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SPAIN'S HOLISTIC APPROACH TO URBAN REHABILITATION AND REGENERATION

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GUEST EDITORIAL

Prudently conservative criteria in mortgage valuation: the European landscape six months after application of the CRR

European Valuation Standards 2025
European Valuation Guidance Note (EVGN) 2
Valuation for Mortgage Lending – Prudently Conservative Valuation Criteria
Paulo Barros Trindade REV REV-BV
28th ANNUAL CONFERENCE OF VALUERS - LASKO - SLOVENIA
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Paulo Barros Trindade at the Slovenian Institute of Auditors' 28th Annual Conference in Lasko on 5 June 2025

Regulation (EU) 2024/1623 (the Capital Requirements Regulation CRR), has applied throughout the Union since 1 January 2025. Its Article 229(1) provides that the value for mortgage purposes – designated as 'property value' under Article 4(74a) must:

- Exclude expectations of price increases *(Criterion No. 1)*;
- Be adjusted to take into account the potential for the current market value to be significantly above the value that would be sustainable over the life of the loan *(Criterion No. 2)*.

This legislative change marks the transition from an approach centred on market value at the valuation date towards a prudently conservative approach. It requires valuers to take into account market trends and medium- and long-term risk factors that may affect the valuation of property, focusing on the term of the loan.

EVS 2025's EVGN 2 is currently the only technical guidance issued by a valuation standards body for the practical application of the CRR's prudently conservative valuation criteria. This guidance fills the gap left by European legislation, which establishes the principles without specifying which technical procedures to adopt. This reinforces the interdependence between EU legislation and the EVS, confirming them as indispensable tools for the correct interpretation and practical application of the European legislative framework.

The Guidance covers:

- Income-based valuation (direct capitalisation and DCF models);
- Treatment of future rents and price trends;
- Adjustments to the residual value method;
- Assessment of the sustainability of the value over time;
- The impact of factors such as oversupply, population decline and environmental regulations.

Six months after the revised CRR came into effect, banks in EU Member States have been hesitant in applying prudently conservative valuation criteria. There is a clear resistance to abandoning traditional approaches, particularly in countries that already had conservative methods, for example because they had adopted Mortgage Lending Value, or because national regulations already imposed a prudent approach to valuations for mortgage lending purposes.

In applying CRR, two aspects in particular must be considered. The first is that the CRR is clear about how the property value should be determined: it must be appraised by an independent valuer. This is an important point to emphasise, since it is clear that there is no room for introducing arbitrary haircuts determined by the banks and imposed on valuers. Should this happen, and should valuers decide to accept them, they must include special assumptions in their reports, making it clear that the valuation has been based on the customer's instructions, or inserting a disclaimer that exempts the valuer from responsibility for the value determined.

The second fundamental aspect is that each country's adaptation to the CRR will depend on the local level and quality of information available about previous property transactions.

"...the CRR is clear about how the property value should be determined: it must be appraised by an independent valuer. This is an important point to emphasise, since it is clear that there is no room for

introducing arbitrary haircuts determined by the banks and imposed on valuers."

Importantly, when historical transaction data are available, it is possible to identify property market trends for a given sector, updated for inflation, and to establish forecast scenarios for the period covered by the loan term. This is based on past trends, thus allowing any necessary adjustments to be made to the market value determined at the valuation date. Of course, when information is scarce or non-existent, it becomes practically impossible to examine these projections. In such cases, any adjustments made must be substantiated from a technical perspective.

One of the key aspects to assess is supply. An important indicator for identifying the need for any adjustments is therefore an examination of trends in the number of planning applications made during the period that precedes the valuation date. This will allow a future projection of the available housing stock and how it will affect the market balance. As a result, one of the factors referred to in EVGN 2 – population fluctuations – is also important here.

The merits of EVGN 2 are clear, since it has served as inspiration for adapting national valuation standards, as can be seen in Italy and Slovenia. The Italian standards highlight a crucial point, also included in EVGN 2, namely the relevance of risk and sustainability in determining the property value. With its focus on energy efficiency and the energy performance of buildings, together with ESG criteria (particularly on climate change), EVS and in particular EVS 6 addresses how these factors may impact a property's valuation over time. This is directly linked to the CRR, which requires that the valuation reflect the value's sustainability over the life of the loan.

"If valuers have not been expressly instructed to apply the property value, the report must include a clear statement indicating that the valuation is based solely on the market value, without

applying the prudently conservative criteria set out in the CRR.”

With no clear instructions from many banks, and with a market that is still adapting, valuers face uncertainties around the consistent application of prudently conservative valuation criteria. EVGN 2 provides practical recommendations, but applying them requires an analysis of the market cycle (peaks and troughs) and a consideration of macroeconomic and regulatory factors.

If valuers have not been expressly instructed to apply the property value, the report must include a clear statement indicating that the valuation is based solely on the market value, without applying the prudently conservative criteria set out in the CRR. In this context, in late 2024 TEGOVA issued a recommendation for a disclaimer to be used by valuers whenever they have not received clear instructions from banks for applying the property value[1].

This poses obvious challenges for communicating with clients and banking supervisors, since it highlights an absence of instructions for applying the CRR and determining the CRR ‘property value’.

The introduction of prudently conservative valuation criteria in the 2024 CRR represents a paradigm shift in European mortgage valuation. EVS 2025 and in particular EVGN 2, is an essential tool for the practical application of the EU legislation. However, it falls to European valuers to apply the technical guidance contained in EVGN 2 according to the circumstances in their own countries, to promote a robust valuation that contributes to the stability of the financial system, in keeping with the spirit of the CRR.

[1] “This valuation is in full compliance with European Valuation Standards (EVS), with one caveat: To the extent that it is used for mortgage valuation purposes, it is not in compliance with EVS 2025 EVGN 2 Valuation for Mortgage Lending – Prudently Conservative Valuation Criteria due to the instruction to estimate exclusively market value notwithstanding Regulation (EU) 2024/1623’s requirement as of 01.01.2025 to estimate a ‘property value’ taking account of ‘prudently conservative valuation criteria’.” In mortgage lending value countries, replace “exclusively market value” by “exclusively mortgage lending value”.

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EDITORIAL

Exit the tunnel to go where?

TEGOVA
The European Group
of Valuers' Associations

Michael MacBrien

In the last issue, “Exit the tunnel”, sought to highlight the European Union’s innate strengths: the single market, the euro, the projection of EU rules worldwide and the EU’s defences against foreign coercion. It concluded that “Europe has everything it takes to control its destiny and is acting on it.” This paper explores what that means going forward.

Current events at least have the merit of spurring Europeans to finally tackle auto-inflicted handicaps that have weakened the Union for decades. What’s happening now is complex and multifaceted, but three megaprojects are essential: energy autonomy, defence and Capital Markets Union.

1. Energy autonomy

The EU is the largest global gas and LNG importer. Half of EU companies see energy costs as a major impediment to investment, probably the single most important hit to European competitiveness. Nonetheless, the Union has made giant strides to energy autonomy by rapidly reducing Russian imports and increasing its energy efficiency.

> *“…the Union has made giant strides to energy autonomy by rapidly reducing Russian imports and increasing*

> *its energy efficiency.”*

1.1. Reducing Russian imports[1]

- **Coal**: from half of EU consumption to zero
- **Oil**: from 26% to 3%
- **Gas**: from 45% to 13%

Yet the EU still paid Russia €23 billion last year.

The EU’s plan to finish the job:

- End 2025: prohibition of new gas contracts
- End 2027: end of all gas contracts
- Strengthened control of Russian shadow oil tankers
- Elimination of Russian nuclear material imports

1.2. Increasing energy efficiency

European Green Deal legislation accelerates the march to zero carbon emission and consequent energy autonomy. That very much includes the building stock – the top energy consumer and CO_2 emitter – for which the EU’s signature achievements are:

For public buildings: renovation of 3% of **all** public building stock down even to municipal level to near-zero energy every year + special obligations for landlords renting to the public sector.

For all buildings, public and private:

- Extension of the EU Emissions Trading System (EU ETS) to buildings (and transport) in 2027
- All new buildings to be zero-emission as of 2030
- Renovation of the 16% worst performing buildings by 2030 and the 22-25% worst by 2033
- Rooftop solar installation by 2031 for all except existing residential

And for rooftop, the ***permit-granting procedure*** shall not exceed three months.

The result of all of the Green Deal’s buildings, transport and industry laws – themselves merely the latest phase in a sustained legislative effort over many years – was released in May: **the Union is on track to surpass its goal of a 55% reduction of GHG emissions in 2030 as compared to 1990.**

Meanwhile, the impacts of European excellence in the field are starting to mushroom:

- Renewable energy deployment is 22%

of EU gross final energy consumption and rising rapidly compared with 14% in China and 9% in the U.S.

- Leader in clean tech innovation with 60% of global high-value patents
- The EU tops global rankings of the most innovative companies for low-carbon fuels

2. Defence

In the fifties, a plan for a European Defence Community was launched and failed. Since then the only appearance of military matters at EU level was their exemption from EU rules[2]. All that is now changing at speed.

What's happening can best be described as EU-coordinated national efforts to rearm for defence and to supply Ukraine, all with immense potential impacts for European economic competitiveness:

1. **€150 billion from an EU bond issue** to support common defence procurements involving either at least two member states or a member state and a member of the EEA or Ukraine for 65% of their value. At last a measure to counter the current 80% of European defence procurement imported from non-EU suppliers
2. **Escape clause from the Stability and Growth Pact**: a deviation equivalent to the increase in defence expenditure since 2021, up to 1.5% of GDP. Projected to reach at least **€800 billion** over the next four years
3. Member States authorised to **reallocate EU Cohesion funding** (regional development) to defence
4. **Reallocation of** €325 billion of leftover **NextGen EU funding**
5. **Loans from the European Investment Bank for military purposes for the first time in its history:** ***Including military real estate***. *There's something for every property investment or development specialisation:*

    - Residential real estate: Barracks and military family housing (crucial for attracting the extra 300 000 soldiers Europe needs)
    - Health care real estate: Military hospitals
    - Educational real estate: Military training centres and academies
    - Logistical real estate: Military warehousing/storage

    This is serious money on the very best terms. The latest tranche for defence approved on 15 may was **€9.1 billion.**

    As EIB lending priorities are a reflection of commonly agreed EU Member

State goals, that portends massive military real estate spending across the Union.

> *“Loans from the European Investment Bank for military purposes for the first time in its history: Including military real estate.”*

The EU authorities and Member States are conscious of the virtuous link between defence and the civilian economy:

- Repurposing opportunities for automotive, steel, aluminium or chemicals
- Cutting edge technologies like AI or advanced electronics that can have military and civilian applications, universally recognised as an underpinning of numerous U.S. technological advances

The learning curve will be steep. In particular, even though enabling common European defence procurement is a game-changing breakthrough, it still needs to prove itself. According to the Kiel Report[3], much can be learnt from U.S. experience with dual sourcing (purchasing weapon systems from more than one company at once to encourage competition) and open-ended tenders (rather than favouring a certain technology with very fixed specifications that favours established players, a call for open-ended solutions to a certain military problem).

3. Capital Markets Union (for some)

This project is an enabler of the others. It’s about finding the money to do all the things Europeans urgently need to do in a situation where there is currently no proof that other financial options are materialising.

For instance, there is an ongoing debate between the EU Institutions about **increasing EU ‘own resources’**, but at time of writing the only ideas that seem to have traction are:

- The Carbon Border Adjustment Mechanism (CBAM, a tax paid by foreign exporters on their carbon intensive goods entering the EU)
- A digital tax
- Raising the €7 fee on foreigners

entering the EU

- And a €2 fee on small parcels from foreign retailers

But even if all are adopted, the revenue will fall far short of what is needed.

There is also much ado about **shifting the existing EU budget to the new priorities**, but so far there is no evidence it will actually happen. The article by Mark Booth in this issue gives a good taste of what precipitous reduction of CAP funding could mean.

So the main way for the EU to raise the money it needs is by reverting to its core competence and filling the largest remaining gap in the Single Market: a deep, liquid and sophisticated capital market.

The market opportunity

In 2022 EU household savings were €1,390 billion compared to €840 billion in the U.S.

According to ECB analysis, if EU households were to align their deposit-to-financial assets ratio with that of U.S. households, €8 trillion could be redirected into market-based investments –€350 billion annually.

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The EU regulatory challenge …

The banking sector has EU supervision, but capital markets have national supervisors. They have a single EU rule book but often apply the rules differently, sometimes for protectionist purposes.

Banks themselves are enablers of capital markets by acting as issuers but there need to be EU rules for managing the failure of mid-sized banks and a European deposit insurance framework.

And you need harmonised rules on aspects of corporate law, insolvency, labour and tax law.

The problem is that such a vast and varied amount of regulatory harmonisation and centralised supervision hurts the vested interests of many local operators who, unlike the European 'common good', have numerous and powerful lobbies.

There have been many failed attempts in the past, but this time it might be different, given national leaders' frequent and increasingly coordinated declarations of intent to go ahead, significantly, *even if it can't be by all Member States together.*

… and a solution: enhanced cooperation

Significantly, Capital Markets Union is a rare part of the Draghi Report that is proposed as an 'enhanced cooperation', a mechanism by which EU law is created for, and applies exclusively to, a subset of 'willing' Member States, the others being free to join later if they accept the rules established by the founders. Significantly, the European Commission's CMU Communication also foresees an enhanced cooperation, a rare breach of European inclusive political correctness. Political subsets remain an EU taboo, but these are hard times for taboos and in fact the Union's most iconic achievements were subsets and still are: Schengen and the euro.

