

Capitalisation: reflections and practice for project appraisal

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Abstract

Income capitalisation is a widely used in commercial property for valuation, development appraisal or for project feasibility analysis. As a decision-making tool, its technical and philosophical limitations are manifest but often overlooked. If bungled, capitalisation, can lead to 'white elephant' projects, investment losses or even corporate collapse. To help avoid such waste, the research reviews some technical issues and philosophical conundrums around capitalisation of property investments. Sound capitalisation practice scopes projects, considers capital market, geographic and institutional context and clarifies valuation base(s). Judicious market comparison, risk diagnostics and analytics filter out noise and render complex data to estimate yields or an appropriate discount rate. For a project feasibility analysis, supplementary salient concerns include wider strategic imperatives, indigenous land rights, stakeholder management, administrative probity and the inclusion of environmental or social spillovers.

Key words: (simplify)

Capitalisation, feasibility analysis, market value, yields, cap rates, discount rates, white-elephant projects, externalities, rule of law, customary rights, consultation, public policy.

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Research problem and main idea

Capitalisation errors can bloat asset values, provoke corporate collapse or leave a legacy of unproductive 'white elephant' projects. A good corporate illustration is an outlandish overpayment for ABN Amro by RBS in 2007. Notorious construction white elephants include Brasilia or Abuja in Nigeria, the Maginot Line (1939), Columbia Road Market (London 1869-1886) and, arguably, the Empire State Building completed in 1931 (Shariatmadari 2015). Recently, receding tide of China's slowdown has revealed many empty malls or apartment blocks. China's Dachangshan Island airport illustrates the divergence between phantasmagorical project projections and reality. It planned for 42,000 passengers in 2010 and another 78,000 in 2015 but only got 4,000 passengers in 2013 (Goh 2015). If Chinese analysts used income capitalisation to evaluate the airport project, something went wrong. Clearly, if improperly used, capitalisation techniques can mislead (Flyvbjerg et al. 2003). Obstacles to discerning capitalisation turn on to (i) Forecasting errors; (ii) Technical misapplication; and (iii) Maladroit philosophy.

Capitalisation compresses future income risky streams into a lump sum but an appraisal or a feasibility analysis is conjectural and, therefore 'rarely, if ever, admits of a precise conclusion' (Lincoln et al. v CB Richard Ellis 2010). Often things go badly wrong as when Colliers International over-valued buildings by €32m (Titan Europe 2014). In property valuation, market risk is a perennial issue. Other concerns for appraisers involve clarification of valuation bases and proper application of appropriate valuation standards and techniques. Procedural rigor and reasonable accuracy parry negligence claims (Webb Resolutions Ltd v E.Surv Ltd 2012). Professionals should also alert clients to salient business risks without meddling in commercial decisions (Scullion v Bank of Scotland 2011; McIntyre vs. Herring & Daw [1988] 1 EGLR 231). In short, appraisers should hedge valuation advice with cyclical or due diligence disclaimers as, in frothy markets, bad news can undermine confidence, spook traders and turn sentiment bearish (Mallaby, 2011).

Capitalisation

Accountants recognise tangible assets either at cost or at re-valued amount (IAS 16). Intangible assets, on the other hand, are only capitalised if measurement is reliable and future benefits probable in practice. This means that auditors capitalise externally acquired brands, IT, publishing rights, patents etc. but not internally generated intangibles unless technical and commercial feasibility of development efforts is demonstrated (IAS 38).

For property (valuation, development appraisal) or in wider arenas (project appraisal, feasibility analysis) sound capitalisation practice impels proper scoping to designate purpose, approach (method), site and model assumptions. A valuation base makes fundamental measurement assumptions clear (RICS 2014). Mainstream recognised bases are 'market value' ('MV') or 'worth' - also termed 'investment value' ('IV'). Other valuation bases are 'market rent' and 'fair value'. Procedurally, formal terms of engagement, legalisation or administrative precedents clarify purpose and valuation base.

Market value

Market Value (MV) is an informed guess at a likely transaction price. For the International Valuation Standards Council (IVSC 2013), MV is *'the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion.'*

For hypothetical or 'representative' buyers, MV is a snapshot which ignores either growth or decline prospects. There are three MV approaches and (five methods of valuation):

- Comparison in active markets,

- Income capitalisation (implicit, explicit or hypothetical),
- Depreciated replacement cost.

Investment value

In contrast to MV for a hypothetical buyer, Investment Value (IV) is a subjective assessment for a specific buyer with particular funding constraints. Entity structure, funding sources and relative market performance determine the baseline corporate Weighted Average Cost of Capital (WACC) or corporate 'hurdle' rate. For project commercial assessments, analysts moderate it, in line with local risks, to generate a project-specific 'target' rate or discount rate ('DR'). In short, DCF modelling to estimate Net Present Value (NPV) for IV is proponent and project specific. Requisite funding costs reflect market judgements about entity's relative performance prospects and site, project or building-specific risks (RICS 2010; IVSC 2014). In short, risk resides at:

- Entity level (capital structure, past performance, size, financial strength, asset prices capabilities, credibility),
- Project level (land acquisition/amalgamation, planning, site, business model complexity, lease covenants/expiry, local market conditions).

