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ADJUSTING THE PBO UNDER IAS 19 (PROJECTED UNIT CREDIT) IN VENEZUELA AMID HYPERINFLATION AND VOLATILE DEMOGRAPHIC ASSUMPTIONS: A TECHNICAL DEFENSE OF AN ADJUSTMENT FACTOR

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ABSTRACT

In the Venezuelan context—characterized by episodes of hyperinflation and heightened macroeconomic volatility—the demographic assumptions that materially affect the measurement of defined benefit obligations under IAS 19 (NIC 19)—particularly turnover, disability, and early retirement rates—may be highly unstable. In many cases, entities do not possess sufficiently robust or statistically credible historical series to estimate age-specific rates. In such an environment, the explicit omission of certain decrements should not be construed as their nonexistence: it is, in effect, an implicit assumption that they are zero, and therefore a source of bias. This article defends the technical reasonableness and conceptual alignment with IAS 19 of adjusting the PBO calculated under the Projected Unit Credit method through a Demographic Completeness Factor (DCF) when the direct estimation of key decrements (disability and early retirement) is not feasible due to severe data constraints. We propose a model-governance framework, calibration by triangulation, and disclosure practices that make the adjustment auditable, defensible, and consistent with the principle of an unbiased best estimate.

KEYWORDS: IAS 19 / NIC 19; Projected Unit Credit; PBO; hyperinflation; Venezuela; demographic assumptions; turnover; early retirement; disability; model risk; completeness adjustment.

1.0 PROBLEM STATEMENT (VENEZUELAN REALITY AND ASSUMPTION RISK)

In economies subject to hyperinflation or recurrent shocks, workforce exits often exhibit structural breaks: (i) abrupt changes in turnover patterns, (ii) internal policy changes, (iii) migration, (iv)

payroll redesigns, and (v) non-stationary behavior in eligibility and benefit-take-up. An additional practical challenge is that many entities lack a clean and consistent historical record to infer age specific turnover, disability, and early-retirement rates with statistical credibility (recording bias, system migrations, changing definitions, under-reporting of exit causes, etc.).

Critical actuarial implication. If a decrement exists in reality but is not modeled, the model is implicitly setting it to zero. That decision may bias the PBO in at least two ways:

• **Bias in retention/exit probabilities.** By excluding certain exits, the probability that an employee reaches ages/conditions at which benefits accrue or become payable is distorted.

• **Bias in payment timing.** Some causes (e.g., early retirement or disability) may accelerate (or alter) the settlement date of benefits, affecting present value.

2.0 MINIMUM NORMATIVE FRAMEWORK: WHAT IAS 19 REQUIRES

IAS 19 requires measuring the defined benefit obligation using the Projected Unit Credit method and actuarial assumptions that represent a best estimate of the determinants of the ultimate cost, avoiding deliberate bias. In particular:

- Assumptions should be **unbiased** and **mutually compatible** (economically consistent with one another).
- Demographic assumptions, by their nature, include variables such as **turnover**, **disability**, and **early retirement** (among others) as drivers of the expected ultimate cost.

Essential point for the defense. IAS 19 does not prescribe a single statistical technique for estimating age-specific rates when data quality is poor; it requires the entity (assisted by the actuary) to select reasonable assumptions and document their basis. Therefore, when direct age specific estimation is not viable, the defensible solution is not to "ignore the phenomenon," but to approximate it in an auditable manner, with governance and transparency.

3.0 AUDITABLE CALCULATION BASE: PBO UNDER PROJECTED UNIT CREDIT (MINIMAL FORMULATION)

This section summarizes the auditable PBO structure used as the calculation core, consistent with a full projection (PUC) technical framework for termination-related benefits, where the PBO arises from summing discounted expected contributions weighted by eligible exit probabilities and service attribution.

3.1 Notation and core equations

Let $t = 0, 1, 2, \ldots$ denote the projection year from current age x.

$$v(t) = (1 + i)^{-t}.$$

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Projected integrated salary and projected benefit.

$$SI\ (t) = SI_0\ (1 + g)^t\ ,\ B(t) = 0.75\ SI\ (t)\ ABT.$$

Persistence and probability of payable exit. With mortality $q^d{}_a$, and exit rates (payable and non-payable) $q^{pay}{}_a$, $q^{nop}{}_a$, define:

$$p_a^{stay} = 1 - q_a^{pay} - q_a^{nop} - q_a^d, \qquad {}^t p_x^{stay} = \prod_{k=0}^{t-1} p_{x+k}^{stay}, \qquad {}^0 p_x^{stay} = 1.$$

The probability of a payable exit in year t is:

$$\pi_t^{pay} = {}^t p_x^{stay}\ q_{x+t}^{pay}\ \mathbf{1}_{\text{elig}}(x+t),$$

Where $\mathbf{1}_{\text{elig}}$ ($\cdot$) is an eligibility indicator based on plan design (age/condition).

PUC service attribution (event-dependent).

$$\alpha(t) = \frac{s_0}{s_0 + t}.$$

PBO (remaining-service summation). In generic form:

$$PBO_0 = \sum_{t=t_{\min}}^{t_{\max}} v(t+1)\,\pi_t^{pay}\,B(t)\,\alpha(t).$$

Remark. The strength of this base formulation is transparency: each component (discounting, salary projection, payment probability, service attribution) is auditable, and it cleanly separates *financial* assumptions (i, g) from *demographic* assumptions (q's).

4.0 THE DATA PROBLEM AND THE TRAP OF "FALSE PRECISION"

In data-scarce environments, attempting to fit complex parametric age-specific rates may produce *false precision*: attractive-looking curves that are statistically unstable and change dramatically under small sample or definition changes.

