

Government Debt Collection Metrics in the Estonian Market

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Chapter 1

Executive Summary

Objectively measuring ‘Government financial collection performance’ is a complicated and difficult problem that is in the interest of the government to have proper metrics. Given the important job that agencies perform, it is necessary to ensure professional quality, but it is difficult to identify much less state in a meaningful number. That said, it is difficult but not impossible.

It is interesting to note that the relationship between collections and the Ministry represent a very special mathematical case. There is no win-lose paradox in this relationship given the nature of the debt collecting business, this relationship is a simply win-win situation whereby the best strategy:

- is for the Ministry to cooperate and be fully open with all agencies.
- is for agencies to cooperate with each other as well as the Ministry for a maximum benefit.
- eliminates unfair competition that detracts the maximum pay-off for all parties.

The goal of a metric suite is to remove the subjective guesswork surrounding evaluation by establishing objective standards, common concepts, and implementing dynamic metrics with solid metainfo benchmarks. It is also to assist the agencies in identifying their business practices in an objective form. The Ministry requires a methodology for assigning claims to ensure quality and objective metrics are superior to subjective stories, random noise, personal judgments, or sheer guesswork when making allocation decisions. agencies require and deserve a system that is fair and unbiased.

Objectives and Goals

1. The main objective is to ensure that claims are fairly satisfied in a timely and efficient manner.
2. Assist the Ministry such that administrative burdens are minimized.
3. The information gathering process must be open, fair, timely, and automatic such that calculations do not require a significant investment of time or money.
4. agencies require metrics that can assist their business practice and help increase revenues.

Metrics must be an objective reflection of reality, robust, transparent, easy to view / understand and resistant to manipulation. It is important to note that metrics should:

- Recognise and reward the collection of claims in a courteous, timely and professional manner.
- Reward honesty, reporting, and openness in a community that only benefits from this environment.
- Not penalize people that take on difficult claims and/or perform better than the average agency.
- Discourage cyclic reasoning and penalize people that abuse or game the reporting of information.

Remarks

1. Given the statistical metrics for the completed claims from January - September 2006, it is quite obvious the current metric system is being manipulated.

2. The current metric, as shown in (1.1), contradicts itself and is a random variable.
3. The courtesy of the agency can be measured by ‘realistic’ complaints. There will always be a residual number of complaints due to the nature of the collection business, this will be factored into the metrics.
4. For metric results, refer to the attached file ‘metrics_sum.pdf’ where each agency is listed by claim amounts and time to process. Refer to Section A.2 for agency specific graphs and comments.
5. The proposed metrics require independent review from the agency community.
6. I can provide a complete list of how to manipulate A.1, but given the potential to distribute this report, I will provide this upon request in a separate document.

1.1 Current Practice and Issues

Action	$Score(B_j)$ Result
Process few claims	↑ Increase
Write off claims	↑ Increase
Turn down claims in one period	↑ Increase
Over-report at the beginning of the quarter	↑ Increase
Under-report at the end of the quarter	↑ Increase
Be significantly better than average	↓ Decrease
Process large or difficult claims	↓ Decrease
Process many small claims	↓ Decrease
Visit claimants	↓ Decrease
Process more claims than average	↓ Decrease

Table 1.1: A few methods to manipulate (1.1).

The current scoring system used by the Ministry to evaluate a agency’s performance relies upon the following statistic where:

$$Score(B_j) = \frac{1}{2} \left(\left(\frac{x\% (B_j) - \hat{\mu}\%}{x\% (B_j)} \right) - \left(\frac{y_c (B_j) - \hat{\mu}_c}{y_c (B_j)} \right) \right) = \frac{1}{2} \left(\frac{x_j - \hat{\mu}\%}{x_j} - \frac{y_j - \hat{\mu}_c}{y_j} \right) \quad (1.1)$$

- B_j = agency_{*j*}: agency₁ = Priit J.; agency₂ = Veiko K.; agency₃ = Katrina L.; etc.
- $Score(B_j)$ is a linear normalized statistic that is unit-less.
- $x\% (B_j) = x_j$ is the percentage of claims satisfied during the time period.
- $y_c (B_j) = y_j$ is the number of satisfied claims completed within an average time.

To evaluate a agency performance during a quarter (1.1) relies upon two statistical measures:

- Percentage of claims satisfied during the quarter time period.
 - The number of satisfied claims completed within an average time during the quarter.
- Further manipulation of the data occurs via:
- Taking the average of ‘deviations’ for both statistics.
 - Condensing and normalizing the data into one unit statistic ranging from $[-1.0, 1.0]$.

From a statistical point of view this methodology is very simple to implement, but it simply naive and incorrect in its assessment of agency performance. (1.1) is only slightly better than random noise; i.e. throwing a dart at a piece of paper. To draw an analogy, rate the artistic quality of a painting by only comparing:

- How big the frame is relative to the average frame.
- How much paint was used relative to the average amount of paint used per painting.

