Investment Property Forum

Depreciation in Commercial Property Markets

Findings and Recommendations

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The IPF Educational Trust and IPF Joint Research Programme

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The three-year programme supports the IPF's wider goals of enhancing the knowledge, understanding and efficiency of property as an investment class. The initiative provides the UK property investment market with the ability to deliver substantial, objective, and high quality analysis on a structured basis. It will enable the whole industry to engage with the other financial markets, wider business community and government on a range of complementary issues.

The programme is funded by a cross-section of 16 businesses, representing key market participants. The IPF Educational Trust and the IPF gratefully acknowledge the contributing organisations:

Capital & Regional, Donaldsons, Grosvenor, GVA Grimley, Investment Property Databank, KPMG, LaSalle Investment Management, Land Securities, Lovells, Morley Fund Management, Nabarro Nathanson, Prudential Property Investment Managers, Quintain Estates & Development, Scottish Widows Investment Partnership, SJ Berwin and Strutt & Parker.

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Introduction

Depreciation continues to be an important issue for property investors owing to its effect on returns and the pricing of real estate assets. This project has sought to improve understanding of how depreciation should be measured and to measure rates of depreciation for all the major segments of the UK property market.

Real estate as an asset is affected by depreciation. Values will decline through time and individual assets will require expenditure and management. Estimates of depreciation form inputs into decision-making models both at the individual asset level (as part of detailed appraisals) and for forecasting the performance of a property or group of properties. It is, therefore, a topic that is intricately related to the performance and pricing of real estate investments.

Objectives

This research project examines depreciation of commercial real estate investment. The aims of the project are:

- To provide an appropriate methodological framework for the measurement of depreciation.
- To clarify how depreciation affects market indices and benchmarks, and outline the model benchmark to use in the measurement process.
- To measure rates of depreciation for different segments of the UK commercial property market, examining rental and capital values, and capital expenditure.
- To examine wider issues for the property industry arising from this topic – in particular, the importance of considering depreciation in the development of a UK REIT-style vehicle.

Findings and Recommendations

The full Research Findings are available as a separate report. This section comprise solely of the Findings and Recommendations which is chapter 5 of the full Research Findings.

The IPF congratulates the Research Team on an excellent project that lays the foundation for a deeper understanding of the complex aspects of depreciation in the UK commercial property markets. It provides an important contribution to the ongoing debate about the potential for a tax transparent investment vehicle in the UK. The findings of Chapter Four: Depreciation and Property Investment Vehicles (see full report) have been submitted to HM Treasury in response the consultation paper Promoting More Flexible Investment in Property.

The IPF invite comments on the findings and the recommendations for future research. Please address comments or suggestions to Charles Follows, Research Director, IPF 3 Cadogan Gate, London SWIX 0AS. cfollows@ipf.org.uk 020 7695 1649

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Findings and Implications

1. Introduction

Real estate as an asset is affected by depreciation. Values will decline through time and individual assets will require expenditure and management. Estimates of depreciation form inputs into decision-making models both at the individual asset level (as part of detailed appraisals) and for forecasting the performance of a property or group of properties. It is, therefore, a topic that is intricately related to the performance and pricing of real estate investments.

This project has sought to improve understanding of how depreciation should be measured and to measure rates of depreciation for all the major segments of the UK property market. Specifically, the main aims of the project have been as follows:

- To provide an appropriate methodological framework for the measurement of depreciation.
- To clarify how depreciation affects market indices and benchmarks, and outline the model benchmark to use in the measurement process.
- To measure rates of depreciation for different segments of the UK commercial property market, examining rental and capital values, and capital expenditure.
- To examine wider issues for the property industry arising from this topic – in particular, the importance of considering depreciation in the development of a UK REIT-style vehicle.

Each of these aims has been addressed in Chapters 1 to 4 respectively. This Chapter summarises the findings of the others before discussing two further important questions:

- First, how should the rates and other information from this research be used in practice?
- Second, what further areas need to be explored in future depreciation research?

2. Summary of Results & Findings

2.1 The Measurement of Depreciation

The first Chapter in this report provides an appropriate methodological framework for the measurement of depreciation, based on work by Law (2004). There have been several previous studies of depreciation in the UK commercial property market, but these all vary in their measurement approach. Law showed that these differences contribute as much to the different findings as the datasets or era under examination. This means that results from these studies are not comparable – a variation in a depreciation rate found for offices, for instance, could be as much due to the calculation as to the time period or sub-market being analysed.

