase from such postponement is greater than the discount rate. Suppose the discount rate is 10% and the annual yield on future development is 11%. Then, absent taxes on the site value, there is a clear incentive for a developer to postpone development, for the non-developed land value thus rises to €111,000, while developed land will produce a value of €110,000. Now, today, a speculator holding this land will have an incentive to go out to the market to sell the land a year from now, receiving a market value bid of €100,909 (present value of €111,000). Now, if we impose a 2% tax on land, the development value is $€10,000/(0.1+0.02)=€83,333$ today and $€11,100/(0.1+0.02)=€92,500$ tomorrow, which is still 11% higher than today's value. Speculators

discount the latter value one period back to bid $€92,500/(1+0.1+0.02)=€82,589$, while developers will be willing to pay €83,333. Thus, the tax will price speculators out of the market and will allow real developers access to land and feasible prices.

Thus, unlike any other tax or levy, LVT encourages present development of land (abstracting from the issues of permissions to build and zoning), as it increases the required rate of return, shifting the rate of return closer to the developer-linked returns and away from purely speculative holdings of land. Gihring (2009) states this clearly and unequivocally: “As a result of placing a higher tax rate on land values, it would become more costly to hold onto vacant or underutilized sites. Lowering the tax rate on improvement values would engender private capital investment in building improvements. Coincidental with the reformed tax system would be a gradual trend towards infill development, as owners realize the tax benefits of making substantial capital investments. The marginal tax shift onto sites having a high ratio of land-to-building value would effectively be capitalized into lower resale prices. Because LVT is applied uniformly on all properties... the general effect would be a restraint on rising land prices and housing prices.”

In addition, as Gafney (2006) shows in the case of timber investments, “yield taxes, property taxes on capital, and income taxes all impose substantial excess burdens on timber culture [or any other use of land that yields below maximal returns in the market despite being associated with potentially higher non-market benefits] and, by extension, on all land uses. They sterilize marginal land completely, and abort marginal increments of capital and work on all land. To abate problems of the income tax, we may allow expensing capital outlays other than land purchase. To abate problems of the property tax, we may ...raise the rate of site value.”

(4) What overall impact on economic development can the system be expected to have? A generally positive impact, especially if the revenue from LVT application is used to remove such distortionary taxes as stamps, development levies and other property-related charges. In contrast, a direct property tax will distort incentives to privately invest in property upgrade or more efficient use of land.

Thus, overall, price signals to developers and to government entities about where to put public investment projects can be tracked out of land valuations and ability to pay on a much more consistent and lower risk basis under the LVT than under any other forms of revenue raising. Developers, facing LVT, will have much stronger incentives not to invest in land speculatively

and to increase the efficiency of land utilization than under any other value-capture tax or levy. LVT will also speed up the process of development of underutilized and vacant lands, especially in relation to brownfield sites, thus aiding economic growth in an organic and sustainable fashion. Pennsylvania example (Pittsburgh) has shown that LVT most certainly does not reduce economic development, in contrast to many studies showing adverse impact of property taxation on growth.

In an early paper, Douglas (1980) has shown conclusively that LVT is actually a non-neutral tax when it comes to changes in development incentives. Specifically, the study showed that LVT affects “the timing of land development in that it provides an incentive for landowners to develop land sooner than under a property tax levied on improvements also.”

Gihring (2009) concluded that “The LVT is in practice incentive taxation; that is, by shifting tax burden onto land-intensive sites, it increases the potential for infill development, greater capital investment, higher commercial rents, and the rapid absorption of building space. For example, Harrisburg, PA shifted its tax system to LVT in 1996 and as since seen substantial increase in new development as owners of parking lots on prime downtown sites are no longer paying lower taxes.”