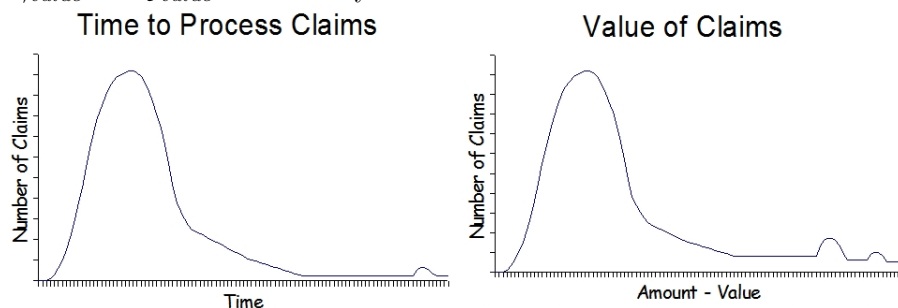
More important than the statistical issues are the practical issues of using (1.1) that affect agencies. I will limit myself to ten observations concerning the impractical application of this scoring system:

1. A successful agency who is ‘better than average’ is penalized for their success.
2. The distribution for the amount and time of claims and amount of claims are completely ignored.
3. (1.1) encourages manipulation. agencies who process: large claims, small claims, hard to collect claims, or more volume than ‘the average agency’ are penalized.
4. The counting scheme for completed claims is flawed and incorrect. It is not measured properly.
5. Insignificant information is treated as significant.
6. The calculation of the completion rate is not a completion rate. The deviation is not a deviation. The measure does not reflect reality.
7. Temporal shifts (cheating) are encouraged and rewarded. I.E. Removing claims from the portfolio as a function of time and/or under-report at the end of the quarter and over-report at the beginning.
8. The measure contradicts itself by normalizing data and penalizing / rewarding agency volume & size.
9. There is no measure of efficiency, quality, or effort.
10. A claim of 100 EEK is treated with equal weight as 100,000 EEK; both in time and value.

1.1.1 Recommended Practices

The following metrics will involve probability measures based on density functions (PDFs or f) that are approximated using histograms from data provided by the Ministry. By normalizing the histograms, f probabilities will be calculated using discrete time and spaces steps ($\Delta t, \Delta x$) for both open and satisfied claims. For each agency (with enough claims) the following dynamic graphs and densities will be considered:

- A scatter plot of value versus time with a \ln transformation.
- f_{time} and \mathfrak{F}_{time} - the density functions for the time it takes to satisfy a claim and/or remain open.
- f_{value} and \mathfrak{F}_{value} - the density functions for the value of the claim with a \ln transformation.



An incomplete listing of considered metrics is provided in Appendix A, but for a summary refer to Table 1.1.1. It is important to remember that a specific score is an indication of quality and not an all inclusive statement - metrics should not be viewed as the final word of god; like a weight they are indications not determinations. Rather than combine the metrics into one ‘one size fits all metric’ score, I would recommend a Bayesian approach for identifying agencies based on weighted conditionals where:

- B_j = agency_j: agency₁ = Priit J.; agency₂ = Veiko K.; agency₃ = Katrina L.; etc.
- C_s = Number of satisfied claims.
- C_a = Number of claims allocated.
- A_o = Amount of money for claims that are still open.
- A_a = Amount of money for allocated claims.
- A_s = Amount of money for claims that are satisfied.
- T_o = Time open.
- T_s = Time closed.

• $\mathbf{1}(\alpha) =$ Unit indicator for α .

$$Score_0(B_j) = \mathbf{1}(\mathcal{H}, L_0) L_0(T) Odds(C) \quad (1.2)$$

$$Score_1(B_j) = \mathbf{1}(\mathcal{H}, L_0) L_0(A) Odds(A) \quad (1.3)$$

$$Score_2(B_j) = \frac{1}{2} \left(Rank \left(\ln(C_s) \frac{\mathbb{P}(C_s)}{\mathbb{P}(C_a)} \right) + Rank \left((\mathcal{H}(A_o) + \mathcal{H}(A_s)) \frac{\mathbb{P}(A_s)}{\mathbb{P}(A_a)} \right) \right) \quad (1.4)$$

$$Score_3(B_j) = \mathbf{1}(\text{less than 20 claims in portfolio}) \quad (1.5)$$

$$Score_4(B_j) = \mathbf{1}(\text{left skew}) Rank \left(\frac{2Skewness(T_o) + Skewness(T_c)}{3} \right) \quad (1.6)$$

Remark 1.1.1. *The recommended metric results are posted on pages 10 + 10a and are still being reviewed to ensure fairness, thus the Table 1.1.1 will be brief due to potential changes.*

Metric	Description
$Score_0$	A weighted odds ratio using the L_0 complexity measure as a scaling factor for the claims processed.
$Score_1$	A weighted odds ratio using the L_0 complexity measure as a scaling factor for the amounts processed.
$Score_2$	A weighted ratio of satisfied claims relative to the allocated amounts. The natural log and entropy values are chosen to scale the ratios for volume.
$Score_3$	Since a number of agencies have not processed enough claims to warrant analysis, they should be given a chance.
$Score_4$	The skewness of the claims with emphasis on open claims should be rewarded for less than average processing time.
$Score_5$	Additional metric being developed for complaints.
$Score_6$	Additional metric being developed for derivative rate measures.
$\mathfrak{f} + \mathfrak{F}$	Amount and time plots for both open and satisfied claims.
Scatter Plot	Amount versus Time to notice correlation trends.

Remark 1.1.2. *Since rankings will be used, ties are treated as equivalent rankings and weighted as such. The rankings are subject to change as reporting issues are identified and/or corrected as highlighted in Section A.2.*

1.2 Conclusion

We feel that the current measures for agency performance are inadequate, encourage manipulation, and only harm the agency community. This opinion is based on the disparity in the metainfo metrics that have been calculated for each agency. The current measures used by the Ministry contradicts itself and penalizes the efficiency and effort of agencies. It is my recommendation that agencies address this issue with the Ministry and propose a system that will provide a more accurate representation as to the quality of performance.

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