

Opponent's Report on Dissertation Thesis

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Title of the Thesis:	Three Essays on Applied Bayesian Econometrics
Type of Defense:	DEFENSE
Opponent:	Doc. Dr. Ing. Martin Melecký, Ph.D.

Address the following questions in your report, please:

- a) Can you recognize an original contribution of the author?
- b) Is the thesis based on relevant references?
- c) Is the thesis defensible at your home institution or another respected institution where you gave lectures?
- d) Do the results of the thesis allow their publication in a respected economic journal?
- e) Are there any additional major comments on what should be improved?
- f) What is your overall assessment of the thesis? (a) I recommend the thesis for defense without substantial changes, (b) the thesis can be defended after revision indicated in my comments, (c) not-defensible in this form.

(Note: The report should be at least 2 pages long.)

Thank you for the opportunity to review this interesting and technically savvy dissertation that examines several macrofinancial issues using Bayesian econometrics. I would like to commend Tomáš Adam on demonstrating excellent technical skills and addressing relevant issues in macrofinancial policy such as the pricing of bonds and the systemic risk of banks.

Since the pre-defense draft on which I commented, Tomáš has made several improvements by incorporating most of my and other referee's comments. Also, I was told he had to drop for "technical" reasons chapter 4 on exchange rates that appeared in the pre-defense draft. While a loss, the dissertation remains strong and quantitatively advanced.

In my view, Tomáš has made at least two original contributions to the literature and policy-relevant knowledge. I believe Chapters 3 and 4 present interesting ideas that could be publishable in decent journals. After some back-testing and further improvements in their robustness the developed tools could be deployable and useful for policy work in the area of monetary policy and financial stability. The Czech National Bank could be keen to integrate such tools in their macro monitoring toolbox.

To improve the accessibility and impact of the thesis, including for non-Bayesian economist, the abstract could be rewritten. It could be transformed into a style typical for an executive summary. As it now stands, it represents more a collection of chapter abstracts than an accessible and informative summary. I suggest adding a sentence on priors and where these could come from (theory, other empirical work (different context, times). Also, Tomas could conclude this summary with a paragraph capturing the lessons learned from applying Bayesian techniques in the selected areas, as well as present some recommendations for policy and decision makers (including in the private sector).

I find the dissertation thesis based on a robust body of references to relevant literature. The references are presented chapter by chapter in blocks. The literature reviews in individual chapters link the presented work to several strands of related research that approaches the topics from complementary perspectives. One may see a scope for further expanding the references, especially if Tomas and his co-authors want to publish the papers in good journals. I think chapter 4 could better link the presented research to the literature on the conditional value at risk (CoVaR; Tobias Adrian or Markus Brunnermeier, among others) as well as the distance to default (Dale Gray, and others). Namely, I suggest incorporating the following references:

- Adrian, Tobias, Nina Boyarchenko, and Domenico Giannone. 2019. "Vulnerable Growth." *American Economic Review*, 109 (4): 1263-89.
- Michael Gapen & Dale Gray & Cheng Hoon Lim & Yingbin Xiao, 2008. "Measuring and Analyzing Sovereign Risk with Contingent Claims," *IMF Staff Papers*, Palgrave Macmillan, vol. 55(1), pages 109-148, April.
- Segoviano Basurto, Miguel and Goodhart, Charles A.E., Banking Stability Measures (January 2009). IMF Working Papers, Vol. , pp. 1-54, 2009. Available at SSRN: <https://ssrn.com/abstract=1356460>

Serving as Lead Economist at the World Bank and Adjunct Professor at the VSB-Technical University of Ostrava, I find the dissertation thesis defensible at the level of both institutions. At the VSB-Technical University of Ostrava the dissertation would reach the highest standard. At the World Bank the contributions and monitoring tools that Tomas has developed—especially chapter 3 and 4—would be also valued and respected. On technical grounds, the thesis clearly excels. There are still occasional typos here and there that Tomas may want to pick up by rereading the thesis once again.

I have some outstanding detailed comments and questions on the individual chapters of the thesis that Tomas could respond to during his oral defense.

Chapter 2 “Assessing the External Demand of the Czech Economy: Nowcasting Foreign GDP Using Bridge Equations.” I am not satisfied with the response Tomas has provided. Perhaps I was not clear when writing:

Tomas could clarify whether the uncertainty surrounding the forecasts of monthly variables using an auxiliary model is considered when computing the overall confidence bands for the forecast of the external demand (foreign GDP growth). Furthermore, the role of time-varying (trade-based) weights on trade partners' GDP in forecasting aggregate foreign demand for an open (Czech) economy could be discussed.”

I understand that the paper does not attempt to forecast Czech GDP. However, when forecasting the GDP of the foreign trade partners, Tomas (and his co-authors) use in principle a two-equation system that bridges the monthly and quarterly frequency between growth indicators and GDP. The equation on monthly frequency (here the AR processes for Xs) could

be called "auxiliary." The estimated coefficients from that regressions are surrounded by uncertainty. My question was: How is that uncertainty accounted for when estimating or drawing inference on equation (2.1). I hope the question is clear now and Tomas can respond to it during his oral defense.

I am also not convinced by the response to my comment:

The pros and cons of evaluating forecasting performance using RMSE could be discussed. The forecasting literature uses numerous other performance criteria, and the author's choice could be better justified—see, for instance, the work of Francis Diebold.

In absence of an explicit utility function for the forecaster the discussion I suggested to include is warranted. It is independent of possible complications such as the length of forecasting horizon because the calculation of RMSE also takes stand on that. Let me give a practical example. A central banker, for instance, could value a symmetric forecast evaluation metrics because s/he targets inflation and, in theory, wants to avoid missing the target by being to high or too low. In contrast, an investor, may not care about missing the upside (that's actually a good news for him/her), s/he worries (asymmetrically) more about missing on the down side. I trust my comment is clear now and Tomas could discuss the RMSE in relation to other symmetric and asymmetric measures of forecasting performance during his oral defense.

Chapter 3 "Modeling Euro Area Bond Yields Using a Time-Varying Factor Model." Tomas is right that in absence of any theoretical framework one can always argue that some variables could be missing. But it is a strange counterargument to my comment because it reveals the need to have some basic framework in the chapter to motivate his estimations. This aside, Tomas's response to my comments regarding the important co-determinants (confounding factors) potentially omitted from the estimation raises an interesting question to debate during the defense. Namely, in a framework with multiple time-varying coefficients, is there a less risk of biased estimates when potentially important determinants are omitted? Do various time-varying loadings and intercepts in each equation really serve as robust dummy controls? Perhaps depending on the frequency of variation in the missing confounding factors. Moreover, this debate illustrates the tension between the approaches to economic analysis and forecasting. While economic analysis strives to understand all relevant drivers (not just control for them using dummy variables), forecasting is fine with dummies as long as the forecasting criterion is optimized. Tomas could reflect on this tension in his oral defense.

Overall, I assess the dissertation thesis as highly satisfactory, and recommend it for defense without substantial changes. In the presented Ph.D. thesis, Tomas has demonstrated technical excellence, research rigor, and policy relevance of his research. I wish him all the best for his ensuing career in academia or as policy analyst.

Date:	Oct
Opponent's Signature:	
Opponent's Affiliation:	D V