Mortgage Value

As the Titan (2014) case illustrates a recurring proclivity in valuation practice to adopt a 'rear-view mirror', 'tick-box' mentality. Unfortunately, such blinkered practices power a malignant positive feedback loop in line with Minsky's Financial Instability Hypothesis (1992). In a boom, sustained asset price inflation drives yields mechanistically down and artificially inflates values. One way out of the exuberance imbroglio is Mortgage Lending Value ('MLV'). The European Mortgage Federation (2007: 7) defends MLV on the basis it takes a long-term perspective which 'excludes all short-term expectations regarding the return on investment'. Generally, MLV produces lower valuations although Crosby (2012) dismisses it as a 'cookbook' approach. For Crosby (*ibid.*) determining asset quality and appropriate yield requires experience, judgement and consideration of risk relating to location, market, covenant and economic conditions.

Valuation approaches

The main valuation approaches are comparison, replacement cost or income capitalisation (in twin implicit or explicit manifestations) but Pagourtzi et al. (2003) elaborate on other techniques. The selection of capitalisation technique depends on purpose, resources available, asset under scrutiny and character of cash flows. For properties in thick markets (many transactions) or with stable lease profiles, appraisers rely on direct comparison (residential) or implicit income capitalisation (commercial) (RICS 2014 VPS 4). For mixed-use developments or in other specialist arenas, hybrid approaches make sense. The Valuation Office Agency Rating Manual (2014: 240/4.3), for example, stipulates comparison as the preferred valuation method for cinemas but accepts 'a percentage of actual or estimated gross receipts'.

Income approaches

For the commercial valuation of leased-up investment properties, income methods supplement the comparison mainstay. For the IVSC (2013: 5), the income approach 'provides an indication of value by converting future cash flows to a single current capital value'. Commercial property appraisers capitalize income streams either implicitly or explicitly. The capitalisation tool should fit purpose and character of income streams. Implicitly, appraisers multiply a typical net rent by the Years Purchase

(‘YP’) or divide by its inverse - the All Risk Yield (‘ARY’) or Cap Rate (‘CR’). Alternatively, for projects with variable cash-flow profiles and multiple cost line items, NPV is the most appropriate capitalisation technique. In either approach, historical results or suitable comparables guide estimates of future maintainable income streams but analysts need to:

- Adjust past income streams for excessive or unrepresentative results,
- Strip out irrelevant items or extraordinary items,
- Escalate or downgrade income streams for cycles/trends,
- Weight inflows according to locales, quality or entity size etc.

The appropriate income capitalisation tool is situation specific but considerations include:

- Character of cash flows,
- Public or private sector buyer,
- Continuing business or liquidation,
- Tenure and time to reversion.

In the Private Rented Sector (‘PRS’), many factors, operating at different spatial scales, influence commercial investment value. Perennial considerations are capital (stage in cycle) and local market conditions. Spatial value considerations are regional growth/decline, location character (positive and negative aspects), plot, building design and structural features. Significant legal matters affecting value are tenant standing; covenant strength and encumbrances. For residential tenancies in the UK, vacant possession is more likely with Assured Standard (AST) rather than Assured (AT) or Regulated Tenancies (RICS 2014).

Implicit valuation with ARY or ‘Cap Rate’

To value commercial buildings, implicit valuation capitalise more or less secure future income streams (annuities or perpetuities). Effectively, short-leases with reversion are annuities and long-leased buildings are perpetuities. An annuity is a regular but determinate income flow until reversion to market rent whilst perpetuity, as its name implies, is ongoing. Whilst rent is usually paid in advance (whether quarterly, monthly or weekly), financial models usually simplify the profile of rental flows into a single annual inflow. In practice, be-spoke industry tools capitalise leases using ARY (CR) or its inverse, Year’s Purchase (YP) applied to ‘term and reversion’ or ‘hard-core’ incomes. The ARY (CR) converts net income streams into a MV for a general, hypothetical buyer. Technically, yield relates typical (median) net normalised rental income (not gross rent) to median value or realised selling price but, as Rees and Haywood (2000: 195), point out, ‘the rate of interest at which rents and rental values are...capitalised can vary considerably.’ Yield permutations include ‘initial’, ‘equivalent’ and ‘reversionary’. ARY incorporates all publically known market information relating to leases/building/sub-markets, including inflationary/deflationary expectations. To estimate the value of freehold or leasehold interests, appraisers first estimate usual or typical net rental income making allowance for vacancies or expenses, and then identify any peculiarities or encumbrances. For office building capitalization, McDonald (2015) found appraisers used economic data to adjust expectations and market yields. The main determinants of CR were:

- Building class to capture depreciation,
- General state of the market (vacancy rate),
- Recent changes in vacancy rates.