Overall, LVT can be expected to tip the land-to-total-value ratio for properties in Ireland. During the boom, some 50-60% of the value of the property (ex-tax) was captured by the cost of land. Gihring (2009) estimated that if owners of underutilized sites were to respond fully to the revenue-neutral LVT substitution away from property taxation, the aggregate values of buildings within the Seattle area will rise 14 times, tipping the land-to-total-value ratio for city properties from their 40:60 ratio at the time of research to 30:70.

In contrast with LVT, TIF measures efficiency depends on the ability to raise sufficient funding that can yield significant gains in property values into the future. There is very little evidence on TIF’s efficiency. However, what is known about TIFs is that they are largely more efficient in the cases of high capacity rapid transit structures, with efficiency declining with public facility supply capacity and when the degree of benefits dispersion (geographically) increases. Thus, in general, TIFs are economically more efficient in the cases of large-scale localized projects.

SAs, on the other hand, in effect are localized levies that attempt to replicate the direct approach of LVTs and these apply most frequently in the cases of infrastructure development with a

defined route and capacity. While SAs establish only limited price signaling to the users of public service, they do allow price signaling to the site owners that reveals significant information about the cost of the public investment undertaking. Thus SAs may actually promote economic development to the extent that they are used to finance needed improvements that provide net benefits to local landowners. However, the restricted geographic scope and limited tax base (with little applicability to more mobile businesses and homeowners) mean that SAs do not capture the value accruing to land or sites outside the immediate area of SAs application. This is a major shortcoming for the SAs relative to LVT.

Utility fees are now an acceptable next step in tax reforms in Ireland, in particular in terms of their application to water supply and sewage/waste treatment. However, these fees are not sufficient for raising the first stage financing and are more suited for financing O&M costs. UFs allow to shift some of the cost burden from residential properties to commercial and industrial properties, which typically consume more public services than their relative property tax contributions imply. The drawback here is that with UFs there is an incentive for the governments to use lower rates for business to subsidise economic activity at the expense of households. This is much less distortionary under the use of LVTs. In general, however, UFs do not send clear and transparent pricing signals to the users, as they would imply prohibitive pricing if their levels were set to recoup all sunken present value cost of capital investment. Once paid, furthermore, the UFs no longer provide any incentives to increase efficiency of public service utilization and can lead to excessive or even wasteful demand for public services. This is clearly seen in the case of public transport charges, whereby zoned charging often cross-subsidizes less efficient users of the service at the expense of those who use it more efficiently.

DIFs have only a limited scope in raising funding for general type public investment. However, they do improve the efficiency of resource allocation within the confines of new development as long as such development has very restricted geographic boundary and does not allow for seepage of demand to other areas. Highly localized users of public infrastructure will be likely to receive correct price signals as to the cost of providing the service, but they will not be able to clearly identify the true cost of O&M. However, DIFs do have some potential distortionary effects on economic activity in the area of their application. In the markets where homebuilders have market power – due to either significant overhang of demand over and above supply, or because the markets are in the ascending segment of price bubble formation, builders will expect to pass all development fees onto end buyers of properties. This, in turn will have adverse price effects on

demand. The landowners, originally in possession of the sites usually can escape with only partial charge against the future development. Thus, DIFs can actually act as a tax on end user, failing to capture the value accruing to the original site owners (Yinger, 1998).

JDs and Air Rights are both market-based mechanisms that actually transfer risk from the private sector to the public sector, in so far as both deliver private sector charges at the time after the sunken cost of public investment is already undertaken, or, in the cases of PPPs require a certain return floor guarantees to the private sector participants. While both generally allow for achieving high economic efficiency, they are inferior to the LVT in terms of pricing signals they send to the final users of the services and to the land owners in the areas surrounding the new development.

We summarise the above arguments in Table 9.1 below which establishes rankings of the alternative tax and funding policies in terms of economic efficiency.