Valuers got a foretaste at the TEGOVA Netherlands conference in The Hague on 9 May. Olaf Sleijpen, Member of the Boards of the Dutch and European Central Banks, spoke eloquently of the imperative for Capital Markets Union, and when questioned about the difficulty of the task, agreed that the way forward will be either an enhanced cooperation or a 28th regime[4].

Let's hope the current flow of capital from the U.S. to the EU doesn't sap the energy needed for this effort.

This is not 'Europe's Hamiltonian moment'. None of these initiatives 'federalise the Union'. If successful, they will not fundamentally change the dual nature of EU/ Member State power, but they will make Europeans far more fit to defend their vital interests in a dangerous world.

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[1] Source: "Se acabó el chantaje energético ruso: tenemos un plan", Dan Jørgensen, European Energy and Housing Commissioner, El País, 23 May 2025

[2] The European Commission has just tabled a proposal for a single European licence facilitating intra-European defence commerce replacing the current regime under which there has to be a national licence for every cross-border armaments movement.

[3] Kiel Report – Guns and Growth: The Economic Consequences of Defense Buildups- Ethan Ilzetzki, IfW Kiel Institute for the World Economy, February 2025 https://www.ifw-kiel.de/publications/kiel-report/

[4] A Letta and Draghi-inspired Commission Proposal (not yet tabled) for an optional EU legal framework enabling innovative startups and scaleups to operate across the Union on a single set of rules on aspects of corporate, insolvency, labour and tax law.

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EVS 2025
AT A GLANCE

Michael MacBrien

#01

A two-tier approach to valuation and sustainability

Encompassing:

- *EVS 6 Valuation and Energy Efficiency*
- *Part VI. Valuation and Sustainability*
- *EVIP 8 Flooding and the Valuation of Property*

MASSIVE AND PERVASIVE EUROPEAN GREEN DEAL LAW IMPACTS LAND AND BUILDINGS:

- *Energy efficiency*
- *Renewable energy*
- *Rooftop solar energy installations*
- *The greening of parking areas with smart electric charging and mandatory bicycle space*
- *Legislation on air, water and soil*
- *The greening of construction products and technical building systems*
- *Buildings in the circular economy*
- *EU taxonomy*
- *Green mortgages*

- *Financial institutions' and other industries' ESG obligations*

HOW IS THE VALUER TO DISTINGUISH AND PRIORITISE ALL THIS?

One way is by applying certain criteria:

- *The degree of coercion of EU law – to what degree must it be obeyed and how soon?*
- *Its identifiable impact on real estate markets*
- *And the scale and speed of impact*

Taken together, they lead to a **two-tier valuation approach**, because there is a fundamental difference between the latest Green Deal energy efficiency legislation and all the rest.

FIRST TIER: Energy efficiency

Green Deal law mandates the renovation of the 16% worst performing building stock within a few years. That creates a direct, identifiable, quantifiable and imminent impact on real estate markets and on the estimation of Market Value.It's because of the direct, identifiable and imminent impact that EVS 6 Valuation and Energy Efficiency is a Standard.

SECOND TIER: The gradual valuation impacts of sustainability issues and ESG

On the other hand, the other European Green Deal legislation is neither as coercive, as identifiable and quantifiable, nor as imminent in its effect as the energy efficiency laws.

For example:

- ***Construction products** will have to be greener, more circular. But that will be a gradual process and how is a valuer supposed to identify that and integrate it into the determination of Market Value?*
- ***The Soil Monitoring and Resilience Directive's provisions increasing transparency of contaminated sites** may enable the valuer to take better account of them than is currently the case … possibly … someday. But in the meantime, the valuer will go on shelving it in the valuation report's Disclaimer.*
- **ESG** *is pervasive, but corporate reporting requirements have caused such a business and political backlash that the European legislator is pulling back.*

But that doesn't mean that wider sustainability issues are irrelevant to valuation, quite the contrary.

EVS Part VI. Valuation and Sustainability takes a more macro-economic perspective, explaining the gradual way that diverse sustainability factors going well beyond energy efficiency end up generating a public consciousness of sustainability-induced investment risks and opportunities that very definitely impacts perceptions of value over time.

EVIP 8 Flooding and the Valuation of Property is in this vein. It explores the longer term effects on valuation including:

- *Flood risk and flood events*
- *Measures to counter flooding*
- *Institutional and regulatory changes*
- *Market reactions*
- *Insurers and lenders*

See also the seminal *The impact of flood risk on the assessment of property values for secured lending* by Borut Barlič, Samo Javornik, Jure Kern and Jernej Šturm in European Valuer Journal issue n° 33, June 2024.

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EVS 2025 AT A GLANCE

Michael MacBrien

#02

Part X. European Union Legislation and Property Valuation

This final part of EVS is a unique exposition of EU law impacting or directly targeting property and valuation. It enables practicing valuers to understand how much of the real estate regulatory environment is based on EU law and is equally valuable to European and national supervisory authorities, credit institutions, academics, lawyers and consultants.

Structure of Part X.	
Property valuations required by EU legislation	• General overview • Valuation of property for statutory needs under EU company law • Valuation of property for company accounts • Valuation of property for financial institutions • Valuation of property for insurance and reinsurance institutions • Valuation of property for investment funds • Valuation of property for state aid rules
EU legislation as part of the valuation matrix	• General overview • Climate and environment - General - Environmental assessments - Water - Biodiversity, nature conservation and nature restoration • Asbestos • Energy
Valuation of property and taxation	• Value added tax (VAT) - General overview - The supply of land and buildings - Leasing and letting of immovable property - Works to property • Green taxation

SUSTAINABILITY REHABILITATION AND VALUATION

Energy efficient remodelling of the roof of the historic Library of Castilla y León in Valladolid enabling preservation of the original tiles

#03

Spain's approach to rehabilitation & regeneration

Marta Vall-Llossera Ferrán

In Spain, more than half of the housing stock was built before 1979, the year the first regulation establishing minimum energy efficiency standards came into force. Furthermore, over 80% of those buildings have an energy rating of E, F or G while only 0.2% have achieved an A rating. These low ratings must be improved while simultaneously implementing the accessibility, conservation and functionality upgrades essential to people's needs.

Spain's housing stock is among the most outmoded in Europe, due in part to the historical lack of a culture of conservation, maintenance, and rehabilitation. In contrast, countries such as Austria and France have firmly established such practices, reflected in annual renovation rates of 1.5% to 2%. However, Spain's renovation and retrofitting sector is beginning to gather pace, recently energised by the financial support measures included in the Recovery, Transformation and Resilience Plan, funded through the EU's Next Generation programme and Spain's related tax incentives. This has resulted in:

20% income tax deduction

- Applicable to works carried out on individual dwellings — either detached single-family homes or apartments within multi-family buildings — that achieve a minimum 7% reduction in heating and cooling demand, as certified by a comparative energy performance certificate. (Reference: Law 10/2022, Art. 1, amending Art. 68.1.1 of the Spanish Personal Income Tax Law *Ley del Impuesto sobre la Renta de las Personas* Físicas (LIRPF)[1].

40% income tax deduction

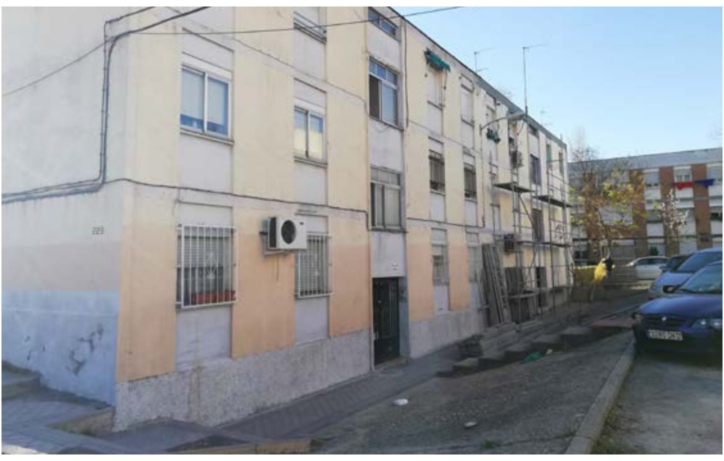
- Applicable to interventions in individual residential units (single-family or apartment) that result in a minimum 30% reduction in non-renewable primary energy consumption,
- Or that lead to an upgrade in the building's energy rating to class A or B. (Reference: Law 10/2022, Art. 1, amending Art. 68.1.2 of the LIRPF)

> *"A substantial portion of Spain's Next Generation EU recovery funds–one of the highest in the Union–has been channelled into energy refurbishment of the built environment."*

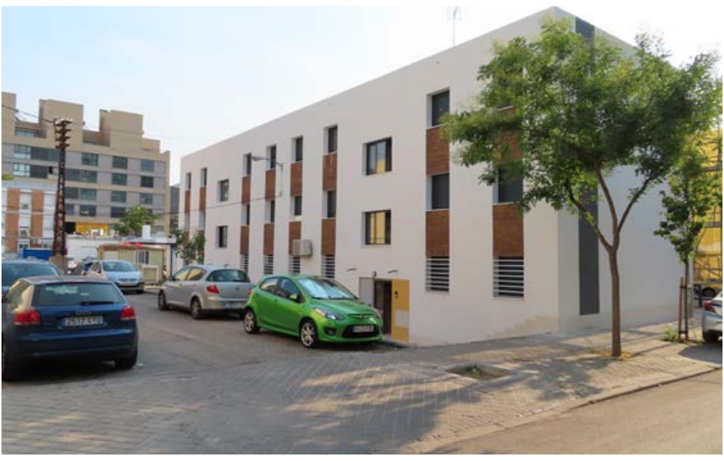
60% income tax deduction

- Applicable to whole-building interventions in multi-family residential buildings (horizontal property), where works result in a minimum 30% reduction in non-renewable primary energy consumption,
- Or an upgrade of the entire building's energy rating to class A or B. (Reference: Law 10/2022, Art. 1, amending Art. 68.1.3 of the LIRPF)

A substantial portion of Spain's Next Generation EU recovery funds–one of the highest in the Union–has been channelled into energy refurbishment of the built environment. The programme prioritises interventions in flats, multi-family residential buildings, and entire neighbourhoods, with implementation scheduled through mid-2026. The main goal is to improve the thermal performance of single-family homes and apartments by reducing heating and cooling demand by at least 7%, lowering non-renewable primary energy use by a minimum of 30%, and upgrading key elements of the building envelope, including façades and window systems.



Building in Madrid airport neighbourhood
BEFORE rehabilitation



Same building AFTER rehabilitation

The €3.42 billion budget is a historic opportunity to promote a building renovation culture in Spain. This momentum is driven by the European Green Deal and the Renovation Wave, two strategic EU measures to achieve a carbon-neutral continent by 2050 in line with the Paris Agreements. Led by CSCAE and its 2030 Observatory, a unified building sector has encouraged the Government to recognise construction as a decisive lever for the recovery and modernisation of the country, through the transformation of the building stock, the regeneration of neighbourhoods and territorial cohesion to counteract rural depopulation.

Thanks to this support package and its associated tax benefits, as well as a favourable economic climate in Spain characterised by strong growth over the past two years, as reflected in the official construction industry data for 2024 ,- according to statistics from Spain's Orders of Architects (CSCAE), 55,473 homes were approved for major renovation last year, a 117% increase compared to 2019 and a 47% rise over 2023.

However, creating the conditions for sustained energy efficiency renovation requires a third pillar alongside tax breaks and a booming housing market: the proactive guidance and leadership of property professionals. This is what CSCAE is providing at several key levels.

> *"… creating the conditions for sustained energy efficiency renovation requires a third pillar alongside tax breaks and a booming housing market: the proactive guidance and leadership of property professionals. This is what CSCAE is providing at several key levels."*

In December 2020, a Network of Firms Supporting Rehabilitation (Red de Oficinas de Apoyo a la Rehabilitación) was established to help local authorities, architects and the general public manage the Next Generation funding for home rehabilitation and neighbourhood regeneration and to boost project implementation and citizen access to the funds, improving quality of life.

Over the course of a single year (2024), the Red de Oficinas handled nearly 21,000 consultations covering more than 38,000 homes. They have produced technical guidance for the sector and fostered connections with the community—primary beneficiaries of grants and urban rehabilitation—through the RehabilitAcción Ciudadana (Citizen Rehabilitation) project. CSCAE, in collaboration with the National Confederation of Neighbourhood Associations (Confederación Estatal de Asociaciones Vecinales, CEAV), has driven this initiative with support from the European Climate Foundation to promote an integrated culture of building maintenance, conservation, and rehabilitation.

Similar initiatives have also been undertaken targeting industry professionals, led by CSCAE's 2030 Observatory.

Although rehabilitation activity is progressing and recent figures are encouraging, there remains significant room for improvement. Spain's Integrated National Energy and Climate Plan (Plan Nacional Integrado de Energía y Clima) outlining the country's environmental objectives and priorities to the European Commission sets an ambitious target in its 2023 update: the energy renovation of 1,377,000 homes by 2030.