Comparative yields fluctuate in line with price and rent evolution during market cycles. Macroeconomic, capital or local space market data informs both. In the adjustment methodology, appraisers moderate base yields to reflect specific risks, relating to asset security, quality, liquidity, income growth/decline expectations or capital realisation prospects (Britton *et al* 1980; Jadevicius and Huston 2014). Base yields or CRs can be industry derived (from market reports) or computed directly

from the analysis of descriptive statistics of similar transactions but the ‘expected percentage change in value is the wild card in the analysis’ (McDonald 2015: 243).

The computation of yields requires skill and judgement. Transaction sampling is critical to identify meaningful comparables (similar buildings/lease/markets). Appraisers then compute the ratio of net rental income (y) over price (P) but a diversity in definitions, sources, timing and computation mechanism muddy the water and explain yield variability (Hungria *et al* 2004). During the credit boom from 2001 to 2007, New York office yields compressed from 10% to 5.5% (inflating values). In extremis, market liquidity can dry up, undermining trust in CRs, which should escalate to reflect market pessimism (Havard 2014).

Considerations include capital market cyclical situation (timing) and property quality, (building grade or location). Idiosyncratic project risks influence CR adjustments for businesses and long-leases, market ‘forth’ or reversion conditions (See Fig. 1).

Prudent property analysis therefore invokes awareness of remote capital market conditions to avoid exuberance. In over-rented properties detected, the estimation of froth presents some challenges (See Fig. 1 below) but chunks of market rent can be separately capitalised with separate consideration of ‘froth’. In any event, dutiful analysts should alert clients of downturn probabilities or prospective post-crash consequences.

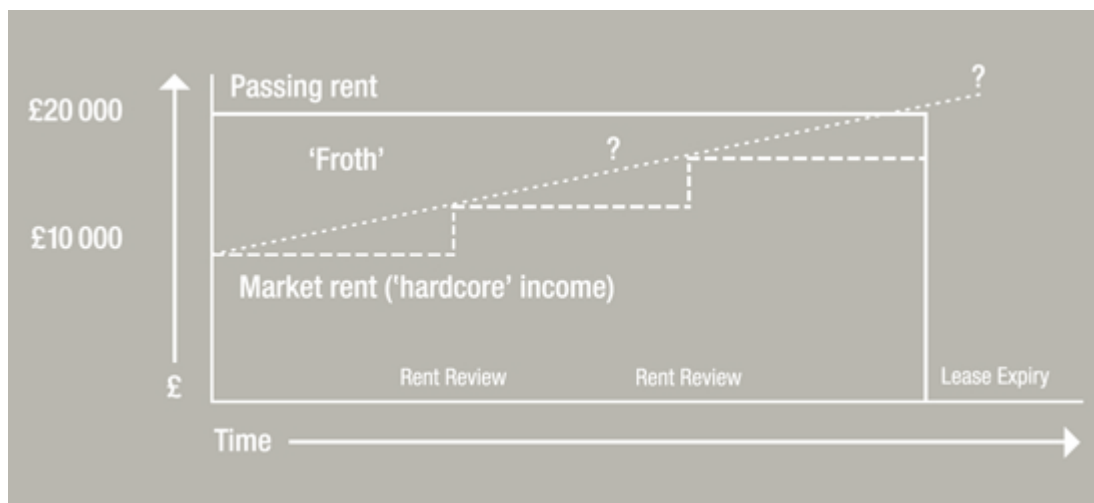


Figure 1: Schematic representation to value an over-rented property.

Source: RICS (2015b)

Build-up method

Alternatively, the CR can built-up from the ‘risk free’ bank rate (reflecting time value of money and inflationary expectations) by adding a risk premium to reflect industry contingencies involving:

$$CR = (k_{rf} + RP) - g$$

Where:

k_{rf} = Yield on government bonds

RP = Real estate risk premium

g = Property income growth expectations

The risk premium (RP) for property will involve consideration of:

- Freehold (heritable interest) or leasehold interest
- Market conditions / stage in cycle / prospects,
- Vacant possession (VP) or encumbrances,
- Covenant strength, passing rent, unexpired lease term,
- Lease type (restrictive covenants, controlled, Fully or Internal Repairing Insuring),
- Tenant mix,
- Property specifics and let-ability (views, floor area, age, design, configuration, condition, energy efficiency) ,
- Location prestige / deprivation / nuisance,
- Logistics and local infrastructure prospects.