From a governance and model-risk-control perspective, it is preferable to adopt an approach that:
1. Explicitly acknowledges the lack of statistical credibility,
2. Avoids implicit zero assumptions for real decrements,
3. Introduces a calibrated and documented correction, and
4. Quantifies sensitivity and plausible ranges.

5.0 DEFENSE OF THE DEMOGRAPHIC COMPLETENESS FACTOR (DCF)

5.1 Definition

We propose adjusting the base PBO via a multiplicative factor:

$$PBO_0^{adj} = DCF \cdot PBO_0^{base}, \qquad DCF > 0.$$

The DCF is defined as a factor that approximates the ratio:

$$DCF \approx \frac{PBO_0^{full}}{PBO_0^{base}},$$

Where $PBO^{full}{}_0$ would be the PBO produced by a more complete model that explicitly incorporates the omitted decrements (e.g., disability $q^{inc}{}_a$ and early retirement $q^{ret}{}_a$), while maintaining the same PUC framework.

5.2 Normative interpretation (why this does not "violate" IAS 19)

This adjustment is not intended to introduce arbitrary conservatism. It is designed to correct an otherwise unavoidable bias:

• **Omitting decrements equals assuming them to be zero.** If disability and early retirement occur in the population but are set to zero due to data limitations, the assumption is biased by construction.

• **DCF approximates an unbiased best estimate under information constraints.** IAS 19 requires an unbiased best estimate; when direct estimation is not feasible, a governed, auditable approximation based on indirect evidence (triangulation) is justified.

5.3 Defensible calibration of DCF (triangulation)

Three layers are recommended (ideally all three):

1. **Layer 1: External benchmarks (proxy).** Use credible external sources (sector studies, academia, insurers, social security, comparable actuarial studies) to define plausible ranges for disability/early-retirement rates, build a proxy model, and estimate $PBO^{full,proxy}{}_0$.

2. **Layer 2: Internal reasonableness (weak signals).** Even absent "perfect" data, internal indicators often exist: exit-cause distributions, average exit age, isolated disability cases, early retirement policies, etc. These help constrain proxy ranges.

3. **Layer 3: Sensitivity and bands.** Define a range [*DCFL*,*DCFU*] and report:

$$PBO_0^{adj}(DCF_L), \quad PBO_0^{adj}(DCF_{base}), \quad PBO_0^{adj}(DCF_U).$$

This converts uncertainty into quantified risk, strengthening the defense.

5.4 Governance rules (to make the paper audit-ready)

The DCF is defensible under audit scrutiny when the entity complies with, documents, and retains evidence of:

- **Causal rationale:** which decrements are missing (disability, early retirement), and why a zero assumption would be biased.
- **Source and traceability:** where proxy ranges originate and why they are comparable to the population.
- **Economic compatibility:** coherence among expected inflation, salary growth, and discount rate (avoiding inconsistent "mixed worlds").
- **Stability:** DCF does not change arbitrarily each period; it is reviewed under defined triggers (policy changes, new evidence, experience).
- **Explicit disclosure:** clear statement that certain decrements were not modeled due to lack of credible data and that a DCF (with sensitivity) was applied.

6.0 NUMERICAL ILLUSTRATION (PURELY DEMONSTRATIVE)

For illustration only (not a substitute for entity-specific calibration), consider a base PBO under PUC with full financial projection. Suppose a demonstrative case yields:

$$PBO_0^{base} = 10{,}491.36.$$

If triangulation supports a range $DCF \in [1.03, 1.12]$ with a base value $DCF = 1.07$, then:

$$PBO_0^{adj}(1.03) = 1.03 \times 10{,}491.36 = 10{,}806.10,$$

$$PBO_0^{adj}(1.07) = 1.07 \times 10{,}491.36 = 11{,}225.76,$$

$$PBO_0^{adj}(1.12) = 1.12 \times 10{,}491.36 = 11{,}750.32.$$

The defense here does not rest on "a single number," but on the **process**: evidence, traceability, ranges, and disclosure.

7.0 DISCUSSION: HYPERINFLATION, VOLATILITY, AND CONSISTENCY

In hyperinflationary settings, volatility affects not only financial variables (rates, inflation, and wages) but also workforce behavior (turnover, retirement, contractual redesign). Therefore:

- Maintaining **economic compatibility** among assumptions (inflation/salary/discount) is critical.
- Recognizing and governing **model risk** in demographic assumptions is equally critical: where statistics are not credible, an age-curve may be more dangerous than a robust, documented approximation.

8.0 CONCLUSIONS (A ROBUST DEFENSE, WITHOUT OVERSTATEMENT)

1. **IAS 19 requires an unbiased best estimate.** When real decrements exist (disability and early retirement), omitting them is equivalent to assuming them to be zero, introducing bias.
2. **When credible data are unavailable, DCF is a technically reasonable approximation.** It is not a "patch"; it is a completeness tool under information constraints, provided it is calibrated and documented.

3. **DCF strengthens audit ability when accompanied by governance and sensitivity.** The adjustment becomes defensible when justified through triangulation, ranges, and clear disclosure.
4. **The key is not the factor, but the framework.** The proposed framework (traceability + compatibility + stability + disclosure) is the technical safeguard.

Scope and limitations statement

This article presents an actuarial approach for measuring and governing assumption risk under IAS 19 in the presence of severe data limitations and macroeconomic volatility. It does not constitute an official IFRS interpretation, nor does it replace the professional judgment required to select entity-specific assumptions.

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