Holistic solutions bring us closer to more sustainable land and energy models, creating synergies between energy efficiency renovations and conservation, functionality and accessibility. To achieve that, before carrying out any work on a building, a holistic study needs to be conducted in advance by qualified professionals, to understand the property's real needs and its potential for improvement. This is the basis for a works programme to be phased in over time with optimal use of resources. All this requires thinking beyond the Next Generation funds and beyond 2026, taking advantage of the current favourable economic climate and momentum.

It is essential to establish medium- and long-term strategies that involve all three levels of government, creating financial support and tax incentives (Spain's general state budget sets these coefficients each year) that remain stable over time, particularly for vulnerable households, and strengthening human and technical resources to process cases more rapidly. These measures must also be complemented by awareness campaigns led by public authorities, in conjunction with industry operators and professionals, to highlight the benefits of the holistic rehabilitation of housing for people's physical and emotional wellbeing. Holistic rehabilitation is about quality of life, and about health and sound investments. These benefits are recognised by the property market, with average price increases of up to 25%, according to the sensitivity analysis of multi-family housing built over 50 years ago regularly carried out by the Sociedad de Tasación valuation firm for CSCAE's 2030 Observatory.

When any work is done on a building, it is therefore essential to seek guidance from qualified professionals. Thanks to technical and human expertise that, in recent years, has been complemented by specific sustainability training, the holistic approach offered by architects provides guarantees at all levels, helping to achieve an ambitious balance between sustainability, functionality, aesthetics, affordability and coexistence.

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1 These deductions are functionally aligned with the rehabilitation aid programmes outlined in Articles 7–11 of Royal Decree 853/2021, particularly:

- Art. 8: Aid for energy efficiency improvements in individual dwellings (C02.I01.P4)
- Art. 9: Aid for comprehensive building-level rehabilitation (C02.I01.P3)
- Art. 11: Aid for drafting energy performance documentation and rehabilitation projects (e.g., building logbooks and energy audits)

Marta Vall-Llossera Ferrán is President of the High Council of the Orders of Architects of Spain (CSCAE)

SUSTAINABILITY REHABILITATION AND VALUATION

Energy efficient remodelling of the roof of the historic Library of Castilla y León in Valladolid enabling preservation of the original tiles

#04

Bulgaria's approach to integrating EU energy efficiency and climate regulation into valuations for lending purposes

Tzenka Bojilova

Georgi Georgiev

The valuation community is well acquainted with EVS's ground-breaking standard and methodology on integrating energy efficiency into the estimation of market value. Nonetheless, in a property patchwork such as Europe's, the Blue Book can only go so far. In this article, the leaders of the Bulgarian valuation profession explain how, taking EVS as their foundation, they have collaborated with the national authorities and the building sector to find viable solutions adapted to a limited-transparency market.

In Bulgaria, around 85% of valuation orders come from banks. Their expectations from valuers now cover not only conventional valuation methods, but also modern, EU-induced sustainability requirements, including energy efficiency and climate risk, introducing a higher degree of accuracy, transparency and expertise in the valuation process.

The role of professional associations in Bulgaria

The two main professional valuers' associations in Bulgaria – the Chamber of Independent Appraisers of Bulgaria (CIAB) [Камарата на независимите оценители в България – КНОБ] and the Chamber of Professional Valuers (CPV) [Камарата на професионалните оценители – КПО] (both members of TEGOVA). play a significant role here. Their collaboration has been a key factor in the success of numerous energy efficiency and sustainability initiatives, jointly drawing up common guidelines, conducting professional fora, and communicating with institutions and international partners. This collaboration guarantees wider representation in the community of valuers and helps in the formulation of unified EVS-compliant standards and practices for Bulgaria.

> *"Bulgarian valuers continue to face serious challenges in their day-to-day work, such as the small proportion of energy-certified buildings (less than 5%), difficulty in accessing public data, fragmented information and lack of a single database. This is compounded by the fact that many valuers believe that the new requirements are beyond the scope of their activities, since access to reliable information on energy efficiency and natural risks is limited."*

European sustainability policy and its impact on valuation practice in Bulgaria

EU climate goals and regulation as well as the European Central Bank's and European Banking Authority's focus on integrating transition risk in banking risk management through the introduction of internal models for assessing the energy efficiency of, and climate risk for, loan collateral mean that valuers must take a comprehensive approach including assessing the energy characteristics of buildings, the transition-related risk, the regulatory framework and the cost of refurbishment.

EVS 2025's EVS 6 Valuation and Energy Efficiency and Methodology section 9 The Residual Method: tools for integrating energy characteristics in property valuations

The European Valuation Standards play a key role in establishing a single and comparable valuation practice in the Member States of the EU. They provide a methodological foundation for the activities of professional valuers and ensure that the valuation process meets the requirements of financial institutions, regulators and international markets. As a supranational authority with an active network of professional associations in 42 countries, TEGOVA ensures that EVS is constantly updated in step with EU regulatory and market developments. By covering topics such as sustainability, ESG and energy efficiency, EVS has become a hallmark of good practice in Europe and an important tool for supporting investment security and sustainable funding at national level.

In response to EU climate regulation, EVS 2025 incorporates tools and guidelines for representing energy efficiency. EVS 6 and Methodology section 9 focus on the identification of energy efficiency characteristics (such as energy performance certificates, or EPCs), assessment of the impact on value, analysis of the regulatory context and the correct implementation of valuation approaches (the comparative, income-based, cost-based and residual methods).

The challenges faced by valuers in Bulgaria in applying this standard and methodology

Bulgarian valuers continue to face serious challenges in their day-to-day work, such as the small proportion of energy-certified buildings (less than 5%), difficulty in accessing public data, fragmented information and lack of a single database. This is compounded by the fact that many valuers believe that the new requirements are beyond the scope of their activities, since access to reliable information on energy efficiency and natural risks is limited. The register of the Sustainable Energy Development Agency (SEDA) [Агенцията за устойчиво енергийно развитие – АУЕР] contains information on the EPCs issued, but its functionality and accessibility remain limited.

Existing buildings, particularly those built before 2000, have often not been certified, while certificates are not renewed once they have expired or following building upgrades. As a result, there is a lack of conformity between the actual energy characteristics of a building and the available document. Data are scattered among various institutions and not centralised, further compounding the problems of analysing and using them in valuation practice.

Initiatives by CIAB and CPV regarding access to data and institutional cooperation

Since the beginning of 2024, numerous teams have been involved in developing tools allowing quick and easy access to the necessary information. Yet this is a lengthy process involving communication at a variety of levels. Lack of funding is another major issue. There are signs that the Association of Banks in Bulgaria is also searching for solutions, but at this stage it is more likely that each bank will develop its own rules and requirements for obtaining the data it requires for its own electronic system.

In the summer of 2024, a professional round table was held involving representatives of the two valuers' chambers, State institutions, commercial banks and technical experts to discuss access to data, cooperation with SEDA and future legislative initiatives. Representatives of the Chamber of Building Entrepreneurs, the Chamber of Energy Auditors, the Bulgarian Association of Building Insulation and start-ups involved in developing tools for assessing energy efficiency also took part. The outcome of the meeting was the signing of a memorandum on cooperation and the development of **Guidelines on the incorporation of energy efficiency in valuation reports.**

The Guidelines propose valuation approaches both with and without the presence of an energy certificate. Where an EPC exists, the valuer must include the specific energy class of the property, the primary energy consumption and the relevant operating costs in the valuation. The data from the EPC is used as a direct indicator of market advantage or of the need for a value adjustment. If there is no EPC, the valuer may use approximation (proxy) models based on the typology of the building, the year of construction and the location. These models include analysing the characteristic construction and installation parameters of the period in which the building was constructed and the regional climate profile to calculate the probable energy class to a reasonable degree of accuracy.

The market factors that allow the impact of energy efficiency on market value to be incorporated are determined taking into account not only market demand for energy efficient buildings, but anticipated regulatory burdens and operational savings. Where the residual method is applied, the Guidelines give guide costs for the investments required to upgrade the energy class (e.g. from Class D to Class B or A), including recommended budgets per square metre, depending on the type of building. These values are based on information provided by SEDA and are integrated into the Guidelines with the approval of both professional associations.

The main valuation methods (comparative, income-based, cost-based and residual) have been adapted to include differences in energy efficiency, for example by correcting market comparisons or allowing for upgrade costs. The income-based method highlights the reduced operating costs, while the residual method focuses on the effect of investments in energy improvements on the final value of the asset. The Guidelines require full disclosure of the sources of information and the assumptions made where no data are available, as well as the inclusion of a budget for upgrading the energy class in the report. The lack of information on energy characteristics in sales listings is a real problem for valuers who are comparing the characteristics of analogous buildings.

As well as energy efficiency, increased attention is being focused on natural risks such as earthquakes, floods and fires. Currently the only reliable and widely accessible source in this regard is the map of seismic zones in Bulgaria. Lack of centralised information about the remaining risks continues to create difficulties in valuation practice.

> *“Bulgarian practice, developed through collaboration between professional associations, State institutions and*

market players, has demonstrated an awareness of the importance of energy efficiency and the need for the practical application of European standards."

Prospects for implementing EVS Methodology section 9 and the sustainable development of valuation practice in Bulgaria

The Guidelines are publicly available and are a first step towards implementing EVS Methodology section 9 and the new requirements in practice. An additional methodological framework, with practical instructions on each of the valuation methods, along with templates for showing EPCs, is in the pipeline. Collaboration with TEGOVA is an important part of this process, as EVS provides the necessary framework and guidelines for incorporating sustainability and energy efficiency in market valuations. The active involvement of Bulgarian valuers' associations in TEGOVA, which includes updating standards, contributes to the synchronisation of European requirements and domestic practice.

Bulgaria is gradually gaining experience in including energy efficiency in property valuations. Thanks to the professional engagement of the CIAB and CPV, a clear methodological framework for integrating EPCs in valuations has emerged in recent years. In collaboration with SEDA, both associations have been given access to real-world data from the certified buildings register, which has helped them develop useful tools to identify the energy class of buildings and to perform valuations under different scenarios. Bulgarian valuers now have practical guidelines on how to incorporate energy efficiency, even where data are limited or absent, thanks to extensive training, round tables and schemes developed in-house.

In the context of growing regulatory pressure and market dynamics related to sustainable development, valuers need to have reliable tools and standards available to them to accurately represent these factors in their valuations. Bulgarian practice, developed through collaboration between professional associations, State institutions and market players, has demonstrated an awareness of the importance of energy efficiency and the need for the practical application of European standards. The Guidelines adopted, together with the methodological framework developed, are an important step towards constructing a sustainable and transparent valuation process capable of meeting both market expectations and the strategic aims of the European Union.

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SUSTAINABILITY REHABILITATION AND VALUATION

Energy efficient remodelling of the roof of the historic Library of Castilla y León in Valladolid enabling preservation of the original tiles

#05

Understanding the new reality for property valuation – Navigating the ESG landscape

Jolanta Panas

Abstract

The European commercial real estate sector is undergoing a profound metamorphosis, compelling valuers to integrate Environmental, Social, and Governance (ESG) factors into their appraisal practices. This article aims to demystify the complexities of ESG integration by focusing on the initial, foundational challenges specific to commercial properties. It addresses the pervasive hurdles of data acquisition and its evolving materiality, the need to adapt traditional valuation models to capture a sustainable future, and the difficulties of quantifying ESG impact within current valuation frameworks. The paper acknowl-

edges the "data maze" that demands immediate attention for the future resilience of our built environment. The aim is to equip valuers with the analytical rigour and strategic foresight necessary to begin navigating this complex, yet ultimately rewarding, ESG frontier, recognising that *"Transformation is not a cost – it's an investment in resilience"*.

1. Introduction: The inevitable evolution of real estate value – An investment in resilience

ESG factors are no longer a peripheral concern but a foundational element in determining the true value of real estate. The European Union's ambitious climate targets and evolving regulations are gradually reshaping market dynamics. My philosophy, "Transformation is not a cost – it's an investment in resilience," reflects the growing expectation for our profession to adapt. Indeed ESG presents a new, critical challenge for property valuers. We are not just assessing current market value; we are, in essence, evaluating the future resilience and adaptability of an asset. This requires a shift from traditional valuation methods to a more comprehensive, forward-looking approach that integrates ESG considerations.

> *"Unlike conventional financial metrics, ESG data in real estate are frequently non-standardised, inconsistently reported, and rarely offer the historical depth needed for robust analysis. It often feels like navigating a true "data maze"."*

2. Navigating the data maze: The difficulties of quantifying ESG impact

One of the most significant — and often frustrating — hurdles in effective ESG integration is the fragmented and inconsistent landscape of ESG data. Unlike conventional financial metrics, ESG data in real estate are frequently non-standardised, inconsistently reported, and rarely offer the historical depth needed for robust analysis. It often feels like navigating a true "data maze."