CR is lowered if ‘an optimum combination of these factors’ (*ibid*: 207) cuts risk and, therefore, inflates freehold interest valuation to ‘reflect the class of investment under consideration’ (Shaprio *et al* 2013:163).

Explicit cash flow modelling

Appraisers can explicitly discount all projected cash (Discounted Cash Flow or ‘DCF’) for Net Present Value (‘NPV’). DCFs explicitly itemise and periodically discount cash flows. Usually, but not necessarily, a DCF estimates IV or ‘worth’ for a development appraisal (‘DA’) or business feasibility study. For a development or investment appraisal, the goal is to estimate ‘worth’ not ‘value. However, analysts can also use the DCF technique to estimate MV by discounting with a ‘representative’ market discount rate, unencumbered by specific firm funding finance details. For valuation purposes, the proponent is a generalised, ‘hypothetical buyer’ a ‘typical ‘buyer. Unlike MV for a representative, ‘hypothetical’ or ‘typical’ buyer, IV estimates of ‘worth’ fluctuate in line with funding costs for a specific proponent. DR is the opportunity costs of client funding for a specific project.

A DCF is a prototype cash-flow budget, stripped of actual finance expenses (interest or dividends payables). Instead, the DR captures the ‘opportunity cost’ foregone by locking up funds in the project. Whilst the forecasting of stock market returns is notoriously difficult (Malkiel 1973), past volatility and indicators like cyclically-adjusted price-earnings ratio (CAPE) or Q ratio (which compares share prices with net asset replacement costs) provide useful guidelines for sensible prognosis.

Explicit valuation of rental property leases or going-concern businesses involves discounting cash flow (‘DCF’) projections for IV using an appropriate proponent ‘target’ or ‘discount rate’ (‘DR’). The opportunity costs of project funding (cost of capital) reflect, on the one hand, existing bank debt covenants and, on the other, capital market player views on relative performance prospects. Judgements about prospects consider past performance but also relative volatility. Hence, IV capitalisation complexities involve proponent structure, funding costs and likely market evolution, considering cyclical capital, planning contingencies or fluctuating vacancy rates. Modelling mixed-use projects can involve escalating MVs (derived from comparables or via ARY income capitalisation) to estimate future inflows from building disposals. In practice, be-spoke developer financial software can help capitalise leases for MV.

The level of DCF model detail varies. Remote, scoping DCFs incorporate rough estimates, not the fine-grain financial detail, found in proximate ones, informed by actual costs incurred. At the limit, a DCF reflects forecast budget line items but excludes actual interest payments or other financing costs, which, instead, the DF captures.

Models reflect entity specific costs of finance (IV), diverse construction outlays, timing of receipts or fluctuations in rental income. Line items likely include 'staged payments' over the construction and operational phases, including for management, marketing, insurance and sundry expenses.

Before running DCF models, essential preliminary steps are to clarify project:

- Scope (design, geographical boundaries and timelines),
- Project proponent as for, IV, proponent corporate structure and funding alters DR,
- Landholdings titles and encumbrances,
- Corporate, public sector and community stakeholders,
- Conditions and prospects in relevant capital markets,
- Strategic policy and planning regime,
- Space market conditions and forces (e.g. infrastructure) shaping evolution.

After these preliminary housekeeping measures, analysts estimate a DR. For IV, analysts can extract proponent cost of capital from in-house documentation (financial statements) or estimate it indirectly, after a systematic review of relevant capital market conditions and prospects. To estimate DR, analysts moderate the baseline corporate WACC (corporate hurdle rate) to reflect relative project or site risks. Once DR is on a sound theoretical and empirical footing, analysts can begin to estimate project costs and income streams. For transparency, credible supporting documentation should support figures or workings.

The financial model capitalises or crystallises project costs and future anticipated free cash flows into a range of Net Present Values ('NPVs') under different scenarios. Acceptable projects generate a discounted 'surplus' so that benefits exceeds associated costs.

In general, if NPV is positive, hypothetical returns adequately compensate investors. If the project fails, equity investors are liable for outstanding liabilities or debt – the dark side of equity risk exposure.

For DCF modelling, it is important to distinguish 'free cash flows' from reported accounting 'profits'. In practice, 'adjusted profits' are often used as, a somewhat flawed, proxy for free cash flows. The degree of model impairment varies is related to the 'agency problem' (Williamson 1988). Statutory financial statements require accounting adjustments to get a 'true and fair' view of entity performance. Depreciation, for example, spreads Capital Expenditure (CapEx) over the useful life of an asset to apportion costs fairly in line with services. The adjusted present value (APV), takes into account all the delayed tax benefits accruing from the investment (depreciation, interest expense, repairs, capital gains allowances, maintenance, grants etc.). It is good practice to separate delayed impacts out from a DCF to assess inherent project viability separate from its artificial fiscal aspects.

