The Engine of Rabobank’s Goal Monitor

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Rabobank Retail & Private Banking
• What problem did Rabobank solve?
• Why MATLAB...?
• The advantages!!!
• What is the purpose of Goal Monitor?
Rabobank Retail & Private Banking

- € 40 Billion Assets Under Management

- 3 Quantitative Researchers (CFA or PhD)

- Develops (quantitative) models to serve clients’ needs
  - Forecasting models (Goal Monitor)
  - Risk models (Value-at-Risk)
Rabobank needs Goal Monitor to serve clients!

- Questions of clients arise, when they come for advice regarding their financial situation:
  - What can I expect after 20 years of investing?
  - What is the (downside) risk of my portfolio over time?
  - What is the chance that I support my children to university?

- As financial markets are unpredictable, Rabobank does need to provide insights though.
- We simulate the dynamics of the financial markets with Goal Monitor!
• **Yearly € 2 million** for an external system

• But...other parties also buy the same system for their clients

• But...we don’t have any suitable software

• Is it really that hard to build internally??!!

• Do we have the expertise to build internally though?

• Which software would be the best for Rabobank?
And the winner is.........
Why MATLAB...?

• Many universities use MATLAB as education software for students
• MATLAB is extremely fast with matrix multiplications
• In-house experience and knowledge with MATLAB
What are the advantages?
Before MATLAB...

Quantitative Analysts → Programmers of the calculation rules → IT-specialists for front-end visuals
...after MATLAB

Quantitative Analysts

Programmers of the calculation rules

IT-specialists for front-end visuals

MATLAB

MATLAB production server
Another saving! $ € £

- Time = Money!

- Much quicker implementation of adjustments in source code by the quantitative analysts

- Verification of the programmer’s code needed by the quantitative analysts
What is the purpose?
Forecasting in Goal Monitor

- Monte Carlo Simulations of returns:
  - Simulated Return = Average Return + Volatility * Random Number
  - Random number is a draw from the Normal Distribution (0,1)

- Transform returns to prices:
  - Price [t] = (1 + Simulated Return[t]) * Price [t-1]
Hoe wilt u uw doel bereiken? 💡

- Huidige portefeuillewaarde: € 4.466.971
- Doelbedrag: € 31.755.000
- Looptijd: 37 jaar
- Einddatum: 01 01 2054

Verwachting 📈

- Portefeuillewaarde: € 4.467.971
- Goede markt: € 83.001.128
- Normale markt: € 32.623.814
- Zeer slechte markt: € 8.024.866

Extra inleggen 🍀

- Eenmalige inleg: € 0
- Periodiek inleggen: € 1.000

Met welke frequentie wilt u inleggen?
Per Maand 📅
Kans dat u uw doel bereikt

Wijzig beleggingsdoel
Toon suggesties

Hoe wilt u uw doel bereiken?

- Huidige portefeuillewaarde: € 4.465.749
- Doelbedrag: € 50.000.000
- Looptijd: 37 jaar
- Einddatum: 01 01 2054

Extra inleggen

- Eenmalige inleg: € 0
- Periodiek inleggen: € 1.000

Met welke frequentie wilt u inleggen?
Per Maand

Verwachting

- Portefeuillewaarde: € 4.466.749
- Goede markt: € 82.978.920
- Normale markt: € 32.615.230
- Zeer slechte markt: € 8.022.934
Uw beleggingsdoel

Het vermogen in deze portefeuille is bedoeld voor vermogensgroei voor uw huis.

Hoe wilt u uw doel bereiken?

Huidige portefeuillewaarde € 4.465.749
Doelbedrag € 50.000.000
Looptijd 22 jaar
Einddatum 01 01 2039

Extra inleggen

Eenmalige inleg € 0
Periodiek Inleggen € 0

Met welke frequentie wilt u inleggen?
Per Maand

Let op: U kunt hier extra inleggen uitproberen, maar niet doorvoeren.

Verwachting

Portefeuillewaarde € 4.467.310
Goede markt € 22.666.864
Normale markt € 12.039.461
Zeer slechte markt € 4.455.934
Summary

- Many universities have MATLAB as educational software
- Quicker implementation of adjustments in source code by the quantitative analysts
- Knowledge + MATLAB = Build your own systems
- Build your own systems = Saving costs
- Saving costs = Salary increase (???) 😏
Questions?