ROBOT INVESTING

ASSET ALLOCATION FOR PRIVATE BANKING CLIENTS

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INDIVIDUAL REPORT

A Project carried out on the Master in Finance Program, under the supervision of:

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Theoretical and Methodological Context

In the first meeting with Banco Invest, the bank issued a challenge for its Private Banking sector, which is responsible for the management of its clients' wealth via asset allocation. The challenge was to develop a model which does not require market views as input. Instead, its only input should be market data so that the asset allocation model is independent of behavioural and emotional biases.

Our supervisor and we, thus, decided that the model should be built around two market anomalies, which are yet to be arbitraged away, that have been known to generate consistently attractive returns across roughly every asset class available to an investor. These two anomalies are the value and momentum anomalies, which are both well documented in literature and continue to draw its attention due to its persistence across time and different asset classes. To exploit these anomalies, one solely needs information flowing from financial markets.

The model itself, i.e., the framework in which the value and momentum anomalies are translated into an allocation of wealth across assets, departs slightly from the usual approaches employed in asset allocation. This is because the said approaches do not allow one to perform the allocation exercise based on asset specific characteristics, such as value and momentum, as easily and robustly as the model we propose.

Individual Contributions to the Project

Following our first meeting with the client, our group and supervisor decided that the model and respective investment strategy, which we would be proposing to Banco Invest, was going to be based on two well-known market anomalies, momentum and value, which have had remarkable performances to date, as mentioned above. Hence, most of the group's initial work consisted in researching into these market phenomena and the model with which we would combine them to implement our proposed investment strategy. Thanks to the guidance provided by our supervisor as far as readings are concerned, I managed to gather a healthy amount of studies focusing on the application of momentum and value to asset allocation, while my colleagues were making notorious headway in the implementation of the model in excel. This database helped us expedite our work to the extent that we quickly overcame setbacks concerning data collection and construction of the momentum and value measures. The main hurdles we came across at the beginning of the project pertained to the currencies asset class. Specifically, we were struggling to find the appropriate way to measure currency value and to compute the return on a currency which the bank could realistically obtain given its constraints and preferences. These issues were short-lived, however, due to the information supplied by the studies we collected.

The subsequent stages of our project ran quite smoothly. The unrestricted model was built rather quickly, owning to the proactivity of my two colleagues, and the results we were obtaining initially were quite satisfactory. Following a meeting with our supervisor, we agreed to prepare an interim report, which summarized our investment thesis and model, to keep the bank up to date on our progress and ascertain whether our work was meeting their expectations. While everyone contributed to writing this report, we thought best that some of us continued to focus on developing the model, as our supervisor had suggested we add a few changes and we wanted it to be finished before the bank representatives' feedback and input regarding

constraints. Therefore, I took it upon myself to conclude the report whilst my colleagues incorporated our supervisor's suggestions into our model. The main goal of this report was to convince Banco Invest of the robustness of both the model and the value and momentum anomalies persistence across time and asset classes. Hence, I wrote a brief, but comprehensive literature review of the two market anomalies, making an account of the success investment strategies based on them have had, as well as their main pitfalls since their discovery. Given its completeness, the literature review section of the final report covering the value and momentum anomalies is the same as the one in the abovementioned interim report. The part in the final report covering the model itself was later detailed by myself.

In short, my main contribution to this work project was to ensure that our methodology was consistent with the theoretical studies which served as basis for our models. Although I also actively participated in the construction of the model in excel and discussions regarding how we could accommodate Banco Invest's restrictions and preferences in our models, the input I provided which I believe aided the group the most was my knowledge of relevant theory, obtained by reading several studies covering our topic. Coupled with my colleagues' proactivity, resourcefulness and practitioner-oriented mindset, we were able to devise two robust models which are in line with theory and the client's requirements.

Personal Reflection

I believe this work project contributed massively to my professional and personal growth. Firstly, knowing that your output will not just be another assignment for your professor to mark, but something meant for an actual Bank to assess and perhaps implement, forced me to be even more diligent and finicky than ever before. Every step we took in building the model was calculated and we constantly checked our results with one another to prevent mistakes. The amount of attention we gave to detail far outstripped the one we were used to give in our assignments as the level of rigour we demanded of ourselves was notoriously higher than before. Secondly, this project gave me and my colleagues meaningful insight into the challenges and restrictions a bank faces in asset management. In addition, having to find robust ways to overcome and account for said challenges and restrictions in our work honed both my creativity and resourcefulness. Lastly, this project required that we had good knowledge of the theory revolving around strategic asset allocation. Thus, even before our first meeting with the bank, both me and my colleagues went through numerous papers covering the theoretical topics our supervisor thought were necessary that we grasped. This not only gave me a better understanding of the field of asset management, but it also sharpened up my analytical skills as these studies are mostly conducted using advanced econometric and mathematical tools to arrive at conclusions. In short, in professional terms, this projected certainly helped me grow, providing me with a unique experience to get in contact with the job market, especially in area in which I now seriously contemplate making a career.

This work project also impacted me positively at personal level, on account of it being developed as a group. Even though I already knew well the two colleagues I worked with before the work project, we still have different ways to approach the task at hand. While some of us like to start working on the model as soon as possible and solve issues that inevitably emerge as they go along, I would rather take my time and devise a detailed plan of the steps

we should follow, anticipating any issue into which we may run. Despite our diverging methods, we managed to adapt to one another's pace. Although, at the time, I thought that we had begun to work on the model prematurely, we always made short work of any hurdles we stumbled upon due to the group's capacity to pool everyone's ideas and, ultimately, quickly conjure up a way to overcome them. Another reason why we were not facing many unexpected issues was that we had indeed "done our homework". Contrary to what I had perceived, all of us had a good grip of most the relevant theoretical concepts and, thus, we seldom had to stop our work and discuss about a certain issue at length. In hindsight, it was good that we began building model when we did, otherwise I think we would not have met certain deadlines. I, therefore, learned that I must optimize the trade-off between planning ahead and starting to work at the task, by being able to discriminate between negligible details and important ones and complete the task without running into any time-consuming hindrances. Furthermore, I tend to be slightly overbearing and assertive in group works. However, in this work project I learned to listen more attentively to my colleagues' opinions and ideas. Obviously, it helped that the two colleagues I worked with knew just as much, if not more, about the topic as me and, thus, our discussions were very stimulating and their ideas were often compelling. Regardless, they taught me to further value others' point of views. Like combining different assets in a portfolio generates diversification gains, blending different opinions results in more robust ideas.