To summarise, DR genesis for DCF modelling varies with purpose. For IV, DR is entity-specific to impound actual entity WACC, adjusted to reflect project risk. Analysts can also use DCF techniques to estimate MV or commercial feasibility complex developments for so-called, 'typical' buyers. Here DR genesis is generic, either by adjusting market yields to reflect project and site risks or by base rate build up with inflation, sector premiums, market cyclical or site premiums. In scenarios, analysts should not double-count risks by moderating both DR and cash flows.

Guidelines for DCF valuation practice

The conceptual framework in Figure 2 provides a useful framework to guide DCF modelling. It begins with stakeholder analysis and partnership management. The proponent Special Purpose Vehicle ('SPV') structure and funding sources determine baseline opportunity cost of capital. Analysts should moderate the target rate of return, depending on market and project specifics. Risk diagnostics collates information on:

- Sales or rental prospects,
- Likelihood of lease breaks or voids,
- Structural space market evolution (locational, economic, physical or functional depreciation),
- Planning, legal or policy shifts,
- Tenant profile or default covenant risk.

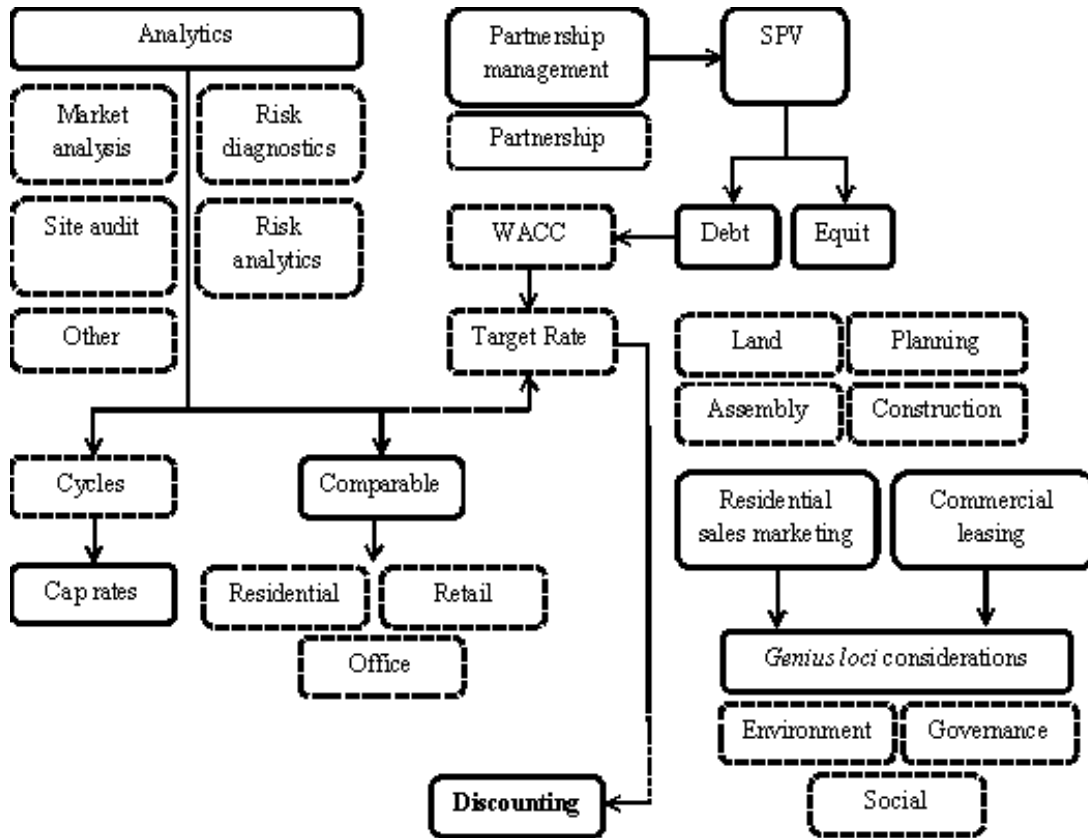


Figure 2: DA capitalisation model where spatial risk moderates cost of finance

Source: adapted from Lowenstein et al (2001: 268). Risk analytics, informed by project and site diagnostics, moderate DR.