Table 9.1: Economic Efficiency Rankings

	Cost to Contributor	Benefits Proportionality	Optimization Incentives	Overall Economic Impact	Ranking Criteria 4.1
LVT/SVT	LL	HH	HH	HH	10
PT	LL	M	M	L	6
TIF	H	H	M	M	5
SA	HH	M	M	M	3
UF	L	H	H	H	6
DIF	M	M	M	H	4
JD & AR	M	H	H	HH	7
Guide	HH – highest cost to contributor; M – medium; LL = lowest cost to contributor	HH – highest proportionality		HH – lowest distortions, highest positive impact	

9.2. Equity

Equity considerations reflect the fairness of resource allocation according to different members of society. In particular, it is important to consider the benefit equity (the distribution of benefits across different social groups); and ability-to-pay (the incidence of burden of finance on various

income groups under the different policies).

(5) Is the system fair from the point of view of contributors in relationship to the benefits they receive? In the case of LVT, establishment of a transparent system of land valuations via a combination of full disclosure of land transactions and a registry of all land will allow for a transparent application of rates on land value. From the residential property perspective, paying a property tax will be seen as a penalty on those who invest in maintenance and upgrade of their properties and a subsidy to those who run down their property holdings. From the point of view of general public, LVT will discourage speculative holdings of properties and thus will minimize the disruption to social life and the quality of life that is associated with retainment of derelict and unused properties. From the point of view of developers, LVT will encourage timely and speedy development that is responsive purely to the demand signals, discouraging speculative inflation in site values.

In contrast, other forms of taxation offer only limited benefits from the payee perspective. We have mentioned some adverse effects of other systems above, but it is worth noting that any other tax, with exception of user fees, will run the risk of being seen as either an arbitrarily assessed, levied or priced as well as the risk of being publicly non-transparent.

(6) Are there issues of social or inter-generational equity from the point of view of benefits received? All tax measures bear inter-generational and social equity implications. LVT can be expected to have a small net positive effect on land-poorer younger urban families and households, while reducing the overall wealth subsidies received by landed older and wealthier rural households. However, a commonly held perception that rural land owners (excluding farmers – see below) will face punitive charges under the LVT system is simply not true, as the value of rural land in the market is currently significantly lower than the value of urban land and is likely to fall further over time. Farmers can face a reduced rate levy on agricultural land and in general the levy on land can be graduated depending on zoning. Without specific policy accommodation, only one social class of taxpayers will face some adverse effects of the LVT – the so-called land rich, income poor households, usually in their retirement age. This issue has been touched upon in our earlier study, but it is worth repeating here that this matter should be considered in the context of ability to pay, and not in the context of social equity. There is nothing that can be said about larger land holding of the elderly with little income that would argue in favour of the status quo of their households receiving subsidies from the poorer and often landless

or property-less younger households.

(7) Is the system capable of addressing ability-to-pay constraints and is it regressive or progressive as a form of taxation? All tax-based measures run into the ability to pay constraints and all require some redistributive structures to address the problem. In the case of property tax, ability-to-pay constraints apply in the context of property value, which covers the size of the house, house quality, land value and house attributes. For example, a standard property tax on a building that is occupied by an elderly person with restricted mobility, using only the ground floor for living will be levied on the entire property irrespective of the use of this property and irrespective of the quality of public amenities and other support structures available to this person through public investment. If such a person were to sell a portion of her site to finance her retirement, the value of the property will decline by less than the value of the land site itself. This is so because the property value is composed of a number of hedonic and other determinants. Thus, her tax exposure will decline, but not by as much as a share of taxes accrued to the land sold.

In contrast, LVT will be levied not on the house, but on land site. This will mean that a person, underutilizing the existent dwelling is not going to face a punitive tax due to the unused part of the property. A sale of the unused site will directly and proportionally reduce her tax exposure.

Ability-to-pay problems can be also addressed through time structuring of the tax (which can be done for both the property tax and an LVT), with, for example, a granting of the tax deferral for people with certain disabilities or due to age. Such deferrals should be income-tested and wealth-tested. In some cases, it might be optimal for a person to move to a smaller, better suited property and release some of the wealth accumulated over the years in the larger property. However, such downsizing is more efficient in the case of the LVT than in the case of the property tax.