- **Data availability and quality:** There is a persistent scarcity of granular, verifiable ESG data. While multi-criteria certification schemes (e.g., BREEAM, LEED, DGNB, EDGE) offer some structured insights, many assets lack such credentials — and even certified buildings may provide ESG data of varying depth and reliability. Operational metrics such as energy or water consumption are often proprietary and inconsistently collected, while social and governance indicators remain the least standardised and most difficult to quantify. As a result, valuers are frequently forced to aggregate data from disparate sources, sometimes requiring external specialists. In the UK, for example, EPC data are widely collected (by 87% of respondents), but information on waste and water is "never" (55–62%) or "seldom" (49–70%) gathered, revealing a disconnect between perceived ESG importance and actual data collection practices (Hossain et al., 2023).
- **Materiality and relevance:** The essence of valuation lies in identifying what is materially relevant to market value. Not all ESG data points carry equal weight. Valuers must apply judgment in determining which ESG factors have a demonstrable and quantifiable impact on income, costs, risk profile — and ultimately, market value. According to IVS 104 Data and Inputs: Appendix, ESG factors and the regulatory environment should be considered "to the extent that they are measurable and would be considered reasonable by the valuer applying professional judgement" (International Valuation Standards, 2025, A10.06).
- **Comparability and standardisation gaps:** A longstanding obstacle to ESG integration is the lack of consistent reporting standards across jurisdictions and property types. Even though the revised Energy Performance of Buildings Directive (EPBD), adopted in 2024, signals a pivotal shift mandating a partially harmonised A–G EPC scale and standardised methodologies to enhance comparability across EU member states, we are still some way from a unified framework for assessing building performance — an essential step for ESG benchmarking

and valuation.

Yet despite these challenges, I firmly advocate for a unified ESG data framework. Standardisation is not only possible — it is essential for improving transparency, enhancing comparability, and increasing the credibility of ESG-driven valuations across Europe. Navigating this data maze requires more than technical proficiency; it demands improved data collection systems, greater analytical capacity, and, crucially, a coordinated, industry-wide push toward transparency and standardisation.

Often, valuers must rely on proxy data when directly relevant information is unavailable, making professional judgment vital in ensuring relevance and comparability. This challenge is even more acute in developing markets, where the primary issue may not be a lack of transactions, but rather the absence of publicly accessible transaction databases. As Oladokun & Mooya (2023) note, "There are very few transactions, and it is therefore difficult to see how the risks actually affect the value." The problem, they argue, lies not in the lack of data, but in the lack of accessible infrastructure to consolidate it.

3. Adapting valuation models for a sustainable future: Incorporating ESG risks and opportunities

ESG factors inherently bring long-term impacts to commercial real estate. These often appear as risks. For example, climate change physical risks include increased flood damage to properties or higher cooling costs due to extreme heat. Transition risks from decarbonisation are also significant. This can mean the obsolescence of buildings with poor energy efficiency or rising costs from carbon pricing as we move towards a low-carbon economy.

However, ESG factors also present clear opportunities. These include potential "green premiums" – a higher value for sustainable assets – and enhanced tenant demand for eco-friendly spaces. Given this dual nature of risks and opportunities, traditional valuation models must adapt. My analytical approach specifically focuses on directly quantifying these impacts.

- **Discounted Cash Flow (DCF):** This is where we can truly integrate ESG.
    - **Income & expenses**: Green-certified buildings often command "green premiums" – higher rents and lower vacancies – driven by rising

tenant demand and corporate sustainability mandates. Conversely, properties with poor ESG performance risk "brown discounts" and suffer reduced Net Operating Income (NOI) due to escalating utility bills and increased insurance premiums.

- **Capital expenditures (Capex):** Decarbonisation and energy efficiency upgrades demand significant capital. A legal obligation to renovate for higher energy efficiency, though not yet universal (like in Poland), creates an unavoidable major cost directly impacting market value (EVS 2025, EVS 6, p. 86). Countries like the Netherlands already enforce strict performance requirements, rendering non-compliant assets un-leasable – making these upgrades essential, not optional.
- The revised EPBD sets clear targets. For commercial property: by 2030, the 16% most energy-inefficient buildings, and by 2033, at least 26% must be renovated to improve their energy performance. This regulatory trajectory implies inevitable expenditures for property owners, with costs varying depending on the building's technical condition and the scope of necessary works. For valuers, accurately estimating these costs and reflecting them in the market value is challenging, especially given limited market evidence of such "future value preservation." Cooperation between valuers and energy auditors[1], as well as insights from ESG Due Diligence reports, will be essential to properly assess the scale and impact of these investments on value.
- **Discount rate/capitalisation rate:** Elevated ESG risks can increase the perceived investment risk, leading to higher discount rates or capitalisation rates. Conversely, resilient, high-performing sustainable assets may warrant a lower risk premium due to better access to "green financing" and more favourable lending conditions from institutions increasingly focused on ESG. Investors are "willing to lower their required return" for certified properties due to reduced operating costs and higher rents.

> *“Integrating CRREM analysis allows us to project the costs associated with necessary energy efficiency renovations to meet future carbon emission targets. Unlike EPC ratings, which often rely on theoretical calculations, CRREM analysis is based on actual energy consumption data…”*

- **Income capitalisation and multiples valuation:** These methods demand that valuers rigorously identify and analyse transactions involving properties with similar ESG characteristics. This requires a nuanced understanding of how ESG performance translates into market premiums or discounts, moving beyond simple square meter rates to “green square meter rates.”
- **Cost approach:** This method can be adapted to reflect the costs of meeting modern ESG requirements. For instance, the “Depreciated Replacement Cost (DRC) method” (International Valuation Standards, 2025, IVS 103, A30.03) is used to estimate the cost of replacing an asset with a modern equivalent, adjusting for various forms of “obsolescence,” including those related to energy inefficiency or outdated sustainable design. Functional obsolescence can arise from outdated technology or design, impacting value due to “excessive capital cost” or “excessive operating cost” from energy inefficiency (EVS 2025, Valuation Methodology, pp. 116-130).
- **The role of the Carbon Risk Real Estate Monitor (CRREM) in quantifying transition risk:** Beyond immediate operational costs and potential green premiums, a critical aspect of valuing sustainable real estate in Europe involves understanding and quantifying transition risks. These risks stem from the shift towards a low-carbon economy, encompassing policy changes, technological

advancements and market shifts that could impact asset values. CRREM is a powerful tool in this endeavor, providing investors and valuers with pathways to assess the decarbonisation performance of individual assets against climate targets, indicating when an asset might become 'stranded' without intervention (RICS, 2024, p. 152).

- **Leveraging CRREM for renovation cost projections:** Integrating CRREM analysis allows us to project the costs associated with necessary energy efficiency renovations to meet future carbon emission targets. Unlike EPC ratings, which often rely on theoretical calculations, CRREM analysis is based on actual energy consumption data, including "plug-load" usage, providing a significantly more realistic assessment of a building's energy performance. This granular insight means that if a property's current energy performance trajectory deviates significantly from the CRREM pathways aligned with the Paris Agreement's 1.5°C goal, valuers can explicitly model the capital expenditure required to bring the asset back on track. This proactive assessment moves beyond simply reacting to current EPC ratings and directly addresses the long-term financial implications of decarbonisation. While CRREM itself does not generate a detailed cost estimate, it provides the critical insights and data points that enable expert valuers to accurately estimate potential 'brown discounts' more precisely. These discounts reflect the unavoidable costs of future renovations that will be borne by the owner to prevent obsolescence and maintain marketability. An analysis of stranding risk "highlights the point at which an asset becomes obsolete without intervention to support decarbonisation" (RICS, 2024, p. 152). This type of analysis is particularly relevant for properties with statutory deadlines for energy class upgrades (EVS 2025, p. 91).
- **Data challenges and future prospects:** While CRREM provides a robust analytical framework, its effective integration still faces data challenges. Crucially, access to detailed, reliable energy consumption data and future-proof renovation cost estimates remains key. While CRREM systematically expands its decarbonisation pathways for specific property types and locations worldwide, significantly simplifying risk analysis, obtaining very precise actual consumption data and detailed cost estimates requires

further input. In this context, close collaboration between the valuer and an ESG specialist becomes essential. It is the ESG specialist, through ESG Due Diligence, who can source and verify reliable data, and determine specific cost projections and detailed decarbonisation pathways tailored to the unique characteristics of a given asset. This synergistic approach ensures that CRREM analysis, supported by in-depth ESG expertise, will become an increasingly indispensable component of forward-looking real estate valuations.

- **Scenario analysis and real options:** Given the uncertainty surrounding future climate policies, energy prices, and market preferences for sustainable properties, scenario analysis becomes crucial. We can model different future states (e.g., varying carbon tax regimes, accelerated decarbonisation) to assess the range of potential values and identify assets at risk of becoming "stranded assets." Real options analysis can be used to value the flexibility embedded in properties that can be easily adapted to meet future sustainability standards.

> *"The key is to move beyond a simple qualitative acknowledgment of ESG and actively quantify its impact on the cash flows, risks, and ultimately, the market value of real estate assets, continuously adapting to "evolving market requirements"."*

The key is to move beyond a simple qualitative acknowledgment of ESG and actively quantify its impact on the cash flows, risks, and ultimately, the market value of real estate assets, continuously adapting to "evolving market requirements."

Conclusion

This first part of our exploration has laid the groundwork for understanding the fundamental shift in property valuation driven by ESG factors. We've highlighted the persistent and evolving challenges in data acquisition, particularly the "data maze" created by fragmentation and lack of standardisation, which demand immediate and collective attention. We've also emphasised the critical need for adapting traditional valuation models—from DCF to cost approaches—to effectively capture the long-term ESG impacts, including the quantification of both "green premiums" and "brown discounts" and the crucial role of tools like CRREM in assessing transition risks.

Mastering these foundational aspects is no longer merely advantageous; it's crucial for valuers to accurately assess the resilience and future value of real estate in a rapidly evolving market. The insights presented here are essential for beginning to navigate the ESG frontier, reinforcing the conviction that integrating ESG is not a cost, but a vital investment in resilience. As the real estate sector continues its profound metamorphosis, the ability of valuers to interpret and apply these new dimensions of value will be paramount to maintaining the profession's relevance and ensuring the sustainability of the built environment.

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In the next issue of EVJ: The evolving paradigm: From energy performance to holistic ESG valuation and the imperative for harmonisation

Abstract

Building upon the foundational understanding of ESG data and model adaptation, this second article delves deeper into

the transformative journey of property valuation. It examines the shift from a primary focus on environmental (E) factors, particularly energy performance, towards a truly holistic valuation paradigm that encompasses the often-overlooked Social (S) and Governance (G) impacts. Furthermore, the paper analyses the regulatory imperative shaped by the EU Taxonomy and other EU law, highlighting their profound influence on sustainable property valuation. A critical emphasis is placed on the persistent lack of full approximation across European and international valuation standards (EVS, IVS, RICS), which continues to pose challenges for practitioners. This article aims to provide valuers with the comprehensive understanding and strategic foresight necessary to navigate the ESG frontier, reinforcing the concept that “Transformation is not a cost – it’s an investment in resilience”.

[1] Ndlr See “Green Deal decarbonisation of the building stock rides on technical building systems”, Ana Caldeira Martins, EVJ issue n° 30, July 2023 and “For valuers, ‘Green Deal’ means more and better deals”, Tania Frank, EVJ n° 31, November 2023.

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SUSTAINABILITY REHABILITATION AND VALUATION

Energy efficient remodelling of the historic Library of Castilla y León in Valladolid enabling preservation of the original tiles

#06

Quantifying climate risks: The new frontier in real estate valuations

Sven Bienert

Ben Höhn

The unique role of real estate in the fight against climate change

Climate risk has become one of the most discussed topics in the real estate industry. With the global average temperature warming already exceeding 1.5°C in 2024[1], the threshold agreed upon in the Paris Climate Agreement is closer than many expected, and thus both the consequences of ongoing climate change and transition towards a decarbonised economy are becoming increasingly important for the industry's operations. Accounting for approximately 38% of global emissions[2] the real estate sector is one of the largest emitters of greenhouse gases. Its large contribution to climate change combined with its high potential for mitigation has put the sector in the spotlight of many regulators. Newly introduced Minimum Energy Performance Standards (MEPS) under the new EU Energy Performance of Buildings Directive and extension of the EU Emissions Trading System (EU ETS) to building and transport as well as similar EU instruments put buildings that do not meet the new standards at risk of devaluation.

In addition, the consequences of advancing climate change are beginning to have a significant impact on buildings and investment decisions. Rising temperatures are leading to an increase in the intensity and frequency of acute natural disasters such as hailstorms, river floods or wildfires or chronic conditions such as extreme heat or drought. As a result, there is an upward trend in economic losses from extreme weather or other climate-related events reaching €13.4 billion in Europe by 2023[3]. According to SwissRe, this trend is also observed globally, with losses from natural catastrophes reaching $120 billion in the first half of 2024 alone – an increase of 31% compared to the 10-year average[4]. Given that much of this is related to construction and infrastructure, the built environment is one of the industries most affected by the consequences of climate change.

It is clear that the double materiality of the sector (buildings' impact on climate and the climate's impact on buildings) could significantly influence the valuation of buildings that are either highly emission-intensive in their operations or at high risk of being impacted by a climate-related natural disaster. According to a recent survey conducted by ULI and PwC, 79% of respondents stated they believe ESG credentials will have a material impact on asset valuations over the next 12-18 months. Interestingly the same survey shows that 77% of respondents do not believe that current valuations accurately reflect this impact[5]. This raises an important question: What is the impact of climate change on real estate values, and how can it be effectively quantified?

Understanding climate risk – transition and physical climate risk

Downside climate risk is generally divided into **transition** (or transitory) climate risk and **physical** climate risk. Transition risk is the risk arising from the transition to a net zero carbon economy. This risk is typically driven by either regulatory or reputational pressures. Mitigation strategies typically target the operational emissions of buildings and include decarbonisation of heating systems, on-site renewable energy generation, or increasing energy efficiency.

