Occasionally Binding Constraints
DIW Graduate Centre Masterclass
April 2016 – Wouter J. DenHaan

This short course focuses on solving and analyzing economic models with occasionally binding constraints. Such constraints are a common feature in many environments. A prominent example that recently has received a lot of attention is the zero lower bound on central banks' policy rates. In response to the financial crisis and the massive decline in economic activity, central banks sharply reduced interest rates to levels close to zero. Although some central banks' policy rates have now entered negative territory, there clearly are constraints that limit the values policy rates can take on. Other popular example are borrowing constraints, incentive constraints, and participation constraints. Constraints that either always or never bind are easy to deal with. By contrast, constraints that bind at times but not all the times present some difficult issues in terms of obtaining accurate model solutions. This course discusses numerical techniques that can be used to solve such models.

Part I (first day): Occasionally binding constraints in economic models. The course starts with a discussion of the use of occasionally binding constraints in economics and in particular whether this modeling device is a necessary complication and when it can be avoided by simpler alternatives.

Part II (first day): Occasionally binding constraints and projection methods. Next, a brief exposition of projection methods is given. Solving models with projection methods is somewhat more complicated than the popular perturbation (linearization) method, but has the advantage that occasionally binding constraints can be implemented in a straightforward way.

Part III (second day): Occasionally binding constraints and perturbation methods. In this part of the course, we discuss modifications of the popular perturbation methods that make it is possible to deal with occasionally binding constraints. The advantage of these approaches is that implementing them is typically simpler than projection methods. The disadvantage is that some assumptions have to be made, which may reduce the accuracy of the numerical solution.

Background reading. The course will be based on my own notes on projection methods, which can be found at http://www.wouterdenhaan.com/notes.htm. Part of the discussion of perturbation methods is based on the work of Matteo Iacoviello which can be found at https://www2.bc.edu/~iacoviel/. Lecture slides will be provided (probably a couple days before the start of the lecture).