The various choices and steps involved in measuring depreciation were critically evaluated and the main findings were as follows:

- There is a distinction between data control and measurement issues. It is the latter that are critical to the correct calculation of depreciation while the former depend on the data available to the study.
- Differences in methodology and calculation implicitly represent different attitudes towards the concept and timing of depreciation, though these are not always recognised.
- A cross-sectional approach shows change in value solely as a function of age and only at a particular point in time. Longitudinal measurement permits the measurement of depreciation due to both time and age over a period.
- The rate of change can be calculated on a growth or a decline basis. A decline rate properly reflects the timing of change.
- The calculation function should calculate the relative change between a sample and a benchmark, as well as being consistent with a decline basis.
- To calculate a rate for a portfolio of properties or a market segment, the change in values over the period should be measured, since this is consistent with value weighting, not an average of individual depreciation rates.

These findings point to a best practice measurement approach, which is determined to be a longitudinal, relative by use of a multiplicative function, decline measurement, consistent with value weighting. The formula for measurement that is consistent with these characteristics is;

$$d = 1 - \{[\sum R^{s}_{t2} / \sum R^{s}_{t1}]^{(1/(t2-t1))} / [\sum R^{b}_{t2} / \sum R^{b}_{t1}]^{(1/(t2-t1))}\}$$

R^{s} = sample rental value, R^{b} = benchmark rental value

This formula can also be applied to capital values. However, the resultant rate would not solely represent capital value depreciation. Changes in the capital value of an asset are driven by factors such as lease characteristics and risk, in addition to depreciation. Therefore, the application of the above formula to capital values results in a rate termed 'capital shift' and not 'depreciation'.

2. Summary of Results & Findings

2.2 Benchmarks and Depreciation

Depreciation was defined in the first Chapter as a relative concept. It should therefore be measured relative to an appropriate benchmark. However, there are a number of different benchmarks available and different types of benchmark have been used by studies in the past. This Chapter, again based on work by Law (2004), explores which are appropriate by first setting out what the model benchmark would be. In practice, the model benchmark is not available, so the characteristics of available series were then assessed against the model to see which were most suitable for this purpose. The key findings were as follows:

- The choice of benchmark should flow from the definition of depreciation. Ideally, depreciation should be measured as the fall off in value from a new building in that same location.
- The model benchmark therefore has three key characteristics;

  - Specification as new to an appropriate modern design. This is preferred to matching the specification of the existing property, as it ensures that the effect of obsolescence is captured by the measurement.

  - In the absence of site specific data, the benchmark should have sufficient coverage and disaggregation to match the location of the property to the benchmark in as much detail as possible.

  - The benchmark itself should not contain depreciation.
- Available benchmarks can be categorised as internal or external and, within the latter category, as market or prime.
- Internal benchmarks are derived from the depreciating sample and therefore include some depreciation.
- Market benchmarks of rental or capital values are measured using held samples of properties. They therefore include depreciation as they comprise a sample that ages over the measuring period, regardless of the shortness of that period.
- Prime indices constructed on a hypothetical rather than 'top rent' basis do not include depreciation. Further, the use of a continually prime index allows the resultant depreciation rate to account for obsolescence.
- However, the use of a prime index when the sample is comprised of non-prime properties may overstate depreciation.
- Of the available series, the CBRE Rent and Yield Monitor (CBRERYM) was identified as the most appropriate benchmark in the absence of the model benchmark. Data on individual locations that comprise the published series were kindly provided by CBRE for this research.
- For measuring capital shift, the use of a prime benchmark may require synthetic series to be constructed from rent and yield data.

2. Summary of Results & Findings

2.3 Rates of rental depreciation, capital shift and capital expenditure

With a methodological framework in place, the aim of the third Chapter was to measure rates of rental depreciation, capital shift and capital expenditure for all main segments of the UK commercial real estate market. Such information is important as it relates to the performance and pricing of properties and its application is considered further in this summary Chapter. All rates could be measured over a 10 year period, but for a longer, 19 year period, only the rental and expenditure rates could be calculated. The Chapter begins by discussing a number of important issues surrounding the application of the methodology to IPD data. The key points arising here were as follows:

- A longitudinal approach required data on properties held throughout the periods by a single investor.
- Properties then had to matched to an appropriate CBRE location in order for their rental and capital values to be benchmarked.
- The resulting samples were 1,870 properties for the 10 year period and 659 properties for the 19 year period.
- These differ in structure from the IPD Universe and show a small bias towards out performance, which must be borne in mind when using the results.