To summarise our findings in the context of equity considerations:

Imposition of LVTs (as well as imposition of a property tax) will undoubtedly change the distribution of taxation in Ireland. Evidence from Pennsylvania (Weir and Peters, 1986) shows that the primary beneficiaries of the imposition of such a tax would be owners of office and multi-family residential properties in high land value locations. This is so because the tax will apply to much higher efficiency of land utilization in these locations of higher density. Owners of

individual homes in locations with higher land value will be the principal losers. On the other hand, Gihring (2009) clearly shows that “more intensively utilized sites including retail stores and apartment buildings... would experience a negative 21% tax shift [under LVT substitution for property tax]... the underutilized subset that includes surface parking lots and vacant lots would see a tax increase of about 93%. Thus, owners of intensively used parcels would be rewarded with lower taxes. Unlike the conventional [income, CGT and property] tax effects, the LVT would not expropriate owners’ capital investments.”

In the end, because buildings comprise most of the aggregate value in real estate (between 60 and 80 percent of the total value), the prevailing equal tax rate on land and improvements will place a high relative burden on any private investment in improvements. The capital investments by owners will be discouraged, especially in those areas where property values are rising. In words of Gihring (2009): “the system amounts to an inducement to monopolized and speculate on land, that is, to hold onto property without improving or selling it, thus reaping windfall gains as land prices rise.” LVT will have an exact opposite effect by raising the cost of holding land for purely speculative purposes.

Taxes on properties in poor neighborhoods would rise in a general setting, but these can be offset by two factors. Firstly, poorer neighbourhoods will face lower overall tax levels due to lower value of their lands. Secondly, poorer neighbourhoods will also see more significant benefits in terms of elimination of the stamp duty charges. The latter effect itself arises due to two major efficiency enhancements under the LVTs system. These are: increased properties turnover and lower upfront cost of properties sales. The latter aspect is important as poorer households usually lack requisite savings and ability to raise debt finance to cover the stamp duties. Increased turnover of properties in poorer neighbourhoods, in turn, can lead to faster gentrification of these areas and a knock on effect of positive enhancement of property values from such gentrification to the existent residents. Geographically, land-based taxes can favor more dense urban locations and will tend to disfavour older stocks of commercial property in the less dense locations, while incentivising more efficient use of residential properties. Thus, LVTs can be seen as largely post-industrial age policies, promoting more economically efficient services-based growth. In addition, LVTs achieve the highest gains in terms of benefit equity consideration, by levying the tax proportionately more on those who actually gain the most from any public investment.

One example of LVT system that addresses the issue of ability to pay rather effectively is found

in California under the specific taxation regime applying to forestry (Gafney, 2006). Specifically, tax assessments in California are based not on the market value of timber but on a preferential pricing regime because timber yields can fall below those obtainable from other uses of land. “Under California law, ...a state agency controls assessments, applying a legislated formula that is structured so as to ensure valuations below market (California Revenue and Tax Code, Section 434.5).”

TIFs present a number of equity problems. In many cases in the past, TIFs were actually used to subsidise commercial development through reduced charges, and TIFs came to be seen as a ‘corporate hand-out’ or a way to channel subsidies to politically favored firms and developers (Dye and Merriman, 2000). Unlike with LVTs, TIFs do not allow us to price directly whether a specific development has taken place due to TIF-financed public investment or if it would have taken place regardless of such investment. In addition, equity considerations are not being served under the TIFs when boundaries of the TIF district are set in an arbitrary fashion, or overlap with other tax zones (Stinson, 1992; Lawrence and Stephenson, 1995). Lastly, TIFs usually do not allow for the direct addressing of the ability-to-pay constraints, and therefore require a case-by-case approach to this major equity consideration. Thus, in many cases TIFs are seen as causing undue hardship on smaller businesses and poorer households. Just as in the case of LVTs, TIFs do require a design of specific discounts and deferrals for those who are unable to pay the tax, but unlike in the case of LVT these measures have to be specific to a particular area, not to the entire nationwide system, thereby implying much lower public transparency of the entire system.