The sequence of tasks is:

1. Scope project (design, quality, buildings, boundaries, timelines),
2. Structure, register and fund the proponent special purpose vehicle (SPV),
3. Identify stakeholders and institutionalise partnership management,
4. Conduct baseline analysis to document,
 - a. Land tenures,
 - b. Planning and policy context,
 - c. Infrastructure, housing and urban context,
 - d. Social conditions and issues,
 - e. Ecologies.
5. Estimate proponent hurdle rate (cost of capital), based on entity funding structure, relevant market data and reasonable expectations,
6. Conduct urban, market and site analysis (risk diagnostics),
7. Moderate proponent hurdle rate to estimate project target rate or DR,
8. Characterise project cash flows to identify appropriate capitalisation tools for different project elements (transaction, annuity or perpetuity),
9. Estimate cash outflows for site acquisition, assembly, planning, demolition, construction,

10. Determine appropriate leasing/building CR via ‘build-up’ or ‘tweaking’,
11. For sales, estimate comparable MV and escalate to end of holding period or capitalise commercial leases using terminal yields,
12. Estimate suitable inflation rate and escalate incomes, rents or expenses,
13. Discount future lease annuities to reflect delayed realisation,
14. Run baseline, pessimistic and optimistic scenarios to calculate range of NPV estimates or run Monte Carlo analysis via *Crystal Ball* or other appropriate software.

In mixed-use projects, leases are capitalised and future retail or office property sales estimated. Hungria-Garcia, et al. (2004: 23) state that, ‘different yield rates may be applied to different portions specified in the cash-flow analyses. Compared to prime’ markets, appraisers can inflate CRs to cater for downmarket tenants. A ‘froth’ option allows adjustment for over-rented properties, let at a premium to Expected Market Value (EMV). Valuation or DCF reports can generate sharply diverging IV or MVs. In any event, capitalisation of predictable income streams (lease covenants) is less problematic than that of disposals or lease reversions when future market conditions are uncertain. Analysts can make intelligent stabs at future ‘market values’ but, in some sense, the development project remains a bundle of real options (Smith and Nau 1995; Garvin and Ford 2012). An explicit cash flow for IV requires yield adjustment so that CR or DRs reflect anticipated market evolution. Post-crash, expected values collapse but lease contracts endure (rent adjustment is ‘sticky’), lifting recorded yields. During revitalisation or an upswing, yields inflate as strong rental demand lifts recorded CR. In such resurgent scenarios, it makes little sense to apply high yields for capitalisation that unnecessarily downgrades values.

Project feasibility analysis

Income capitalisation also underpins project feasibility analysis for infrastructure (dams, bridges, roads) or urban regeneration projects. In Cost Benefit Analysis (CBA), the model is refined with shadow prices for public goods to incorporate ecological and public goods spinoffs. Even so, CBA has limitations when attempting to tackle Urban Political Ecologies (‘UPE’) (Sassen 2011) in financialised landscapes which are ‘highly uneven and deeply unjust’ (Swyngedouw and Heynen 2003: 898). CBA capitalisation confronts five issues:

- Contention around resource endowments and land rights (land grabbing and displacement),
- Teleological focus on expected outcomes rather than due process which ignores procedural, administrative or justice considerations,
- Ecological and urban systems complexity and dynamics that undermines trust in costs or benefit estimates and DR determination,
- Capital markets volatility (Minsky 1986),
- Data collection and filtering costs (Bruijn and Leijten 2008),
- Monetising ‘public good’ or ecological spillovers to internalise logistic, social and environmental externalities.

We consider each in turn.

1 Endowments and land rights

In extractive economies (Acemogly and Robinson, 2013), powerful elites can subvert DCF models for their own ends. To prevent misuse, rigorous project analysis invokes a structured stakeholder analysis and baseline study to establish the formal and informal land rights and ecological spillovers at stake. Often, the ‘initial position’ or endowment of statutory or customary land tenure is ambiguous or contested. Land rights vary with regime, culture, time and geography. Private property rights include that of *usus* (use), *usus fructus* (rent), *abusus* (alteration) and *ius abutendi* (sale). Since time immemorial, philosophers have argued about property’s link to prosperity and social stability. In 594 BC, Solon redistributed land in Athens but ignored women and slaves. In 133 BC, major landowners clubbed Tiberius Gracchus to death for attempting to restrict their holdings to 500 *jugera* of *ager*

publicus or about 330 acres of state land (Richardson 1980). In the Byzantine Empire, land tenure varied. To encourage the cultivation of abandoned patrimony lands, the Emperor granted *emphyteutic* or peppercorn leases in perpetuity. *Vectigal* ones applied to conquered territories. At the other extreme were *adsriptitii* or *coloni* tenant farmers (virtually serfs) who worked *iuga* on the estates of *possessores* (mostly senators) The *iuga* was enough land for an able-bodied peasant (*caput*) to cultivate to support himself and his family (which naturally varied by crop and land quality). In England, perennial tension flared up around interests in land and culminated in the Glorious Revolution of 1688 that overthrew the incumbent extractive monarchy of King James II. When, in 1788, the English arrived in Australia they declared the continent vacant but, the High Court of Australia (1992) overturned the doctrine of *Terra Nullius* during the Mabo Case considering it unjust ‘by any civilized standard’ as it would render ‘the indigenous inhabitants intruders in their own homes and mendicants’ (*ibid.* p28).