The rental results at a sector level are shown in Table 1, below.

Table 1: **Rental Depreciation Rates over the periods 1984-2003 and 1993-2003 (% per year)**

	Rate of Rental Depreciation: 19 Year Sample 84-93 [1]	Rate of Rental Depreciation: 10 Year Sample 93-03 [1]
Standard Shop	0.1%	0.3%
Office	1.0%	0.8%
Industrial	0.6%	0.5%
All Property [2]	1.0%	0.7%

[1] Please note that the figures for depreciation are time specific and that results should not automatically be applied to projections into the future.
[2] The figures at the all property level need to be treated with care because the sample's segment composition is quite different from that of the IPD Universe.

- Rental depreciation rates at the three sector level displayed an expected pattern of offices having the most depreciation and standard shops the least.
- Segment rates were fairly consistent with this pattern, the only puzzling figures being those for City Offices, which showed lower rental depreciation, but greater decline in capital values than the other office segments over 1993-2003.
- Retail Warehouses showed high levels of rental depreciation compared to other segments (1.2%). This was not surprising once the generation of assets in the sample was considered. The results provide a cautionary tale for early investors into a newly emerging market.
- An exploration of possible time and age effects showed rental depreciation to be lower in the 1990s than the 1980s, though such analysis is complex and requires further research into how these factors can be accurately separated.

2. Summary of Results & Findings

To properly understand the rates of rental depreciation and capital shift, two further things need to be considered. First, these two numbers are not additive in any way, because capital shift will include rental depreciation within it. Second, these rates are calculated from a sample where capital expenditure also took place during the period. This means that they do not reflect the full cost of depreciation, but instead show 'managed depreciation', as the expenditure may have arrested or slowed depreciation in values, but is itself a cost of having held the properties through time.

Therefore, average rates of capital expenditure must also be calculated alongside the other information for a more complete picture of depreciation through time. Table 2 shows the average rates at a three sector level in the two samples used.

Table 2: **Capital Expenditure Rates over the periods 1984-2003 and 1993-2003 (% per year)**

	Rate of Capital Expenditure: 19 Year Sample 84-93 [1]	Rate of Capital Expenditure: 10 Year Sample 93-03 [1]
Standard Shop	0.6%	0.5%
Office	1.0%	0.9%
Industrial	0.8%	0.4%
All Property [2]	0.8%	0.7%

[1] Please note that the figures for expenditure are time specific and that results should not automatically be applied to projections into the future.
[2] The figures at the all property level need to be treated with care because the sample's segment composition is quite different from that of the IPD Universe.

2.4 Depreciation and Property Investment Vehicles

Previous research into depreciation has concentrated on the effects on direct real estate investment. However, it is also an issue for indirect investors that hold shares or units in real estate vehicles. This is because depreciation can affect both the value of the holding entity and the income that is available for distribution. Exactly how it affects these depends not only on the assets themselves, but also the way that a vehicle accounts, manages and provides for depreciation within its structure.

- Depreciation and expenditure affect both the current and future earnings levels of a vehicle, which in turn impact on dividends and company valuation.
- The key issue for vehicles is having flexibility to retain income and take action to tackle depreciation where necessary.

After reviewing accounting and structural issues, the Chapter focuses in particular on income distribution. Making sure that depreciation is properly provided for is of critical importance in vehicles whose actions and use of funds are constrained. This is typically the case for tax-transparent vehicles such as the US REIT or the proposed PIF in the UK, for which a distribution level of 90% of gross income had been suggested (HM Treasury, 2004).

2. Summary of Results & Findings

- The setting of an income distribution policy must take account of depreciation whether or not any formal allowance is granted.
- In the US, REITs often pay out much of their formal allowance, but the nature of the REIT industry and different structure of the US real estate market makes direct comparison difficult.
- US leases allow more ongoing reinvestment in the property stock, with such expenditure being allowable before distributions are set. While this may mean lower income returns in the short-run, over time depreciation may be less.
- UK lease structures, on the other hand, may lead to over-distribution of income in earlier years if provision for depreciation cannot be made.
- To explore the UK situation further, income and expenditure data for properties in the 19 year sample were examined. Expenditure accounted for 20% of gross income on average, but this varied widely over the period studied and is before vehicle related costs and gearing are taken into account.
- The results overstate the income that could be paid out because expenditure cannot prevent all types of depreciation and major redevelopment activity is not reflected in the sample.
- Even as a base case, though, it implies that in the case of the PIF proposals, not all expenditure could be undertaken, with implications for depreciation and the long-term value of the vehicle.
- A distribution from net income would allow much greater flexibility and the ability for depreciation to be dealt with.

