Report on **Bachelor Thesis**

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	**Jiří Nosek**
Advisor:	**Mgr. Martin Hronec**
Title of the thesis:	**At the right time, in the right factor. Can factors be timed?**

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

Contribution

Factor timing, i.e. having higher factor exposure when its conditional expected return is higher than normal, and less when lower than normal has been an area of academic and practitioner research for decades.
This thesis aims to explore the promises factor timing by leveraging four timing variables previously identified by the literature. The timing issue is answered from the point of the optimal fraction of capital to invest in order to maximise the growth rate. For this purpose, the Kelly criterion is used. This approach is unique in the factor timing literature. Predictive regressions using timing variables are used to estimate expected factor returns and GARCH models are used to estimate the volatility. Both expected returns and volatility are necessary inputs for the Kelly criterion. Moreover, the research question is explored using international data. For the United States, only timing based on the value spread adds value over static buy-and-hold for Fama, French factors high-minus-low (HML) and small-minus-big (SMB).
In Europe and Japan, timing based on any predictive variable outperforms factors buy-and-hold approach. Interestingly, the outperformance of different timing strategies is driven by suggesting higher exposure in the similar unusually profitable periods.

Methods

The aim of this thesis is to leverage the predictive ability of timing variables for opportune factor timing. The construction of factors on the international data is a feat in itself and is done to the very high standard. Further, given the proliferation of variables claimed to have the predictive power in various financial settings, it is not straightforward which variables should be useful in the factor timing setting. From this sea of potential variables, the author chooses four that have shown promising results specifically in the factor timing literature. These variables are used as independent variables in predictive regressions aiming to forecast expected returns of factors. In order to use the Kelly criterion and compute the optimal fraction of capital to invest, one also needs volatility forecasts, which are obtained using GARCH models. Finally, factor exposures are dynamically adjusted based on the Kelly criterion, and final portfolios are backtested in multiple regions.

Literature

Even though factor timing is a controversial topic, academic literature is not so broad as one would expect. Most of the key papers from the field are covered. Nevertheless, there are some shortcomings. There are various problems with references, such as missing journal, e.g. Asness et al. (2017b), or referencing a working paper instead of the published version. Further, literature review reads more like a listing of papers than a comprehensive review of the literature.
Last, literature review could be extended by the review of Kelly criterion use cases in finance as well as predictive regressions use cases.

Manuscript form

I consider the manuscript form to be one of the weakest parts of the thesis. It is especially unfortunate, given the amount of research that the author delivered. The main problem I see is certain disconnectedness of the sections making the reading of thesis and understanding the underlying

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research processes hard to understand. There are also minor typos but nothing excessive. Further, the same variables are named differently across the manuscript, e.g. valuation signal spread (p.19) is named value spread (p.33 and elsewhere) as well. Finally, some tables and graphs have fully self-contained descriptions, while others only have a title.

Summary and suggested questions for the discussion during the defense

To sum up, I would say that the amount of work dedicated to the research and interesting obtained results are hindered by lower quality manuscript form. Nevertheless, from the research perspective, Jiri took on quite an ambitious project for the Bachelor level, where asset pricing is not seriosly taught. Further, he managed to put together international asset pricing dataset leveraging his coding skills and delivered valuable, even though for the investors not so promising results.
We have discussed the research process and intermediary results very frequently over the number of months.

I suggest the following questions for the defence:
- In your thesis, you take point estimates of expected returns as well as volatility while in reality there is a serious amount of uncertainty around these estimates. How would you incorporate these uncertainties into the final capital allocation decision based on the Kelly criterion?
- Connected to the question of uncertainty around the estimates, how did you go about choosing the length of the estimation window and how does this length (number of observations) influence your results?

In case of successful defence, I recommend grade B (with 85 points).

SUMMARY OF POINTS AWARDED (for details, see below):

CATEGORY		POINTS
Contribution	*(max. 30 points)*	30
Methods	*(max. 30 points)*	27
Literature	*(max. 20 points)*	15
Manuscript Form	*(max. 20 points)*	13
TOTAL POINTS *(max. 100 points)*		**85**
GRADE (A – B – C – D – E – F)		**B**

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NAME OF THE REFEREE: Martin Hronec

DATE OF EVALUATION: 29.8.2019

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Referee Signature

EXPLANATION OF CATEGORIES AND SCALE:

CONTRIBUTION: *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

Strong	Average	Weak
30	15	0

METHODS: *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

Strong	Average	Weak
30	15	0

LITERATURE REVIEW: *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

Strong	Average	Weak
20	10	0

MANUSCRIPT FORM: *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

Strong	Average	Weak
20	10	0

Overall grading:

TOTAL	GRADE
91 – 100	A
81 - 90	B
71 - 80	C
61 – 70	D
51 – 60	E
0 – 50	F