DCF sanctioned development could effectively privatise common land but, notwithstanding Hardin (1968), privatisation is not a panacea. In fact, the loose or misguided implementation of regulated formal rights can subvert well-regulated customary commons. Major development projects can also subvert women’s subsistence customary land rights (Agarwal 1994). The degraded and fragmented legacy is a ‘tragedy of the anti-commons’ (Fitzpatrick 2006). Systemic aberrations, such as land grabbing or rent seeking, occur when individuals seek to privatise benefits and socialise ecological costs (Löhr 2010). Notorious is the usurpation of indigenous land rights via oppressive state apparatus in historically extractive economies such as Guatemala or Sierra Leone (Acemoglu and Robinson 2013). Examples include the trampling on traditional but informal indigenous land rights by mahogany loggers in Peru or Costa Rica (Hale 2006; Wallace 2013). Uncertainty, ambiguous or contested land rights or insecure tenure undermine agricultural investment, productivity and capabilities (Sen 1985; Goldstein and Udry 2008) but the solution may involve the formalisation and clarification of traditional communal rights rather than privatisation or intensive development projects.

2 Teleology

The focus for DCF is anticipated project outcomes but collaborative planning involves the structured engagement of a range of stakeholders in the planning process, harnessing appropriate visualisation and decision support systems mapping and other technologies. Strategic urban interventions blend top-down expert vision for inspirations with bottom up considerations. Considerations involve the rule of law, planning procedure and democratic process moderates impulses towards territorial foresight and strategic intervention.

3 Instability

Over the past three centuries, 13 significant crashes have disrupted financial presumptions (Economist 2014). Clearly, in the face of financial, climatic and geo-political turbulence, entity resilience is critical. Resilience means ability to absorb disturbance or reorganise to retain function, structure and identity (Holling 1973). For firms, it is underpinned by intelligence capability to interpret market conditions, penetrate legislative flux and complexity, screen out ‘lemons’ and identify internet-resistant opportunities (Akerlof 1970; Rudlin et al 2014; Baum 2014). The investment task mandates a robust asset information and capitalisation system. Notwithstanding the spread of specialised automated feasibility analysis software (e.g. Argus Developet Solutions), real property capitalisation remains somewhat of a ‘dark art’ and not an exact science because of macroeconomic uncertainty, asset heterogeneity, and spatial complexity. Once fear replaces euphoria, firm survival can depend on prudent capitalisation. As an example, consider the 1857 slump in the United States which crippled *Ohio Life*. The end of the Crimean War cut wheat prices, dented agricultural prospects and reduced farm migration to the Midwest. Railroad stocks and land prices plummeted, exposing manifest deficiencies in *Ohio’s* valuation practices, compounded by corruption (Calomiris and Schweikart 1991). The CBRE Titan Europe (2006) case offers a salutary recent reminder to practitioners of the significant risk posed by deficient capitalisation. In inefficient and cyclical markets (Shiller, 1990; 2000), location selection and project design, management and disposal performance all affect

performance. Due diligence invokes risk scanning and partnership entity analysis (Sharpe 1964; Fama and French 1993 Schulte 2014).

4 Information costs

The analyst needs to scrutinize projects partners to assess financial, management and operational capabilities (Graham and Dodd 1934). Real estate development projects are more likely to succeed if acquired land is reasonably cheap so that outlays are recoverable. A prudent capitalisation of future net income streams, taking account of the opportunity costs of funding, illustrates fundamental viability. Informed investors avoid over-paying or 'irrational exuberance' or make timely exits from frothy markets (Thaler 1992; Shleifer 2000; Shiller 2000). Fundamental or technical analytics can curtail mispricing but not prevent it.

Operationally, within a real estate firm, information systems record transactions to form a view on values and help to identify overlooked bargains. The information system can estimate yields directly from suitable comparative properties. To avoid mispricing, development cost blowouts or poor investments, the capitalisation system should be fit for purpose and generate reliable values, underpinned by conceptually informed and tempered comparisons yield or discounting practices. However, asset quality assessment and price determination confront complexity, asymmetry and risk.

Information asymmetry and spatial-capital market system complexity can artificially sustain bubbles or hide mis-priced assets (Coleman 2014). Adverse news or risk signals can spark asset downgrades. Property yields escalate in line with inflation, credit tightening or rising vacancies. As market fundamentals deteriorate, bond and property prices fall. Conceptually, the Capital Market Line (Markowitz 1952) shifts down before the *ex-post* realised performance downgrade materialises.