Declining market attractiveness Declining attractiveness of submarkets due to increased vulnerability and exposure to higher cost	• Lower demand (investors and tenants) • Lower competitive advantage by increasing energy cost for properties with high-energy intensities and therefore higher cost for tenants • Reduced asset values may lead to a depressed market environment • Decreasing market values
Increasing regulation Legislation focused on climate change – e.g. disclosure of climate risks, stricter building standards, CO_2 pricing, carbon credits etc.	• Tax increases, e.g. CO, tax • Decrease in subsidies for certain technologies • Additional costs from reporting requirements • Additional investment cost to bring the real estate portfolio in line with EU or national laws • Enforced rules that properties can only be sold or rented if they meet a certain energy standard
Decreasing availability of natural resources Limited access to or availability of natural/fossil resources	• Increased CAPEX to transform buildings to renewable energy/ increase energy efficiency • Increasing cost of energy • Reduction of net income due to increase in cost
Risk to reputation and market positioning Stakeholder demand for real estate companies including climate risk in their investment decision making	• Loss of reputation in case of laggard ambition • Reputational risk for companies not including climate risk in their strategies

Figure 1 Transition risks and their impact on real estate valuation (own illustration)

Physical risk is the risk arising from the consequences of advancing climate change and can be further subdivided into acute physical risk (event-driven risk exposure from floods, hurricanes, extreme precipitation, etc.) and chronic physical risk (long-term shifts in climate patterns). An increase in physical risk is directly related to progressive climate change, as it leads to both more intense and more frequent climate-related events. According to the European Environmental Agency (EEA), Europe is particularly exposed to many of these risks, with both a significant increase in extreme heat and wildfires in the southern parts, and drastic changes in precipitation patterns leading to severe flooding, as seen in the Ahrtal in Germany in 2021[6]. Measures to reduce the physical risk to buildings may include flood protection, storm protection, or improved drainage design (**adaptation**).

The quantification challenges

Transition risk

Identifying the climate risk exposure of assets is not an easy task and varies by risk category. With respect to transition risk, the market has started to move away from only looking at sustainability certification (e.g. BREAM, LEED etc.) or Energy Performance Certificates (EPCs), to a larger spectrum of KPIs. The Carbon Risk Real Estate Monitor (CRREM) for example has become the standard for assessing the transition risk of a buildings operational use phase[7]. CRREM assesses transition risk by identifying the gap between a building's operational emissions and the CRREM decarbonisation pathways, which are aligned with the 1.5°C target of the Paris Climate Agreement. To quantify the financial implications of the CRREM analysis, the excess emissions - the gap between operational emissions and the CRREM decarbonisation pathway - a CO_2 price or an increased cost associated with the use of fossil fuels (indirect CO_2 price) can be used.

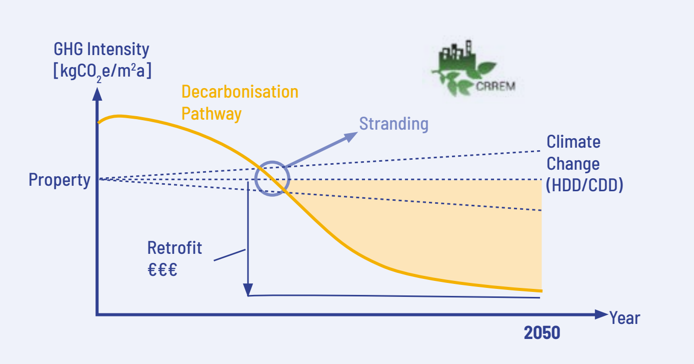

Figure 2 Asset Stranding Diagram (own illustration, based on CRREM (2020))

Physical risk

Physical risk quantification at the asset level involves assessing the probability and intensity of climate-related events using a **hazard function**. Hazard functions are determined through the analysis of climate models (typically from the CMIP model collection[8]). To assess the financial implications of the results, they can be combined with information on the vulnerability of the property - what damage will occur to the property if a natural catastrophe of a given intensity occurs - and the current exposure/value of the asset[9]. Insurance data are typically used to determine vulnerability. While there are some national providers of risk quantification (e.g. GIS-Immorisk in Germany), there is no standard tool for physical risk assessment worldwide.

Both transition and physical risk exposure should always be quantified for the current and future climate, but especially for physical climate risk, as the risk exposure can increase significantly if certain warming scenarios are considered. The quantification process is complex and many market participants rely on external risk assessment analysis. While these commercial providers often provide valuable information for companies' adaptation strategies, the lack of a standardised process leads to diverging results, making it challenging to isolate the specific impact of future physical risks on property values[10]. The quantification of river flood risk remains particularly challenging, as it requires a high granularity of the climate model, leading to high deviations between the risk assessments of different providers for the same properties (Figure 3).

	Observed*	Expected*
River Flood (Undefended)	1	1
Drought	2	4
Storm Surge	3	3
Extreme Heat Days	4	5
Coastal Flood Score	5	6
Wildfire Score	6	2

*** 1 is the highest deviation and 6 the lowest. Expectation refers to the providers**

Figure 3 Expected and observed deviation of different Hazards (own illustration, based on Höhn et al. 2024)

Is there measurable impact of climate risk on real estate values?

Valuation is an evidence-based and objective process; therefore, potential price effects must be empirically demonstrated with market data in order to be included in the valuation. For transition risk, certification, energy efficiency or EPC class have been identified as value drivers[11]. However, the effects are not as simple as adding or subtracting the cost of an energy retrofit or adaptation measure from the value of the asset, as the market may value these measures differently from the projected costs. Therefore, researchers typically use hedonic pricing models to isolate the price effects of certain features. There is ample scientific empirical evidence that environmental sustainability performance and climate risk have a significant impact on the value of buildings, reflected either as a green premium or a brown discount[12]. It is important to note that these scientific studies represent a point in time; with changing regulations and current market sentiment, the significance of these effects can change drastically. With rising interest rates and the resulting cooling of real estate markets, sentiment has shifted strongly towards energy efficient buildings with low exposure to transition risk in markets with lower demand[13].

This trend of increasing importance of climate risk is particularly relevant in the context of **physical climate risks**. Although past studies have shown that property values can recover within five years of a natural catastrophe (see Figure 4), the increasing frequency and severity of natural disasters raises the question of whether these patterns will hold in the future—or whether the negative impacts on property values will become more permanent.

Insurance can lower the financial impacts of current physical risk. However, as the frequency and intensity of natural catastrophes increases, it is likely that premiums for these types of insurance will rise dramatically, some areas will become uninsurable, and recovery from losses will be much slower. This is already happening in parts of Australia and the U.S.

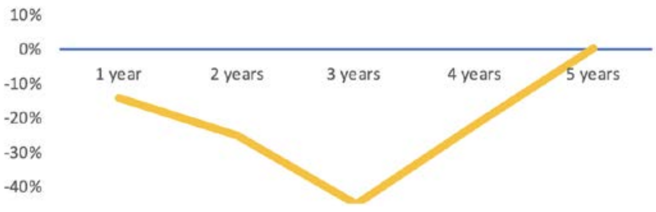

Figure 4 Recovery of property values after hurricanes in the U.S. (own illustration, based on Fisher et al.)

Climate risk is not a new concept in real estate valuation

In general, hedonic regressions provide clear evidence that both transition risk and physical risk have a significant impact on property values. However, the magnitude of these effects depends on current market sentiment, and to ensure the objectivity of valuations, these effects must be derived from market data. Risk quantification tools such as CRREM analysis can provide a robust basis for isolating these effects and incorporating them in the valuation process, but only if they are applied on a large scale and collected. Valuation standards such as the EVS provide more sophisticated and detailed guidance on how these risks can be factored into the valuation process. However, this is not as new as it might appear - an old oil-based heating system has been less attractive than a state-of-the-art heat pump for many years. The magnitude of these risks on valuation is very likely to increase as climate change progresses.

[1] Copernicus (2024) - https://climate.copernicus.eu/.

[2] European Commission (2019) - Commission Recommendation (EU) 2019/786.

[3] Copernicus (2024) - https://www.copernicus.eu/en/news/news/observer-esotc-2023-europe-experienced-extraordinary-year-extremes-record-breaking.

[4] SwissRe (2024) - https://www.swissre.com/press-release/Severe-thunderstorms-drive-insured-losses-to-USD-60-billion-in-first-half-of-2024-Swiss-Re-Institute-estimates/fdefcc81-c403-4ce8-ab2c-37ca6d98cf4a.

[5] ULI & PwC (2024) - Emerging Trends in Europe Survey 2024.

[6] EEA (2024) – European Climate Risk Assessment.

[7] The Carbon Risk Real Estate Monitor offers individual pathways for most types of commercial real estate. There is no individual pathway for single family homes.
More information at www.crrem.eu.

[8] More information at www.wcrp-climate.org.

[9] Hirsch et al. (2015) – Assessment of climatic risks for real estate.

[10] Höhn et al. (2024) – Assessing climate risk quantification tools – mere fulfilment of duty or actually beneficial?

[11] Groh et al. (2022) – Does Retrofitting Pay Off? An Analysis of German Multifamily Building Data.

[12] Bienert et al. (2016) – Metastudie: Nachhaltigkeit contra Rendite?; Fürst et al. (2015) - Does energy efficiency matter to home-buyers? An investigation of EPC ratings and transaction prices in England; Cajias et al. (2019) - Tearing Down the Information Barrier: The Price Impacts of Energy Efficiency Ratings for Buildings in the German Rental Market.

[13] JLL (2024) - https://www.jll.de/de/presse/Preisverfall-unsanierter-Wohnhaeuser-ist-vorerst-gestoppt.

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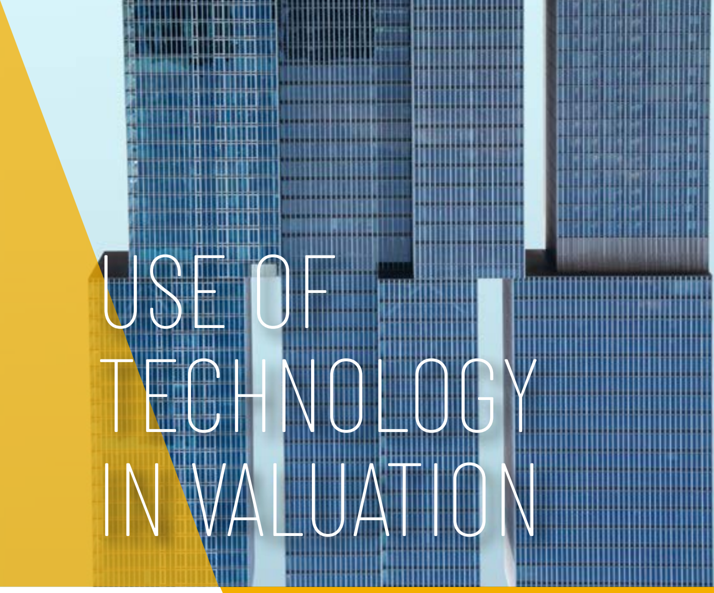

USE OF TECHNOLOGY IN VALUATION

#07

Use of technology in valuation

Alexander Aronsohn

Although technology has been used for decades to perform valuations, there has been a significant evolution that may profoundly impact how valuations are performed and reported.

Some such advances are machine learning, deep learning, data sourcing and data processing and many other uses – many of which have started to be incorporated, to some extent, within valuations across all asset classes through the growing use of automated valuation models (AVMs) and automated valuation reporting.

IVSC has been working with many stakeholders across the valuation profession, including more than 230 member organisations such as valuation professional organisations, standard setters, regulators, service providers, and end-user communities to consider the role and impact of new technology on valuation, and the role of standards in this evolving dynamic. The IVSC Technical Boards agreed that this topic needs additional focus due to the increasing importance across all markets.

As such, the IVSC Standards Review Board (SRB) established a Technology in Valuation (cross-specialism) Working Group working to evolve the standards as they relate to the growing use of technology in valuation. As technology continues to evolve, IVS needs to have clear frameworks in place that promote consistency, quality, and transparency.

It should also be noted that IVS is a principle-based standard that applies broadly to all those involved in the valuation process. This includes not only valuers, but also other stakeholders such as service organisations specialists, tech providers, investors, regulators and end users.

In recognition of recent significant technological advances, the recently published IVS (effective 31 January 2025) includes requirements on governance, data and inputs, valuation models and quality controls.

The Glossary includes the following definitions for an Automated Valuation Model and for a Valuation Model:

Automated Valuation Model (AVM): *A type of model that provides an automated calculation for a specified asset at a specified date, using an algorithm or other calculation techniques without the valuer applying professional judgement over the model, including assessing, and selecting inputs or reviewing outputs.*

Valuation Model: *A quantitative implementation of a method in whole or in part that converts inputs into outputs used in the development of a value.*

IVS 100 Valuation Framework now includes a section on the use of a specialist or service organisation. This recognises that where valuers do not possess the necessary technical skills, experience, data, or knowledge to perform all aspects of a valuation, they may seek assistance from such parties, provided this is agreed and disclosed in the scope of work. This is particularly relevant for data sourcing and processing, and for the provision of valuation models.