3. The Use of Depreciation Rates

The results of this research are important for a number of reasons. Property has to compete with other assets in the multi asset portfolio and the case for property must take account of both financial and asset based issues. Asset allocation models tend to suggest that property should form a significantly higher proportion within investment portfolios than its current allocation. But property performance figures are treated with some suspicion for a variety of reasons. The heterogeneous nature of the asset, illiquidity, the lack of divisibility and the reliance on valuations have all been cited and depreciation in value, often related to obsolescence, has also figured prominently in this debate.

The basic return model for property includes depreciation. Total return is a function of initial income yield plus cash flow growth. Models that ignore the impact of depreciation on cash flow growth will overstate the potential returns. Analysis of the past rates of depreciation do not provide evidence of future rates but, as with all performance measurement indicators, form a basis for the assessment of future rates. Knowledge of the actual impact of depreciation on returns therefore informs the asset allocation decision, as does knowledge of whether the past performance indicators being used also include any element of depreciation.

Pricing models are also based on projected target rates of return, projected growth rates and income yield. Projected growth rates are in turn usually based on analysis of past rates related to the economic drivers for the sub market segment being assessed. Pricing models can be used for both acquisition/sale decisions and asset management decision-making and both require some element of the life cycle of the site and buildings to be assessed (either explicitly in the cash flow or implicitly in the exit yield). This life cycle involves forecasting cash flow from the existing building and this is subject to depreciation through time. However, the location is as likely to appreciate as depreciate and therefore all appraisal models need to reconcile the growth in the location with the growth in the actual building. Redevelopment occurs when the increasing gap between rents based on actual buildings in the location and the hypothetical new building expands so that the increased value of redevelopment (including some element of yield change) outweighs the cost. Irrecoverable capital expenditure additional to periodic redevelopment also reduces cash flow and requires treatment within cash flow models. Increased knowledge of these items reduces the uncertainty surrounding cash flow estimates at both portfolio and individual level, contributing to managing that risk.

The application of the two rates of growth is dependent upon the source of the data. Forecasts of rental value which are based on actual rents through time would require the forecast to be increased by the depreciation rate to obtain location growth. Forecasts based on prime hypothetical indices need adjusting downwards by the depreciation rate to identify actual growth in the property being assessed. Some proprietary cash flow programs appear to have single growth rates and cannot be used to rationally model the impact of refurbishment, redevelopment and other capital expenditure on acquisition, sale, and lease management.

Apart from asset allocation, management decision making and appraisal issues, depreciation rates are increasingly required for bank lending decisions. Market valuations are sometimes subject to special assumptions and one of those is to value the building at both the beginning and end of the loan. Even if both appraisals are based on current value levels, the impact of the passage of time on rents and yields needs modelling. Depreciation rates inform these adjustments and are therefore increasingly being used to adjust market values for lenders' requirements.

4. Areas for further research

So far the project has focused on identifying the correct methods and benchmarks and producing results for the major UK market segments. In addition, the same framework and samples could be used to investigate a number of other issues.

First, the calculation of depreciation has been undertaken by assessing the average annual rates from the start and end points of the longitudinal analysis. The approach has therefore only identified long-term average depreciation rates. Depreciation is unlikely to be a constant rate over the life-time of an asset, though, and therefore a major research question is the shape of depreciation. Do properties depreciate most in the first few years post-completion or does depreciation accelerate as the building gets older? Other related questions are the age that a property filters out of the prime into the secondary category and the age at which depreciation ceases to be an issue.

The approach adopted in this study was longitudinal which measures depreciation over time, but does not indicate the behaviour of depreciation within that period. An alternative approach is cross sectional which would measure the effect of age on depreciation. The longitudinal approach was preferred conceptually to measure depreciation through time and it was more easily managed within the resources of this project. However, the longitudinal approach can create difficulties of sample size when intermediate annual results are required. For example, for both 10 and 19 year samples, benchmark and rent observations were not available for every year of the period being studied. But, in order to investigate pattern, a full set of annual or periodic results are required. Cross sectional analysis could therefore be usefully undertaken to help identify patterns of depreciation.

