Banks Need Help from MiQEF-Students

Max ARRICH and Florian BENKHALIFA
In their Master thesis, Max Arrich and Florian Benkhalifa studied the secrets of credit risk modeling and realized a large potential for practical applications. They started Paraloq Analytics and build mathematical modelling tools for banks. How does it feel to be a start-up entrepreneur? How is entrepreneurship usefully combined with PhD research? Why is the PEF program at HSG their preferred choice?

Which factors determine credit risk of banks?
In principle, the influencing factors are strongly dependent on the lending policies of the bank and differ between customer groups. Regarding retail lending, classical factors such as GDP and unemployment rate have strong effects on credit health. However, our models also indicate that many of these relations are more complex than many practitioners think, since credit risk is determined by a highly non-linear interplay of micro- and macroeconomic factors. Higher GDP, for instance, does not necessarily lead to less defaults. Quite the opposite, when GDP surpasses a certain threshold, credit defaults increase indicating an overheating of the economy. Particularly threatening for banks is a toxic mixture of an economic downturn and an increased divorce rate.

What are the key results and insights from your Master thesis research? What are the econometric and statistical tools that you applied in your research?
In practice, banks often tend to remove observations from the data due to poor data quality. Yet, according to our research, these data still contain valuable information as long as data flaws are properly controlled for. Using machine learning methods regarding imputation, feature elimination, dimensionality reduction and cross validation, we are able to account for these flaws and to achieve a considerable boost in performance. These are models and algorithms which are an integral part of the MiQEF curriculum, which are often not known und not exploited in practice.

What is the mission of Paraloq Analytics? What is your unique selling point? What is the role of MiQEF training? What are the next steps?
We want to bring cutting edge machine learning approaches into the statistically outdated banking world. Our models have a predictive power that is far superior to that of our competitors. It is also important to us that our algorithms are not a black box but allow for good economic interpretation. This is important when using them in day-to-day risk
controlling. Such models require a rigorous mathematical understanding and excellent knowledge of econometric tools. Skills, which we would certainly not have today without the MiQEF programme and which are not taught in regular master programmes in finance. In the Paraverse (our software), we currently offer models for different risk types. These have a modular structure and can be installed ready-to-use in banks. Our vision is to offer models for the entire data modelling of a bank in a unified framework as a plug n’ play solution. This would allow us to optimize the banking business to the fullest detail.

You have already registered for PEF, HSG’s flagship PhD program in Economics and Finance. Why PEF? How can PhD research help to build up Paraloq Analytics?

Our product builds on the latest academic innovations in data modelling. We expect PEF to bring us close to the research frontier. A superior knowledge in econometric and statistical tools will help us stay ahead of potential competitors. We also expect to benefit if our algorithms get academically challenged and validated by our supervising professors. The flexible structure of the PEF program makes it possible to combine our business with a PhD: some of the ECTS can be managed from Vienna (our company headquarters). The HSG offers classes in summer school. Some of the academic publications can be written in co-authorship. The excellent reputation of our university is a crucial factor as well. In the banking world outside Switzerland, an academic degree from the HSG is highly appreciated. It has already opened many doors for us.

Building a firm and satisfying the demands of an ambitious PhD program appears to be a tough agenda. What’s left for your hobbies and private life?

It’s weird. Sometimes we don’t know whether we work or whether we pursue our hobby all day long. Or maybe we just need a break to put these in perspective again [laughs].