IVS also includes the following new standards related to data, inputs, and valuation models:

- IVS 104 Data and Inputs
- IVS 105 Valuation Models

IVS 104 Data and Inputs sets out requirements for the selection and use of data in valuations. The aim is to maximise the use of relevant and observable data wherever possible. This chapter also covers the use of a specialist or service organisation, the characteristics of relevant data, input selection, and data and input documentation. Notably, it states: *"the valuer is responsible for assessing and selecting the data, assumptions and adjustments to be used as inputs in the valuation based upon professional judgement and professional scepticism."*

IVS 105 Valuation Models addresses the selection and use of valuation models, including the involvement of service providers, and sets out the criteria for appropriate model selection and application.

It states that *"valuation models can be developed internally or sourced externally from a specialist or service organisation"* but *"in all cases the valuer must apply professional judgement and professional scepticism in the selection and use of valuation models and the application of inputs used in the valuation model."*

IVS currently notes that *"no model without the valuer applying professional judgement, for example an automated valuation model (AVM), can produce an IVS-compliant valuation."*

The IVSC SRB recognises that this is a fast-developing field, and this position may evolve in future editions of the IVS in response to the rapid growth of artificial intelligence, machine learning, and deep learning.

Understanding future standard-setting needs in this space also requires an appreciation of differences between these technologies. At present, a valuation model that uses AI, machine learning, or deep learning is unlikely to produce an IVS-compliant valuation unless the valuer has appropriate understanding and involvement to assess the model and apply professional judgement.

IVS 105 currently states:

"40.02 Regardless of whether the valuation model is developed internally or externally sourced the valuer must assess the valuation model in order to determine that the valuation model is fit for its intended use.

40.03 The valuer must understand the way the valuation model operates."

"Although IVSC does not believe a human valuer can be replaced at this time, we continue to monitor developments

closely.”

This does not mean that a valuation model using AI, machine learning, or deep learning cannot assist the valuer. These tools can be used as part of the valuation process, as long as the valuer retains responsibility for applying judgement and meeting the standards.

The IVSC Technical Boards have observed the increasing use of technology in valuation – either for parts of the process or in full. AI is already being used by valuers in different ways, although its application varies significantly across markets.

According to the CBVI Primer on Artificial Intelligence[1], two types of AI are currently being used in financial services and litigation.

*“**Predictive AI** is being used to analyse large datasets, forecast trends, and identify patterns to help professionals make informed decisions. It is also being used to identify potential risks and opportunities in the market.*

***Generative AI** tools, (e.g. ChatGPT, Copilot, Gemini, DALL-E, Midjourney) create content such as text, images, video, or audio in response to prompts. These tools are often powered by large language models (LLMs).*

AI can help streamline straightforward valuation tasks – such as report writing – allowing valuers to focus on more complex areas that require higher levels of judgement.

In property valuation, AVMs are increasingly used by banks alongside valuation reports to support secured lending decisions for residential property. While AVMs have seen notable advances in residential real estate, this progress has not yet extended at the same pace to commercial property, business, or financial instrument valuations.

In conclusion, while valuations solely using AI, machine learning or deep learning are not currently IVS-compliant, the use of these tools to support a valuer’s work represents an opportunity to enhance the process by providing additional insights and efficiencies. However, these developments also raise important questions about managing valuation risk, defined in IVS as *“the possibility that the value is not appropriate for its intended use.”*

Although IVSC does not believe a human valuer can be replaced at this time, we continue to monitor developments closely. In the meantime, IVSC welcomes input from stakeholders to help inform potential support materials of future updates to the standards – ensuring that valuers can appropriately incorporate technology while maintaining compliance with our principles-based standards.

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[1] NDLR: See "Primer on artificial intelligence – Essential considerations for business valuers on the responsible use of AI, CBV Institute, EVJ n°35, March 2025"

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AGRICULTURAL VALUATION

Mark Booth REV

#08

The personal nature of valuing the family farm – Combining comparative and income approaches to achieve an accurate and didactic valuation report

Mark Booth and Rita

Introduction - France's "Empty Diagonal"

The Limousin region in which I farm and practice valuation is situated in central France, right at the heart of the area referred to, somewhat pejoratively, by the French as "The Empty Diagonal" (La diagonale du vide).

The term refers to a large area stretching from Lorraine to the Massif Central and includes the Limousin and Périgord regions. The area is dominated by forestry, farmland, and semi-mountainous regions, with relatively few urban centres and is characterised by low population density compared to the rest of France, with an average of just 30 inhabitants per square kilometre.

Market challenges

In these regions, away from large population centres, values of residential, retail and office properties have struggled to keep pace with inflation. Effectively, they have remained static or even declined in value when inflation-adjusted valuations are carried out.

Agricultural industry realities

With particular regard to the Limousin and Périgord regions, a similar pattern has emerged in the agricultural industry. The area's poorer-than-average soils mean that livestock farming, heavily reliant on EU CAP aid, is the only route toward any level of profitability.

As a result, returns per hectare and per man-hour of work are lower than in other regions. Relative to areas with greater yield potential and earning capacity, life is harder for all involved. Combined with the general rural exodus, farmers have struggled – and sometimes been unwilling – to retain the next generation on the farm. This has resulted in a substantial number of farms entering the market as the post-war "baby boomer" generation of farmers reaches retirement age.

A bright spot in this scenario has been an influx of capital from mainly Northern Europeans moving to more scenic regions in search of a quieter, rural lifestyle and lower agricultural property prices. This has allowed some regions within the diagonal to sustain the balance between supply and demand, thus maintaining agricultural and rural property prices and market stability.

> *"The highly personal relationship between the "family farmers" and their assets means that, in a declining market, the valuer's role extends beyond assessment to managing expectations and potential disappointment."*

The role of the valuer in a changing market

In recent history, this market stability has permitted agricultural property valuers to rely primarily on the comparative method, with little need to look elsewhere for confirmation of valuation results. However, farming demographics have now shifted to such an extent that the volume of farms in need of buyers exceeds demand.

The valuer must therefore be acutely aware of these changing market conditions, which complicate the already challenging task of finding reliable comparable sales in a market where accurate references for individual fixed property elements of an agricultural holding (residence, farm buildings, agricultural land, woodland, etc.) are not readily available[1].

The highly personal relationship between the "family farmers" and their assets means that, in a declining market, the valuer's role extends beyond assessment to managing expectations and potential disappointment. Consequently, valuation reports must be carefully prepared with well-reasoned arguments. Recent downward trends in the market, inferred from the absence of recent transactions, may come as a surprise to clients, and the factors influencing current values are, by their nature, difficult to support with concrete, published evidence.

Introduction of the VEA method

To this end, a valuation method known as 'VEA' (valeur de l'entreprise agricole, or 'agricultural enterprise value'), developed and commonly used by Experts Fonciers in the more profitable farming areas of northern France, has become a useful tool.

The method was developed in the 1980s mainly for tenanted farms, as a means to adapt commercial and business valuation methods in order to integrate an income approach to the agricultural property valuation, reflecting the added value of long term profitability to the value of fixed assets.

In all regions the VEA has traditionally been used to establish a fair value for share transactions when replacing a partner within a company structure—a scenario where no open market exists for the partial sale of shares.

Previously, this method was avoided for calculating Market Value in the region, as property prices remained stable despite low returns, largely due to the presence of non-local buyers who were less sensitive to pricing. Applying the income approach in such a context would have risked undervaluing properties relative to achievable market levels.

However, in the current climate, where political pressures and administrative restrictions limit the highest and best use scenarios *(see box)* often achieved by breaking up the farm, this approach has gained broader relevance. Today, even in whole-farm sale scenarios, many owners are now compelled to market their properties as functioning units to local buyers. To attract these predominantly new entrants, working farms require a valuation approach that considers the business's ability to finance both capital and labour costs.

Application of the VEA method

The VEA method conforms to the French valuation standards charter "La Charte de l'Expertise en Evaluation Immobilière" by employing a variation of two valuation methods, combining them to achieve a final single value:

- **"The Substantial Value (VS)**, also known as the Mathematical Value, is determined using comparative and DRC methods to reflect the 'patrimonial' worth of the business assets.
- **"The Yield Value (VR)**, which discounts the average adjusted gross operating surplus (EBE or EBITDA) over a specific period while considering a specific risk coefficient.

For its implementation, the farming operation is considered as being under lease. The substantial value only includes assets essential to the business's operation. Land and assets deemed non-essential are initially excluded before being reintegrated into the final valuation.

Historical valuation practices vs updates to the VEA method

Historically, and for many years:

- The discount period was set at 18 years[2].
- The discount rate was fixed at 5%.
- The weighting between Substantial Value (VS) and Yield Value (VR) was an equal 50/50 split.

However, with increasing market volatility and changing economic and political conditions, the VEA method was updated in 2023 to introduce greater flexibility. Now, valuers have the ability to:

- Adjust the VS/VR ratio according to various factors, provided they are well justified in the report
- Modify the discounting period depending on the specific context
- Adapt the discount rate, again requiring reasoned justification

The knowledge and skill of the valuer are brought to the fore here as required to adjust and contextualise each variable according to the property and its business potential.

Alternative applications of the "Valeur de reprenabilité" method

Other institutions involved in agricultural valuations, such as agricultural accountancy and advisory service providers, have adopted a simplified version of the method known as the "Valeur de Reprenabilité" (transferability or takeover value).

This approach inverts the traditional valuation process by determining the maximum investment an agricultural enterprise can support, based on its capacity to service debt. Rather than valuing an asset in isolation, it anchors the analysis in economic reality: farm acquisitions are typically financed through borrowing, and the ability to repay that debt defines the financial ceiling of the transaction. However, when a transfer entails a change in production (ex. beef to dairy), priority must be given to projected future cash flows rather than past financial performance. The associated risk level must also be adjusted to reflect the profile of a "new entrant," often accounted for by excluding a security margin – typically expressed as a percentage of corrected EBITDA – from the yield value (VR) (referred to by the lender/investor as "investable value") calculation.

Saint-Christophe, Charente department

The author organises his grazing and follows the movement of his herd with the aid of GPS collars and an app on his phone.

Conclusion

The VEA method ensures accurate valuation of agricultural properties in this evolving market and facilitates meaningful client engagement. The necessary dialogue during the preparatory phase helps clients understand and assimilate the rationale behind a valuation figure that may not always meet their expectations.

The VEA as applied in France is very much adapted to the effects of French legislation on statutory and administrative obligations as well as risk. However, much of the methodology and due diligence required to build the model and prepare such a valuation is now available in EVS 2025's EVGN 4 Valuation of Agricultural Property. The guidance notes in European Business Valuation Standards 2020 are also essential reading for completing the valuation model.

As with all high quality valuations, however, local market experience and understanding by the valuer remain the essential key to the conclusion of a truly accurate valuation report and a satisfactory outcome for the client.

Regulatory control of land sales in France

France operates one of the most comprehensive and interventionist systems in Europe for regulating the sale and use of agricultural land. This framework seeks to ensure that farmland remains in productive use, accessible to active farmers, and protected from speculative or purely financial investment pressures.

At the core of this system is the SAFER (Société d'Aménagement Foncier et d'Établissement Rural), a public agency with a legal mandate to oversee rural land transactions. SAFER has the right of preemption (droit de préemption), allowing it to replace a buyer in any eligible transaction involving agricultural or rural land. Its objective is to support land consolidation, facilitate generational renewal, and protect vulnerable natural or agricultural zones. All qualifying transactions must be declared to SAFER, which then has a fixed period—typically two months—to exercise this right.

In some cases, SAFER may also preempt "avec révision du prix", offering to purchase the property at a price below that agreed by the buyer and seller if it believes the sale price exceeds a fair market level. The seller must then either accept the revised offer or withdraw the property from sale. This mechanism effectively restrains prices to a level closer to that which would be reasonably achievable by an active farmer wishing to repay borrowings solely from the land's productive output, rather than from external capital or non-agricultural revenue streams.

"France operates one of

the most comprehensive and interventionist systems in Europe for regulating the sale and use of agricultural land. This framework seeks to ensure that farmland remains in productive use, accessible to active farmers, and protected from speculative or purely financial investment pressures."

Another critical element is the "contrôle des structures", administered by the Direction Départementale des Territoires (DDT). This process governs the right to exploit agricultural land and requires prior authorisation for acquisitions or leases above certain surface thresholds. It gives priority to smaller or newly established farms, particularly those led by qualified farmers, while effectively excluding larger, well-capitalised operations from expanding. In doing so, it imposes a selective filter on potential buyers that further restrains market dynamics.

These controls must be assessed by the valuer in view of their effect on removing potential purchasers from the marketplace and thus limiting land values as compared to a truly free market. The resulting land prices may reflect productive capacity and policy goals more than open-market demand, and this distinction is essential in any valuation analysis.

The regulatory framework was further reinforced by the Loi Sempastous (2021), which closes a major loophole in land transfer oversight. It brings under scrutiny the indirect acquisition of farmland via share purchases in non-listed landholding companies. Where control thresholds are crossed, the transaction must be declared and may be subject to administrative review, with SAFER potentially involved. This extends the reach of land governance into corporate structures that were previously opaque.

Together, these mechanisms reflect France's strong public policy commitment to preserving agricultural land as a productive resource, rather than allowing it to be governed purely by market forces. For valuers, this regulated context presents both challenges and essential considerations in determining market value.

[1] In regard to land prices, for reasons of taxation and political pressure, aided by administrative controls, the breakdown of the value of assets within a whole farm sale can be "massaged". Land prices in particular tend to be restrained to a lower than true market value.