A second set of analyses involves segmentation of the results in various ways other than by main property sector and by IPD's (PAS) Portfolio Analysis Segments. Other analyses may be based on issues such as building size; for example, larger properties may be less susceptible because they offer greater flexibility, being capable of accommodating both large and small occupiers. But major companies who occupy large prestigious buildings may be more concerned by changes in aesthetic taste than smaller companies who are not out to impress. Other segmentation could be by lease structure; for instance, are shorter leases more likely to be associated with lower depreciation in rent but higher capital expenditure than long leases? Are lease renewals more likely in buildings with low depreciation rates?

A third set of questions lie within the cyclical nature of depreciation. How does the rate of depreciation vary with the property cycle? Does it accelerate during booms as the design of new developments responds more quickly to changing occupier requirements and prime rents soar? Or does the rate of depreciation fall as demand spills over from prime buildings into those of lower quality? The 19-year sample could be used to compile depreciation rates for the different phases of the rental cycle.

A fourth group of questions relates to international comparisons. Having established a method of research, can comparisons be made by adopting similar approaches with other countries? Even in countries where individual data are available, though, appropriate benchmarks may not exist.

A fifth set of issues for further research are the causes of depreciation. Building obsolescence (both functional and physical) has been identified as a major cause of depreciation in value, but this research has also identified relative site quality change to the benchmark as being an issue for the rates found in this research. In addition to locational issues, the research has not identified the impact of the physical causes of depreciation and this remains a significant area for future analysis.

4. Areas for further research

Finally, within the UK studies, the impact of depreciation on capital value shift has proved difficult to identify and capital expenditure has rarely been addressed. This project has produced some preliminary figures, but the analysis has not been developed beyond this initial stage. Capital value shift is based on yield change and these rates are subject to many influences that are not depreciation related. They also only represent future expectations of both rental value change and redevelopment or refurbishment options and so it could be argued that they are captured more accurately in rental depreciation and capital expenditure. Therefore, the results for capital shift should be treated with the utmost caution and require much further analysis.

Capital expenditure ranges from small regular irrecoverable items, which may reduce rental depreciation, to major refurbishments and redevelopments which change the nature of the physical asset and can eliminate physical obsolescence entirely by replacing with a new building. Given the definition used for depreciation in this research, this should return the property to the benchmark. The research has only scratched the surface of this issue by estimating average amounts based on capital values. Properties subject to major refurbishment or redevelopment were excluded and so the whole spectrum of the effect of capital expenditure has not yet been examined.

The research agenda into depreciation of investment properties is therefore extensive, but the research team would isolate the pattern of depreciation as being one of the more important and challenging issues.

5. Conclusions

This research project has aimed to extend the understanding of investment property depreciation in a number of areas. It has focused particularly on how depreciation should be measured rather than causes (of which obsolescence is one) or the pattern of depreciation (owing to different causes or market states). The definition of depreciation that formed the basis for this investigation was as follows:

> "the rate of decline in rental/capital value of an asset (or group of assets) over time relative to the asset (or group of assets) valued as new with contemporary specification" (Law, 2004).

In practice, though, this definition had to be relaxed given the constraints of data and benchmarks available – described in Chapters Two and Three.

The opening chapter discussed the different methods of calculating depreciation, which can have a major effect on the rates obtained – as important as differences in the time period and dataset selected. Only by understanding the differences in approach can the various options be evaluated and a best practice approach recommended. Chapter Two then set out the attributes of a model benchmark for the measurement process, against which available benchmarks can be critically assessed.

In Chapter Three, these principles were then applied to property data in the IPD databanks, using a prime benchmark supplied by CBRE. This led to the production of rates of rental depreciation, capital shift and capital expenditure for ten major segments of the UK commercial property market, including previously unexamined segments of shopping centres and retail warehouses. The discussion of depreciation was then extended in Chapter Four to its impacts on indirect investors in property, through analysis of the effects on real estate vehicles.

In exploring these areas, several other issues have been highlighted that have received little attention in the past. One of these is the centrality of capital expenditure to a proper understanding of depreciation, since measured rates of depreciation will always be post-expenditure and so not reflecting the full costs of holding a property through time. A second is whether there is a distinct concept of capital 'depreciation' beyond those of rental depreciation and the expenditure to protect or create new income streams for the future. It is important that these two issues in particular are explored in future research as part of wider examinations of cause, pattern, cycle and sub-markets.