SAs do assign costs of public services to the local property owners and as such deliver benefit equity. This means that they are relatively beneficial for the alleviation of spatial disparities between various locations that do arise under the centralized system of public investment financing. Unlike LVTs, the SAs do not have universal applicability and can be structured on local basis, introducing a possibility of political interference, favoritism and reducing overall equity transparency. Stopher (1993) shows this to be the case in Los Angeles metro experience where significant exemptions granted to residential property owners have created a significant cost disadvantage to commercial property users, thereby potentially reducing economic growth along the metro corridor. Such political interference can lead to a free-rider problem with exempt beneficiaries being subsidized by other payers. Finally, SAs can be regressive, as they generally apply to the benefits gained on property values and thus can end up imposing higher charges on poorer households. Ability-to-pay considerations have to be explicitly incorporated into SAs

design.

Utility fees allow for, theoretically, complete capture of the benefit equity principle. In practice, benefit equity requires a very accurate assessment of individual gains from the use of public service – something that cannot be done through existent pricing structures. Thus, for example, in zoned ticketing, commuters residing at the outer boundary of the zone are subsidized by commuters residing at the inner boundary of the zone through two charges: the ticket price itself, and (especially in the case of unidirectional passengers flows, as in Dublin Luas case) through better access to transport for those residing further away from the final destination. Equity in terms of ability-to-pay is the biggest problem with user fees or utility fees, especially when the fees are imposed on a flat rate basis and there is no direct means testing, i.e in the cases where the fees are collected outside income tax brackets.

Establishing some sort of utilities fees structure allowing for credits and discounts on the basis of ability to pay is extremely difficult.

For example, under LVT application, collection of **LVT can be linked to income tax collection at the source, thus allowing costless matching for a large proportion of PAYE population.**

This is clearly not feasible in the case of utility fees. Furthermore, since fees are charged on specific services (i.e water and schools, for example), then income matching must be done on multiple occasions and credit must be assigned to payment of some fees before income testing is done for other. Determining which fees bear an exemption and which are liable for full payment can be arbitrary and can cause negative perception of the value capture system based on UFs overall.

DIFs usually apply to developers, thus pushing the issues of equity aside. However, if development fees can be passed onto the end user/owner of the property, then equity issues do arise ex-post payment of the fees and correcting for these can be extremely costly and difficult. Issues of spatial development equity do arise whenever DIFs are imposed on either arbitrarily defined or not fully contained areas of benefit. Potential for free-riding can further exacerbate equity perceptions. DIFs usually disregard ability-to-pay considerations. Per Huffman et al (1988), “an unintended effect of impact fees may be that builders in desirable markets could ignore lower-income households and turn their attention to more high-income segments of the market when they cannot recover costs associated with high, fixed levels of impact fees.” Exactly

the same applies to JDs and Air Rights.

Once again, as above, we summarise these arguments in Table 9.2 below in the form of qualitative rankings of various policy alternatives.

Table 9.2: Equity-based Rankings

	Fairness to Contributors	Social Equity	Ability to Pay Equity	Ranking Criteria 4.2
LVT/SVT	HH	H	H	10
PT	M	M	H	5
TIF	M	H	M	5
SA	M	H	M	5
UF	H	M	M	5
DIF	M	M	M	3
JD & AR	H	M	H	7
Guide	HH – highest Equity; M – medium; LL = lowest equity efficiency			

9.3. Sustainability of revenue for public investment and O&M.

(8) Is the system revenue base broad or narrow? Is the system capable of supplying adequate revenue streams without imposing a punitive level of taxation? The revenue base for the majority of non-tax (levy and user fees-based) measures discussed above is restricted to a specific category of beneficiaries. Only two measures – LVT and property tax have broader tax bases. In the case of the property tax, in general, land is treated as a separate category of property with many countries having no specific property tax applicable to sites held as investment. In Ireland, some of the land can also be classified as an investment and can command different tax rates. However, under the LVT all types of property, as long as such property actually occupies a site, will bear the burden of land tax. This implies that LVT supports a broader tax base than an ordinary property tax.

