1. What I have done so far (these modifications are introduced in the code by the comment starting with “NEW”)
   * I changed the interface so that it looks like a usual NetLogo model, i.e. I introduced *setup* and *go* commands and removed your simulation structure; further, there are now many plots, sliders and input tables
   * I removed the part of the code on the interconnectedness risk, including the evaluation of the second round effects as I believe it is not much relevant to our current objective (as we aim to calibrate the model using the Czech data and the interbank market has not been relevant here for the last couple of years)
   * I created three types of loans – housing, corporate, consumer – along with corresponding agentsets, all fall under the *loan* breed
   * GDP growth is introduced as a global variable and it is negatively linked to PD (and thus also to risk weights) in the new *main-update-globals* procedure
   * I define *new-defaulted-loans* as the volume of loans that default in each period (more on that later)
   * As one of the bank characteristics, I introduce *bank-underleveraged?* which attains the value “true” if the leverage ratio of a bank is above the Basel leverage ratio threshold (chosen manually via a slider); however, the functions on the Basel leverage ratio and its potential interaction with the capital ratio are not introduced yet
   * The *main-update-globals* procedure allows to change the values of some of the key parameters (GDP growth, CAR) while the model is running and allows to observe effects of such changes
   * I set minimum reserve requirements to 0.02 which is the value the Czech National Bank has used since 20 years ago or so
     + However, for the Czech Republic the reserve requirements are not binding at all as the reserves at the CNB are subject to the interest rate that equals CNB repo rate
     + Moreover, the Czech banking sector reports high surplus of liquidity (thus the repo operations by the CNB take form of the reverse repos)
   * I introduced a new bank-specific variable CARW (critical average risk weight); it is the ratio of leverage ratio over capital ratio and tells something about which of the regulatory requirements is binding (for more info on the CARW, my colleague has a paper on the topic: <http://journal.fsv.cuni.cz/mag/article/show/id/1388>)
     + The plan is to distinguish the traditional CAR requirement from the leverage ratio requirement by different reactions by the banks
       - While in the case of CAR requirement binding, the bank is supposed to react by selling its most risky loans (thus those with highest PD) for the leverage ratio the bank will sell its loans with lowest return
   * I introduced a command in the *go* procedure that stops the model when assets do not match liabilities by a considerable amount (it happens when you “play around” with e.g., the values of the GDP growth)
2. Where we need your guidance & help
   * Links to macro variables, monetary policy
     + As for the macro-dynamics, I think we could use some inspiration from the housing market model – I wrote you about that earlier (<http://cress.soc.surrey.ac.uk/housingmarket/ukhm.html>) or alternatively, we could apply (some of) the approach by Ms. Valderrama (from the presentation I sent you earlier). Last time, we talked about the inclusion of securities/the bond market. I would like to stress that this feature could be useful not only regarding explicit treatment of market/interest rate risk in our model but also because it would allow us to take into account the effects of monetary policy.
     + We believe that we should link the three loan categories to the evolution of real estate prices (housing loans), investment (corporate) and consumption (consumer). However, given the current structure of the ABBA, we would probably need to assume these as exogenous factors. Do you think such a link makes sense?
     + I have an idea about how to incorporate credit cycle into the model. Let’s say we have 20.000 loans in each period and this can be understood as a pool of all potential loans (something like potential output). Now we could assume that in the downturn e.g., only ½ of the loans will be approved while during the expansionary phase of the cycle, the number will grow towards 20.000. I believe we could put some constraints on the *loan-approved?* parameter.
       - Also, we could introduce the probability that a loan will participate in the loan market. This probability would measure “demand for credit” and could be later linked to the macro part of the model. Thus the pool of potential loans would be constant (“constant population” of households and firms) while some of the loans would be inactive (probability to enter loan market = 0). In booms the probability to enter the loan market would increase, in busts decrease.
   * The model
     + Please, how do you compute ROE? (Figure 6 in your IMF working paper)
     + Now, the biggest challenge ahead in my view is the calibration using the Czech data. I believe it would require dropping the *initialize-deposit-base* and *initialize-loan-book* procedures. Also the best way how to get the banking data into NetLogo is to include something like **ask bank 1 [set equity 101]** in the *setup-banks* procedure?
     + Another important thing I want to discuss with you is the way how defaulted loans are currently treated in the model which is connected to the fact that I believe that our model should contain a measure of non-performing loans (NPL). If I understand it correctly, some loans default every period but at the end of this period, they are „brought back to life“. In my view, this approach still allows you to compute the NPL ratio if you include something like **set new-defaulted-loans sum [amount] of loans-with-bank-default** in the *calculate-credit-loss-loan-book* procedure and then you simply compute the ratio of **new-defaulted-loans** and **bank-loans.** Still, I believe that my colleagues would find that imprecise (also because “good loans” – loans that do not default – of a “good bank” – a bank that stays capitalized stay in the balance sheet of this bank forever). The better option (as I am sure you know) would be to work with a stock of loans, inflows (new loans) of loans and outflows. Also, it would be nice to have that some of the defaulted loans would stay in banks’ balance sheets for some time.
3. What we are working on now
   * Thinking about which data we should collect for the calibration exercise
     + This is connected to the fact that the balance sheet is simplified in the ABBA (reserves, loans; deposits. equity) but this very simple structure would require us getting a bit imprecise during the calibration (e.g., either we would not include all asset classes – e.g. exposures to central banks/government – or we should assume that everything falls under reserves)
   * Thinking about how to incorporate the Basel leverage ratio into the model
     + A possible approach when a bank runs into trouble with the leverage ratio is that it will start to offload least profitable loans (similarly as it offloads riskiest loans in case of capitalization difficulties)
   * Better distinguishing loan categories
     + Improving modeling of risk weights
       - Different equations for different loan categories
     + To introduce that some of the loans are collateralized (housing loans)
       - Further, you can link e.g. LGD of housing loans to residential property prices
     + To introduce that loans can have different maturities
       - E.g., we can introduce a probability measure that a loan drops out in each period (i.e. gets repaid)
         * Further, this probability could be linked to some loan characteristics/macro characteristics and could also reflect the possibility of refinancing the loans (thus if the risk adjusted loan rate would be too distant from the risk free rate the probability of the loan “escaping” to the other bank would be higher)