**Project Abstract**

Course: CIND820

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**Supervisor: Ceni Babaoglu**

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1. I am requesting to have **Ceni Babaoglu** as my supervisor
2. The themes chosen for the project fall into the following categories
   * Regression (non-textual dataset)
     + Specifically, this will be a quantile regression
   * Predictive analytics (time series)
3. Context
   * The International Monetary Fund (IMF) has developed the concept of “Growth-at-Risk” (GaR). According to the IMF, the growth-at-risk (GaR) framework links current macrofinancial conditions to the distribution of future growth. Its main strength is its ability to assess the entire distribution of future GDP growth (in contrast to point forecasts), quantify macrofinancial risks in terms of growth, and monitor the evolution of risks to economic activity over time. By using GaR analysis, policymakers can quantify the likelihood of risk scenarios, which would serve as a basis for preemptive action.
   * The seminal publication laying out the model for GaR is:
     + Tobias Adrian, “Vulnerable Growth”, Federal Reserve Bank of New York, Staff Report No. 794, September 2016, Revised November 2017
4. The problem that you are solving
   * Growth-at-risk (GaR) is a cutting-edge concept: given an economic shock, we can predict how much real GDP growth would be lost if the economy falls into the 5th quantile of the growth distribution
   * This project is an attempt to replicate the concept of GaR for the Canadian economy
   * This effort is pertinent as, to my knowledge, there is currently no publicly available application of GaR to the Canadian economy
   * As per Module 2 of CIND820, this project is an effort to replicate the existing GaR model developed by the IMF to the Canadian economy
     + Similarities to Tobias Adrian’s paper “Vulnerable Growth” are the use of a forward-looking, financial indictor variable to estimate the full conditional distribution of future real GDP growth (dependent variable)
     + Differences are: Tobias Adrian use a broad National Financial Conditions Index, computed by the Federal Reserve Bank of Chicago, as the indicator variable. Such an index is not available for Canada to my knowledge. However, any forward-looking financial indicator variable should work. I propose to use total credit to the private non-financial sector in Canada (independent variable) to estimate the full conditional growth distribution of real GDP in Canada (dependent variable)
5. The techniques and the tools that you are proposing to solve the stated problems
   * The technique used is quantile regression
     + To estimate GDP growth conditional on the flow of credit, I run a quantile regression and look at in-sample predictions. I run quantile regressions from the fifth quantile to the ninety-fifth quantile, in increments of 2.5 quantiles (for a total of 37 regression estimates per quarter). For clarity, we estimate independently 37 quantiles, covering the full conditional GDP growth distribution per quarter!
       1. We use quarterly data going back to 1963 and at least up to 2020 (or longer if data available)
       2. Because I calculate GDP at 37 quantiles per quarter over 57 years (= 228 quarters), the project makes 8,436 independent calculations (228\*37).
   * The quantile regression is implemented in R.
6. The data you are using
   * I use quarterly GDP data for Canada -- publicly available from Stats Canada at [The Daily — Gross domestic product, income and expenditure, fourth quarter 2021 (statcan.gc.ca)](https://www150.statcan.gc.ca/n1/daily-quotidien/220301/dq220301a-eng.htm)
   * I use total credit to the Canadian economy -- publicly available from the Bank for International Settlements at: [Credit to the non-financial sector (bis.org)](https://www.bis.org/statistics/totcredit.htm)

540 Words