Our earlier paper on revenue generating capabilities clearly identifies the greater efficiencies of LVT in raising tax revenue compared to other tax systems. In addition to allowing for more stable, more predictable and less pro-cyclical revenue generation, LVT will also allow for a more

equitable collection of revenue, as it applies to land – something that can be perceived as being not related to individual investment of time, effort and funds. This contrasts with a property tax that can be seen as a tax on disposable or invested income by those, especially urban dwellers, who live in higher density, more efficiently utilized neighborhoods.

These results hold broadly in line with Grosskopf (1981) which showed conclusively that, contrary to some earlier assertions in policy literature, LVT can yield sufficient revenue base to match and exceed revenue generated from the traditional property taxation.

(9) Does revenue stream follow closely income growth stream (cyclicality and general economic value-capture properties)? Is revenue volatility higher or lower than income volatility? Once again, in the previous study we have shown that revenue stream from LVT is expected to yield closer proportionality to the long-term trend growth, allowing for lesser pro-cyclicality in Exchequer receipts than a property tax. This, in return yields lower revenue volatility under the LVT stream than under a property tax.

(10) Can revenue be scaled to reflect increases in demand for new infrastructure financing (one-off, cyclical or structural)? An unanticipated increase in the cost of ongoing public investment project cannot be directly financed through scaling up either the LVT or the property tax. This is true of all tax and charge measures that apply across the entire economy and are levied on a class of assets or income streams, rather than on specific individual asset holders. Once again, even the early research on tax policies, (e.g Grosskopf, 1981) shows that LVT system of taxation can yield sufficient scalability of revenue to even exceed the revenue that can be raised via traditional property tax.

(11) Is the tax transparent from the point of view of the public? Property tax, user fees and LVT are more transparent and easier to comply with than all other measures under consideration. In the case of Ireland – lacking extensive and precise system of property valuations, prices and transactions history, both property tax and LVT will require significant changes to data collection and disclosure systems in order to establish a transparent and popularly accepted basis for taxation. However, in countries where LVT operates over a number of years – Australia, Denmark, parts of the US, Hong Kong – LVT is often seen as a more popularly accepted form of tax that is levied in a less arbitrary fashion than the property taxes.

There are many reasons as to why LVT can be more easily accepted by the taxpayers. One of these is that there is a fairness argument that establishes a direct link between LVT payment and the private gains accruing to land owners from public investment. This argument cannot be made in support of the property tax. Another reason is because homeowners can clearly see that LVT does not penalize private investment in their properties, while a property tax does. Thirdly, if LVT is levied at the same rate as the property tax, it can be presented as a tax that forces land speculators to pay their fair share of taxes. A property tax, in general, can be interpreted as a subsidy by residential and commercial property owners to land investors.

(12) Can this tax be evaded/avoided through legal means internally or by exporting underlying tax base to lower tax jurisdiction? What is the cost of collecting this tax and the cost of compliance with the tax? It is much harder to evade payment of LVT and property taxes than other forms of taxation and levies. When compared to other taxes, especially those levied on more liquid and more mobile assets, taxes on less mobile assets in general register higher rates of compliance and lower cost of administration. This is also reflected, on the margin, in the differences between compliance with property tax and LVT with LVT being associated with lower costs of collection and compliance than property tax in countries where LVT operates.