State controls on agricultural land and building rental values mean that in France, the notion of market rent for agricultural property does not exist. A simple capitalisation formula for valuation is therefore impossible.

More on this in the box "Regulatory control of land sales in France".

[2] The duration of the most common statutory long term tenancy. As the expected income over the selected period is not limited to the income from the activity, at the end of the discounting period, it would be wrong to consider that the farm has no sale value. The residual value of the farm at the end of the analysis period must be included in the income for the final year. This future residual value will be discounted along with the other income.

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Since emigrating from the UK to France in 1991, he has been farming, and for the last 19 years, working as an agricultural property valuer with a specialisation in accompanying the transmission of agricultural properties and businesses to the next generation of farmers, whether within or outside of the family.

BUSINESS
VALUATION

#09

Market multiples' adjustments – Size, growth and risk

Nina Milenković

1 Introduction

The market approach is one of the traditional approaches to valuation. It is based on the principle of substitution and the premise that a rational investor will not pay for an asset/company a higher amount than he would pay on the market for the purchase of an asset/company with similar characteristics and utility. As a result, application of the market approach usually includes the use of market multiples calculated for comparable companies that are listed on active stock markets or that have recently been sold/purchased. Multiples are based on data about market value of equity and debt, and information from financial statements of selected comparable companies. The sources of data about comparable companies are usually specialised data platforms and/or databases (Bloomberg, Capital IQ, Infront Analytics, Damodaran, etc.). These databases contain comprehensive information about a large number of companies, but only for those companies that exceed threshold values in terms of size (thresholds vary, but they mainly relate to annual turnover in excess of 50 million USD).

When the valuation subject is a large company, a multinational or one that operates on a developed market, most often the multiples can be used directly. However, when undeveloped or emerging markets are involved, in which the business environment differs significantly and valuation subject companies are often as much as one hundred times smaller, direct use of multiples would produce distorted results, mostly with significant overestimation of their value. For this reason market multiples need to be adjusted by a factor or factors which will take into account key differences between a selected sample and the valuation subject.

These factors are very often determined subjectively, based on qualitative analysis of risk profile and the appraiser's experience. However, it is precisely the subjectivity of such an approach that represents its greatest weakness, because the result is directly dependent on the level of adjustment, and is perforce subject to error and even to manipulation. That is why it is much better if the adjustment factor is determined using a quantitative method. It is desirable, therefore, for factors that are taken into account for the adjustment to be consistent with factors that were used in determining the discount rate as part of the income approach.

2 Sources of Differences and Impact on Multiples

The most commonly used multiples that result in Enterprise Value (equity plus interest-bearing debt minus cash) are:

- **EV/EBIT** – Enterprise value (market capitalisation plus market value of interest-bearing debt minus cash) relative to earnings before interest and tax;
- **EV/EBITDA** – Enterprise value relative to earnings before interest, tax, depreciation and amortisation;
- **EV/Sales** – Enterprise value relative to revenue;
- **EV/BVEV** – Enterprise value relative to book value of invested capital.

The most commonly used multiples that result in equity value are:

- **P/E (Price to Earnings)** – Market capitalisation relative to net income;
- **P/BV (Price to Book Value)** – Market capitalisation relative to book value of equity.

Most valuation experts agree that peer company samples are often heterogeneous in terms of various performance metrics, leading to wide dispersion in multiples (illustrative examples are given in Literature reference [1]). There is also near consensus that the primary sources of differences between peer companies and the company being valued are growth potential, investment risk, and company size. These factors affect all types of multiples. Depending on how the multiple is constructed, other influencing factors include profitability (EBIT and EBITDA margins), ROIC (Return on Invested Capital: EBIT/IC), ROE (Return on Equity: NI/BV), and leverage, measured as the debt-to-equity ratio (D/E).

In brief, the factors influencing each multiple are summarised in the following table:

Multiple	**Influencing Factors**
EV/EBITDA, EBIT	Growth, risk, size
EV/Revenue	Growth, risk, size, profitability
EV/BV	Growth, risk, size, ROIC
P/E	Growth, risk, size, leverage
P/BV	Growth, risk, size, leverage, ROE

Table 1. Influencing factors for selected multiples

3 Quantifying Differences and Adjustments

There are numerous methods for adjusting multiples for growth and/or risk (some methods, mainly based on the P/E multiple, are presented in references [2], [3], and [4]). Reference [5] describes a method for combining multiple adjustment factors—covering market, size, leverage, and risk—though not explicitly addressing growth potential. Since these three factors affect all multiples, encompassing them within a single adjustment factor is particularly useful.

3.1 Adjustments for Growth, Risk, and Size (GRS)

The key question concerning the relevance of the GRS (Growth, Risk & Size) factor is: how much higher or lower would the multiples be if the growth, risk, and size of the peer companies matched those of the company being valued? According to references [6] and [7], the answer lies in comparing the net present value of one monetary unit of EBIT or EBITDA for the peer company and the subject company. It could be done in the following way:

- It is assumed that for the next five years EBIT or EBITDA for each company grows at the expected growth rate (growth rates are often available in databases);
- From year 6 to year 10, growth is assumed to decelerate linearly to the terminal growth rate (typically aligned with expected long-term inflation);
- NPV is calculated using each company's respective WACC (usually simplified), which includes a size premium;
- The ratio of the NPV of the subject company to that of the peer company is the adjustment factor for growth, risk, and size (the GRS factor).

WACC in the third step can be obtained from data platforms (as actual WACC for the company), but it can be calculated in different ways. A lot of authors (including this one) recommend a simplified way with same risk-free rate and equity risk premium, but including appropriate size risk premium and country risk.

3.2 Adjustments for Profitability and Leverage

The *revenue* multiple is adjusted for profitability as follows:

- Adjusted EBITDA for each company is calculated using the margin of the company being valued;
- EV is calculated "backwards" using the original EBITDA multiple;
- From the adjusted EV and revenue, the adjusted revenue multiple is derived.

Essentially, the adjustment factor is the ratio of the EBITDA margin of the subject company to that of the peer company.

Similarly, *EV/book value of EV* multiples are adjusted for differences in ROIC and *Price/BV* multiples for differences in ROE. ROIC factor is simply the ratio between ROIC of subject company and ROIC of public company. The same logic applies to the ROE factor.

Leverage adjustments to the *net income* multiple stem from the fact that EBIT and net income multiples are reciprocal to ROIC and ROE respectively, so it is possible to calculate the P/E multiple from EV/EBIT (see [6] for further explanation). Finally, the price-to-book multiple is derived by multiplying the net income multiple by ROE.

3.3 Simplified

Adjustments for Size and Risk

The previously described adjustments are possible when all necessary data are available. As all valuers from smaller countries very well know, it depends on the access to data platforms. If a valuer is from a small valuation firm, it is not always affordable.

In such cases, GRS could be replaced with simplified adjustment for size and risk using a so-called “adjusting” discount rate, calculated as described in section 3.1.

The idea behind simplification and equalisation of risk-free and ERP is to exclude specific differences and emphasise those related to size and market (geography) risk. For that reason, beta could be excluded as well (i.e. assumed to be equal to one).

Cost of debt could be calculated using risk-free, country risk and default spread, but it is also possible to use cost of debt of valued company.

The adjusting factor for equity multiples is the ratio between simplified cost of equity of public company and cost of equity of valued company (calculated in the same way). Similarly, the adjusting factor for EV multiples is the ratio between WACCs.

3.4 Example of an Airline Company

The multiple adjustments procedure is illustrated using the example of a regional airline company; as it is a real company, regardless of outdated data, for confidentiality reasons here it is named Eastern Air. Basic company financials are shown in Table 2.

Eastern Air	**000 USD**
Book Value of Equity	74.90
Total Debt incl leases	2,801.90
Firm Value	2,876.80
Cash	1.00
Enterprise Value	2,875.80
Debt to capital ratio	97,40%
Debt to Equity ratio	3740,85%
Revenues	6489,90
EBITDA	459,60
EBIT	325,02

Net Income	4,12

Table 2. Basic Financials for Eastern Air for the Last Fiscal Year

Source: Financial statements for the 20XX fiscal year

The company operates mostly in Europe, having a few intercontinental lines as well. The majority owner is the state, and minority shareholders are also mostly government institutions. Shares are not quoted on the local stock exchange. The company is highly indebted and whole debt is in the form of leasing. Bad management combined with high interest expenses took the company close to loss-making territory, so the book value of equity is very low.

Having a relatively new fleet, well operating regional lines and access to some interesting airports, the company expect EBIT growth at 18.3% p.a. in the next five years and could be a desirable acquisition target. For the purpose of illustration it is assumed that the potential acquirer engaged the valuer to conduct a quick indicative valuation. Market multiples are often the first choice in this scenario.

The valuer formed a peer group, using data from one of the data platforms.

Multiples are shown in Table 3.

Company Name	Country	Market cap	Market D/D+E
Finnair Oyj	Finland	489.2	73.44%
Air France-KLM SA	France	3,092.6	87.67%
Aer Lingus Group plc	Ireland	939.3	49.42%
Norwegian Air Shuttle ASA	Norway	1,090.1	74.05%
SAS AB	Sweden	845.5	67.79%
Türk Hava Yollari A.O.	Turkey	4,140.1	59.08%
Median			**70.62%**

Company Name	Market Multiples — Unadjusted					
	P/E	P/BV	EV/ EBIT	EV/ EBITDA	EV/ Sales	EV/ BVEV
Finnair Oyj	12.31	0.48	11.23	8.95	0.51	0.82
Air France-KLM SA	NA	0.71	35.01	12.56	0.59	0.93

Aer Lingus Group plc	22.31	0.91	16.51	8.10	0.78	1.30
Norwegian Air Shuttle ASA	12.17	2.23	NA	20.17	1.66	1.35
SAS AB	30.75	0.49	3.51	3.64	0.29	0.93
Türk Hava Yollari A.O.	7.72	1.23	9.50	7.44	1.11	1.22
Median	**12.31**	**0.81**	**11.23**	**8.53**	**0.69**	**1.08**

Table 3. Market Multiples

Source: Data Platform

Comparing Eastern Air's profile with the peer group, it is obvious that all selected companies are much bigger, are settled in more developed countries and are less indebted. Moreover, there is no information about assets/fleet values, but comparing EBITDA and EBIT multiples it seems that i) depreciation share in revenue is lower in comparable companies and ii) some of the companies have non-cash non-operating revenues. Finally, although there are data in the database about debt structure and amount of leasing, there is no information on type and terms of leasing. All those differences and potential differences make multiple adjustments necessary.

Additional data needed for multiples adjustments are shown in the following table:

Company Name	Country	5-year growth	D/E ratio
Finnair Oyj	Finland	7.55%	276.57%
Air France-KLM SA	France	13.60%	711.22%
Aer Lingus Group plc	Ireland	4.79%	97.70%
Norwegian Air Shuttle ASA	Norway	26.40%	285.35%
SAS AB	Sweden	5.75%	210.48%
Türk Hava Yollari A.O.	Turkey	23.00%	144.37%
Eastern Air	**Country X**	**18.30%**	**3740.85%**

Company Name	Size premium	Cost of Equity	WACC
Finnair Oyj	2.65%	12.15%	6.92%
Air France-KLM SA	1.20%	11.30%	6.67%
Aer Lingus Group plc	1.88%	13.78%	7.40%
Norwegian Air Shuttle ASA	1.88%	11.38%	6.70%
SAS AB	1.88%	11.38%	6.70%

Türk Hava Yollari A.O.	1.01%	13.01%	7.18%
Eastern Air	**12.06%**	**25.56%**	**11.52%**

Company Name	EBITDA margin	Pre-tax ROIC	After-tax ROE
Finnair Oyj	5.75%	6.35%	2.83%
Air France-KLM SA	4.72%	5.63%	25.75%
Aer Lingus Group plc	9.64%	6.31%	4.06%
Norwegian Air Shuttle ASA	8.21%	NA	17.08%
SAS AB	7.96%	12.35%	1.60%
Türk Hava Yollari A.O.	14.91%	11.91%	15.16%
Eastern Air	**7.08%**	**11.30%**	**5.50%**

Table 4. Factors Used in Multiples Adjustments

Source: Data Platform and Table 2

In the calculation "adjusting" CoE and WACC for comparable companies and Eastern Air the build-up method is selected (i.e. Beta is assumed to be equal to 1) and the following assumptions are used:

- risk-free rate: return on U.S. government bonds as at valuation date,
- market risk premium: valuer's estimation, based on different research studies,
- country risk premium: assessed for each country, based on credit rating,
- size risk premium: from Ibbotson Associates Yearbook, in line with market capitalisation,
- cost of debt (after-tax): median of comparable companies' data,
- capital structure: median of comparable companies' data.

WACC calculation is presented in detail in Appendix 1.

Based on presented data, adjustment factors and adjusted multiples are calculated. Calculation of GRC factor and P/E derivation from EV/EBIT and ROIC are presented in Appendices 2 and 3.