5 Spatial externalities

For DCF feasibility modelling, the project base funding costs depend on debt covenants, entity and sector equity markets vicissitudes. At play are capital structure, yield to maturity, share-price and relative performance. Risk diagnostics involve design and construction complexity, market and site considerations. Risk analytics moderate generic firm hurdle rate to generate a theoretical *ex-ante* project DR. The analyst populates the base model with anticipated cash outflows and inflows. Costs include land acquisition, assembly, planning, demolition and construction costs, marketing and professional fees. Inflows include grants, pre-leasing, rents, and reversion or staggered building sales. Scenarios generate a probabilistic range of project NPVs. The process is cumbersome and even if a project passes theoretical discounting muster or looks commercially viable, final endorsement involves wider baseline, stakeholder, land use, funding, strategic and ethical considerations:

- Stakeholders - is the stakeholder analysis inclusive?
- Baseline analysis – did ecologists or entomologists scientifically map species?
- Were costs/benefits, reflected in imputed 'shadow' prices?
- Land use – does the proposal degrade or fragment customary commons?
- Environmental assessment - are spatial / cultural impacts duly considered?
- Liquidity - can the proponent actually meet its covenants and pay its creditors?
- Strategic options - does the project enable other options (networks, reputation, land banking)?
- Multi-criteria ESG impacts – was an assessment conducted in line with agreed partnership criteria to determine if the project is sustainable, equitable and ethical and preserves or enhances *genius loci*?

Discussion

Misuse of capitalisation is pernicious can lead to asset mis-pricing and waste. In the worst cases, the hapless public foots the bill for overvaluation, woeful project oversight, or downright swindling. Where wealth endowments, power, influence and deceptive malpractice distort adjustment pathways, chasing the classical chimera of 'perfect competition' is misguided and foists adjustment costs onto

the economic underclass, sentencing them to a premature death from stress and chronic diet-related disease (Komlos 2014). The wider social ramifications of capitalisation malpractice extend to diminished lives, dilapidated schools or hospitals, unemployment and obesity (Means 2013). Capitalisation ineptitude, over-valuation or project myopia results from:

- Blindness to institutional failure,
- Cyclical impairment and, hence, forecasting errors,
- Technical maladroitness,
- Deception, fraud or improper practices.

Capitalisation procedural shortcomings could involve incompetence or impropriety, fuelled by moral hazard or corruption (Dowd 2009). At Caja Madrid, its roots were malpractice (Burgin 2014) but, in capitalism, incentive misalignment is widespread (Cheng *et al* 2015) and bailouts can reinforce structural economic imbalances or toxic institutional cultures.

Technical modelling adroitness cannot overcome the twin philosophical limitations of feasibility assessments. First, they are teleological or outcome based and, second, feasibility analysis relies on induction (or assumptions about the future based on experience). The estimate of project cash-flow ignores the ethics, administrative, customary or formal legal process of 'surplus' generation. Often, land use alteration or intensification can undermine informal and communal property rights. Robust DCF preliminaries include proper project scoping, proponent identification, land-use audit and stakeholder's analysis. Science should inform baseline environmental analyses. In complex and unstable anthropogenic socio-economic systems, projected outcomes are uncertain, model assumptions contested and information costs are high. DCF's limited financial perspective must extend to strategic, social and ecological considerations. Even diminished financial perspectives, require trustworthy institutions with robust capabilities to filter out noise and capture data. Informed by relevant data, sound financial judgements still depend on a sensible interpretation of turbulent global capital markets, local geography, institutions, complex projects and building structures. Systematic asset information and capitalisation helps to screens out lemons and navigate planning flux. It extends beyond specialised software packages to the considered judgements by professional staff, alert to the dangers of ill-considered valuation bases, inappropriate capitalisation tools or rates. The capitalisation techniques adopted depends on purpose, character of the cash flows and distinguish between raw yields, CR and DR. CR can either be 'built up' from base rates, inflation and market risk considerations or determined empirically by 'tweaking' the ratio between passing or reversionary rents and comparable building values for a sample of empirical properties. The simplistic use of raw yields, untempered by prudent cyclical considerations, can stoke an inflationary positive feedback spiral. Judgement and local experience cut information asymmetry to identify a relevant comparable active market. Property leases with agreed terms and market reviews are relatively straightforward to capitalise for MV but complications arise for mixed-use developments or with business valuation where income streams must first rendered into a 'typical' projection.

Conclusion

Notwithstanding concerns about some of the philosophical assumptions underpinning mainstream economics, the capitalisation of income streams to value properties or evaluate projects needs careful handling and the discount or cap rate use requires reflection and calibration. Robust valuation and feasibility practice involves proper project scoping, stakeholder analysis, land tenure due diligence and documentation of baseline ecological and cultural conditions. DCF assessment is teleological (outcome based) but, in complex dynamic urban systems, projected outcomes are uncertain and diverse externalities contentious and costly to incorporate. Besides projected outcomes, project evaluation must extend to considerations of procedural justice and pathway disruption costs. Financial models ignore the mechanics of project delivery which should be inclusive and reflect both customary or formal law. In short, for balanced project evaluation strategic, social and ecological considerations must supplement capitalisation's limited, financial perspective.

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