To summarise:

Our earlier paper has addressed the efficiencies of LVTs in raising revenue for the Exchequer. From the point of view of administrative and implementation efficiency, LVTs represent very broad – broader than property tax – base for taxation and thus can be levied at lower rates than any other value-capturing taxes and levies. However, to maximize economic efficiency gains from LVTs, we propose to set initial rates high enough to allow:

- A significant reduction in highly distortionary income taxes preferably at the upper margin of the income tax;
- Complete elimination of markets-destabilising stamps and development levies on property;
- A significant reduction in labour-market distorting PRSI; and
- A significant reduction of investment-skewing taxes (stamp duties on shares trading, pensions levies, and CGT).

If applied (partially) at local levels (e.g., municipal or county levels), LVT should replace the

existing subventions from the central budget to local revenue sources. The growth potential of a tax on land value would be stable, as historically, in stable markets (stabilized with the help of LVT) returns to real estate will roughly track the general rate of inflation. As a property-based revenue source, land taxes (once the market is stabilized) will provide revenue that is stable and resistant to economic cycles.

Specifically, with respect to the tax-base, Gihring (2009) states that “Any tax tends to diminish the base upon which it is levied. Hence, what in public interest is desirable should be taxed less – commerce, job growth and investment. What is undesirable should be taxed more – pollution, traffic congestion, land consumption (urban sprawl), and energy resource depletion. Yet, as the nation’s tax codes demonstrate, the reverse is often the case. ‘Our tax system is brilliant in its perversity.’ Claims green tax advocate Alan Durnin, of Northwest Environmental Watch.”

TIF, in contrast has a limited revenue base, restricted to specific locations or defined areas near public investment projects. The implicit tax rate is therefore required to be set at a much higher, even prohibitive levels. The crucial cap on tax rate here will be the potential for actually monetizing the benefits of public investment programme that accrue to the private sector. This limits the scope of TIF applicability as setting a tax sufficient to finance public investment might induce mass withdrawal of demand and leave the investment project unsupported by the revenue base. This is precisely why TIFs are not widely used in public investment financing. Furthermore, TIFs represent serious problems with respect to O&M financing. Special Assessments are similar in this nature to TIFs, as are development impact fees and other project-specific levies.

UFs are slightly more efficient in terms of economic impact and revenue stability than TIFs and SAs. But this hinges also on price elasticity and income elasticity of demand for specific public services. Shall a recession reduce demand for specific public service, the revenue from user fees might drop significantly below the levels required for O&M financing, inducing the need for general funds subsidy to the project. This is clearly not the case with much less pro-cyclical LVTs. Furthermore, UFs are not suitable for large scale upfront investment financing since they generate revenue only ex-post completion of the public investment project. Finally, there is an inherent problem with adjusting fees based on demand for services, as a drop in demand that might induce the requirement to raise fees can coincide with a general recession – a period during which it might be politically infeasible to raise highly visible user fees.

There is a host of other indirect benefits of the LVT system over other forms of revenue raising for financing public investment. For example, a general system based on income tax will not allow to capture any gains in value of sites owned by non-resident investors. LVT will bring their gains from land holdings and property holdings in Ireland into the tax base. Another source of long term gains under the LVT system is the changes in the efficiency of pricing for agricultural land in Ireland. However, many of these effects are not readily measurable in the current environment and are subject to specific ways of implementing an LVT system.

Table 9.3: Sustainability of Revenue for Investment Financing Rankings

	Revenue Base	Revenue Cyclicity	Revenue Scalability	Tax Transparency	Enforcement Efficiency	Ranking Criteria 4.3
LVT/SVT	HH	HH	HH	H	HH	10
PT	H	M	H	M	H	7
TIF	M	M	H	M	H	6
SA	LL	L	M	M	H	4
UF	M	H	LL	H	H	6
DIF	L	M	LL	L	H	3
JD & AR	LL	LL	LL	LL	M	2
Guide		HH – highest protection from cyclicity in macroeconomic context and in infrastructure demand context				

10. Conclusions

In the present paper, we have undertaken a comprehensive analysis of various alternative means for raising revenue for Public Investment Financing.

The policy instruments considered were:

- land value taxes (LVT),
- property taxes (PT)
- tax increment financing (TIF),
- special assessments (SA),
- utility fees (UF),
- development impact fees (DIF),
- joint development (JD), and air rights (AR).

