

# **Effective Programming Practices for Economists**

## **Debugging**

### **Using the Pdb+ debugger**

Janoś Gabler and Hans-Martin von Gaudecker

# Setting a breakpoint

## Simple

```
def cobb_douglas(x1, x2, gamma1, gamma2, a):  
    import pdb; breakpoint()  
    return (a * x1**gamma1 * x2**gamma2,)
```

## Conditional

```
def cobb_douglas(x1, x2, gamma1, gamma2, a):  
    if gamma1 <= 0.5:  
        import pdb; breakpoint()  
    return (a * x1**gamma1 * x2**gamma2,)
```

- Set a breakpoint with `import pdb; breakpoint()`
- You can do that anywhere!
  - Inside function definitions
  - In loops
  - In if conditions!
- Execution will stop at the breakpoint and show you the interactive debug prompt

# Important commands

Command	Action
<code>n</code>	Execute the <b>next</b> line
<code>s</code>	Execute the next <b>step</b>
<code>c</code>	continue until the next breakpoint
<code>u</code>	Go one frame <b>up</b> (go backwards through code)
<code>d</code>	Go <b>down</b> one frame (go forward through code)
<code>exit</code>	Stop the debugging (also <code>ctrl + d</code> )

- More commands here
- Do not use any of those as variable names!

# Graphical alternatives

- VScode and other IDEs have graphical debuggers
  - Set breakpoints via clicking
  - Variable explorers
- We prefer the terminal for several reasons
  - Integrates perfectly with pytask and pytest
  - Extremely fast once you get a bit of practice
  - More robust (in our experience)