In future, there will also be a need to update the depreciation information. Yet, although the rates here cover the period up to 2003, it should be remembered that no matter how recent they currently are, they should not be directly entered into appraisals, forecasts or other models without consideration for the individual circumstances of the asset and what depreciation it is likely to experience in the future. This can most clearly be seen through reference to the results for retail warehouses, where the rates in this report related to a particular generation of these assets. Just as past performance will not necessarily be a guide to future performance, nor can past depreciation show what future depreciation will be.

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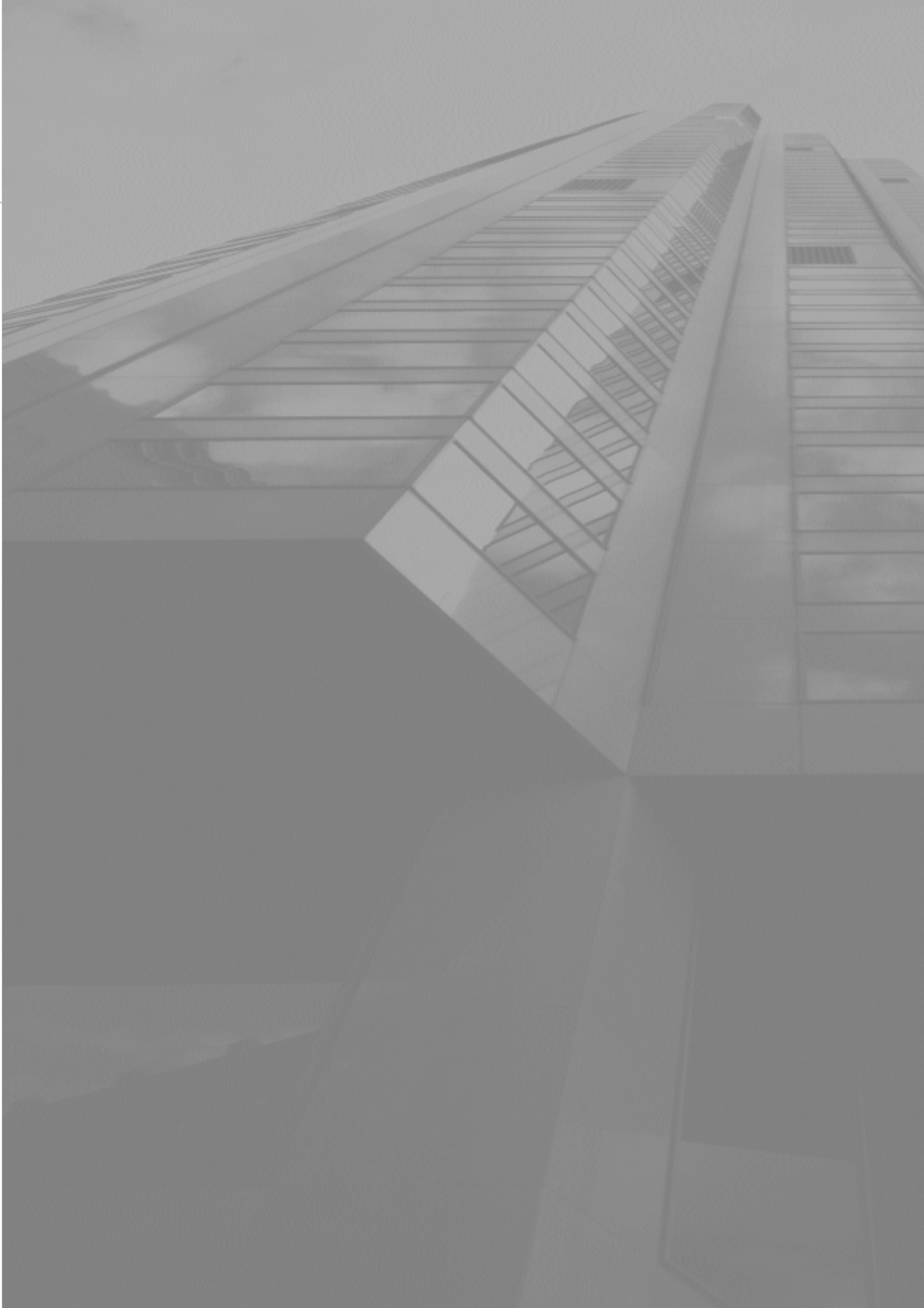

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