These policies were assessed and ranked on the basis of the following criteria, all relating to the issue of financing public investment, creation of value from public investment and value-capture of the private gains accruing as a result of public investment. We distinguished several stages of public investment –

- Pre-planning announcement;
- Planning;
- Financing;
- Implementation; and
- O&M.

For completeness purposes, we analysed the efficiencies (economic, social and political, whenever applicable) of each policy within each of the following criteria:

7. Value creation:

- Timing of value accretion to the private beneficiaries of public investment and whether or not a specific policy can capture the private gains arising from early stages of public investment;
- First, second and higher order loops of value creation, and how efficiently each policy allows us to capture the values added to private assets / consumption / income arising in each subsequent loop;

8. Value capture:

- Ability of the policy instrument to provide upfront investment financing for the projects, thereby reducing the risk on the Exchequer of financing large capital costs prior to recouping any of the gains privately arising as a result of such investment;
 - Ability of the policy instrument to provide ongoing funding for O&M operations post-investment;
 - Overall impact of each instrument on enforcement and supervision costs of revenue collection; timing of revenue collection, location on which the revenue collection measures fall, and the incidence of each instrument and cost;
9. Risk transfers implied by application of each instrument;
 10. Economic efficiencies of each instrument;
 11. Social, economic and age-related equity considerations and the application of ability-to-pay equity principle to each instrument;
 12. Revenue sustainability of each instrument

All of the results are summarized in the tables 10.1 and 10.2 below.

Table 10.1: Summary of results for Criteria 1-3 rankings

	Criteria 1.1: Capture timing	Criteria 1.2: Loops capture	Criteria 2.1: Upfront investment	Criteria 2.2: Post-investment recovery	Criteria 2.3: Basic Features	Criteria 3.1: Risk transfers	Total Score for Criteria 2-3
Land Value Tax (SVT/LVT)	8	8	8	10	10	7	51
Property Tax	3	6	2	8	8	6	33
Tax Increment Financing (TIF)	6	3	2	8	7	3	29
Special Assessments (SA)	4	4	0	8	6	6	28
General Utility Fees (GUF)	2	2	0	8	9	6	27
Development Impact Fees (DIF)	2	2	6	4	6	7	27
Joint Developed and Air Rights (JD & AR)	8	2	6	4	10	5	35

Ranked 0-10, with 10 being most efficient alternative and 0 being least efficient

Toable 10.2: Summary of results for Criteria 4 rankings and overall rankings

	Criteria 4.1: Economic Efficiency	Criteria 4.2: Equity	Criteria 4.3: Revenue Sustainability	Criteria 1-3 cumulative scores	Overall ranking scores	Overall Rank of policy (1 being the best suited for Public Investment Financing)
Land Value Tax (SVT/LVT)	10	10	10	51	81	1
Property Tax	6	5	7	33	51	2
Tax Increment Financing (TIF)	5	5	6	29	45	4
Special Assessments (SA)	3	5	4	28	40	6
General Utility Fees (GUF)	6	5	6	27	44	5
Development Impact Fees (DIF)	4	3	3	27	37	7
Joint Developed and Air Rights (JD & AR)	7	7	2	35	51	2

As Tables 10.1 and 10.2 clearly indicate, in our view, Land Value (site value) Tax represents the optimal policy instrument for raising revenue for public investment when compared to all other alternatives. In a qualitative rankings above, the final distance between the optimal policy (LVT/SVT) and the runner-up policies (Property Tax and Joint Development/Air Rights) is significantly greater than the distance between the least favored two alternatives (Development Impact Fees and Special Assessments). This shows that the economy would gain much greater efficiency from moving from a Property Tax or a PPP-style system of financing (consistent with Air Rights and Joint Development) to a Land Value Tax system of revenue collection, than it would from any other reform within the confines of the above choices of policy instruments.

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