	Adjustment factors		
Company Name	GRS	Margin	ROIC
	I	II	III

Finnair Oyj	0.80	1.23	1.78
Air France-KLM SA	0.54	1.50	2.01
Aer Lingus Group plc	1.04	0.73	1.79
Norwegian Air Shuttle ASA	0.29	0.86	NA
SAS AB	0.84	0.89	0.91
Türk Hava Yollari A.O.	0.28	0.47	0.95
Adjusted Median	**0.67**	**0.88**	**1.78**

	Market Multiples — Adjusted					
Company Name	P/E	P/BV	EV/EBIT	EV/ EBITDA	EV/Sales	EV/BVEV
	IV	V	VI	VI	VII	VIII
Finnair Oyj	27.43	1.51	8.98	7.16	0.50	1.17
Air France-KLM SA	74.15	4.08	18.98	6.81	0.48	1.01
Aer Lingus Group plc	27.74	1.53	17.18	8.43	0.60	2.43
Norwegian Air Shuttle ASA	NA	NA	NA	5.84	0.41	NA
SAS AB	11.94	0.66	2.95	3.06	0.22	0.72
Türk Hava Yollari A.O.	12.45	0.68	2.69	2.11	0.15	0.33
Adjusted Median	**27.43**	**1.51**	**8.98**	**6.33**	**0.45**	**1.01**

Table 5. Adjusted Multiples

Source: Data Platform and Table 2

I GR&S = Growth, Risk & Size factor. For calculation see Appendix 2.

II Valued Co EBITDA margin / Public Co EBITDA margin

III Valued Co ROIC / Public Co ROIC

IV P/E adjusted for GR&S and leverage. For calculation see Appendix 3.

V Adjusted ratio = Adjusted P/E ratio × Valued Co ROE

VI Adjusted multiple = Unadjusted multiple × GR&S factor

VII Adjusted multiple = Unadjusted multiple × GR&S factor × Margin factor

VIII Adjusted multiple = Unadjusted multiple × GR&S factor × ROIC factor

The original and adjusted medians of the multiples for peer airline companies, as well as the estimated equity value of Eastern Air based on adjusted medians, are presented in the following table:

	P/E	P/BV	EV/EBIT	EV/ EBITDA	EV/Sales	EV/BVEV
Unadjusted Median	12.31	0.81	11.23	8.53	0.69	1.08
Equity Value	50.7	60.7	849.1	1,117.2	1,644.7	291.9
Adjusted Median	27.43	1.51	8.98	6.33	0.45	1.01
Equity Value	113.02	113.02	118.48	106.49	102.25	109.12

Table 6. Results and effects of multiple adjustments

Multiple adjustment factors are interdependent and inherently consistent. If calculations are made properly, resulting values derived from different multiples should be close, or at least closer than those derived from unadjusted multiples.

4 Transformations and Selection of Multiples

The adjusted multiples highlight redundancy in some multiples (EV/Sales and BV multiples provide no additional information beyond EBITDA, EBIT, and P/E) and demonstrate their interrelationships. For example, the EBITDA multiple multiplied by the EBITDA margin gives the revenue multiple; the EBIT multiple multiplied by ROIC gives the EV/book multiple; and as noted, the P/E multiple multiplied by ROE gives the P/BV multiple.

These transformations can be particularly useful when a specific multiple cannot be applied but a similar one is needed.

For example, if a company's EBIT and EBITDA are negative, these multiples cannot be used. In such cases, the revenue multiple is helpful, but one should select peers with similar (low or negative) profit margins. Likewise, instead of an EBIT multiple (when EBIT is negative), one may use the book value multiple — especially in asset-intensive industries, provided the book value reflects fair and well-assessed values.

Finally, the P/E multiple may be preferred over EBIT or EBITDA multiples when financial activities (loans, investments) represent the core business rather than a method of financing operations (e.g., banks and financial institutions).

In general, EBITDA and EBIT multiples are considered most relevant. When both are positive, the choice between them should depend on differences in depreciation and capital investment policies. If the company being valued has relatively lower depreciation than its peers, the EBIT multiple will likely overstate value (and vice versa). Depending on the extent of divergence, adjustments can be made, although in practice, it is often sufficient to be aware of these differences when interpreting results.

5 Advantages and Limitations of Quantitative Adjustments

The main advantages of the presented adjustments are evident:

- They objectify and quantify qualitative analysis and intuitive conclusions;
- They reduce dispersion in calculated multiples, making average values more meaningful;
- They help users of valuations better understand the difference between raw peer multiples and the adjusted multiple applied in the valuation.

Some limitations are also evident—mainly regarding the GRS adjustment and its simplifications and/or subjective assumptions:

- Assumptions about average growth followed by linear deceleration to a (also subjectively defined) terminal growth rate;
- Assumption that the size factor is fully captured by the size premium within WACC;
- Other WACC components are based on assessments and assumptions;
- Prerequisites for growth (investments, restructuring, expansion costs, etc.) are not considered.

These limitations do not apply to the other adjustments – profitability and leverage – which are based on financial analysis and essential relationships between multiples.

Regardless of whether specific adjustments are based on assumptions or exact relationships, valuers should never apply them automatically. It is always necessary to carefully assess whether the adjustments are consistent with other value indicators and assumptions used in alternative valuation methods.

6 Concluding Remarks

Insufficient comparability between small companies in emerging markets and public companies for which data can be found in specialised databases and publications frequently leads to unreliable valuation results generated using the market approach, so its application is often being limited to purely illustrative/control purposes, making adjustments to market multiples a common discussion topic among valuation professionals. There are various approaches to handling observed differences: from the view that multiples should not be adjusted and the market approach deemed inapplicable if differences are too large, to subjective assessments of the degree of adjustment, to quantifying differences using various adjustment factors — even to the point of exaggeration in excessive (and irrational) attempts to include every single potential factor.

The list of differences that can distort value is by no means exhaustive. Significant discrepancies may arise in tax treatment and rates (which affect P/E), or in the structure and sources of financing permanent working capital (which affect all EV multiples), etc. For each such discrepancy, it is possible to calculate and apply an adjustment factor or use an alternative technique, but the specifics go beyond the scope of this paper.

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BUSINESS VALUATION

Appendix

Appendix 1. Simplified Discount Rates Calculation

Company Name	Country	Risk-free	ERP
Finnair Oyj	Finland	4.00%	5.50%
Air France-KLM SA	France	4.00%	5.50%
Aer Lingus Group plc	Ireland	4.00%	5.50%
Norwegian Air Shuttle ASA	Norway	4.00%	5.50%
SAS AB	Sweden	4.00%	5.50%
Türk Hava Yollari A.O.	Turkey	4.00%	5.50%
Eastern Air		**4.00%**	**5.50%**

Company Name	CRP	SRP	Cost of Equity
Finnair Oyj	0.0%	2.65%	12.15%
Air France-KLM SA	0.6%	1.20%	11.30%
Aer Lingus Group plc	2.4%	1.88%	13.78%
Norwegian Air Shuttle ASA	0.0%	1.88%	11.38%
SAS AB	0.0%	1.88%	11.38%
Türk Hava Yollari A.O.	2.5%	1.01%	13.01%
Eastern Air	**4.00%**	**12.06%**	**25.56%**

Company Name	Cost of Debt	E/D+E	Adj. WACC
Finnair Oyj	4.75%	29.39%	6.92%

Air France-KLM SA	4.75%	29.39%	6.67%
Aer Lingus Group plc	4.75%	29.39%	7.40%
Norwegian Air Shuttle ASA	4.75%	29.39%	6.70%
SAS AB	4.75%	29.39%	6.70%
Türk Hava Yollari A.O.	4.75%	29.39%	7.18%
Eastern Air	**4.75%**	**32.54%**	**11.52%**

Appendix 2. NPVs for GRS factor calculation

Finnair Oyj		1.000	6.92%	PV
1	7.55%	1.076	0.935	1.006
2	7.55%	1.157	0.875	1.012
3	7.55%	1.244	0.818	1.018
4	7.55%	1.338	0.765	1.024
5	7.55%	1.439	0.716	1.030
6	6.28%	1.529	0.669	1.023
7	5.22%	1.609	0.626	1.007
8	4.34%	1.679	0.585	0.983
9	3.61%	1.740	0.547	0.952
10	3.01%	1.792	0.512	0.917
TV	2.50%	1.837	0.512	21.255
			NPV =	**31.226**

Air France-KLM SA		1.000	6.67%	PV
1	13.60%	1.136	0.937	1.065
2	13.60%	1.290	0.879	1.134
3	13.60%	1.466	0.824	1.208
4	13.60%	1.665	0.772	1.286
5	13.60%	1.892	0.724	1.370
6	10.26%	2.086	0.679	1.416
7	7.73%	2.247	0.636	1.430
8	5.83%	2.378	0.596	1.418
9	4.40%	2.483	0.559	1.388
10	3.32%	2.565	0.524	1.344
TV	2.50%	2.629	0.524	33.005
			NPV =	**46.063**

Aer Lingus Group plc		1.000	7.40%	PV
1	4.79%	1.048	0.931	0.976

2	4.79%	1.098	0.867	0.952
3	4.79%	1.151	0.807	0.929
4	4.79%	1.206	0.751	0.906
5	4.79%	1.264	0.700	0.884
6	4.30%	1.318	0.651	0.859
7	3.86%	1.369	0.607	0.830
8	3.46%	1.416	0.565	0.800
9	3.11%	1.460	0.526	0.768
10	2.79%	1.501	0.490	0.735
TV	2.50%	1.538	0.490	15.358
			NPV =	**23.996**

Norwegian Air Shuttle ASA		1.000	6.70%	PV
1	26.40%	1.264	0.937	1.185
2	26.40%	1.598	0.878	1.403
3	26.40%	2.019	0.823	1.663
4	26.40%	2.553	0.772	1.970
5	26.40%	3.227	0.723	2.333
6	17.82%	3.802	0.678	2.576
7	12.03%	4.259	0.635	2.705
8	8.12%	4.605	0.595	2.741
9	5.48%	4.858	0.558	2.710
10	3.70%	5.038	0.523	2.634
TV	2.50%	5.163	0.523	64.314
			NPV =	**86.235**

SAS AB		1.000	6,70%	PV
1	5.75%	1.058	0.937	0.991
2	5.75%	1.118	0.878	0.982
3	5.75%	1.183	0.823	0.974
4	5.75%	1.251	0.772	0.965
5	5.75%	1.323	0.723	0.956
6	5.00%	1.389	0.678	0.941
7	4.36%	1.449	0.635	0.921
8	3.79%	1.504	0.595	0.895
9	3.30%	1.554	0.558	0.867
10	2.87%	1.598	0.523	0.836
TV	2.50%	1.638	0.523	20.407
			NPV =	**29.735**

Türk Hava Yollari A.O.		1.000	7,18%	PV
1	23.00%	1.230	0.933	1.148
2	23.00%	1.513	0.871	1.317
3	23.00%	1.861	0.812	1.511
4	23.00%	2.289	0.758	1.735
5	23.00%	2.815	0.707	1.991

6	20.64%	3.396	0.660	2.241
7	18.52%	4.025	0.616	2.478
8	16.62%	4.694	0.574	2.696
9	14.91%	5.394	0.536	2.891
10	13.38%	6.116	0.500	3.058
TV	2.50%	6.268	0.500	67.012
			NPV =	**88.077**

Eastern Air		1.000	11,52%	PV
1	18.30%	1.183	0.897	1.061
2	18.30%	1.399	0.804	1.125
3	18.30%	1.656	0.721	1.194
4	18.30%	1.959	0.646	1.266
5	18.30%	2.317	0.580	1.343
6	13.13%	2.621	0.520	1.363
7	9.42%	2.868	0.466	1.337
8	6.76%	3.062	0.418	1.280
9	4.85%	3.211	0.375	1.203
10	3.48%	3.323	0.336	1.117
TV	2.50%	3.406	0.336	12.687
			NPV =	**24.976**

GRS factor for Finnair Oyj = NPV (Eastern Air) / NPV (Finnair Oyj) = 24.976 / 31.226 = 0.80

Appendix 3. Calculation of adjusted P/E

	Finnair Oyj	Air France-KLM SA	Aegean Airlines S.A.
EBIT Multiple (unadjusted)	11.23	35.01	3.99
Market ROIC	6.35%	3.45%	49.81%
Less Interest rate	4.75%	4.75%	4.75%
Spread	1.60%	-1.30%	45.06%
Multiplied by D/E ratio	276.57%	711.22%	57.84%
Pre-tax gain from leverage	4.43%	-9.26%	26.06%
1-tax rate	0.79	0.79	0.79
After-tax gain from leverage	3.50%	-7.32%	20.59%
Plus after-tax market ROIC	5.02%	2.73%	39.35%
After-tax other items	-1.38%	-1.38%	-1.38%

Market ROE	3.65%	1.35%	37.97%
Adjusted P/E Ratio	**27.43**	**74.15**	**2.63**

	Aer Lingus Group plc	SAS AB	Türk Hava Yollari A.O.
EBIT Multiple (unadjusted)	16.51	3.51	9.50
Market ROIC	6.31%	12.35%	11.91%
Less Interest rate	4.75%	4.75%	4.75%
Spread	1.56%	7.60%	7.16%
Multiplied by D/E ratio	97.70%	210.48%	144.37%
Pre-tax gain from leverage	1.52%	16.00%	10.34%
1-tax rate	0.79	0.79	0.79
After-tax gain from leverage	1.20%	12.64%	8.17%
Plus after-tax market ROIC	4.98%	9.75%	9.41%
After-tax other items	-1.38%	-1.38%	-1.38%
Market ROE	3.61%	8.38%	8.03%
Adjusted P/E Ratio	**27.74**	**11.94**	**12.45**

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